FINAL
MILITARY MUNITIONS RESPONSE PROGRAM AND INSTALLATION RESTORATION PROGRAM
REMEDIAL INVESTIGATION REPORT

FORMER CURTIS BAY ORDNANCE DEPOT
ANNE ARUNDEL COUNTY, MARYLAND

Contract No.: [redacted] **DO** [redacted]

Prepared for:

US Army Corps of Engineers®
BUILDING STRONG®

Prepared by:
EA Engineering, Science, and Technology, Inc., PBC
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Hunt Valley, Maryland 21031
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February 2021

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Prepared for:
U.S. Army Corps of Engineers
Baltimore District

Contract: [redacted] Delivery Order [redacted]

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February 5, 2021

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Senior Project Manager

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COMPLETION OF SENIOR TECHNICAL REVIEW

In compliance with EA Engineering, Science, and Technology, Inc., PBC's (EA's) Senior Technical Review Policy, I hereby certify that Michael O'Neill reviewed this deliverable as the assigned Senior Technical Reviewer for this project. I, consequently, conclude that the information presented in this report/deliverable was prepared in accordance with the approved scope of services for the project and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the contract and/or the standard of care existing at the time of the preparation. By signing below, the Project Manager attests and affirms that the Senior Technical Reviewer comments have been addressed in the final deliverable or otherwise resolved following procedures specified in Section 6 of the EA Senior Technical Review Policy.

Contract No.:	[redacted]
EA Project No.:	[redacted]
Delivery Order No.:	DO [redacted] and [redacted]
Description of Report/Deliverable:	Final RI
EA Project Manager:	[redacted] P.E., PMP, VP

[redacted]

February 5, 2021

[redacted] P.E., PMP, VP — Date
Senior Project Manager

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ACRONYMS AND ABBREVIATIONS

°F	Fahrenheit
%	Percent
%R	Percent Recovery
µg	Microgram
AF	Adherence Factor
Al	Aluminum
AOC	Area of Concern
Army	U.S. Army
As	Arsenic
AST	Aboveground Storage Tank
AT	Averaging Time
AT-C	Averaging Time - Cancer
AT-NC	Averaging Time – Noncancer
AWQC	USEPA Ambient Water Quality Criteria
bgs	Below Ground Surface
BTAG	USEPA Region III Biological Technical Assistance Group
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
BTV	Background Threshold Value
BW	Body Weight
C_{air}	Chemical Concentration in Air
Cd	Cadmium
CDC	Centers for Disease Control
CDI	Chronic Daily Intake
CEHNC	Corps of Engineers – Huntsville Center
CENAB	USACE Baltimore District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CF	Conversion Factor
CFR	Code of Federal Regulations
m^2	Square Centimeter
Co	Cobalt
COPC	Chemicals of Potential Concern
COPEC	Chemicals of Potential Ecological Concern
Cr	Chromium
Cr+6	Chromium (VI)
C_S	Chemical Concentration in Soil
C_{sed}	Chemical Concentration in Sediment
CSM	Conceptual Site Model
Cu	Copper
C_w	Chemical Concentration in Water
DA	Dermal Absorption Fraction
Daniel	Daniel Consultants, Inc.

Depot	Former Curtis Bay Ordnance Depot
DERP	Defense Environmental Restoration Program
D_{event}	Dermally Absorbed Dose per Event
DGM	Digital Geophysical Mapping
dL	Deciliter
DLA	Defense Logistics Agency
DMM	Discarded Military Munitions
DNSC	Defense National Stockpile Center
DNT	Dinitrotoluene
DO	Dissolved Oxygen
DoD	Department of Defense
DPT	Direct Push Technology
DQA	Data Quality Assessment
DQO	Data Quality Objectives
DU	Decision Unit
EA	EA Engineering, Science, and Technology, Inc., PBC
EC	Environmental Concern
ED	Exposure Duration
EE/CA	Engineering Evaluation/Cost Analysis
EF	Exposure Time
EM	Electromagnetic
EOD	Explosive Ordnance Disposal
EPC	Exposure Point Concentration
ERT	Earth Resources Technology, Inc.
ESAR	Environmental Survey and Analysis Report
ESI	Expanded Site Investigation
ESP	Explosives Site Plan
ET	Exposure Time
FA	Fraction Absorbed
FI	Fraction Ingested from Depot
FRI	Focused Remedial Investigation
FS	Feasibility Study
FSI	Focused Site Investigation
ft	Feet
FUDS	Formerly Used Defense Sites
g	Gram
GPS	Global Positioning System
GSA	General Services Administration
Hg	Mercury
HHRA	Human Health Risk Assessment
HI	Hazard Index
HpCDF	Heptachlorodibenzofuran

HQ	Hazard Quotient
hrs	Hours
HMW	High Molecular Weight
HTW	Hazardous and Toxic Waste
HxCDD	Hexachlorodibenzo-p-dioxin
HxCDF	Hexachlorodibenzofuran
IR	Ingestion Rate
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
ISM	Incremental Sampling Methodology
ISOs	Industry Standard Objects
ITRC	Interstate Technology and Regulatory Council
IUR	Inhalation Unit Risk
IVS	Instrument Verification Strip
J	Estimated value
K	Estimated value, result may be biased high
kg	Kilogram
Koc	Organic Carbon Partition Coefficient
Kp	Permeability Coefficient (for inorganics)
L	Estimated value, result may be biased low
L	Liter
LCS	Laboratory Control Sample
lbs	Pounds
LMW	Low Molecular Weight
LOAEL	Lowest Observed Adverse Effect Level
LOD	Limit of Detection
LOQ	Limit of Quantification
m	Meter
m^3	Cubic Meter
MC	Munitions Constituent
MCL	Maximum Contaminant Level
MD	Munition Debris
MDAS	Material Documented as Safe
MDE	Maryland Department of Environment
MDNR	Maryland Department of Natural Resources
MEC	Munitions and Explosives of Concern
MEC HA	MEC Hazard
mg	Milligram
MKM	MKM Engineers
mL	Milliliter
mm	Millimeter

MMRP	Military Munitions Response Program
Mn	Manganese
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS	Matrix spike
MSD	Matrix spike duplicate
msl	Mean Sea Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Not Detected
NFA	No Further Action
NG	nitroglycerin
NHANES	National Health and Nutrition Examination Survey
Ni	Nickel
NIOSH	National Institute for Occupational Safety and Health
NOAA	National Oceanic and Atmospheric Administration
NOAEL	No Observed Adverse Effect Level
NTCRA	Non-Time Critical Removal Action
OCDD	Octa-Chlorinated Dibenzo-P-Dioxin
ORNL	Oak Ridge National Laboratory
ORP	Oxidation Reduction Potential
PAH	Polynuclear Aromatic Hydrocarbon
Pb	Lead
PCB	Polychlorinated biphenyl
PCDD	Polychlorinated dibenzo-p-dioxin
PCDF	Polychlorinated dibenzofuran
PCE	Tetrachloroethene
PDT	Project Delivery Team
PeCDD	Pentachlorodibenzo-p-dioxin
PeCDF	Pentachlorodibenzofuran
PEF	Particulate Emission Factor
PETN	pentaerythritol tetranitrate
pg	Picogram
pH	Potential of Hydrogen
PMP	Project Management Professional
PPRTVs	Provisional Peer Reviewed Toxicity Values
PRG	Preliminary Remedial Goal
PSL	Project Screening Level
QAPP	Quality Assurance Project Plan
QC	Quality Control
RAGS	Risk Assessment Guidance for Superfund

RAIS	Risk Assessment Information System
RBA	Relative Bioavailability
RCRA	Resource Conservation and Recovery Act
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RDX	Cyclotrimethylenetrinitramine
RME	Reasonable Maximum Exposure
RPD	Relative Percent Difference
RSL	Regional Screening Level
RTK	Real Time Kinematic
RTS	Robotic Total Station
SA	Surface Area for Contact
Sb	Antimony
SF	Slope Factor
SI	Site Investigation
SLERA	Screening Level Ecological Risk Assessment
SQuiRT	Screening Quick Reference Tables
SSL	Soil Screening Levels
SU	Sampling Unit
SVOCs	Semi-Volatile Organic Compounds
t*	Time to Reach Steady-State
TAL	Target Analyte List
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	Tetrachlorodibenzofuran
TCE	Trichloroethene
TCLP	Total Characteristic Leaching Procedure
TEF	Toxicity Equivalence Factor
T_{event}	Lag Time per Event
Ti	Titanium
TNT	Trinitrotoluene
TRV	Toxicity Reference Value
UCL	Upper Confidence Limit
UFP	Uniform Federal Policy
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAEHA	U.S. Army Environmental Hygiene Agency
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USEPA EcoSSL	USEPA Ecological Soil Screening Level
UXO	Unexploded Ordnance
VOCs	Volatile Organic Compounds

VSP	Visual Sampling Plan
yr	Year
Zapata	Zapata, Inc.
Zn	Zinc

GLOSSARY OF TERMS

Cultural Debris – Debris found on operational ranges or munitions response sites (MRSs), that may be removed to facilitate a range clearance or munitions response, that is not related to munitions or range operations. Such debris includes, but is not limited to, rebar, household items (refrigerators, washing machines, etc.), automobile parts and automobiles that were not associated with range targets, fence posts, and fence wire. Cultural debris does not refer to items of cultural or historical significance.

Defense Site – All locations that are or were owned by, leased to, or otherwise possessed or used by the Department of Defense (DoD). The term does not include any operational range, operating storage or manufacturing facility, or facility that is used or was permitted for the treatment or disposal of military munitions.

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance (UXO), military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations (10 United States Code [U.S.C.] 2710(e)(2)).

Environmental Concern (EC) – The concept of addressing each of the areas of concern (AOCs) as ECs and dividing the ECs into categories based on their description was first introduced and defined in the *Revised Draft Environmental Survey and Analysis Report* (ESAR; EA Engineering, Science, and Technology, Inc., PBC [EA], 2011). The ECs were categorized based on their investigatory status and arbitrarily numbered to assist in identification of the AOCs at the Former Curtis Bay Depot.

Explosive Hazard – A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage) to people, property, operational capability, or the environment.

Explosive Ordnance Disposal (EOD) – The detection, identification, onsite evaluation, rendering safe, recovery, and final disposal of UXO and of other munitions that have become an imposing danger, for example, by damage or deterioration.

Explosive Ordnance Disposal (EOD) Unit – A military organization constituted by proper authority, manned with EOD personnel, outfitted with equipment required to perform EOD functions, and assigned an EOD mission.

Explosives Safety – A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions.

Fill – Soil that has been brought onsite to backfill excavated areas. Fill is non-native soil.

Material Potentially Presenting an Explosive Hazard (MPPEH) – Material potentially containing explosives or munitions (e.g., munitions containers and packaging material;

munitions debris [MD] remaining after munitions use, demilitarization, or disposal; range-related debris); or material potentially containing a high enough concentration of explosives such that the materia1 presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means (A) UXO, as defined in 10 U.S.C. 101(e)(5); (B) DMM, as defined in 10 U.S.C. 2710(e)(2); or (C) munitions constituents (MC) (e.g., trinitrotoluene [TNT], cyclotrimethylenetrinitramine [RDX]), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC) – Any materials originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710(e)(3)).

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions Response (MR) – Response actions, including investigation, removal actions, and remedial actions to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or MC, or to support a determination that no removal or remedial action is required.

Munitions Response Area (MRA) – Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. An MRA is composed of one or more MRSs.

Munitions Response Site (MRS) – A discrete location within an MRA that is known to require a munitions response.

Unexploded Ordnance (UXO) – Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause (10 U.S.C. 101(e)(5)(A) through (C)).

UXO-Qualified Personnel – Personnel who have performed successfully in military EOD positions or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

UXO Technicians – Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

EXECUTIVE SUMMARY

Introduction and Scope

Earth Resources Technology, Inc. (ERT) was originally contracted to perform a Remedial Investigation (RI)/Feasibility Study (FS) for seven Military Munitions Response Program (MMRP) sites and 15 Installation Restoration Program (IRP) sites at the Former Curtis Bay Ordnance Depot (hereinafter referred to as the "Depot") in Anne Arundel County, Maryland. Services included an Engineering Evaluation/Cost Analysis (EE/CA) for one of the MMRP sites (EC-25: Dump/Powder Burning Tower [Building 1052]/Powder Burning Plant), which was finalized in March 2016.

This RI report was previously prepared by ERT and submitted to the Maryland Department of the Environment (MDE) for regulatory concurrence in October 2016 (referred to herein as the "ERT RI/FS," as warranted). The regulatory comments from MDE were dated 29 June 2017. EA Engineering, Science, and Technology, Inc., PBC (EA) was subsequently awarded the present task order, U.S. Army Corps of Engineers (USACE) Contract [redacted] Delivery Order [redacted] to finalize the RI and conduct the FS. In accordance with the Performance Work Statement, EA was tasked with revising the ERT 2016 document to address the June 2017 regulatory comments. As such, the work conducted by EA in accordance with the Performance Work Statement was not intended to duplicate, review for accuracy, or otherwise alter effort already completed by ERT other than elements related to achieving regulatory concurrence.

As part of the EA work described above, uncertainties were identified with regard to the Screening Level Ecological Risk Assessment (SLERA) that necessitated the collection of incremental sampling methodology (ISM) sediment samples in 2019 from EC-21, the Unnamed Tributary, and EC-58B. Additionally, an incremental background sediment sample was required and was collected. EA was awarded a task order, USACE Contract [redacted] Delivery Order [redacted] to address the uncertainties. The Revised Draft Final RI report was submitted to the MDE in October 2019. Comments were received from the MDE on 23 December 2019 and 23 January 2020. Discussions were held in the Spring of 2020 between MDE and USACE/DLA to reach resolution for the comments. Revision of the SLERA and HHRAs was required to address the comments, and the revisions are addressed herein. Additionally, ERT conducted a site-wide arsenic and manganese RI investigation (ERT 2020), the results of which are incorporated into this report.

Figures and data presentations in the appendices and throughout the document, which were not altered as a result of work performed by EA, have ERT logos and formats retained. Figures that were revised by EA include the EA logo.

Each area investigated as part of this RI is identified as an environmental concern (EC). The concept of addressing each of the areas of concern (AOCs) as ECs and dividing the ECs into categories based on their description was first introduced and defined in the Revised Draft Environmental Survey and Analysis Report (ESAR; EA 2011). The seven MMRP ECs and 15 IRP ECs are identified below. It should be noted that 2 of the original 7 MMRP ECs were divided into different areas: As discussed in the approved Final Work Plan (ERT 2013), EC-57

became EC-57B, EC-57C, and EC-57D, while EC-58 became EC-58B and EC-58C. Additionally, during the EA Habitat Assessment, EC-16 was split into EC-16A, EC-16B, EC-16C, and EC-16D.

A summary of the areas investigated are as follows:

IRP ECs:

- EC-3: PE Paint Storage
- EC-16 (EC-16A, EC-16B, EC-16C, EC-16D): Transformers
- EC-27: Building 831 – Oil House Utility Area
- EC-28: Building 825 – Post Engineer Shop
- EC-29: Building 822 – E.E. Machine Shop
- EC-30: Building 821 – Locomotive House
- EC-31: Building S833 – Post Engineer Storage
- EC-32: Building S832 – P.E. Lumber Storage
- EC-33: Building 835 – BTG. Div. on Lumber Storage Shed
- EC-34: Building 1025 – Boiler House – Warehouse Area
- EC-35: Building1026 – Oil House – Warehouse Area
- EC-36: Building 515 – Incinerator Plant
- EC-39: AOC-5 – Medical Supplies Burial Area
- EC-50: Building 724-G – Tire Retreading Shop
- EC-53: Leach Fields/Septic Tanks

MMRP ECs:

- EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)
- EC-22: Barricade 646-XK/Former Explosive Open Burning Area
- EC-25: Dump/Powder Burning Tower (Building 1052)/Powder Burning Plant
- EC-49: Northern Bank of Furnace Creek
- EC-52: Disturbed areas at the end of G-line Road noted on aerial photographs
- EC-57 (EC-57B, EC-57C, EC-57D): Pre-1955 Ordnance and Shell Refurbishing
- EC-58 (EC-58B, EC-58-C): Explosive Open Burning/Wire Cage

Due to the EE/CA for EC-25 having been included in ERT's contract and the inclusion of EC-49 in a non-time critical removal action (NTCRA), RIs for these two ECs were excluded from this RI and will be conducted in the future under separate contract. The IRP Shop Area consists of several ECs that are located in close proximity. Site-wide groundwater and the Unnamed Tributary (that discharges to Back Creek) were also investigated.

The Depot consists of an approximate 435-acre portion of the former U.S. Army Ordnance Depot. Construction of the former U.S. Army Ordnance Depot began in 1918; the Depot was fully operational by 1920. Its mission began as a receipt and storage facility for domestic and overseas munitions and supplies. Over time, the mission evolved and expanded to include activities such as maintenance and demilitarization of ordnance, and storage activities for bulk

ores, minerals, and metals. The name of the former U.S. Army Ordnance Depot changed through time to the Curtis Bay Ordnance Depot.

The overall purpose of the RI is to determine whether the MMRP and IRP ECs warrant further response actions pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the MMRP or IRP processes. The objectives of the RI are to:

- Determine the nature and extent of potential munitions constituents (MC) contamination or munitions and explosives of concern (MEC) hazards at the MMRP ECs, as applicable;
- Determine the nature and extent of potential hazardous and toxic waste (HTW) contamination at the IRP ECs;
- Determine the potential risks posed to human health and the environment from MC or HTW contamination; and
- Collect or develop additional data for an FS, as appropriate, to determine remediation alternatives for mitigation, including no further action (NFA).

As agreed upon by the ERT RI/FS Project Delivery Team (PDT), ERT conducted initial discrete sampling at the MMRP and IRP ECs where a release had not been previously documented, to determine presence or absence of contamination, termed "SI-level sampling" or "SI-level discrete sampling" for ECs that also had 2019 incremental sampling. RI-level discrete sampling was conducted at ECs that had a previously documented release. The MMRP ECs were investigated for both MEC hazards and MC contamination, while the IRP ECs were investigated only for HTW contamination.

Upon review of the data collected during the initial field activities in 2013, releases were determined to have occurred at 8 ECs including: EC-16 (specifically EC-16B), EC-29, EC-32, EC-36, EC-57B, EC-57C, EC-57D, and EC-58B. A release was defined in the ERT Work Plan (ERT 2013) as a parameter that was greater than the project screening level (PSL). The PSLs were the higher of the background or industrial soil regional screening level. For groundwater, the PSLs were based on the background value and the maximum contaminant level (MCL). ERT developed a Work Plan Addendum (ERT, 2015) that provided details on the additional sampling needed for the ECs with a release and additional sampling required to determine nature and extent at one of the initial RI-level ECs (EC-21). These field activities were conducted in Fall 2015.

Following a review of the data, additional sampling was conducted in Winter 2016 by ERT at EC-32, EC-36, EC-57B, and EC-57D to fully delineate the extent of potential contamination.

EA developed a Work Plan Addendum (EA 2019) that provided details on the additional incremental sampling at the ECs with existing uncertainties with regard to sediment (EC-21, EC-58B and the Unnamed Tributary). During development of the EA Work Plan Addendum, MDE requested that surface soil samples also be collected in EC-21, which was included in the 2019 EA Work Plan Addendum. Soil and sediment samples collected by EA in 2019 utilized

ISM. Incremental soil sample concentrations were compared to U.S. Environmental Protection Agency (USEPA) industrial soil regional screening levels and incremental sediment sample concentrations were compared to USEPA Biological Technical Assistance Group (BTAG) values and USEPA ecological sediment screening levels.

Property Description

The Depot is located at 710 East Ordnance Road, Baltimore, in Anne Arundel County, Maryland, approximately one mile southeast of Baltimore City (Figure 1). The Depot is bordered to the north by the Baltimore Beltway (Interstate 695) and East Ordnance Road, to the south by Furnace Creek, to the east by Curtis Creek and Stahl Point Road, and to the west by Back Creek (Figure 2).

Historical Information

The original U.S. Army Depot was built in 1918 on 789 acres of farmland and became fully operational in 1920. Following several land transfers to Anne Arundel County and the Maryland Department of Transportation, the remaining 435 acres was transferred to the General Services Administration (GSA) as excess property in the late 1950s.

The former U.S. Army Ordnance Depot's mission, from approximately the 1920s through the 1950s, included receipt, storage, maintenance, and demilitarization of ammunition of domestic and overseas supplies. In 1952, GSA delegated a new strategic and critical materials stockpile program to its own newly established Emergency Procurement Service. A portion of the Depot was set aside for the storage of strategic and critical materials by the Emergency Procurement Service. In 1992, the Defense Logistics Agency (DLA) established the Defense National Stockpile Center (DNSC) to manage the stockpile program after DLA was assigned responsibility over the program in 1992. The DNSC no longer conducts operations at the Depot; all stockpiles have been removed from the Depot. The Department of Defense (DoD) assigned the responsibilities for environmental investigations and possible remedial actions to the DLA, who acts as executor for the GSA for the Depot RI activities.

Based on findings from historical research and previous investigations of the Depot, MEC may be present within EC-49, EC-21, EC-25, and/or EC-52. The presence of MEC may pose an imminent and substantial endangerment to the personnel at the Depot and to the environment.

Additionally, the potential for known and unknown MC and HTW contamination exists within each of the investigated ECs.

Investigation Activities

An RI was conducted at IRP ECs and MMRP ECs at the Depot to determine 1) if there had been a release [Site Investigation (SI) level sampling], and 2) if a release had occurred, to determine the nature and extent of that release and if there were any human health or environmental risks (RI-level sampling). A release was defined as any results that were greater than the PSLs, which were the higher of the background or industrial soil regional screening level. For groundwater, the PSLs were based on the background values and the MCLs.

Additionally, for the MMRP ECs, digital geophysical mapping (DGM) and intrusive investigations, when warranted, were conducted to determine if there was a MEC hazard at any of these ECs. As no MEC was found during the investigations, MEC Hazard Assessments were not done. The Munitions Response Site Prioritization Protocols were completed for the MMRP ECs, with the exception of EC-25 and EC-49, where an NTCRA was performed and the RI will be completed under a separate contract.

A total of 583 discrete primary surface and subsurface soil, 26 groundwater, 4 sediment and 6 surface water samples were collected during the ERT RI investigation. An additional 183 quality control (QC) samples were collected, for a total of 826 samples collected. A summary of each EC is provided below. Note that arsenic and manganese exceeded the PSL in numerous locations around the Depot and was investigated by ERT under a separate contract (ERT 2020). Therefore, ECs with an arsenic exceedance were not evaluated in the human health risk assessments (HHRAs) in this RI, with the exception of EC-32 soil. However, this report incorporates the conclusions of the ERT 2020 evaluation with respect to arsenic (and manganese) throughout.

Twenty incremental samples, inclusive of QC samples, were collected by EA in April 2019 at EC-21 (8 surface soil and 3 sediment[1]); EC-58B (3 sediment); and the Unnamed Tributary (3 sediment). A background incremental sediment sample (3 sediment samples) was collected from the stream channel of a separate Back Creek tributary along the southwestern site boundary. Because discrete sample results and incremental sample results cannot be combined in the same HHRA or SLERA, EA performed an HHRA and SLERA using incremental sample data and the relevant updated procedures are described in the Work Plan Addendum (EA 2019).

A 2020 site-wide RI was conducted by ERT under separate contract to address identified arsenic and manganese concentrations. ERT conducted incremental sampling and completed a SLERA and HHRA for three DUs encompassing the Curtis Bay Depot (with the exception of EC-25 and EC-49) (ERT 2020). DU 1 consisted of all areas except DU 2 and DU 3. DU 2 consisted of the IRP Shop ECs (EC-28, EC-31, EC-32, and EC-33 are within this footprint). DU 3 addressed concerns at EC-57D. Based on the results of the ERT HHRA, there are no unacceptable risks due to arsenic; and potential unacceptable risks were identified for site workers in DU 3 due to manganese concentrations in surface and subsurface soil combined (ERT 2020). Based on the results of the site-wide SLERA, significant ecological impacts due to arsenic in soils are unlikely, and potentially significant ecological impacts exist at DU 3 (EC-57D) due to the presence of manganese.

EC-3: PE Paint Storage

EC-3 was historically used for paint storage; the building is no longer standing, but the concrete foundation is in place. SI-level sampling was conducted for select metals and paint related

1 Incremental surface soil samples at EC-21 were collected as a primary, duplicate, and triplicate at one of the six sampling units (SUs) of this decision unit (DU) (SU3). Other DUs for incremental sediment samples had one primary, duplicate, and triplicate sample.

solvents[2] in surface and subsurface soil as well as groundwater. All results were less than the PSLs. Therefore, a release has not occurred. The SLERA found no potential unacceptable ecological risk. EC-3 is recommended for NFA.

EC-16: Transformers
There are four separate transformer locations within the Depot (EC-16A, EC-16B, EC-16C, and EC-16D). Available information indicates that former polychlorinated biphenyl (PCB) containing transformers were replaced with non-PCB transformers between 1986 and 1989 (Daniel Consultants, Inc. [Daniel], 1992; EA 2011). SI-level sampling was conducted at each of the four EC-16 locations for PCBs for surface soil only. PCBs were not detected at concentrations greater than the PSLs in three of the four locations. Aroclor 1260 was detected at concentrations slightly greater than the PSL in two samples at the transformer location in the IRP Shop Area (EC-16B).

Additional RI-level sampling for Aroclor 1260 was conducted in both the surface and subsurface soil; none of these additional samples exceeded the PSLs. An HHRA and SLERA were conducted for the EC-16B transformer location. The HHRA and the SLERA found no unacceptable human health and ecological risk. Therefore, all locations of EC-16 are recommended for NFA.

EC-27: Building 831 – Oil House Utility Area
EC-27 is located in the northeastern portion of the Depot and is associated with historical Building 831, referred to as "Diesel Oil Pump House" in some documents. The building no longer exists, but the concrete foundation is still in place. SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, naphthalene, and solvents. All results were less than the PSLs; therefore, a release has not occurred at this EC. The SLERA found no potential unacceptable ecological risk. EC-27 is recommended for NFA.

EC-28: Building 825 – Post Engineer Shops
EC-28 is located in the northeastern portion of the Depot and is associated with Building 825, also referred to as the Carpenter Shop. The building is still standing and was mainly used as a woodworking shop for maintenance and minor construction operations conducted at the Depot, as well as for paint and solvent storage. SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, paint related solvents, pentachlorophenol, naphthalene, and PCBs. No analytes were detected at concentrations greater than the PSLs in surface and subsurface soil, with the exception of arsenic. Results (other than arsenic) were less than the groundwater PSLs; therefore, a release has not occurred at this EC. Arsenic was evaluated in a site-wide investigation as part of DU-2 the IRP Shop Area (ERT 2020). The HHRA determined no potential carcinogenic risks or noncancer hazards greater than acceptable levels for both the site worker and construction worker exposure to arsenic in soil at DU-2. Based upon the site-wide investigation, NFA is recommended at EC-28 with regard to human health.

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2 Per the 2013 ERT Work Plan and 2015 ERT Work Plan Addendum, *paint related solvents* refer to: acetone; benzene, toluene, ethylbenzene, and xylenes (BTEX); carbon tetrachloride; methanol; methylene chloride; methyl ethyl ketone; and ethyl alcohol.

The SLERA found potential unacceptable ecological risks due to arsenic and lead for at least one ecological receptor. Arsenic was evaluated by ERT in the site-wide investigation, and the SLERA found that ecological impacts were not likely due to arsenic in DU 2 associated with the IRP Shop that includes EC-28 (ERT 2020). Further action for soil is recommended to protect ecological receptors due to lead at EC-28; this will be evaluated in the FS.

EC-29: Building 822 – E.E. Machine Shop
EC-29 is located in the northeastern portion of the Depot and consists of Building 822. Building 822 still stands and was historically used for miscellaneous small-scale metal cleaning and degreasing operations involving solvents (U.S. Army Environmental Hygiene agency [USAEHA], 1989). SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, solvents[3], naphthalene, PCBs, and herbicides. All results, with the exception of PCB (Aroclor 1260), were less than the PSLs.

Additional RI-level sampling was conducted for Aroclor 1260 by ERT; none of the additional samples exceeded the PSL. An HHRA and SLERA were conducted for this EC. The HHRA found no unacceptable human health risk. Although there is potential for localized ecological risks due to cadmium, chromium, lead, and Aroclor 1260 concentrations at one sample location (EC-29-4-SO-0.5), the SLERA found no potential unacceptable ecological risks to site-wide populations based on the weight-of-evidence approach. Therefore, EC-29 is recommended for NFA.

EC-30: Building 821 – Locomotive House
EC-30 is located in the northeastern corner of the Depot and is associated with Building 821. Building 821 is still standing and was historically used as a roundhouse to service boxcars. SI-level sampling was conducted on surface and subsurface soil and groundwater for lead, naphthalene, and solvents. All results were less than the PSLs; therefore, a release has not occurred at this EC. Although there is potential for localized ecological risks due to lead in the soil at one sample location (EC-30-4-SO-0.5), the SLERA found no potential unacceptable ecological risk to site-wide populations based on the weight-of-evidence approach. EC-30 is recommended for NFA.

EC-31: Building S833 – Post Engineer Storage
EC-31 is located in the northeastern portion of the Depot, associated with Building S833; however, the structure is no longer standing and there is no remnant concrete foundation. The assumed historical use of this building is that this area provided storage for materials in support of activities performed at Building 825 – Post Engineer Shop. SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, paint related solvents, pentachlorophenol, naphthalene, and PCBs. No analytes were greater than the PSLs in surface and subsurface soil, with the exception of arsenic. Results (other than arsenic) were less than the groundwater PSLs; therefore, a release has not occurred at this EC.

3 Per the 2013 ERT Work Plan, *solvents* refer to: acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, tetrachloroethene (PCE), and trichloroethene (TCE).

Arsenic was evaluated in the site-wide investigation as part of DU 2 (ERT 2020) because it was not believed to be associated with the activities conducted at this EC. The HHRA determined no potential carcinogenic risks or noncancer hazards greater than acceptable levels for both the site worker and construction worker exposure to arsenic in soil at DU 2. The SLERA found no potential unacceptable ecological risk. EC-31 is recommended for NFA.

EC-32: Building S832 – P.E. Lumber Storage

EC-32 is located in the northeastern portion of the Depot and is associated with Building S832. The structure is no longer standing and was assumed to have been used for the storage of treated lumber. SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, polycyclic aromatic hydrocarbons (PAHs), and pentachlorophenol. Results were less than the PSLs for surface and subsurface soil and groundwater for the metals and pentachlorophenol, with the exception of arsenic and chromium in surface and subsurface soil.

Reported results for four PAH compounds were greater than the PSLs and indicated a release had occurred. RI-level sampling was conducted in the surface and subsurface soil for arsenic and the four PAHs that had concentrations greater than the PSLs. Based on the HHRA and the MDE acceptable level of $1x10^{-5}$, there is potential unacceptable incremental cancer risk for exposure to PAHs in surface soil for the site worker at EC-32. Therefore, there are also potential concerns for trespasser exposure to surface soil at EC-32. In addition, the construction worker had noncancer hazards greater than the acceptable level of 1 for exposure to surface soil/subsurface soil combined; the primary contributor to the unacceptable hazards to the construction worker was due to benzo(a)pyrene. The HHRA determined acceptable non-cancer hazards for the site worker at EC-32. Arsenic was evaluated in the site-wide investigation as part of DU-2 (ERT 2020). The HHRA determined no potential carcinogenic risks or noncancer hazards greater than acceptable levels for both the site worker and construction worker exposure to arsenic in soil at DU-2. Based on these HHRA results, further action for PAHs in soil is required to protect human health at EC-32; this will be evaluated in the FS.

Although there is potential for localized ecological risks due to high molecular weight (HMW) PAHs in the soil at one sample location (EC-32-06-SO-0.5), the SLERA found no potential unacceptable ecological risk to site-wide populations based on the weight-of-evidence approach.

EC-33: Building 835 – BTG. Div. on Lumber Storage Shed

EC-33 is located in the northeastern portion of the Depot and is associated with Building 835. The structure is no longer standing, but the foundation remains (EA 2011). SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, PAHs, and pentachlorophenol. No concentrations of analytes were greater than the PSLs in surface and subsurface soil, with the exception of arsenic. Arsenic required additional investigation in the site-wide investigation because it is not believed to be associated with the activities conducted at this EC. Results (other than arsenic) were less than the groundwater PSLs; therefore, a release has not occurred at this EC. Arsenic was evaluated in a site-wide investigation as part of DU-2 (ERT 2020). The HHRA determined no potential carcinogenic risks or noncancer hazards greater than acceptable levels for both the site worker and construction worker exposure to arsenic in soil at DU-2. The SLERA found no potential unacceptable ecological risk. EC-33 is recommended for NFA.

EC-34: Building 1025 – Boiler House – Warehouse Area
EC-34 is located in the southeastern corner of the Depot, adjacent to Building 1022 (EC-57B). The concrete foundation is still present, and the building is presumed to have housed the material and equipment (boilers) used to heat Building 1022. SI-level sampling was conducted on surface and subsurface soil and groundwater for benzene, toluene, ethylbenzene, and xylene (BTEX), and naphthalene. No analytes had concentrations greater than the PSLs in the surface and subsurface soil or groundwater; therefore, a release has not occurred at this EC. The SLERA found no potential unacceptable ecological risk. EC-34 is recommended for NFA.

EC-35: Building 1025 – Oil House – Warehouse Area
EC-35 is located in the southeastern corner for the Depot, adjacent to Building 1021. The concrete foundation is still present. Based on the building title and the proximity to Building 1021, Building 1026 is presumed to have housed the material and equipment used to heat Building 1021. SI-level sampling was conducted on surface and subsurface soil and groundwater for BTEX and naphthalene. No concentrations of analytes were greater than the PSLs in the surface and subsurface soil or groundwater; therefore, a release has not occurred at this EC. The SLERA found no potential unacceptable ecological risk. EC-35 is recommended for NFA.

EC-36: Building 515 – Incinerator Plant
Building 515 is located in the northern portion of the Depot. The structure is made of brick and concrete, is partially collapsed, and contains a brick-lined oven (EA 2011). While there is no written information on the historical operations conducted at the incinerator, this is a small building that appears to have been used for incineration of general trash. SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals, dioxins/furans, and PAHs. Results were less than the PSLs for surface soil for all metals, except lead, and PAHs. The SI-level sampling results were less than the PSLs in the subsurface soil and groundwater for all analytes.

Four dioxin/furan compounds were reported at concentrations greater than the PSLs in four of seven surface soil samples. Lead was reported at a concentration greater than the PSL in one surface soil sample. These results indicated a release to surface soil has occurred from the activities associated with the incineration of general trash and possibly disposal of the ashes around the incinerator.

RI-level sampling was conducted in the surface and subsurface soil for the dioxins/furans and lead, and a risk assessment was completed for this EC. The HHRA determined no unacceptable incremental cancer risk greater than the MDE acceptable level ($1x10^{-5}$), and current site workers or future construction workers would not have non-cancer hazards greater than acceptable levels at EC-36. As a result, there are no potential concerns for trespasser exposure to EC-36. The average concentration of lead in both surface soil and surface soil/subsurface soil combined was less than the MDE soil screening criteria for commercial and industrial land use. EC-36 is recommended for NFA with regard to human health.

The SLERA found potential unacceptable ecological risks from lead. It is noted that while cadmium may pose risks at one sample location (EC-36-5-SO-0.5), the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk. Further action for soil is recommended to protect ecological receptors at EC-36 due to lead; this will be evaluated in the FS.

EC–39: AOC–5 – Medical Supplies Burial Area
EC-39 is located in the southwestern portion of the Depot and consists of a historical disposal area. A medical disposal area was reportedly located approximately 100 yards from the south end of G-Line Road; three exploratory trenches were dug at the end of G-Line Road in response to this anecdotal evidence (Parsons, 2003). Based on the contents of the burial area and the soil and groundwater sampling associated with the investigation, Parsons determined that no further investigations were warranted at the Medical Supplies Burial Area (Parsons 2006; EA 2011). Based on the multiple previous investigations performed within the Medical Supplies Burial Area and that no harmful materials were discovered, ERT recommended NFA for EC-39; this was approved by the PDT.

EC-50: Building 724-G – Tire Retreading Shop
EC-50 is located in the center of the Depot and is associated with Building 724-G, which is still present but partially collapsed. No specific information is documented on the history of EC-50; however, based on site conditions, activities that likely occurred within this shop not only included retreading and patching tires, but may have also included grinding tires. SI-level sampling was conducted on surface and subsurface soil and groundwater for solvents, naphthalene, PCBs, and PAHs. No analytes had concentrations greater than the PSLs in the surface and subsurface soil or groundwater; therefore, a release has not occurred at this EC. The SLERA found no potential unacceptable ecological risk. EC-50 is recommended for NFA.

EC–53: Leach Fields/Septic Tanks
EC-53 refers to two leach fields and six septic tanks. One leach field is located in the northern portion of the Depot and is currently receiving waste from the administrative offices located in Building 305, which is associated with the active U.S. Army Reserve property (USAEHA, 1992). The second leach field is associated with Building 821, located in the northeastern portion of the Depot and part of the active U.S. Army Reserve property, and is no longer in use.

During a program review of the Depot's water pollution program, USAEHA determined that the wastewater at the Depot flows by gravity lines to septic tanks and associated leach fields; no industrial wastewater discharges were noted at the Depot (EA 2011). ERT recommended NFA for the two EC-53 locations as there are no harmful materials associated with the leach fields and septic tanks; the PDT agreed with this recommendation.

EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)
EC-21 is located on the western portion of the Depot, on the north side of Back Creek Road, and consists of a historical landfill/open dump and Barricade 645 shell burning pit where controlled dumping and burning activities reportedly occurred. EC-21 also contains a visible propellant grain dumping area on the ground surface in the southern portion of the EC. An RI-level investigation was conducted at this site for MEC and MC. DGM was conducted with the EM61-

MK2A (see Section 3.3.2); based on the results of the DGM, three trenches were intrusively investigated. Munitions debris (MD) was found in one of the trenches and 166 CS grenade bodies and nine 37-38-millimeter (mm) CS/CN riot control projectiles were found on the surface of EC-21. No MEC was found at EC-21.

Surface and subsurface discrete soil and groundwater samples were collected and analyzed for select metals[4], PCBs, PAHs, dioxins/furans, and explosives. Surface and subsurface samples were collected from the propellant grain area for explosives analysis. No results were greater than the PSLs for the propellant grain area. Some metals (manganese, antimony, lead), dioxins/furans, PAHs and 2,4-dinitrotoluene (DNT) were greater than the PSLs in the surface soil for some samples; only the benzo(a)pyrene concentration was greater than the PSL for subsurface soil in the remaining area. All groundwater sample concentrations were less than the PSLs.

Incremental surface soil and sediment samples were collected within EC-21 in April 2019. Surface soil was collected from one Decision Unit (DU) with six Sampling Units (SUs), and sediment was collected from one DU where standing water was observed within the EC-21 barricade. The eight incremental soil samples (six SUs, one with a duplicate and triplicate) were analyzed for lead and PAHs. The three incremental sediment samples (one DU with a duplicate and triplicate) were analyzed for Target Analyte List (TAL) metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc), and PAHs.

The HHRA determined potential unacceptable incremental cancer risk as specified by MDE ($1x10^{-5}$) for the site worker from PAHs in surface soil based upon the incremental sample results: therefore, a trespasser may also face potential unacceptable risk. For discrete soil samples, the HHRA did not determine any unacceptable incremental cancer risk for either the site worker or construction worker. Non-cancer hazards were below the acceptable level for both the site worker and construction worker from both discrete samples and incremental sample results. The average concentration of lead within the discrete surface soil samples, combined discrete surface soil/subsurface soil samples, and the 2019 incremental soil sample results did not exceed the MDE soil screening criteria for both commercial land use and industrial land use. Based on these HHRA results, further action for PAHs in soil is required to protect human health at EC-21; this will be evaluated in the FS.

The average concentration of lead in surface soil and surface soil/subsurface soil combined for both discrete and ISM samples are less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use. However, the two highest detected concentrations of lead in discrete samples are significantly higher than both the commercial and industrial land use soil screening criteria. Sample locations EC-21-A (3,230 mg/kg) and EC-21-B (3,220 mg/kg) had lead detections greater than 3 times the MDE soil screening criteria. Other EC-21 discrete sample results and ISM samples did not indicate widespread lead concentrations

4 Per the 2013 ERT Work Plan, select metals at this EC refers to: aluminum, copper, manganese, lead, antimony, zinc; no metals were sampled for in the EC-21 propellant grain dump area, only the remaining areas of EC-21.

at these significant levels. Therefore, these locations are considered "hot spots", which may present a potential concern for human health to site workers, construction workers and trespassers. EC-21 will be further evaluated in the FS.

The SLERA found no potential unacceptable ecological risks. It is noted that localized elevated results were observed for antimony, copper, lead, manganese, and 2,4-dinitrotoluene, but the conclusion of the weight-of-evidence approach found these results are not anticipated to pose unacceptable ecological risk to site-wide populations.

In a memorandum dated 20 May 2020 (Appendix M) it was noted that USACE collected 4 samples to address remaining propellant grains on the ground surface: 2 from EC-21 and 2 from EC-52. From each EC, one soil and one propellant grain sample was collected and submitted for toxicity characteristic leaching procedure (TCLP) analysis, including volatile organic compounds, pesticides, metals, herbicides, base neutral/acid extractable semi-volatile organic compounds, reactive sulfide, reactive cyanide, corrosivity, and ignitability. Analysis indicated that neither the soil nor propellant grains were ignitable, nor were they considered hazardous waste, as the concentrations of analytes were less than applicable TCLP regulatory standards (USACE 2020).

Residual propellant grains were identified in the top 3 inches of soil within a portion of EC-21 (USACE 2020). As noted, soil sampling indicated that this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant have impacted soils through elevated nitrogen, thereby inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events, and largely clay remains in this area. The lack of vegetation will continue to allow accelerated erosion of soil into the Unnamed Tributary (USACE 2020). Therefore, the propellant grain area of EC-21 is recommended for further evaluation in the FS.

EC-22: Barricade 646-XK/Former Explosive Open Burning Area

EC-22 is located on the western portion of the Depot, on the north side of Back Creek Road, northwest of EC-21. This EC consists of Barricade 646-XK, a former explosives open burning area where controlled burning occurred, as well as alleged dumping activities. No known release is associated with EC-22. DGM was conducted with the EM61-MK2A; there were no anomaly clusters or large, broad anomalies indicative of possible burial pits. Therefore, no trenches were excavated within EC-22. No MEC or MD was found at this EC.

Surface and subsurface soil and groundwater samples were collected and analyzed for select metals, PCBs, PAHs, dioxins/furans, and explosives. All reported results were less than the PSLs; therefore, an MC release has not occurred at this EC. The SLERA found no potential unacceptable ecological risk. Due to this and the absence of MEC, EC-22 is recommended for NFA for both MEC and MC.

EC-25: Dump/Powder Burning Tower (Building 1025)/Powder Burning Plant

EC-25 is located on the southeastern portion of the Depot along the banks of Furnace Creek and was reportedly used for burial activities. EC-25 also consists of a Powder Burning Tower used for controlled burning operations. EC-25 was investigated for the EE/CA, which was finalized

in March 2016. Based on this Final EE/CA, releases of material potentially presenting an explosive hazard (MPPEH)/MEC and MC were considered to have occurred within this EC. Due to the potential existence of MPPEH/MEC, an NTCRA was conducted for EC-25 and an RI will be conducted under a separate contract.

EC-49: Northern Bank of Furnace Creek

EC-49 is located in the southern portion of the Depot, along the banks of Furnace Creek where potential burial/burning activities occurred. There is no specific detailed background information about the activities that may have occurred within EC-49; however, based on findings from previous geophysical and trenching investigations, burning/burial activities are presumed to have occurred. EC-49 is adjacent to EC-25 and it was suspected that at least the eastern part of EC-49 was used for disposal in the same manner as EC-25 as similar material was located in the area between EC-25 and EC-49 during the EE/CA field investigation in 2013. Based on the March 2016 Final EE/CA, MPPEH/MEC and MC releases were considered to have occurred within this EC. Due to the potential existence of MPPEH/MEC, an NTCRA was conducted at EC-49 in conjunction with the EC-25 NTCRA, and an RI will be conducted under a separate contract.

EC-52: Disturbed Areas at the End of G-Line Road

EC-52 is located in the southwestern portion of the Depot. Background information for EC-52 is based on anecdotal reports provided by two former employees of the Depot who described grenade and munitions burial activities at the Depot (USACE St. Louis 1993). A propellant grain dump is located in the western portion of the EC. EC-52 was split into two areas for this investigation. All of EC-52 was determined to be an SI-level investigation to determine if there was a release of MEC. SI-level sampling was conducted on the portion of EC-52 that does not contain the propellant grain field; surface and subsurface soil and groundwater samples were analyzed for select metals and explosives. RI-level sampling was conducted on the propellant grain area; samples were analyzed for explosives. Both the SI and RI-level results were less than the PSLs. The SLERA found no potential unacceptable ecological risk.

DGM was collected using the EM61-MK2A and one trench was intrusively investigated in EC-52; other anomalies within EC-52 had previously been intrusively investigated. No MEC or MD was found at EC-52.

Based on the investigation results, there has been no release of MEC and there are no MC concentrations greater than the PSLs. Residual propellant grains remain in the top 3 inches of soil within a portion of EC-52. Soil sampling indicated that this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant has impacted soils through elevated nitrogen, thereby inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events, and largely clay remains in this area. The lack of vegetation will continue to allow accelerated erosion of soil (USACE 2020). Therefore, the propellant grain area of EC-52 is recommended for further evaluation in the FS.

EC-57B: Building 1022 – Brass and Steel Area

EC-57B is located in the southeastern corner of the Depot, along the banks of Furnace Creek, and refers to a warehouse (Building 1022). Building 1022 served various functions throughout the Depot's operational history, including renovation of munitions, a bag loading plant, a small arms packing plant, and for popping furnace operations. SI-level sampling for MC was conducted on surface and subsurface soil and groundwater; samples were analyzed for select metals, explosives, dioxins/furans, PCBs, and PAHs. Reported results for all metals except manganese, explosives, and PCBs in surface and subsurface soil samples were less than PSLs. As a result, it was determined that a release of these constituents has not occurred. All reported results were less than the PSLs for the groundwater sample, which was a combined EC-34 and EC-57B groundwater sample due to proximity of the ECs.

Manganese, five PAHs, and dioxin/furan compounds were greater than the PSLs at some of the surface and subsurface soil sampling locations; therefore, RI-level sampling was conducted for these analytes and a risk assessment was completed for EC-57B. The HHRA determined no unacceptable incremental cancer risk, as specified by MDE ($1x10^{-5}$) for both the site worker and construction worker. Non-cancer hazards for the construction worker were above the acceptable level of 1 due to manganese at EC-57B. However, site-wide manganese was evaluated by ERT as part of DU 1 and no unacceptable manganese risk was identified (ERT 2020). Therefore, NFA is recommended at EC-57B with regard to human health.

The SLERA found potential unacceptable ecological risks due to manganese and zinc. Manganese was evaluated by ERT (2020) in a site-wide investigation and the SLERA found that ecological impacts were not likely due to manganese. It is noted that while antimony may pose risks at one sample location (EC-57B-1-SO-0.5), the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk. However, further action for soil is required to protect ecological receptors at EC-57B due to zinc; this will be evaluated in the FS.

EC-57C: Building J-408

As discussed in the 2015 Work Plan Addendum, ERT established the location for EC-57C based on a row of buildings consecutively labeled J-404 to J-407 on a 1941 map. Additionally, the ERT 2015 Work Plan Addendum referenced a second map in the Environmental Program Review (USAEHA, 1992) that shows a spur of railroad tracks extending beyond building J-407, presumably to the former location of J-408. EC-57C is located in the central portion of the Depot and is intended to represent the location of the 1928 explosion (Green, n.d.). The fire occurred at Building J-408 in 1928, resulting in the building and its contents being entirely destroyed. The building reportedly stored smokeless powder (Green n.d.). SI-level sampling was conducted for this EC.

DGM was conducted with the EM31. The DGM results did not indicate the presence of burn areas or anomalies. Therefore, no pits or trenches were excavated at EC-57C.

Surface and subsurface soil and groundwater samples were collected and analyzed for explosives, dioxins/furans, and PAHs. All reported results were less than the PSLs with the exception of benzo(a)pyrene in one subsurface sample. Additional RI-level sampling was

conducted to delineate the extent of the benzo(a)pyrene release. The additional sample concentrations were not greater than the PSL.

The HHRA determined that the acceptable incremental cancer risk level, as specified by MDE ($1x10^{-5}$), and non-cancer hazard indices (HIs) are not exceeded at EC-57C for current site workers or future construction workers. Current site workers or future construction workers, and trespassers intermittently contacting the EC would not face unacceptable risks from non-cancer hazards at EC-57C. The SLERA found no potential unacceptable ecological risk. EC-57C is recommended for NFA.

EC-57D: Brass and Steel Stockpile Area

EC-57D is also located in the southeastern corner of the Depot, adjacent to EC-57B. EC-57D is presumed to have been used as a stockpile area outside of Building 1022 where munitions were stored, awaiting dismantlement. SI-level sampling was conducted on surface and subsurface soil and groundwater for select metals and select explosives. All results with the exception of manganese were less than the PSLs and did not indicate a release. Manganese was identified at a concentration greater than the PSL in two surface samples. RI-level sampling was conducted for surface and subsurface soil to determine the extent.

Because the manganese concentrations were higher north of the EC boundary (Figure 26), ERT reviewed the historical documentation for the Depot to determine if there were other sources of this manganese other than the storage of munitions in this EC. During this review, it was determined that a historical manganese ore stockpile existed just north of EC-57D (Parsons 2006). Locations in the northern portion of the EC and north of the EC boundary correlate with the higher analytical concentrations around the historical stockpile area. Because manganese concentrations generally decrease outside of the original Parsons stockpile boundary, it appears that these manganese concentrations are not related to historical munitions-related activities associated specifically with EC-57D. While not investigated with DGM for MEC, MD (0.30 caliber shells) was found at one of the subsurface soil sampling locations. EC-57D is recommended for NFA for MEC.

Manganese was not evaluated in an HHRA for EC-57D because it was evaluated in a site-wide investigation as DU-3 (ERT 2020). The 2020 ERT site-wide HHRA determined potential non-cancer hazards above the acceptable level of 1 for both the site worker, trespasser and construction worker exposure to manganese in soil at DU-3, which encompasses EC-57D. Based upon the site-wide investigation, further action is warranted at EC-57D for manganese in surface soil and combined surface soil/subsurface soil; this will be evaluated in the FS.

The SLERA found potential unacceptable ecological risks due to manganese for at least one ecological receptor. It is noted that while copper, lead, and zinc may pose risk at one sample location (EC-57D-2-SO-0.5), the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk. Manganese was evaluated by ERT (2020) in a site-wide investigation. The SLERA found that ecological impacts were likely due to manganese at the DU associated with EC-57D (DU 3) and further action is warranted to address the manganese impacts to soil; this will be evaluated in the FS.

EC-58B: Explosive Open Burning/Wire Cage
EC-58B is located along the northeastern boundary between A-Line Road and Yard Office Road and contains the high explosive suspect area component of EC-58. ERT reported that there is no documentation in the available historical record regarding the specific operations conducted within EC-58; however, USACE personnel observed a small wire cage in the suspected high explosives area, potentially related to burn cage activities. SI-level discrete sampling was conducted by ERT on surface and subsurface soil, groundwater, surface water, and sediment for select explosives, dioxins/furans, and PAHs. All results, with the exception of benzo(a)pyrene in one subsurface soil sample, were less than the PSLs and do not indicate a release.

RI-level discrete sampling of the subsurface soil for benzo(a)pyrene was conducted. The sampling location with the benzo(a)pyrene exceedance was associated with the below ground surface asphalt layer, which may be the source of this contamination. The groundwater was not impacted by benzo(a)pyrene.

Incremental sediment samples (1 primary, 1 duplicate and 1 triplicate from 1 DU) were collected by EA in April 2019 and analyzed for TAL metals, PAHs, and dioxins/furans.

The HHRA determined no unacceptable incremental cancer risk, as specified by MDE ($1x10^{-5}$), and that current site workers or future construction workers would not face unacceptable risks from non-cancer hazards at EC-58B. Therefore, there are no potential concerns for trespasser exposure to EC-58B. The SLERA found no potential unacceptable ecological risk. EC-58B is recommended for NFA.

EC-58C: Explosive Open Burning/Wire Cage
EC-58C is located on the western side of the depot and comprises the explosive open burning/wire cage component of the EC as described in the ESAR (EA 2011). This EC also contains a bunker. SI-level sampling was conducted for surface and subsurface soil and groundwater for select metals, PAHs, dioxins/furans, PCBs, and explosives. All results were less than the PSLs.

ERT collected data with the EM61-MK2A within the barricade 644-XI; based on the results of the DGM, three trenches were intrusively investigated. No MEC or MD were found in the trenches.

Based on the results of the DGM and MC sampling conducted at EC-58C, no release has occurred at this EC for either MEC or MC. The SLERA found no potential unacceptable ecological risk. Therefore, EC-58C is recommended for NFA.

IRP Shop Arsenic Area
Based on the arsenic results shown on Figure 29 and as collected during the 2013 mobilization, there appeared to be an area of arsenic exceedances throughout the IRP Shop Area in the surface soil. Therefore, in Fall 2015, arsenic sampling was conducted for the IRP Shop Arsenic Area, rather than each individual IRP site with arsenic releases. The arsenic sampling was conducted in 2015 for the larger area IRP Shop Arsenic Area, which include the individual IRP sites with arsenic releases (EC-28, EC-31, EC-32, and EC-33). The IRP Shop Area in total encompasses

EC-16B, EC-27, EC-28, EC-29, EC-30, EC-31, EC-32, and EC-33. The additional sampling was designed to determine if the arsenic releases are from activities at each EC, from the overall storage/use of preserved wood throughout this area, or if there are impacts to the overall area due to activities not directly associated with each EC, such as the use of arsenic-based pesticides and herbicides or deposition from surrounding industrial activities.

At the conclusion of the 2015 sampling, based on the distribution of arsenic concentrations throughout the IRP Shop Area, the analytical results did not appear to support the conceptual site model (CSM) for these ECs. The CSM identified point sources of arsenic contamination, primarily treated wood storage and use. As the results are widespread and are not consistent in magnitude, these results did not appear to be related to the EC-specific activities. Historical Depot activities that may have contributed to the widespread, non-point source arsenic contamination potentially include herbicide/pesticide usage and/or material stockpiling. Material stockpiling was the Depot's primary mission between 1952 and 1958. Therefore, further evaluation including a reassessment of the CSM and data gap analysis was performed in the site-wide investigation for arsenic concentrations in the IRP Shop Area.

The site-wide HHRA (ERT 2020) determined no potential carcinogenic risks or noncancer hazards above acceptable levels for both the site worker and construction worker exposure to arsenic in soil at the IRP Shop Area (DU-2). Based upon the site-wide investigation, the IRP Shop Area is recommended for NFA.

Groundwater

Groundwater was sampled for the same analytes as the soil for each EC; therefore, the analytes vary between EC. The initial 2013 groundwater sampling using point-in-time wells caused some samples to contain significant turbidity levels, even after initial purging. Therefore, when there were elevated concentrations in the sample results, the data could not be directly correlated to the groundwater (as the sediment could have been the source of the analytes). For any point-in-time wells that had exceedances, temporary monitoring wells were installed in 2015 to get valid groundwater results.

The well at EC-21-31 could not be completed due to refusal during drilling at the original and multiple offset locations. Additionally, a groundwater sample at location EC-58B-4B could not be collected because the well went dry during purging.

No reported results for site groundwater were greater than the PSLs. The CSM considered the potential exposure to future residents and future construction workers to groundwater, if a release to groundwater had occurred. NFA relative to Depot groundwater is recommended.

Unnamed Tributary Sampling

Surface water and discrete sediment samples collected from the Unnamed Tributary were analyzed for PAHs, pentachlorophenol, PCBs, dioxins/furans, select metals[5], select explosives,

5 Per the 2015 Final ERT Work Plan, discrete sediment samples and surface water were analyzed for PAHs, pentachlorophenol, PCBs, dioxins/furans, metals (Al, As, Cd, Co, Cr, Cr+6, Cu, Hg, Mn, Ni, Pb, Sb, Ti, Zn),

solvents, and herbicides. The 2019 incremental sediment samples were analyzed for arsenic and lead and evaluated in the SLERA. The SLERA found no potential unacceptable ecological risk.

NFA is recommended for the Unnamed Tributary.

RI Summary

Table ES-1 provides a summary of the ECs and their status at the conclusion of this RI associated with MC or HTW. No MEC was found during the field investigations. The HHRA identified unacceptable cancer risk for site workers (and therefore, potentially trespassers) from exposure to PAHs in surface soil at EC-21 and EC-32. At EC-21 potential lead "hot spots" were identified that may present a concern for human health to site workers, construction workers and trespassers. For EC-32, there was also unacceptable non-cancer risk to future construction workers due to exposure to combined surface/subsurface soil (primarily benzo(a)pyrene). The HHRA also identified unacceptable risk for construction worker exposure to manganese in surface soil/subsurface soil combined at EC-57D. Further action for soil is required to protect human health at EC-21, EC-32, and EC-57B.

The SLERA identified unacceptable ecological risk at the following ECs: EC-28 (lead), EC-36 (lead), EC-57B (zinc), and EC-57D (manganese).

At both EC-25 and EC-49, an NTCRA was conducted. An RI will be conducted under separate contract.

At EC-21 and EC-52, residual propellant grains remain in the top 3 inches of soil within a portion of each EC. Soil sampling indicated that this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant has impacted soils through elevated nitrogen, thereby inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events, and largely clay remains in this area. The lack of vegetation will continue to allow accelerated erosion of soil (USACE 2020).

Table ES-1. EC Summary Results at Completion of RI

NFA based on No MC/HTW Release Identified	NFA based on HHRA and SLERA results	ECs recommended for inclusion in the Feasibility Study
MMRP ECs[1] **EC-22**: Barricade 646-XK/Former Explosive Open Burning Area **EC-58C**: Open Burning Wire Cage	**MMRP ECs** **EC-57C**: Bldg. J-408 **EC-58B**: Explosive Open Burning/Wire Cage	**MMRP ECs** **EC-21:** Barricade 645 (HHRA and Propellant Area) **EC-52**: Disturbed Areas at End of G-Line Road (Propellant Area only)

explosives (2,4-DNT, 2,6-DNT, TNT, nitroglycerin, nitroguanidine), solvents and herbicides. Similar to other areas of the Depot, arsenic was omitted from the HHRA at the Unnamed Tributary.

Table ES-1. EC Summary Results at Completion of RI

		EC-57B: Building 1022 – Brass and Steel Area (SLERA) **EC-57D:** Brass and Steel Stockpile Storage Area (HHRA and SLERA)
IRP ECs[2] **EC-3**: PE Paint storage **EC-16A, EC-16C, EC-16D**: Transformers **EC-27**: Bldg. 831 Oil House Utility Area **EC-31**: Bldg. S8s33 - Post Engineer Storage **EC-33**: Bldg. S835 – BTG Lumber Storage Shed **EC-34**: Bldg 1025–Boiler House Warehouse Area **EC-35**: Bldg 1026 – Oil House Warehouse Area **EC-50**: Bldg 724-G Tire Retreading Shop **Groundwater**	**IRP ECs** **EC-16B:** Transformer located in IRP Shop Area **EC-29**: Bldg 822 - E.E. Machine Shop **EC-30**: Bldg. 821 – Locomotive House **Unnamed Tributary IRP Shop Area**	**IRP ECs** **EC-28**: Bldg. 825 – Post Engineer Shops (SLERA) **EC-32**: Bldg. S832 – Post Engineer Lumber Storage (HHRA) **EC-36:** Incinerator Plant (SLERA)

Notes:
1) This table excludes EC-25 and EC-49 since those ECs were excluded from the RI due to an NTCRA. The NTCRA was completed, and an RI will be conducted under separate contract.
2) EC-39 and EC-53 were recommended for NFA during development of the ERT 2013 Work Plan; therefore, they are not included in the summary table.

1. INTRODUCTION

Earth Resources Technology, Inc., (ERT) was originally contracted to perform a Remedial Investigation (RI)/Feasibility Study (FS) for seven Military Munitions Response Program (MMRP) sites and 15 Installation Restoration Program (IRP) sites at the Former Curtis Bay Ordnance Depot (hereinafter referred to as the "Depot") in Anne Arundel County, Maryland. The seven MMRP areas of Environmental Concern (EC) and 15 IRP ECs are identified below. Services included an Engineering Evaluation/Cost Analysis (EE/CA) for one of the MMRP sites (EC-25: Dump/Powder Burning Tower (Building 1052)/Powder Burning Plant), which was finalized in March 2016. Each area investigated as part of this RI is identified as an EC.

This RI report was previously prepared by ERT and submitted to the Maryland Department of the Environment (MDE) for regulatory concurrence in October 2016 (referred to herein as the "ERT RI/FS," as warranted). Regulatory comments were received from MDE on 29 June 2017. EA Engineering, Science, and Technology, Inc., PBC (EA) was subsequently awarded the present task order, U.S. Army Corps of Engineers (USACE) Contract [redacted] Delivery Order [redacted] to finalize the RI and conduct the FS. In accordance with the Performance Work Statement, EA was tasked with revising the document to address the June 2017 regulatory comments. As such, the work conducted by EA in accordance with the Performance Work Statement was not intended to duplicate, review for accuracy, or otherwise alter, effort already completed by ERT other than elements related to achieving regulatory concurrence.

Figures and data presentations in the appendices and throughout the document that were not altered as a result of work performed by EA have ERT logos and formats retained. Figures that EA revised as part of the current task order contain the EA logo.

IRP ECs:

- EC-3: Post Engineer Paint Storage
- EC-16 (EC-16A, EC-16B, EC-16C, EC-16-D): Transformers
- EC-27: Building 831 – Oil House Utility Area
- EC-28: Building 825 – Post Engineer Shop
- EC-29: Building 822 – E.E. Machine Shop
- EC-30: Building 821 – Locomotive House
- EC-31: Building S833 – Post Engineer Storage
- EC-32: Building S832 – Post Engineer Lumber Storage
- EC-33: Building 835 – BTG. Division on Lumber Storage Shed
- EC-34: Building 1025 – Boiler House – Warehouse Area
- EC-35: Building1026 – Oil House – Warehouse Area
- EC-36: Building 515 – Incinerator Plant
- EC-39: Area of Concern (AOC) 5 – Medical Supplies Burial Area
- EC-50: Building 724-G – Tire Retreading Shop
- EC-53: Leach Fields/Septic Tanks

MMRP ECs:

- EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)
- EC-22: Barricade 646-XK/Former Explosive Open Burning Area
- EC-25: Dump/Powder Burning Tower (Building 1052)/Powder Burning Plant
- EC-49: Northern Bank of Furnace Creek
- EC-52: Disturbed areas at the end of G-line Road noted on aerial photographs
- EC-57 (EC-57B, 57-C, 57-D): Pre-1955 Ordnance and Shell Refurbishing
- EC-58 (EC-58B, EC-58C): Explosive Open Burning/Wire Cage

The Department of Defense (DoD) established the MMRP under the Defense Environmental Restoration Program (DERP) to address unexploded ordnance (UXO), munitions and explosives of concern (MEC), discarded military munitions (DMM), and munitions constituents (MC) located on current and former military installations. MEC are a safety hazard and may constitute an imminent and substantial endangerment to site workers and to the public. Applicable provisions of Chapter 29 of the Code of Federal Regulations (CFR) 1910.120 apply. The IRP is a comprehensive program under DERP, established to identify, investigate, and clean up hazardous substances, pollutants, and contaminants at active and/or former U.S. Army installations. Work was performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act; the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Sections 300.120(d) and 300.400(e); and the Resource Conservation and Recovery Act (RCRA). Activities involving work in areas potentially containing MEC hazards were conducted in full compliance with USACE, Department of the Army, and DoD safety regulations. All MEC and/or material potentially presenting an explosive hazard (MPPEH) encountered by ERT during the munitions response was appropriately handled and disposed of in full accordance with the USACE Explosives Site Plan (ESP).

1.1 PURPOSE AND SCOPE

The Depot consists of an approximately 435-acre portion of the former U.S. Army Ordnance Depot. Construction of the former U.S. Army Ordnance Depot began in 1918; the Depot was fully operational by 1920. Its mission began as a receipt and storage facility for domestic and overseas munitions and supplies. Over time, the mission evolved and expanded to include activities such as maintenance and demilitarization of ordnance, and storage activities for bulk ores, minerals, and metals. The name of the former U.S. Army Ordnance Depot changed through time to the Curtis Bay Ordnance Depot. The overall purpose of the RI is to determine whether the MMRP and IRP ECs warrant further response actions pursuant to CERCLA and the MMRP or IRP processes. The objectives of the RI are to:

- Determine the nature and extent of potential MC contamination or MEC hazards at the MMRP ECs, as applicable;

- Determine the nature and extent of potential hazardous and toxic waste (HTW) contamination at the IRP ECs;

- Determine the potential risks posed to human health and the environment from MC or HTW contamination; and

- Collect or develop additional data for an FS, as appropriate, to determine remediation alternatives for mitigation, including no further action (NFA).

As agreed upon by the Project Delivery Team (PDT), which is comprised of ERT, USACE, Defense Logistics Agency (DLA), and the MDE, ERT conducted initial sampling at the MMRP and IRP ECs where a release has not been previously documented, to determine presence or absence of contamination. This sampling is termed "SI-level sampling" or "SI-level discrete sampling" throughout the document for differentiation from 2019 RI incremental sampling or ERT RI-level discrete sampling, which was conducted at ECs that had a previously documented release. Exhibit 1-1 summarizes the release status of the ECs and the type of sampling performed at the initiation of the project. The seven MMRP ECs were investigated for both MEC hazards and MC contamination, while the IRP ECs were investigated only for HTW contamination.

Exhibit 1-1: EC Release Status at Project Initiation

GROUP 1 ECs	GROUP 2 ECs	GROUP 3 ECs
SI Level Sites - Release Status Unknown	RI Level Sites - Release Confirmed	EE/CA
Investigate to determine whether a release has occurred	Investigate to determine the nature and extent	Investigate to determine scope of removal action to allow completion of RI
MMRP ECs EC-58 (A-C): Wire Cage Burning EC-57 (A-D): Pre-1955 Ordnance & Shell Refurbishing EC-52: Disturbed Areas at End of G-Line Road (exclusive of propellant grain dump) EC-22: Barricade 646 (Open Burning Area)	**MMRP ECs** EC-25: Powder Burning Tower EC-49: North Bank Furnace Creek EC-52: Disturbed Areas at End of G-Line Road (release at propellant grain dump) EC-21: Barricade 645 (Shell Burning Pit)	**MMRP EC** EC-25: Powder Burning Tower
IRP ECs EC-3: PE Paint storage EC-16: Transformers EC-27: Bldg. 831 Oil House Utility Area EC-28: Bldg. 825 – Post Engineer Shops EC-29: Bldg. 822 - E.E. Machine Shop EC-30: Bldg. 821 – Locomotive House EC-31: Bldg. S833 - Post Engineer Storage EC-32: Bldg. S832 - P.E. Lumber Storage EC-33: Bldg. S835 – BTG Lumber Storage Shed EC-34: Bldg. 1025–Boiler House Warehouse Area EC-35: Bldg. 1026 – Oil House Warehouse Area EC-36: Incinerator Plant EC-50: Bldg. 724-G Tire Retreading Shop	**IRP ECs** None	**IRP ECs** None
IRP – Recommended No Further Action ECs EC-39:Medical Supplies Burial Area EC-53: Leach Fields/Septic Tanks		

The scope of the ERT contract required an RI at EC-25 and EC-49, and an EE/CA at EC-25. However, after contract award, the PDT determined that RIs at EC-25 and EC-49 were not possible due to the size of the release, and the project resources were shifted in order to collect data to support an NTCRA. ERT performed an EE/CA on EC-25. Data collected from EC-49 was included in the EC-25 EE/CA. The objective of the EE/CA was to address the immediate threat to human health and the environment posed by MEC hazards at EC-25, with the goal of determining the extent of the immediate threat and the evaluation of suitable alternatives to

reduce or eliminate that threat. ERT conducted field work in support of development of the EE/CA for EC-25 and provided the final EE/CA in March 2016 (ERT 2016).

Upon review of the data collected during the initial field activities in 2013, releases were determined to have occurred at 8 ECs including: EC-16 (EC-16B only), EC-29, EC-32, EC-36, EC-57B, EC-57C, EC-57D, and EC-58B. A release was defined in the ERT Work Plan (ERT 2013) as a parameter with a concentration greater than the project screening level (PSL[6]). ERT developed a Work Plan Addendum (ERT, 2015) that provided details on the additional sampling needed for the ECs with a release and additional sampling required to determine nature and extent at one of the initial RI-level ECs (EC-21). These field activities were conducted by ERT in Fall 2015.

Following a review of the data, additional sampling was conducted in Winter 2016 at EC-32, EC-36, EC-57B, and EC-57D to fully delineate the extent of potential contamination. In order to address uncertainties, EA conducted incremental sampling in 2019 at EC-21 (surface soil and sediment), EC-58B (sediment), Unnamed Tributary (sediment) and a background sediment location.

1.2 PROPERTY DESCRIPTION

The Depot is located at 710 East Ordnance Road, Baltimore, in Anne Arundel County, Maryland, approximately one mile southeast of Baltimore City (Figure 1). The Depot is bordered to the north by the Baltimore Beltway (Interstate 695) and East Ordnance Road, to the south by Furnace Creek, to the east by Curtis Creek and Stahl Point Road, and to west by Back Creek (Figure 2) (EA 2011).

1.3 FORMER CURTIS BAY ORDNANCE DEPOT HISTORICAL INFORMATION

The original U.S. Army Depot was built in 1918 on 789 acres of farmland and became fully operational in 1920. Additional acreage was acquired, increasing the total area to 815 acres. Approximately 37 acres were reassigned to the U.S. Army Reserve in 1958 and 1966. Following several land transfers to Anne Arundel County and the Maryland Department of Transportation, the remaining 435 acres was transferred to the General Services Administration (GSA) as excess property in 1965. A map of the existing property (435 acres) is shown on Figure 2.

The former U.S. Army Ordnance Depot's mission, from approximately the 1920s through the 1950s, included receipt, storage, maintenance, and demilitarization of ammunition of domestic and overseas supplies. During this time, the property was designated as the Curtis Bay Ordnance Depot. Among the original facilities constructed in 1918 were docks, pump houses, 33 standard magazines, eight standard high explosive magazines, 57 smokeless magazines, nine fuze and primer magazines, barracks, mess halls, a medical building, an engine house, a machine shop, a

6 As described in the 2013 Final ERT Work Plan, the PSLs were the higher of the background or industrial soil regional screening level. For groundwater, the PSLs were based on the background and the maximum contaminant level (MCLs). For surface water and sediment, see the Work Plan (ERT 2013) and Work Plan Addenda (ERT, 2015; EA 2019).

repacking house, a guard house, a fire engine house, and two general warehouses. Ordnance-related operations at the Depot included a renovation plant which transferred 75-millimeter (mm) shrapnel to metal containers (Green, n.d.).

A 1928 fire within a smokeless powder magazine that contained 630,000 pounds (lbs) of 9.2 howitzer powder and the ensuing public protest prompted the removal of 155mm high explosive ammunition from the Depot to the Savanna Illinois Ordnance Depot. The remaining high explosive ammunition stored at the Depot consisted of 75mm shells (Green, n.d.). In 1932, bonderizing plant operations began in a section of Building 1022. Operations at the bonderizing plant included the breakdown of 75mm shrapnel, inspection of the powder, and re-priming. From 1938 to 1942, a different section of Building 1022 was used as a bag loading plant for manufacturing propelling charges for 155mm howitzers and guns (Green, n.d.).

Facilities at the Depot underwent renovations and rehabilitation, primarily through the Works Progress Administration between 1939 and 1940. The function of the Depot then evolved in 1942 to include its use as a small arms packing plant, a transshipment depot for Hawkins Point Pier, and facility for personnel training, particularly in bag loading. Operations at the small arms packing plant began in 1951 and included belting, linking, and clipping .30- and .50-caliber cartridges.

Following World War II and the Korean War, the Depot's mission involved sorting, processing and decommissioning munitions returning from overseas. This operation was known as Operation Brass and Steel (Miduski, circa 1952-1953 and Green, n.d.). An ammunition-popping plant located near Warehouse 1022 on the Army reserve portion of the site, was built in the 1950s. The operations in the ammunition popping plant included disarming and dismantling small brass ammunition returning from overseas (Miduski, circa 1952-1953).

The Depot's mission once again evolved in the 1950s to include: the inspection, maintenance, and storage of small arms ammunition, inert ammunition, ammunition packing materials and smokeless powder (Class 2 only); the demilitarization of unsafe and surplus small arms ammunition, components, and smokeless powder; the storage of general supplies; the receipt, inspection, demilitarization, and shipment of mixed metals, such as fired artillery shells, containers, brass, and projectile plugs; the winterization of equipment; and the receipt and storage of ore for the GSA (Miduski, circa 1952-1953).

In 1952, GSA delegated a new strategic and critical materials stockpile program to its own newly established Emergency Procurement Service. A portion of the Depot was set aside for the storage of strategic and critical materials by the Emergency Procurement Service.

Storage activities at the Depot were placed on inactive status in 1958, with the exception of the strategic and critical materials activity. During this time, the 435.46 acres of the Depot, including the critical materials storage area, were transferred to GSA as excess property. In 1992, the DLA established the Defense National Stockpile Center (DNSC) to manage the stockpile program after DLA was assigned responsibility over the program in 1992. The DNSC no longer conducts operations at the Depot; all stockpiles have been removed from the Depot. OSD delegated the responsibilities for environmental investigations and possible remedial

actions to the DLA, who acts as executor for the GSA for the Depot RI activities. The dock area of Curtis Creek is owned and controlled by the U.S. Army Reserve and lies outside the project area. The Baltimore City Police Canine Corps uses a small training area for police dogs at Building 812.

A summary of available historical information for each MMRP and IRP EC is provided in each chapter associated with that EC. The concept of addressing each of the AOCs as ECs and dividing the ECs into categories based on their description was first introduced and defined in the *Revised Draft Environmental Survey and Analysis Report* (ESAR; EA 2011). The ESAR was developed by reviewing over 200 historical documents (i.e., investigations, reports, inventories, etc.) pertaining to past operations throughout the Depot. The goal was to compile the data to determine whether the operations performed at each EC may have impacted the soil or groundwater (EA 2011). The history of each MMRP and IRP EC was the driver for the environmental sampling and/or geophysical investigation performed by ERT.

Based on the review of historical documentation, at no time during Depot operations were firing ranges present, nor did live firing occur. The presence of surface and subsurface munitions items is the result of demilitarization and disposal activities as part of the Depot's mission; intentional burial activities occurred as part of disposal. Large anomalous areas are associated with burial activities, not individual anomalies. Based on typical historical Army practices and topographical changes over the lifetime of the Depot, munitions items are not expected to be below 6 feet (ft) below ground surface (bgs), but in some ECs, in order to determine the extent of contamination, samples were taken at depths up to 9 ft.

1.4 PREVIOUS FORMER CURTIS BAY ORDNANCE DEPOT INVESTIGATIONS

Numerous investigations have occurred at the Depot for varying environmental concerns ranging from in-building hazardous building materials to radioactivity to historical investigations performed under the DERP-Formerly Used Defense Sites (FUDS) Program. Although many historical reports exist, only those reports directly relevant to the purposes of this RI are summarized below. The ESAR consolidated known historical documentation pertinent to environmental investigations and site history of the Depot (EA 2011). Information from the ESAR provides a substantial amount of data for this Report; further discussion on the ESAR is included in Section 1.4.6. Additionally, ERT's Work Plan (2013) provided review of prior data collected that was used to develop the field approach that is not included in the summaries below.

1.4.1 Geophysical Survey and UXO Removal Report, MKM Engineers

During a 1999 MKM Engineers (MKM) project involving a soil removal/sifting activity in what is now classified as EC-49, stokes mortar training rounds and a rocket were discovered. These discoveries halted the MKM project and the USACE, Huntsville (CEHNC) was brought in to determine the next steps. A February 1999 USACE trip report detailed MEC and munitions debris (MD) found, including a 2.36 inch rocket (bazooka round) and approximately 24 stokes mortar training rounds in the MKM project area. USACE recommended the following: 1) the land area between Patrol Bridge Road and Furnace Creek be geophysically mapped for electromagnetic anomalies; 2) the areas between Furnace Creek Road and Back Creek and along

Back Creek Road be geophysically mapped for magnetic anomalies; 3) MKM not replace sifted dirt from their operations; and 4) MKM halt all intrusive activities in the areas adjacent to Curtis Creek, Furnace Creek, Back Creek, and near the revetment areas inspected during the site visit (CEHNC-OE-DC, 1999).

As a result of the findings from the 1999 trip report, MKM performed a geophysical survey that included visual identification of surface UXO and excavation/removal of MEC-related surface and subsurface items. MKM removed surface and subsurface material (0.25-2 ft bgs) in the general vicinity of a discovered .30-caliber round, covering approximately two acres. Removed material was sifted for UXO and/or metallic objects. The UXO and/or metallic items and their debris were characterized and stored in 55-gallon drums; each item collected was power washed on-site for off-site disposal (MKM, 1999).

MKM also conducted an electromagnetic survey using the EM61 after a surface sweep was completed to scan and identify material up to a depth of 4 ft bgs in 19 grids. Areas investigated were addressed through six AOCs, largely covering the same footprint as the seven MMRP ECs under this RI. MKM identified each subsurface UXO item for either removal or, if greater than 4 ft bgs, to remain in place until a future decision could be reached (MKM, 1999).

1.4.2 Focused Site Investigation (FSI) and Final Expanded SI (ESI), Parsons

Parsons conducted an FSI at the Depot in 1999 to determine whether hazardous substances had been released in the environment by the Depot's ore stockpiles, and to determine the likelihood that the hazardous substances had migrated offsite and impacted human or environmental receptors (Parsons, 2000). Parsons collected soil, sediment, groundwater, and surface water samples from four AOCs: Stockpile 1, Stockpile 2, the Former Radioactive Waste Pit, and the Medical Supplies Burial Area.

The objective of the environmental sampling was to determine whether specific media contained concentrations of contaminants greater than background and regulatory standards. Upon evaluation of each medium, Parsons recommended additional field sampling and investigations for three of the four AOCs (Stockpile 1, Stockpile 2, and the Medical Supplies Burial Area) to further characterize the groundwater, surface water, and soil pathways.

In 2003, Parsons conducted a Final ESI, as a follow-up to the FSI, for the three AOCs recommended for further investigation. The Final ESI intended to further define the nature and extent of contamination in the groundwater, surface water, and soil pathways of the three AOCs. Additional environmental sampling was performed, and samples were analyzed and screened against applicable standards.

For the two sediment samples collected, seven metals were reported at concentrations greater than the site-specific background values and arsenic was reported at concentrations greater than the 2008 MDE non-residential soil cleanup standard (EA 2011).

The concentrations of three surface soil samples were reported to be greater than the site-specific background values for select metals; arsenic was reported slightly greater than the 2008 MDE non-residential soil cleanup standard in these soil samples. The subsurface soil samples co-

located with the surface samples had concentrations of select metals reported greater than the site-specific standards. Arsenic was reported at concentrations greater than the 2008 MDE non-residential soil cleanup standard in two of the subsurface samples; the concentration of lead was reported significantly greater than the 2008 MDE non-residential soil cleanup standard in one of the subsurface samples (EA 2011).

The concentrations of metals were reported less than the 2008 MDE groundwater standard for each of the groundwater monitoring wells associated with Stockpile 1 and Stockpile 2. Concentrations of semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs) were also less than the 2008 MDE groundwater standard for the groundwater samples. The concentration of lead in the groundwater sample collected near the Medical Supplies Burial Area was slightly greater than the 2008 MDE groundwater standard (EA 2011).

One surface water sample had concentrations of thallium greater than the site-specific background values and was slightly greater than the Maryland water quality criteria (EA 2011).

Parsons recommended further environmental sampling of the groundwater, surface water, and soil pathways to determine the nature and extent of the reported contamination.

1.4.3 Final Revised DNSC FRI, Parsons

In 2005, Parsons conducted a Focused RI (FRI) to delineate the nature and extent of contamination within AOCs identified during their previous FSI and ESI activities, and within areas of known DoD activity not previously investigated. A Human Health Risk Assessment (HHRA) and a Screening Level Ecological Risk Assessment (SLERA) were conducted to evaluate the human health and environmental risks associated with Depot activities. Parsons collected more than 200 surface/subsurface soil, sediment, surface water, and groundwater samples from AOCs designated within the property. The HHRA and the SLERA did not identify any contaminants of concern for any receptors and concluded that no further evaluation was warranted for the Depot.

As part of the investigation, Parsons collected 10 surface and 10 subsurface samples from the U.S. Army Reserve Facility, located northwest of the Depot, to develop a Depot-specific soil background metals comparison standard. Both the background samples collected and previous soil background data from the FSI were used for a statistical evaluation. Parsons calculated the mean and the 95 percent (%) upper confidence limit (UCL) of the mean (95% UCL); the 95% UCL was used as the Depot-specific soil background comparison standard. Each background soil sample was analyzed for target analyte list (TAL) metals, tin, and hexavalent chromium (Parsons 2006).

The statistical evaluation included an initial evaluation of data during which data points or data sets not representative of background data were eliminated. Specifically, surface and subsurface soil sampling at one anomalously high background location collected during the previous FSI in 1999 was not included in the background data set for this FRI. The Parsons FRI attributed the anomalously high concentrations of arsenic, iron, lead, and vanadium to long-term truck traffic since the anomalously high FSI location is along the main Depot access road. The data were, however, incorporated into the risk assessments (Parsons 2006).

Parsons collected co-located discrete background sediment and surface water samples along Back Creek, offsite and upstream of the Depot. The background sediment sample was screened against U. S. Environmental Protection Agency's (USEPA's) 2004 Region III Soil Risk Based Concentrations and the surface soil background standard calculated during the statistical evaluation. The background surface water sample was screened against the Maryland Water Quality criteria or, if more stringent, against the USEPA National Water Quality Criteria (Parsons 2006).

1.4.4 Geophysical Validation Report, Zapata

Zapata, Inc. (Zapata) was tasked to validate the results of MKM's 1999 geophysical survey. Activities included locating, identifying, and removing MEC and MD anomalies within and around 19 anomalous locations in the southern and southwestern portion of the Depot where the MKM geophysical survey was previously conducted. No MEC was found during this investigation. Soil sampling was also performed to identify any MC contamination.

After conducting Digital Geophysical Mapping (DGM) in the 19 anomalous locations validation trenching was conducted resulting in 31 trenches. Zapata removed 159 pounds of MD from the 31 trenches; MEC was not encountered during the validation trenching. The scope of work was limited as Zapata did not intrusively investigate anomalies below 4 ft. Non-munitions cultural debris was not removed. The Geophysical Validation Report was reissued within the Site Inspection Report, finalized in February 2011 (Zapata, 1999; CEHNC, 2011).

ERT reviewed the Zapata DGM data sets to determine its quality and usability for purposes of the RI and EE/CA activities. The accuracy of Zapata's geophysical prove out and the latency test results indicate that the data were of high quality and were usable for the planned RI activities. Further discussion of the quality and usability of the Zapata data is available in the DGM Technical Review Memo located in the Final Work Plan (ERT 2013).

1.4.5 Final Site Investigation (SI), CEHNC

The 2011 Final SI documented previous munitions response actions at the Depot and determined that further action at the Depot was warranted under CERCLA. Documentation included determining whether hazardous substances had been released to the environment through Depot operations, and assessing the likelihood that they had migrated off-site or impacted human and ecological receptors.

The Final SI report indicated that Zapata had collected ten soil samples from five trench locations. Two soil samples were analyzed for explosives, pentaerythritol tetranitrate (PETN), and nitroglycerin (NG); the remaining eight were sampled for explosives, PETN, NG, copper, lead, antimony, zinc, and perchlorate. Zapata screened analytic results against the USEPA Regional Screening Level (RSL) for industrial soil. Only DNT and perchlorate were reported at concentrations greater than the detection limit; other analytes were reported at concentrations less than the detection limit. No concentrations for either explosives or perchlorate were reported greater than the USEPA RSL for industrial soil. Concentrations of lead in three samples

were reported higher than the USEPA RSL of 800 milligrams per kilogram (mg/kg) (CEHNC, 2011).

The Final SI report concluded that the presence of lead greater than the USEPA RSL for Industrial Soil presented a potentially unacceptable risk to human receptors and/or the environment. The Final SI additionally concluded that there was an unlikely risk to human health or the environment based on the absence of MEC and on the types of MD collected. Given the potential unacceptable risk to human receptors exposed to lead, the Final SI determined that additional RI/FS sampling was warranted. It was also determined that an immediate removal action was not warranted (CEHNC 2011).

1.4.6 Environmental Survey and Analysis Report (ESAR), EA

In 2011, EA developed a Final Environmental Survey and Analysis Report for the Depot. The ESAR documented whether potential ECs had impacted the soil or groundwater as a result of past or current uses of the Depot. Past uses may have involved hazardous materials, hazardous substances, hazardous wastes, or petroleum products. To prepare the ESAR, EA reviewed previously developed documentation, and performed onsite reconnaissance and interviews. The ESAR summarizes the environmental suitability of the Depot by identifying and characterizing potential ECs.

The ESAR classified each of the 63 identified ECs into one of seven categories; each category provides the environmental condition of the EC and whether additional investigations were required. The categories were based on the current or former presence of operations that involved hazardous materials, hazardous substances, hazardous wastes, or petroleum products. The report presents detailed information on the Depot's utilities and infrastructure, hazardous substances and petroleum products, stockpiled materials, medical and biohazardous waste, suspected asbestos-containing material, lead-based paint, radioactive materials/wastes, military munitions/ordnance, and polychlorinated biphenyls (PCBs).

In October and November 2010, GSA, USEPA, and EA conducted a site visit and found numerous subsurface anomalies and MD located along the railroad tracks and the open burn area. Along the western boundary of the Depot, weathered propellant (containing no energetic material) was observed on the surface and brass was located in the area of a berm near the northeast boundary. Findings of the site visit are documented and included as an appendix to the ESAR. GSA and DLA are currently working with MDE to ensure that the Depot is appropriately addressed prior to transfer to an interested party (EA 2011).

1.4.7 EC Changes Determined during Final Work Plan Development

1.4.7.1 EC-39: AOC–5–Medical Supplies Burial Area

EC-39 is located in the southwestern portion of the Depot (Figure 2) and consists of a historical disposal area. A medical disposal area was reportedly located approximately 100 yards from the south end of G-Line Road; three exploratory trenches were dug at the end of G-Line Road in response to this anecdotal evidence (Parsons, 2003). Numerous glass bottles located approximately 8 ft bgs were uncovered; these bottles were labeled as saline and/or dextrose and

were believed to be expired supplies returned from the Korean War. The area was backfilled and the determination was made that no further investigation was recommended as the contents of the bottles were innocuous (Parsons, 2003; EA 2011); however, additional investigations determined to be necessary were conducted under a Focused RI by Parsons in 2006. During the Focused RI, Parsons performed extensive test pitting and surveying at the Medical Supplies Burial Area to delineate the nature and extent of the buried materials. Boxes of bottles containing innocuous dextrose and saline solutions were uncovered and documented (Parsons 2006). Based on the contents of the burial area, and the soil and groundwater sampling associated with the investigation, Parsons determined that no further investigations were warranted at the Medical Supplies Burial Area (Parsons 2006; EA 2011).

Based on the multiple previous investigations performed within the Medical Supplies Burial Area, ERT recommended NFA for EC-39; this was approved by the ERT RI/FS PDT.

1.4.7.2 EC–53: Leach Fields/Septic Tanks

EC-53 refers to two leach fields and six septic tanks. The locations of the leach fields are noted as EC-53 on Figure 2. One leach field is located in the northern portion of the Depot and is currently receiving waste from the administrative offices located in Building 305, which is associated with the active U.S. Army Reserve property (U.S. Army Environmental Hygiene Agency [USAEHA], 1992). The second leach field is associated with Building 821, located in the northeastern portion of the Depot and part of the active U.S. Army Reserve property, and is no longer in use.

Historical records note six separate septic tanks throughout the Depot associated with the northern administration building, machine shop area, former guard house, Building 1003, and warehouse 1022 (EA 2011; ORISE, 2005). In a 1992 *Building Evaluation*, four septic tanks are reported and described as sufficient capacity to meet the usage demands and were reportedly problem-free (Daniel Consultants, Inc. [Daniel], 1992).

During a program review of the Depot's water pollution program, USAEHA determined that the wastewater at the Depot flows by gravity lines to septic tanks and associated leach fields; no industrial wastewater discharges were noted at the Depot (EA 2011). ERT recommended NFA for the two EC-53 locations; the PDT agreed with this recommendation.

1.4.7.3 EC-57: Pre-1955 Ordnance and Shell Refurbishing

EC-57 is described as two separate areas in the ESAR: "Brass and Steel Sections I, II, III 1952-1953," located in the vicinity of Buildings 1021 and 1022 and as a 1920s era explosion that occurred in Building 408-J (EA 2011). The ESP provides boundaries for two areas designated as EC-57, noted as Munitions Response Site (MRS) 2 (USACE, 2012), based on documented areas in the ESAR. Due to the multiple locations for EC-57, ERT reviewed historical records and concluded that EC-57 is three separate areas; EC-57B, EC-57C, and EC-57D. Research indicated that EC-57A is not an EC, as detailed in Appendix H of the Final Work Plan (ERT 2013).

1.4.7.4 EC–58: Explosive Open Burning / Wire Cage

The ESAR indicates three components of EC-58: 1) areas of potential contamination (small arms cartridge cases), 2) high explosive suspect area, and 3) explosive open burning/wire cage burning area. According to the ESAR, these three components are located within two separate locations: a small area north of EC-25 and a larger area between Yard Office Road and A Line Road (EA 2011). The ESP provides a boundary for one of the areas associated with EC-58 labeled as MRS 1 (USACE, 2012). Due to uncertainties associated with the multiple locations for EC-58, a review of historical documents was performed to determine the areas for investigation; a site visit conducted in June 2012 also supplemented this information. ERT concluded that EC-58 is comprised of two separate areas, EC-58B and EC-58C; only EC-58B corresponds to the location presented in the ESP (USACE, 2012) and ESAR (EA 2011). Research indicated that EC-58A is not an EC, as detailed in Appendix H of the Final Work Plan (ERT 2013).

1.4.8 Initial Summary of Risk from Munitions and Explosives of Concern

Based on findings from historical research and previous investigations of the Depot, MEC may be present within EC-49, EC-21, EC-25, and/or EC-52 (Table 1-1). The presence of MEC may pose an imminent and substantial endangerment to the personnel at the Depot and to the environment. Table 1-1 lists MEC and MD that have been found and documented within the Depot during previous investigations.

Table 1-1. List of Historical MPPEH/MEC Items and MD Found at the Depot

Location	MPPEH/MEC and MD Identified	MPPEH/MEC or MD
EC-49	3-inch stokes mortar training rounds	MPPEH/MEC
EC-49	2.36-inch rocket	MPPEH/MEC
EC-21, EC-25, EC-49	Small arms (.30 and .50 caliber) shells and cartridges	MD
EC-25	Grenades, grenade fuzes	MD
EC-25	Adapter boosters	MD
EC-21, EC-25	Flash tubes	MD
EC-25, EC-52	Propellant grains	MD

1.5 REPORT ORGANIZATION

This report is structured to present the remedial investigation and site investigation activities for the ECs within the Depot. Chapters 1 through 4 present the history, site description, general sampling and analysis approach, and general risk assessment protocols for the Depot. Due to the large number of ECs investigated within the Depot, the information particular to each EC is presented in its own section. Chapters 5 through 28 present the history, description, conceptual site model (CSM), sampling and analysis objectives, analytical results, risk assessment, and conclusions for each EC; each sub EC (such as EC-57B and 57C) is included as a separate chapter. Chapter 29 presents the groundwater assessment and Chapter 30 presents the Unnamed Tributary assessment. The data quality assessment (DQA) is provided in Chapter 31, while the updated CSMs are provided in Chapter 32. Chapter 33 provides the fate and transport information and Chapter 34 summaries the results of the RI. References are found in Chapter 35. Additional relevant information is provided in Appendix A through Appendix M as listed below.

- Appendix A: Figures
- Appendix B: Geophysical Quality Control (QC) Results
- Appendix C: Daily Reports/MEC Documentation
- Appendix D: Surveyor Report
- Appendix E: Analytical Data
- Appendix F: Risk Assessment Supporting Tables and Figures
- Appendix G: Photo Documentation
- Appendix H: Munitions Response Site Prioritization Protocol (MRSPP)
- Appendix I: Memoranda
- Appendix J: Field Documentation
- Appendix K: Technical Project Planning Meeting Minutes
- Appendix L: Habitat Assessment
- Appendix M: Response to Comments.

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2. SITE DESCRIPTION AND ENVIRONMENTAL SETTING

2.1 OVERALL SITE DESCRIPTION

The Depot lies within the Atlantic Coastal Plain physiographic province, which is characterized by soft, unconsolidated sediment dating from the lower Cretaceous to the Pleistocene age. This soft, unconsolidated sediment generally overlies crystalline bedrock, which is predominately composed of gneiss, schist, and gabbroic rocks from the Pre-Cambrian and Paleozoic eras.

2.1.1 Surface Features

Elevations at the Depot range from approximately 10 ft above mean sea level (msl) in the south to approximately 50 ft above msl to the north (U.S. Geological Survey 2011). The land surface generally slopes south-southeast (EA 2011).

2.1.2 Surface Water Hydrology

Approximately one half of the Depot's perimeter is bounded by creeks, to the west by Back Creek, to the south by Furnace Creek, and to the east by Curtis Creek (Figure 2). An Unnamed Tributary, located in the center of the Depot, drains approximately one half of the Depot's surface water to Back Creek. From Back Creek, the water flows east to Furnace Creek then to Curtis Creek, eventually flowing into Curtis Bay and the Patapsco River, within the Chesapeake Bay. It is possible that the Depot may experience flooding from the Unnamed Tributary, or in the case of storm surges, from the Chesapeake Bay backwater (USACE St. Louis 1993).

2.1.3 Meteorology

Curtis Bay is located within the Mid-Atlantic States with weather consisting of four distinct seasons. The average temperatures in the summer and winter are in the mid-80s (Fahrenheit [°F]) and mid-30s (°F), respectively. July is the warmest month of the year with an average high temperature of 90°F; January is the coldest with an average low temperature of 29°F. Daily temperature variations between night and day in the summer may reach up to 18°F in difference, while daily temperature variations in the winter average approximately 15°F in difference (CEHNC 2011).

The annual average precipitation is 43.59 inches. Rainfall is fairly evenly distributed throughout the year. The wettest month of the year is May with an average rainfall of 4.18 inches (EA 2011).

2.1.4 Geology

The Pre-Cambrian-Paleozoic age crystalline bedrock has been affected greatly by intrusions, pressure from folding, and periods of erosion. Characteristic of the Coastal Plain depositional environment during the Cretaceous age, the younger, overlying, unconsolidated sediments comprise non-marine, irregularly bedded, and lenticular sediments due to their down gradient location from the Piedmont Plateau. The three formations deposited during the Cretaceous age are the Patuxent, the Arundel clay, and the Patapsco. The oldest Cretaceous age formation, the

Patuxent, is defined by series of lenticular beds of sands, gravels, and clays. The Patuxent is further defined as being unfossiliferous, lacking in a characteristic color, and ranging in thickness from 200 to 300 ft. The depositional environment of the Arundel Clay is considered to be swamp-like, as evidenced by lignitic material and organic matter such as tree trunks and roots. The Arundel clay, ranging in thickness from 25 to 200 ft in the Baltimore area, is characterized by gray and red clay containing geodes and nodules of limonitic material. The Arundel clay formation is considered to be a confining layer (USACE St. Louis 1993). The Patapsco Formation is at the surface, and it consists of "gray, brown, and red variegated silts and clays; lenticular, cross-bedded, argillaceous, subrounded sands; and minor gravels" (Cleaves et al., 1968).

2.1.5 Soils and Sediments

The Depot is primarily underlain by deep, well-drained soils on uplands that exhibit a silty sand surface layer and a yellowish-brown to strong-brown subsoil of poorly graded sand with silt and gravel. These soils form the beds of sandy sediments containing moderate amounts of silt and clay.

The vertical permeability of the surface soils is moderate, 0.6 to 2.0 inches per hour except in the upland slope soils which are less permeable. The soil has low corrosivity to uncoated steel and a high corrosivity to concrete (USACE 2011).

2.1.6 Hydrogeology

The Depot groundwater is part of the Patuxent reservoir, which is confined by the Arundel clay formation. The Patuxent formation, in the vicinity of Baltimore, is known to yield high supplies of groundwater ranging from 400 to 600 gallons per minute. As part of prior investigations, driller's logs have demonstrated varying degrees of thickness within the sand and gravel units, suggesting that the hydrologic properties of the Patuxent formation may not be uniform (USACE St. Louis 1993). The Depot is supplied drinking water by the Glen Burnie public water supply system. The drinking water for the properties surrounding the Depot is supplied by Baltimore City. As shown on Figure 3, shallow groundwater depths range from 1.71 (southern areas) to 62.82 (northern areas) ft bgs at the Depot (EA 2011).

2.1.7 Demography and Land Use

The land currently occupied by the Depot is owned by the GSA and was declared as excess property in 2005. There are currently no active uses of the Depot. The property is zoned W2 – light industrial, which is identified as traditional industrial uses exhibiting some nuisance characteristics (Anne Arundel County, 2019). The property is expected to be sold once all environmental investigations are complete. The projected future land use is expected to remain industrial; however, Anne Arundel County has identified this property's future land use as government institution, of which any zoning classification appropriate for the property can apply (Anne Arundel County 2008).

2.1.8 Ecology

This section includes a description of the ecology of the Depot, as well as a summary of the 2017 Habitat Assessment (EA 2018) and a discussion of rare, threatened, and endangered species.

The Depot is located along the shorelines of Back Creek to the west, Furnace Creek to the south, and Curtis Creek to the east. In addition, there are three small unnamed tributaries that drain approximately 50% of the Depot and flow into Back Creek (EA 2011). Outside the project boundary but within the 0.5-mile radius, the majority of land cover is urban land and open water. A wetlands area exists southwest of the Depot outside of the fence, along Back Creek, on the southern property boundary. The area is approximately 2,000 ft long according to a 1994 National Wetlands Inventory. In addition, a small wetlands area is located on the southeastern portion of the property border, along Curtis Creek (Parsons 2006).

Portions of the depot are within the Chesapeake Bay Critical Area (Figure 2). Specifically, the site includes a combination of RCA (Resource Conservation Areas) and IDA (Intensely Developed Areas). The nearby Curtis Bay Channel, Patapsco River, and Stoney Creek have been identified as Historic Waterfowl Staging and Concentration Areas. However, none of the waterbodies within or adjacent to the Depot provide suitable waterfowl habitat.

The ecological site characteristics of the Depot indicate limited ecologically valuable habitat due to the altered habitat, lack of native vegetation, and the on-going adjacent human activity. The Depot has been filled, drained, graded and otherwise altered to the point that there are little natural areas remaining. All areas of the Depot have been altered to varying degrees by management practices and by mission-related maintenance activities within the last 80 years.

However, good quality terrestrial and aquatic habitat also exists at the site and one natural area was identified within the 2017 Habitat Assessment survey boundary (Appendix L; EA 2018). A summary of the results of the 2017 Habitat Assessment is included below. A narrow and forested riparian area exists along the Unnamed Tributary, the perennial stream in the central portion of the site. Trees are present along this stream that provide good quality habitat in an otherwise urban/industrial area. Major habitat types identified during the site visit conducted by Parsons in May 2004 are summarized by Parsons (2006); these include successional fields, successional hardwoods, an artificial pond, and a ditch/channelized stream. The large central drainage ditch and numerous shallow ditches convey surface water to discharge into adjacent open water bodies, mostly flowing to Back Creek, with very little surface water retained on the Depot. The ditches draining the Depot are small, intermittent, and support common wetland species like cattail and giant reed.

2017 Habitat Assessment

A qualitative habitat assessment for the areas of the Depot for which a SLERA was performed was conducted on 16 November 2017 (Appendix L; EA 2018). The purpose of this assessment was to record habitat aspects for each of the eight ECs and the Unnamed Tributary to be included in a revised SLERA. A biologist surveyed the site and documented each of the eight EC areas for size, percent impervious cover (e.g. asphalt, concrete pads, etc.), vegetation present, evidence of invertebrate or wildlife use, mammals and birds observed, and recorded photographs

documenting these observations. The Unnamed Tributary was also surveyed and evidence of use by aquatic organisms as well as the aquatic habitat quality was documented.

In general, the overall habitat value of the Former Curtis Bay Ordnance Depot site is considered low quality due to the altered habitat, lack of native vegetation, and the on-going adjacent human activity. However, good quality terrestrial and aquatic habitat also exists at the site, as supported by the wildlife observations and habitat recorded during the one-day survey conducted in November 2017. The site offers habitat for common species of flora and fauna that have adapted to urban and disturbed habitats. Successional Old Field Habitat was dominant at the majority of the EC areas and is the main habitat type present at the Former Curtis Bay Ordnance Depot. Successional Old Field Habitat attracts a wide variety of early-successional dependent birds and mammals as evidenced in this report, including many ground and shrub nesting songbirds, American woodcock, and Eastern cottontails. The loss of this habitat through conversion to other land uses, residential development or through succession, results in the decline and disappearance of wildlife that are dependent upon early-successional habitats (Teft 2014). The presence of Successional Old Field Habitat in an otherwise urban and industrial area near the City of Baltimore is unique and provides habitat value to numerous wildlife species.

Four types of land use/vegetative cover were observed within the nine areas included in the 2017 habitat assessment: successional old field habitat (including upland meadow); riparian forest habitat; wetlands and waters of the U.S.; and abandoned structures. There is one natural area present within the survey boundary of the site. A narrow and forested riparian area exists along the existing Unnamed (perennial) Tributary to Back Creek in the central portion of the site. Trees are present along this stream that provide good quality habitat in an otherwise urban/industrial area.

The paragraphs below summarize the general habitat types observed at the site during the November 2017 Habitat Assessment.

Successional Old Field Habitat

The majority of the undeveloped lands within the habitat assessment area is characterized as successional old field areas that include upland meadow habitat. This habitat type occurs in areas in which the vegetation and/or soil have been altered by clear-cutting, grading, draining, mowing, or other activities commonly associated with land management practices, such as succession which occurs on abandoned farmland. This environment is first colonized by a group of species called pioneer species. The vegetative cover in these areas is limited to herbaceous species common to recently or routinely disturbed areas and includes numerous nuisance exotic and opportunistic species known as weeds. Pioneer species are usually characterized by having long-lived seeds capable of remaining dormant in the soil for many years, long-range dispersal ability, and the ability to utilize resources rapidly, allowing them to grow and reproduce quickly (Rutgers 2017). It has been proposed that the Depot may have been planted with a commercial mixture of grass and forb species commonly used on fallow agricultural lands to enrich the soil, provide forage for wildlife, and prevent erosion (Parsons 2006). All upland areas within the EC areas surveyed that do not support a shrub or tree stratum exceeding 50% cover are grouped into this classification, including fallow meadows with scattered, young tree species. This vegetation classification provides excellent habitat for the white-tailed deer which were often observed

foraging in the old field areas as well as red fox. Other species that may also utilize this habitat include eastern cottontail rabbit, ground hog, and many types of songbirds.

Forested Riparian Habitat
There is one historic natural area present within the boundaries. A narrow and forested riparian area exists along the existing unnamed perennial tributary to Back Creek in the central portion of the site. Deciduous and mature canopy trees are present along this stream that provide good quality habitat compared to the adjacent urban/industrial area.

Wetland Communities and Waters of the U.S. Habitat
The wetlands within the survey area have historically been altered by previous land management practices. Based upon review of aerial photographs, the natural creeks have been straightened and channelized, and former wetland areas have been drained and filled in the project area. The remnant wetlands that currently exist at the site included in the November 2017 survey convey and/or retain stormwater during rain events and have little habitat value due to their lack of native vegetation, their intermittent water regime, and their small size. The northeastern portion of the project drains to the east to discharge into Curtis Creek. The Unnamed Tributary, a small, perennial stream, bisects the central portion of the site and drains to Back Creek, Furnace Creek, then ultimately flows to Curtis Creek. In the eastern portion of the site, just west of the culvert under Yard Office Road, a shallow wetland has formed in a depression. This wetland is man-made and too small to provide significant wildlife habitat for species other than small mammals.

Abandoned Structures
The features included in this category include previously developed and now abandoned roadways, buildings, industrial areas, and railroad tracks, that provide very little ecological value. The Depot has a network of paved and gravel roads, although many are no longer used, are failing, and/or are overgrown. The roads do not offer forage opportunities for most species but do provide basking areas for ectothermic species during cooler weather, and therefore, offer prey opportunities for certain predators. Deer and other mammals likely use the roads as game trails (Parsons 2006); during the November 2017 Habitat Assessment, an Eastern cottontail rabbit was observed dead on Furnace Creek Road. The abandoned buildings within the Depot may provide nesting habitat for barn swallows, roosting sites for bats, and shelter for small mammals (Parsons 2006). No wildlife species were observed in abandoned buildings during the November 2017 Habitat Assessment. No other habitat utilization of the abandoned buildings was observed. Abandoned railroad tracks within the habitat assessment area were largely overgrown and provided little habitat.

Rare, Threatened, and Endangered Species
No rare, threatened, or endangered species or rare habitats have been documented at the Depot (EA 2011; Parsons 2006; CEHNC 2011). Two protected plant species are known to occur in the Depot area including: swamp pink (*Helonias bullatai*) (state listed endangered, federally listed threatened) and dwarf iris (*Iris verna*) (state listed endangered) (USACE 2011).

Sensitive bird species, such as the formerly federally-endangered peregrine falcon (*Falco peregrinus*), the state-threatened and formerly federally-threatened bald eagle (*Haliaeetus leucocephalus*), and the osprey (*Pandion haliaetus)* have been recorded breeding in the vicinity

(two to four miles) of the Depot (Parsons 2006; CEHNC 2011). Although these species may potentially be found foraging in habitats adjacent to the Depot, suitable breeding and roosting habitat for these species does not exist on-site (Parsons 2006; CEHNC 2011).

The Depot is not within the recorded range of most rare, threatened, or endangered fish, reptile, or amphibian species in Maryland (Maryland Department of Natural Resources [MDNR], 2007 and 2010). Additionally, the Depot does not contain suitable habitat for species of interest that do occur within Anne Arundel County, such as the state-endangered eastern tiger salamander (*Ambystoma tigrinum*) and the state-rare northern scarletsnake (*Cemophora coccinea copei*).

3. PROJECT INVESTIGATION APPROACH

An overview of the general approach for the field activities is including in this section. EC specific investigation activities are included in each EC chapter.

3.1 DATA NEEDS AND DATA QUALITY OBJECTIVES

Data were needed to assess the nature and extent of potential HTW/MC contamination or MEC hazards resulting from past practices at the Depot. Data obtained included DGM surveys; intrusive investigations to identify location, density, and types of MEC; and environmental sampling to determine the distribution and concentrations of metals, polycyclic aromatic hydrocarbons (PAHs), dioxins/furans, and explosives, in soil, sediment, surface water and groundwater. These data were used to quantify risks to human health and the environment and assess MEC hazards.

Data Quality Objectives (DQOs) are qualitative and quantitative statements that specify the quality and level of data required to support the decision-making processes for a project. The DQOs were developed to support the project objectives discussed in Section 1.1.

DGM and intrusive investigations are the primary means of identifying the nature and extent of MEC contamination and environmental sampling is the primary means for identifying the nature and extent of HTW/MC contamination. The DQOs for the DGM and intrusive investigation, and environmental sampling for each EC are presented in the EC-specific chapter. In addition, laboratory analytical DQOs for environmental sampling were presented in the Uniform Federal Policy (UFP) Quality Assurance Project Plan (QAPP), which is Appendix E to the Work Plan (ERT 2013) and Appendix E of the Final Work Plan Addendum (EA 2019). All DQOs were reviewed and accepted by the PDT prior to the commencement of field activities.

3.1.1 Conceptual Site Models

The CSM is used to communicate and describe the current state of knowledge and assumptions about risks at a project site. The IRP CSM presents the exposure pathway analysis by integrating information on the HTW source, receptors, and pathways. The preliminary IRP CSM indicated the potential for site workers, construction, workers, trespassers, groundwater, and biota to be exposed to HTW in surface and subsurface soil at IRP ECs, as well as theoretical future residents and construction workers to MC in groundwater.

The MMRP CSM presents the exposure pathway analysis by integrating information on the MEC and MC source, receptors, and receptor/MEC interaction. The preliminary MMRP CSM indicated the potential for site workers, construction workers, trespassers, groundwater, and biota to be exposed to MC and MEC in surface and subsurface soil at MMRP ECs, and theoretical future residents and construction workers to MC in groundwater.

Revisions to the preliminary CSMs, based on the RI findings, are presented in Section 32 of this report. Figures 4 and 5 of Appendix A present the revised CSMs in diagram format.

3.2 CHARACTERIZATION OF MC/HTW

3.2.1 General Approach

All sampling was conducted in accordance with the Final Work Plan (ERT 2013), the Work Plan Addendum (ERT, 2015), and sampling memoranda dated 5 January 2016 and 9 February 2016. Field activities were conducted between 11 June 2013 through 4 September 2013, 21 September 2015 through 9 October 2015, 19 January 2016 through 22 January 2016, and 8 February 2016 through 10 February 2016. In addition, EA prepared a 2019 Work Plan Addendum that pertained to the incremental sampling effort.

3.2.2 Comparison Criteria

As detailed in the Final Work Plan (ERT 2013), data results were compared against USEPA RSLs for Industrial Soil, USEPA Maximum Contaminant Levels (MCLs) for groundwater, background data from prior Depot investigations, and additional background samples collected in 2013. MDE issued the *Lead (Pb) Soil Screening Update* effective July 1, 2020 and this guidance was incorporated into this RI and HHRA where appropriate.

3.2.2.1 Background Screening Concentrations

The original evaluation of background screening concentrations for metals (Parsons 2006) and ERT (2013) used the 95% UCL, as was previously done during prior investigations at the Depot (ERT 2013). However, based on new guidance (ProUCL Version 5.0.00 Technical Guidance, USEPA September 2013), ERT re-evaluated the background location results to derive background threshold values (BTVs) for metals and PAH compounds in the surface and subsurface soil. The UCL is a central tendency statistic which is inappropriate for comparison to individual sample results but may be used as a comparison to site UCL data. In order to screen individual sampling results, ProUCL (USEPA, 2013a) guidance recommends using an upper tolerance limit, upper prediction limit, or upper simultaneous limit as the BTV. The upper prediction limit, upper tolerance limit, and upper simultaneous limits each provide an estimate of the value below which the majority of the background population is expected to fall. The BTVs were derived using ProUCL version 5.0.00; details of the re-evaluation are provided in the Work Plan Addendum (ERT, 2015).

In order to provide data for the calculation of BTVs for comparison of site soil PAH results, ERT collected nine surface and subsurface soil samples in September 2013 from the same background locations used to provide analytical data for the calculation of BTVs for metals (Parsons 2006). Background location BG-SB05 was not sampled for PAHs due to the presence of asphalt. Background soil samples were collected and submitted for laboratory analysis of PAHs.

Background surface (sample interval 0-0.5 ft bgs) and subsurface (sample interval 2-4 ft bgs) soil metals (Parsons 2006) and PAH (ERT 2013) sampling results were analyzed to derive BTVs using ProUCL version 5.0.00 (ERT, 2015). BTVs were used in conjunction with the USEPA RSLs to develop PSLs, defined as the greater of Curtis Bay BTVs or the RSLs for Industrial Soil (USEPA, November 2015). PSLs were used to determine whether releases had occurred at ECs.

The data summary tables for the background surface and subsurface soil samples are presented in Appendix E-2. BTVs are presented in Tables 3-1 and 3-2.

Table 3-1. Background Threshold Values (BTVs) for Metals

Analyte	Surface Soil BTV (mg/kg)	Subsurface Soil BTV (mg/kg)
Aluminum	14,159	18,404
Antimony	0.95	0.68
Arsenic	9.09	9.26
Barium	93.2	57.85
Beryllium	0.6	0.55
Cadmium	0.17	ND
Calcium	6,171	1,225
Chromium	24.9	35.16
Chromium, Hexavalent	10.0	2.6
Cobalt	10.2	6.57
Copper	32.83	14.44
Iron	18,049	23,822
Lead	123.9	13.96
Magnesium	2,475	2,348
Manganese	699.8	681.6
Mercury	0.11	0.087
Nickel	15.95	14.0
Potassium	696	678.6
Selenium	0.94	1.03
Silver	0.66	ND
Sodium	176.7	286.5
Thallium	1.2	ND
Tin	3.9	0.37
Vanadium	48.33	191.1
Zinc	83.92	44.64

Table 3-2. Background Threshold Values (BTVs) for Polynuclear Aromatic Hydrocarbons (PAHs) in Soil

Analyte	Surface Soil BTV (µg/kg)	Subsurface Soil BTV (µg/kg)
Acenaphthene	41.5	0.92
Acenaphthylene	363	2.38
Anthracene	154	2.63
Benzo(a)anthracene	1,035	16.31
Benzo(a)pyrene	1,036	11.91
Benzo(b)fluoranthene	1,116	23.14
Benzo(ghi)perylene	708	6.8
Benzo(k)fluoranthene	476	5.37
Chrysene	842	20.56
Dibenz(a,h)anthracene	152	2.53
Fluoranthene	1,488	24.95
Fluorene	40	31.7
Indeno(1,2,3-cd)pyrene	928	6.22
Naphthalene	13.3	2.2

Table 3-2. Background Threshold Values (BTVs) for Polynuclear Aromatic Hydrocarbons (PAHs) in Soil

Analyte	Surface Soil BTV (µg/kg)	Subsurface Soil BTV (µg/kg)
Phenanthrene	500	10.85
Pyrene	1,117	19.95

3.2.2.2 USEPA Regional Screening Levels for Industrial Soil

Industrial soil screening levels (SSLs) were available in the published USEPA RSL tables for the majority of analytes detected in soil and sediment. For chemicals not listed in the RSL table, surrogate compounds with similar chemical structures were used. The screening tables list all surrogates used. RSLs for analytes known to be carcinogens were developed to correspond to a screening incremental cancer risk level of 10-6 and the non-carcinogenic analytes were developed to correspond to a hazard index (HI) of 0.1.

Table 3-3. Regional Screening Levels (RSLs), Background Threshold Values (BTVs), and Project Screening Levels (PSLs) for Metals and Polynuclear Aromatic Hydrocarbons (PAHs) for Surface and Subsurface Soil

Analyte	Unit	RSL	Surface BTV	Subsurface BTV	Surface PSL	Subsurface PSL
Metals						
Aluminum	mg/kg	110,000	14,159	18,404	110,000	110,000
Antimony	mg/kg	47	0.95	0.68	47	47
Arsenic	mg/kg	3	9.09	9.26	9.09	9.26
Cadmium	mg/kg	98	0.17		98	98
Chromium	mg/kg	6.3*	24.9	35.16	24.9	35.16
Chromium, Hexavalent	mg/kg	6.3	10	2.6	10	6.3
Cobalt	mg/kg	35	10.2	6.57	35	35
Copper	mg/kg	4,700	32.83	14.44	4,700	4,700
Iron	mg/kg	82,000	18,049	23,822	82,000	82,000
Lead[1]	mg/kg	800	123.9	13.96	800	800
Manganese	mg/kg	2,600	699.8	681.6	2,600	2,600
Mercury	mg/kg	4.6	0.11	0.087	4.6	4.6
Nickel	mg/kg	2,200	15.95	14	2,200	2,200
Zinc	mg/kg	35,000	83.92	44.64	35,000	35,000
PAHs						
Acenaphthene	µg/kg	4,500,000	41.5	0.92	4,500,000	4,500,000
Acenaphthylene	µg/kg	2,300,000	363	2.38	2,300,000	2,300,000
Anthracene	µg/kg	23,000,000	154	2.6	23,000,000	23,000,000
Benzo(a)anthracene	µg/kg	2,900	1035	16.31	2,900	2,900
Benzo(a)pyrene	µg/kg	290	1036	11.91	1,036	290
Benzo(b)fluoranthene	µg/kg	2,900	1116	23.14	2,900	2,900
Benzo(ghi)perylene	µg/kg	2,300,000	708	6.8	2,300,000	2,300,000
Benzo(k)fluoranthene	µg/kg	29,000	476	5.37	29,000	29,000
Chrysene	µg/kg	290,000	842	20.56	290,000	290,000
Dibenz(a,h)anthracene	µg/kg	290	152	2.53	290	290
Fluoranthene	µg/kg	3,000,000	1488	24.95	3,000,000	3,000,000
Fluorene	µg/kg	3,000,000	40	31.7	3,000,000	3,000,000

Table 3-3. Regional Screening Levels (RSLs), Background Threshold Values (BTVs), and Project Screening Levels (PSLs) for Metals and Polynuclear Aromatic Hydrocarbons (PAHs) for Surface and Subsurface Soil

Analyte	Unit	RSL	Surface BTV	Subsurface BTV	Surface PSL	Subsurface PSL
Indeno(1,2,3-cd)pyrene	µg/kg	2,900	928	6.22	2,900	2,900
Naphthalene	µg/kg	17,000	13.3	2.2	17,000	17,000
Phenanthrene	µg/kg	2,300,000	500	10.85	2,300,000	2,300,000
Pyrene	µg/kg	2,300,000	1117	19.95	2,300,000	2,300,000

*As a conservative measure, the RSL for chromium, hexavalent is used when sample analysis does not included chromium, hexavalent. The RSL for chromium, trivalent is 180,000 mg/kg.
[1]The Industrial RSL value is included in this table because it was utilized in the determination of the PSL value. The HHRA utilized the values in the *Lead (Pb) Soil Screening Update* (July 2020 MDE).

3.2.3 Soil Sampling

Discrete surface and subsurface soil samples were collected at locations within the MMRP and IRP EC sites as outlined in the Work Plan (ERT 2013), Work Plan Addendum (ERT, 2015) and 2016 sampling memorandum. Analytes collected from each EC were based on historical activities at each EC; this is detailed in Appendix H of the Final Work Plan (ERT 2013). Sample analysis was determined based on historical use of each EC (Section 3.2.2).

All soil samples were collected using discrete sampling methods in accordance with the Work Plan (ERT 2013) and Work Plan Addendum (ERT, 2015). Surface soil sampling was conducted using dedicated disposable plastic scoops and all surface samples were collected from 0 to 0.5 ft bgs. Subsurface soil sampling was conducted using a hand auger or direct push technology (DPT) where the subsurface soil sample was collocated with a groundwater sample. Subsurface soil sampling depths ranged from 1 to 9 ft bgs depending on the historical use of each EC, depth to saturated soil (all samples were collected above the saturated soil), and analytical sampling results.

3.2.4 Sediment and Surface Water Sampling

Four discrete sediment samples and four surface water samples were collected from the Unnamed Tributary. The discrete sediment and surface water sampling locations were co-located. Discrete sediment samples were collected using the hand auger, while surface water samples were collected using a dipper. Initial sampling at the tributary was conducted during the 2013 field activities. However, due to a laboratory error, the discrete sediment and surface water samples were not extracted within analytical method holding time. The tributary was resampled during the 2015 field activities. The 2015 tributary analytes included: PAHs, pentachlorophenol, PCBs, dioxins/furans, metals (aluminum [Al], arsenic [As], cadmium [Cd], cobalt [Co], chromium [Cr], hexavalent chromium [Cr+6], copper [Cu], mercury [Hg], magnesium, nickel [Ni], lead [Pb], antimony [Sb], titanium [Ti], and zinc [Zn]), explosives (2,4-dinitrotoluene [2,4-DNT], 2,6-dinitrotoluene [2,6-DNT], 2,4,6-trinitrotoluene [TNT], nitroglycerin nitroguanidine), solvents, and herbicides.

Sediment was sampled at the Unnamed Tributary, EC-21, EC-58B and a background location, by EA in 2019 using incremental sampling methodology (ISM). The incremental sampling and analysis plan and DQOs for the Unnamed Tributary are described in the March 2019 Final Work Plan Addendum (EA 2019), and are summarized in Table 3-4 in Section 3.2.6 below, Chapter 18 (Table 18-2A), Chapter 26 (Table 26-2A), and Chapter 30 (Table 30-1). Incremental sediment sample results from the Unnamed Tributary are presented in Appendix E-6.

3.2.5 Groundwater Sampling

As detailed in the Final Work Plan (ERT 2013), ERT employed the use of point-in-time wells to collect groundwater samples from the ECs during the 2013 field activities. Point-in-time wells were installed using a DPT, and the goal was to collect the water at that specific sampling location with limited purging. The point-in-time wells were not screened. Groundwater samples were not collected at EC-16 (transformers) as the only parameter analyzed were PCBs, which are typically not available for leaching to groundwater due to adherence to soils or evaporation (USEPA, n.d.). The groundwater sampling locations for the IRP ECs were determined during ERT and CENAB's 20 December 2012 site visit, summarized in the Site Visit Memorandum (Appendix H). These groundwater sampling locations were co-located with one or more of the soil samples to be collected. The groundwater sampling location was downgradient from the building/source area. For the MMRP ECs, the locations and depth of the groundwater sampling locations were biased based on DGM data, MEC/MPPEH and MD finds, and field observations of the soil samples. The 19 August 2013 memorandum provides the rationale for the placement of the MMRP EC groundwater sampling locations (Appendix I).

Groundwater samples were collected directly into the laboratory supplied sample bottles from the Teflon-lined polyethylene tubing that is connected to the low-flow peristaltic pump utilized.

While the point-in-time wells were purged, the turbidity results from some of the samples collected from the point-in-time wells were high, which could have biased the results from these samples. Turbidity may be caused by suspended solids. Metals, some SVOCs, petroleum hydrocarbons, and PCBs easily adsorb to the suspended particles. Therefore, the presence of suspended solids in groundwater can lead to false positive analytical results and may not be representative of actual groundwater conditions (USEPA, 2005a). In order to accurately characterize potential release to groundwater from past site activities at the Depot, at any EC where the point-in-time groundwater results were at concentrations greater than the PSLs, temporary monitoring wells were installed, developed, purged, and sampled in accordance with the Work Plan and ERT's SOPs provided in the UFP-QAPP (ERT 2013). These results were used in place of the 2013 results. Reported analytical results for point-in-time wells that were not proposed for resampling were less than PSLs in spite of high turbidity readings (and therefore possible high bias of the analytical results). Because the reported analytical results were less than PSLs, it can be concluded that the groundwater at these locations has not been impacted by site activities. Temporary monitoring wells were installed at the following ECs in 2015: EC-3, EC-21, EC-22, EC-25, EC-27, EC-28, EC-29, EC-31, EC-32, EC-33, EC-34, EC-49, EC-52, EC-57D, and EC-58C. The temporary groundwater wells were installed with a DPT and screened over a 5 ft interval; the screen ended 1 ft above the bottom of the well. The temporary wells were not sampled until at least 24 hours after installation. Groundwater parameters (pH, temperature, dissolved oxygen [DO], specific conductance, oxidation reduction

potential [ORP], and turbidity) were monitored with the water quality meter during purging of the wells. The wells were purged until the turbidity of the sample was less than 20 NTU. The groundwater samples collected in 2015 were analyzed for total and dissolved metals.
During the 2013 field activities, groundwater samples could not be collected from EC-57B (Brass and Steel Area Building 1022) as the sampling points were too close to the building for drill rig access. As the groundwater from EC-34 was resampled in 2015 and this location is next to EC-57B, the EC-34 groundwater location was used to represent both ECs. The groundwater was analyzed for the parameters for EC-34 and EC-57B. Sampling locations for these 2015 wells were offset from the original sampling location by approximately 1 ft.

3.2.6 Background Sampling

Nine background soil surface and subsurface samples (Figure 2) were collected at each of the Parsons background locations to develop a supplemental background dataset for PAHs due to the possibility of contamination from PAHs on the Depot soil from surrounding industries and activities.

Background sampling was conducted after the 2013 EC sampling in order to determine if there were variances within the soil horizon, such as distinct soil layers or varying grain size throughout the soil profile. As the soils were determined by visual survey to be homogenous throughout the profile to the extent of the deepest subsurface samples collected during EC sampling, the Parsons FRI background metal results were used for comparisons. The PAH background samples were collected from the surface and subsurface background locations; the subsurface were collected from 3-4 ft bgs to match the depth at which the Parsons FRI metals samples were collected.

Background groundwater samples were collected from a well on U.S. Army Reserve property on 9 September 2013 and 8 October 2015.
An incremental background sediment sample was collected in April 2019 (Figure 2a).

Table 3-4. DQO – Supplemental RI Incremental Sampling at the Background Sediment Location

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To obtain background ISM sediment data.
Data User Perspective(s)	To obtain background ISM sediment data and incorporate the data into the SLERA.
Contaminant or Characteristic of Interest	None.
Media of Interest	Sediment
Required Sampling Locations or Areas and Depths	A. Background location – one incremental sample (30 increments in triplicate) of sediment at background location; analyze for TAL metals, PAHs, dioxins/furans (Figure 6)
Number of Samples Required	See A above
Reference Concentration of	USEPA Regional Screening Levels (RSLs), USEPA Region III

Table 3-4. DQO – Supplemental RI Incremental Sampling at the Background Sediment Location

Data Quality Objective Element	EC-Specific DQO Statement
Interest or Other Performance Criteria	Biological Technical Assistance Group (BTAG), USEPA Region 4 Ecological Screening Values, USEPA Ecological Soil Screening Levels (Eco SSLs), and Curtis Bay background dataset (see EA 2019 Work Plan QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine chemicals of potential ecological concern (COPCs) and chemicals of potential ecological concern (COPECs) for the risk assessment.
Sampling Method	ISM
Analytical Method	TAL Metals (Method 6020A, 7471B), PAHs (Method 8270 SIM), and dioxins/furans (Method 8290)

3.3 CHARACTERIZATION OF MEC/MPPEH

3.3.1 General Approach

As described in the following sections, geophysical and intrusive investigations occurred in the MMRP ECs (EC-21, EC-22, EC-25, EC-49, EC-52, EC-57C, EC-58B, EC-58C). Due to the possibility of burial pits at most MMRP sites, 100% geophysical coverage was the goal, to be followed by intrusive investigation by trenching at selected anomalies or anomaly clusters. A major previous geophysical effort by MKM Engineering in 1999 covered substantial portions of most ECs, as well as many areas outside of the EC boundaries, and therefore ERT's geophysical effort was essentially to fill in gaps between areas covered by MKM. While the original Geonics EM61 was used by MKM for the survey, ERT used the more-sophisticated, but similar EM61-MK2A for most of the work. The Geonics EM31 was used at two sites due to slightly different DQOs for those sites.

Daily reports, which summarize all field activities for each day of investigation, are presented in Appendix C-1.

3.3.2 Equipment

Geophysical and navigational equipment used to identify locations for intrusive investigation are listed below. The excavator, which was used during parts of the investigation, is described briefly as well.

- Geonics EM61-MK2A: This is a time-domain electromagnetic device consisting of a computer, data logger (Juniper Systems Allegro CX), and cart assembly that carries an upper and lower copper coil towed on wheels. This instrument measures the response of the immediate area to a primary pulsed electromagnetic (EM) field, generated in the lower copper coil, in units of millivolts. The EM61-MK2A is able to discriminate between surface and subsurface conductive materials more efficiently than most other metal detection devices. The device was integrated with the Real Time Kinematic (RTK) global positioning system (GPS) or Robotic Total Station (RTS) (both described below)

for navigation, or without a navigation device under tree canopy. Note that this device is not to be confused with the original Geonics EM61, which was used by MKM Engineering for the 1999 geophysical survey.

- Geonics EM31: This is a frequency-domain electromagnetic device consisting of a computer, data logger (Juniper Systems Allegro CX), and the transmitter and receiver coils, which are carried by the operator. This instrument measures the response of the immediate area to an EM field, generated by the transmitter coil. The EM31 measures both the quadrature component (ground conductivity) in units of milliseimens per meter and in-phase component (metal detection) in units of parts per thousand. The device was integrated with the RTK GPS (described below) for navigation.

- Schonstedt GA-52Cx: This magnetic locator is a hand-held gradiometer that detects the magnetic field of a ferromagnetic object. The instrument controls consist of an on/off sensitivity switch with four sensitivity settings and a volume control. It responds to the difference in the magnetic field between two sensors spaced about 0.51 meters (m) apart. The response is a change in the frequency of the signal emitted by the piezoelectric speaker. The instrument provides audio detection signals that peak in frequency when the locator's tip is held directly over the target. The locator can be oriented in any direction without producing a significant change in the frequency of the tone from its idling frequency. The GA-52Cx was used by qualified UXO personnel for instrument-assisted surface clearance, anomaly avoidance, and for intrusive clearance.

- Topcon RTK GPS: The HiPerGa model of Topcon RTK GPS was used in the MMRP ECs, and controlled with a Juniper Systems Allegro CX field computer running Carlson SurvCE software. High-powered systems were used, transmitting at up to 35 Watts. The base station was set up daily at point "CP1" or "CP3" listed in the surveyor report (Appendix D). The rover was integrated with the EM61-MK2A or EM31. It was also used to stake out proposed trench locations in all MMRP ECs and capture ground elevations of certain soil samples in EC-21.

- Leica RTS: The RTS was integrated with the EM61-MK2A for the DGM survey of several MMRP ECs and associated instrument verification strip (IVS). It consists of a robotic base station with laser rangefinder that automatically tracks a rover prism. The base station was set up by resection using two points staked by licensed surveyors (listed in Appendix D). The rover prism was mounted on a tripod directly above the center of the EM61-MK2A coils.

- Trimble GeoXH GPS: The GeoXH is a hand-held GPS of sub-meter accuracy. It was used by the sampling team to find and record final soil sample locations.

- Compact excavator: A Bobcat E32 compact excavator was used to complete shallow trenching operations in the MMRP ECs. A larger excavator was used to complete deeper excavations that became necessary in EC-25 and EC-49.

3.3.3 Geophysical Investigation Process

All MMRP ECs were geophysically surveyed with 100% coverage, except where steep slopes, dense vegetation, or standing water prohibited it, within the boundaries of the EC defined by USACE. As described in Section 1.4.1, many areas were previously mapped by MKM in 1999. As described in the Final Work Plan (ERT 2013), ERT georeferenced the MKM data and determined the extent of new survey area. The areas surveyed by MKM were not re-surveyed.

In addition, the geophysical survey coverage was expanded beyond the EC boundary in several instances. It was suspected prior to fieldwork that contamination of EC-25 and EC-49 would be similar, and so the area between the two EC's was geophysically surveyed. It was also possible that contamination in EC-25 and EC-49 extended to the north, and so transects spaced 50 ft apart and extending up to 150 ft to the north were collected. In EC-22, there was an area to the east of barricade 646-XK that was outside the EC boundary as defined by USACE, but which had not been surveyed by MKM, and this data gap was filled. The area surveyed for EC-58B was also expanded to cover the extent of an open pit discovered by aerial photograph analysis, as described in the work plan (ERT 2013).

Prior to the DGM survey, surveyors licensed in the state of Maryland staked out perimeter points and interior grid corner points within each EC while escorted by a UXO Technician for anomaly avoidance. Grids were given individual names for ease of data management, as detailed in the Final Work Plan (ERT 2013).

Per the DQO for DGM investigations, an approximate spacing of 2.5 ft was used for the EM61-MK2A survey with a data collection rate of 10 Hertz. Navigation was accomplished by RTK GPS in open areas, RTS in semi-open areas, and by fiducial methods (with tapes and flags) in areas with dense vegetation. Figures showing EM61-MK2A data are presented in Appendix B-1.

Per the DQO for DGM investigations, an approximate spacing of 15 ft was used for the EM31 survey with a data collection rate of 5 Hertz. Navigation was accomplished by RTK GPS. Figures showing EM31 data are presented in Appendix B-1. All MMRP ECs were geophysically surveyed with 100% coverage, except where steep slopes, dense vegetation, or standing water prohibited it, within the boundaries of the EC defined by USACE. Table 3-5 provides a summary of the DGM coverage for the MMRP ECs.

Table 3-5: Summary of DGM coverage in all MMRP ECs

EC	Total Area of EC (acres)*	MKM coverage (acres)	ERT coverage (acres)
21	10.41	6.78	2.58
22	2.76	1.16	1.12
25	7.63	5.11	3.31 ** (plus 5,507 linear ft of transects)
49	7.33	4.81	
52	5.02	4.69	0.31
57C	1.00	None	1.05
58B	2.27	None	2.22
58C	0.24	None	0.18

* Area of EC-21, EC-22, EC-25, EC-49, and EC-52 were defined by USACE. Area of investigation for EC-57C, EC-58B, and EC-58C were defined by ERT.
** The area within, surrounding, and between EC-25 and EC-49 were investigated essentially as a single area with respect to DGM.

3.3.4 Intrusive Investigation Process

DGM results were communicated to the PDT in the EC-25 and EC-49 Proposed Trench and Sampling Locations memorandum and finalized in a revised memorandum dated 29 July 2013 (Appendix I). Later, DGM results in other ECs were communicated to the PDT in another memorandum and finalized in a revised memorandum dated 19 August 2013 (Appendix I). The proposed trench locations are also presented in the memoranda. The number of trenches proposed for investigation in each EC are summarized in Table 3-6. Trenching and other excavations were conducted at several of the ECs in previous investigations, and these are noted on the table as well.

Approved trench locations were staked out by ERT using the RTK GPS. In a few cases the location or orientation of the trench was modified slightly from the approved location due to site conditions. Trenches were excavated by use of the compact excavator for most trenches and by a larger excavator for several deep trenches in EC-25 and EC-49. Excavation proceeded in lifts where a Schonstedt sweep was conducted over the trench, anomalies were removed by UXO personnel, and the base of the trench was advanced by removing 0.5 ft of soil at a time. This process was repeated until no subsurface metals were detected at the bottom of the trench, groundwater was encountered, or the on-site soil scientist identified native (undisturbed) soil. Trenches were approximately 20 ft long and 2 to 4 ft wide unless site conditions (fences, slopes, vegetation) required a smaller footprint.

Table 3-6: Summary of Trenches in all MMRP ECs

EC	Previous Investigation	Number of trenches or excavations (designations in parentheses) during previous investigations	Approved number of trenches (trench designations in parentheses) for this field investigation
21	Zapata 2009	5 trenches (1, 2, 10, 11, 12)	3 (A-C)
22	ORISE 2007	1 pit (removed radioactive material)	(soil samples only)
25	Zapata 2009	4 trenches (8, 9, 16, 18)	27 (1-3, 5-28)
49	MKM Eng. 1999	2000 cu. yd. surface soil removed and sifted	7 (A-H)
	Zapata 2009	6 trenches (5, 6, 7, 7A, 7B, 17)	
52	Zapata 2009	2 trenches (3, 4)	1 (A)
57C	none	0	(soil samples only)
58B	none	0	1 (A)
58C	none	0	3 (A-C)

In each trench a measured profile of the soil was drawn by the field team on graph paper. Soil color, grain size (clay, silt, sand, etc.), and moisture content were recorded. The locations of munitions-related items and other cultural features present in the trench wall were drawn on the

profile. A supplemental soil profile recorded the approximate location of each excavator bucket of soil, which were then examined thoroughly by the UXO staff for munitions-related items and noted on the excavation supplemental profile. Compiled soil profiles for all trenches are presented in Appendix C-2, which also contains the trench photographs.

Once uncovered, items were identified, catalogued, and segregated. Any excavated items identified and confirmed to be non-hazardous waste were placed in appropriate bins for recycling or disposal. Excavated soils were temporarily stored on plastic sheeting until completion of the investigation and then placed back into the trench.

3.3.5 Geophysical Quality Control

QC for the DGM survey consisted of installation of an IVS, use of quality control spikes at known locations, repeat lines, daily "static" and "spike" tests, and verification of GPS and RTS accuracy.

3.3.6 Instrument Verification Strip

Full documentation of the IVS is presented in the IVS Memorandum dated 28 June 2013, in Appendix I. The Memorandum was approved by USACE by email on 28 June 2013. The IVS is summarized here.

The IVS was located between EC-49 and EC-52 in a flat, grassy field. UXO personnel performed mowing and an instrument-assisted surface sweep of the area (see photograph 2, Appendix G). "Background" data were collected with the EM61-MK2A in a wide area (approximately 50 ft x 100 ft) in the approved location. A "clean" area with no anomalies existed in the center of the area, and ERT gained concurrence from USACE Baltimore District (CENAB) to install the line of seeds within that area.

Five industry standard objects (ISOs), or "seeds" were placed in the approved location the same day. Two small ISOs, two medium ISOs, and one large ISO were placed at depths ranging from 3.1 inches to 22.8 inches bgs, as shown in Table 1 of the Memorandum. This established the seed line, and a "noise" line was set up 6 ft away.

Data were collected daily on the IVS before and after data collection in the ECs using the EM61-MK2A. Results are presented in Appendix B-2.

3.3.7 Quality Control Tests

For both the EM31 and EM61, a static background test was performed to quantify instrument background readings or electronic drift, and to locate potential interference spikes in the time domain. A minimum of 3 minutes of static background data was collected after instrument warm up. The instrument operator monitored readings to confirm stability.

A vibration test, also known as a cable shake test, was used to identify shorting cables and problematic connectors. All cables were shaken for one minute with the instrument held in a static position. No spikes were identified during vibration tests.

A static standard response test ("spike test") was performed to determine impulse response and repeatability of the instrument to a standard test item. A minimum of 3 minutes of static standard response (spike) data was collected after the vibration test. For the EM31, the instrument was held in place next to the conex storage container. For the EM61-MK2A, a 12-inch long, 0.5-inch diameter piece of rebar was used, generally at the same location near the IVS. The instrument operator monitored readings to confirm stability. The acceptance criterion was ±20% of responses for the static spike test between pre-survey and post-survey tests.

All QC tests for the EM31 and EM61 are presented in Appendix B-3 (QC forms) and Appendix B-4 (QC charts).

3.3.8 Repeatability

Repeatability of the DGM data is documented by the IVS, as shown in Appendix B-2. Furthermore, repeat lines were collected with the EM61-MK2A in many grids. The results are shown in Appendix B-5.

3.3.9 Navigational Accuracy

RTK GPS was the preferred means of navigation during field activities. The base station was set up at point "CP1" or "CP3" with coordinates provided by a licensed surveyor, and the rover was always checked on the nearby point "CP2" or "CP4" to ensure the coordinates were correct and that the signal was "fixed" at the highest accuracy. These points are included in the surveyor report presented in Appendix D.

When the RTS was used, resection by use of two surveyed points was used to locate the RTS base, and the rover was checked on a third surveyed point for accuracy when possible, or at least on one of the two resection points. These points are included in the surveyor report presented in Appendix D.

When line and fiducial methods were employed for navigation, stakes set by licensed surveyors were used to set up tapes and flags. Distances between fiducial marks in the data files were normalized prior to submission of the data to the data processor.

As an additional navigational check in the grids, a "QC Spike" was utilized, where a small ISO or rebar was placed at a grid corner (with known coordinates), and the location was provided to the data processor to ensure the anomaly was detected at the correct location.

The GeoXH accuracy was not actively verified, but its use was limited to locating or recording soil sample locations.

3.3.9.1 Geophysical Data Processing

Data from the EM61-MK2A were stored in R61 or H61 format, which integrates the digital EM data with the GPS or RTS position data in real time. Similarly, data from the EM31 were stored in R31 format, which integrates the digital EM data with the GPS position data. The files were

transferred from the data loggers via flash card to a laptop. For line and fiducial data, the operator pre-processed the data in DAT61. Raw and pre-processed data files were emailed to the ERT Senior Geophysicist, who in turn, converted them to Geosoft .xyz format. QC review and analysis was performed using Geosoft Oasis Montaj with UX Detect, as follows:

- Latency corrections were performed based on instrument latency;
- Data were reviewed for precision, accuracy, response, completeness, and sensitivity. Line paths were plotted to evaluate across-track sampling in grids. A velocity map was generated to locate any areas where collection speed was above 3 miles per hour;
- EM61-MK2A data were gridded using the minimum curvature algorithm with a cell size of 0.5 ft; EM31 data were gridded using the minimum curvature algorithm with a cell size of 3.75 ft;
- A color map was produced from the gridded data; and
- Line paths were posted over the mapped data and reviewed for coverage completeness.

For EM61-MK2A data, only channel 3 data were used to construct maps. As discussed in detail in the Final Work Plan (ERT 2013), this was done in order for the EM61-MK2A data to be maximally comparable to the old EM61 data collected by MKM. The color scheme presented in the maps was designed to closely match the color scheme used by MKM as well.

For QC and interim reporting of the DGM data, Data Item Description MMRP-04-009 was followed, and the following file formats were provided to CENAB: .xyz, .gdb, .target-gdb, .map, and .grd.

Because the goal of the geophysical survey was to identify optimal locations for trenches, no individual anomalies were identified for excavation (i.e., no "dig sheet" was generated).

Contour maps of the geophysical data were generated, and these are presented in Appendix B-1.

3.3.10 Geophysical Uncertainty

Uncertainly in geophysical work occurs due to limitations in investigation methods and detection capabilities. Uncertainties associated with this RI include the following:

- Differences in the geophysical detectors used. The EM61 used by MKM Engineering was a simpler (single channel) instrument than the EM61-MK2 used by ERT (four channel). Furthermore, the EM61 had a 1 m x 1 m coil whereas the EM61-MK2 has a 1 m x 0.5 m coil (smaller footprint). Both of these instruments are time-domain electromagnetic instruments, while the EM31 is a frequency-domain instrument, and these devices detect metal in different ways.
- Limitations of geophysical detectors used. The EM61-MK2 and EM31 can detect metallic objects to various depths depending on size. For example, a 105mm round can

be detected by an EM61-MK2 at a depth of approximately over 1.8 m under low-noise conditions, but a 37mm round can be detected at a depth of approximately 0.6 m under the same conditions (National Research Laboratory, 2008), meaning that small items at depth are more likely to be left in the ground.

- Limitations of georeferencing historical DGM data from MKM Engineering. As discussed in Section 3.3.3 and in the Work Plan (ERT 2013), many reference points were located which were used to successfully georeferenced the MKM data; however, portions of the data (especially in the vicinity of EC-22) may have had moderate to low positional accuracy. This was compensated by ERT collecting data around peripheral areas of the historical data.

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4. INTRODUCTION TO RISK ASSESSMENT FOR MC/HTW, HAZARD ASSESSMENT FOR MEC

The risk assessments for the RI-level ECs at the Depot include both HHRAs and SLERAs. The risk assessments focus on MC/HTW only. The objectives of the risk assessments were to:

- Determine the potential risks posed to human health and the environment from chemicals detected at the ECs investigated for the Curtis Bay RI, and
- To support the determination of remediation alternatives for mitigation of potential risks at each individual EC, and for site-wide groundwater, including NFA.

The EC-specific HHRAs and SLERAs are in each individual EC section. This section presents the generic risk assessment approach.

The data used to support the risk assessment include background (as detailed in Section 3.1.2), surface and subsurface soil, groundwater, sediment, and surface water. All data results are provided in the EC-specific chapters following this chapter. The preliminary CSMs are detailed in Section 3.1.1.

4.1 GENERAL SITE DESCRIPTION

There are no DoD operations or other activities occurring within the ECs investigated at the Depot. All stockpiles have been removed from the Depot. The Depot's current features consist of warehouses in various stages of disrepair, concrete pads where warehouses once stood, a network of paved and gravel roads, numerous revetments, railroad tracks and vacated railroad beds, and a small area formerly used by the Baltimore City Police Department for canine training. The U.S. Army Reserve also traverses the Depot to access their Dock. Future Depot use is expected to remain industrial. Past Depot uses included receiving, shipping, storage, maintenance, and demilitarization of munitions.

4.2 CONTAMINANT SOURCES AND TRANSPORT MECHANISMS

Based on current and historical Depot use, the potential exists for MC and HTW constituents to migrate to the environment through surface runoff and other mechanisms. Previous investigations and reviews of Depot history have determined that potentially impacted media include surface soil (0-0.5 ft) and subsurface soil (1 to up to 9 ft bgs). In addition, groundwater, surface water, and sediment at the Depot could have been impacted by onsite activities.

4.3 POTENTIAL RECEPTORS

The potential receptor evaluation considered criteria such as:

- Current and future land use;
- Zoning status and/or deed restrictions of the Depot and adjacent properties;
- Current and future access to the Depot and to the affected media;
- Existing and/or planned exposure controls (e.g., engineered containment structures);

- Extent of development and vegetation;
- Potential for soils to be disturbed (e.g., soil-invasive activities).

Human

Currently, the Depot property is zoned W2-Light Industrial based upon current and past use of the property. Due to the limited use of the Depot property, potential human receptors at the Depot are likely limited to authorized site workers, which could include site workers and construction workers. Exposure intervals to surface soil were assumed to be from 0 to 0.5 ft bgs, and for subsurface soil exposures were assumed to be from 1 to up to 9 ft bgs depending on the EC. As noted previously in this report, subsurface sampling depths ranged from 1 to 9 ft bgs based on the historical use of each EC, depth to saturated soil with all samples collected above the saturated soil, and/or analytical sampling results. Although trespassers are not likely based on the limited access to the Depot, this receptor has been included in the CSM for completeness; however, trespassers would likely only intermittently access the site soils, sediment, and/or surface water for shorter time periods than would site workers. Because a lower exposure frequency is likely for trespassers, this receptor was evaluated qualitatively relative to site workers who would come to the site daily throughout the year.

Residential groundwater use was considered as a potential exposure pathway in the CSM although future residential use is unlikely (as described below). However, groundwater residential use is considered in the event there is a groundwater release, or a potable water well is installed within or immediately outside the Depot boundaries. Residential exposure was not considered for soil, because the Depot will be deed-restricted against residential use and allow commercial/industrial use only.

With regard to groundwater exposures, according to the SI (Parsons 2006), there are no drinking water wells at the Depot, however, residential groundwater use was assessed in the unlikely case this future use occurs. Drinking water in the Depot vicinity is provided by Anne Arundel County, using the Glen Burnie Well System. This system comprises 15 municipal drinking water wells located within a 4-mile radius of the Depot. The 15 wells tap into a semi-confined aquifer and serve the majority of the area. The system well nearest the Depot is on Glendale Road, approximately 2.5 miles west of the Depot. An estimated 250,000 people are served by this system. The depth of the well system aquifer is reportedly greater than 170 ft and approximately 167 people use private drinking water wells within 1 mile of the Depot. Reportedly, the nearest private drinking water well is 0.25 miles from the Depot (Parsons 2006). Shallow groundwater depths range from 1.71 (southern areas) to 62.82 (northern areas) ft bgs at the Depot (EA 2011). Surface water is not used as a potable water source in the Depot vicinity. In addition, it is noted in the HHRA that future construction workers could be exposed to groundwater during intrusive activities, although potential future contact for construction workers would be less than those assumed for future residential use as a tap/potable water supply.

Ecological

The environmental setting and ecological site description for the Depot is included in Section 2.1.8 and is summarized here. In general, the overall habitat value of the Depot site is considered low quality due to the altered habitat, lack of native vegetation, and the ongoing

adjacent human activity. However, good quality terrestrial and aquatic habitat exists at the site, as supported by the wildlife observations and habitat recorded during the one-day survey conducted in November 2017. The site offers habitat for common species of flora and fauna that have adapted to urban and disturbed habitats. Successional Old Field Habitat was dominant at the majority of the EC areas and is the main habitat type present at the Depot. Aquatic habitats in the following ECs were evaluated for ecological risk: EC-21, EC-58B, and the Unnamed Tributary.

Soil pH was recorded at each of the eight EC areas as well as the Unnamed Tributary. Toxicity from aluminum is dependent on the soil pH. Aluminum in soil with pH greater than 5.5 is not expected to pose risk to ecological receptors (USEPA, 2003b). pH at the site ranged from 5.8 to 8.0, thus aluminum is not expected to pose risk to ecological receptors and was eliminated from further evaluation.

Vegetation
Within the Depot ECs, vegetation primarily consists of highly disturbed open grassy areas. Several ECs along the property boundary, such as EC-22, contain small patches of successional woodland. Wetland-type vegetation patches and the largest woodland patches are located outside of the ECs identified for investigation. The terrestrial plant community has been selected for evaluation in the SLERAs.

Soil Invertebrates
Although some of the ECs consist of mostly impervious surfaces, the soil invertebrate community, represented by earthworms, has been selected for evaluation in the SLERAs.

Benthic Invertebrates
In areas where sediment samples were collected, the benthic invertebrate community has been selected for evaluation in the SLERAs.

Aquatic Organisms
In areas where surface water samples were collected, the aquatic organism community has been selected for evaluation in the SLERAs.

Wildlife
Wildlife receptors (e.g., mammals and birds) at the Depot were documented by Parsons (2006) and are not currently monitored or managed. These species have adapted to the lack of mature habitats and the prevalence of human activity. Abandoned buildings at the Depot provide breeding, roosting, and shelter habitats. Paved and gravel roads may provide basking areas for reptiles, and active and overgrown railroad tracks may provide trails for diurnal and nocturnal mammals. Wildlife species within 0.5 miles of the Depot are generally well-adapted to urban environments or highly-used open waterways. Surface water bodies and wetlands at the Depot do not provide suitable waterfowl habitat.

Common mammals at the Depot include white-tailed deer (*Odocoileus virginianus*), Eastern cottontail rabbit (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), Virginia opossum (*Didelphis* virginiana), and deer mouse (*Peromyscus maniculatus*). Various

bat species such as the little brown bat (*Myotis lucifugus*) may use abandoned Depot buildings as roosting sites (Parsons 2006).

Numerous resident and migratory birds tolerant of successional field and successional woodland habitats have been observed at the Depot by Parsons (2006) and ERT. Examples include American robin (*Turdus migratorius*), black vulture (*Coragyps atratus*), northern cardinal (*Cardinalis cardinalis*), and northern flicker (*Colaptes auratus*). Barn swallows (*Hirundo rustica*) nest within abandoned Depot buildings.

Common aquatic wildlife species include the eastern snapping turtle (*Chelydra serpentina*), which utilize larger drainage ditches at the Depot as well as the adjacent creeks (Parsons 2006).

As discussed in Section 2.1.8, no rare, threatened, or endangered species or rare habitats have been documented at the Depot (EA 2011; Parsons 2006; CEHNC, 2011).

4.4 POTENTIAL EXPOSURE MEDIA AND EXPOSURE PATHWAYS

Human

Current and future potential receptors for soil include site workers, construction workers, and trespassers. Residential exposures were evaluated for future use of groundwater as a tap/potable water supply. Residential exposure to soil was not assessed because a deed restriction will be placed on the Depot that restricts residential use and allow commercial/industrial use only.

The following bullets summarize the potential exposure media and exposure pathways for the HHRA:

- Surface soil (0-0.5 ft) is a potential current and future exposure pathway for site workers and trespassers (incidental ingestion, dermal contact, inhalation). Exposures for trespassers would be less than for site workers due to the intermittent contact trespassers would have with the Depot. Therefore, the trespasser is only evaluated qualitatively.

- Surface/subsurface soil (combined data for surface soil, 0 to 0.5 ft, and subsurface soil, 1 to up to 9 ft) is a potential future exposure route for construction workers who may contact mixed surface and subsurface soil (incidental ingestion, dermal contact, inhalation).

- Surface water and sediment are potentially complete pathways for site workers and trespassers (incidental ingestion, dermal contact, inhalation), although intermittent exposures for trespassers would be lower than those for site workers. Therefore, the trespasser is only evaluated qualitatively.

- Groundwater is a potential future complete pathway for construction workers during intrusive construction activities at the Depot (incidental ingestion, dermal contact, inhalation) due to the shallow depth of groundwater. However, exposures for construction workers to groundwater would be lower than those assumed for future residential use of groundwater as a tap/potable water supply.

- Groundwater could be an exposure route for future potential residential receptors (via drinking water ingestion, dermal contact, or inhalation), in the event there is a groundwater release that migrates offsite or if a potable water well were to be installed within or immediately outside the Depot boundaries. These scenarios are considered unlikely, since the Depot will be deeded to restrict residential use and only allow commercial/industrial use only. Additionally, a public potable water supply is available to the Depot and the surrounding area. However, these pathways were evaluated in the HHRA only if any chemicals of potential concern (COPCs) were identified in groundwater.

Table 4-1 summarizes the potential human receptors and exposure pathways for the Depot for MC. The pathways labeled "quantitative" are quantified in the HHRAs only if the constituents detected in these media exceeded their applicable medium-specific screening levels.

Ecological

Based on the ecological setting and media of concern discussed above, ecological receptors potentially present at the site include plants, soil invertebrates, wildlife (birds and mammals), benthic invertebrates, and aquatic organisms. Media of concern and ecological receptors are evaluated to determine potential exposure routes linking the two and to determine which pathways are complete and significant. The sections below identify the major routes of exposure and their applicability to each of these receptor groups.

For most terrestrial receptors, soil exposure intervals are limited to the upper 1 ft of the soil column, though some burrowing species and deep-rooted plants can be exposed to deeper soils. For the SLERAs, ecological risks are assessed for surface soil only (not subsurface soil), even though soils in the Depot are partially covered by pavement. Surface soil samples were collected from the top 6 inches; the absence of data from 6 to 12 inches is an uncertainty for the SLERAs. However, the "root zone" in the top 6 inches of soil reflects the habitat of the majority of ecological receptors (including plants and soil invertebrates), consequently while this is an uncertainty, it is likely not significant.

Ecological receptors are not directly exposed to contaminants in groundwater, although they may be indirectly exposed via plant uptake or exposed to surface water into which contaminated groundwater has discharged. As shown in the CSMs, exposure to groundwater was considered an incomplete pathway for ecological receptors at the Depot.

Potential migration of contaminants to sediment and surface water may occur via groundwater to surface water and/or sheet flow from soils to surface water. Exposure to surface water and sediment at the Depot was evaluated in the SLERAs for aquatic receptors. The SLERAs do not evaluate the wetlands or waterways surrounding the Depot.

Terrestrial Plants and Invertebrates

Terrestrial plants and invertebrates may be exposed to environmental media through direct contact. Plants may absorb chemicals from surface and subsurface soil via their roots. They may also absorb chemicals from air or airborne particles through their leaves, although the waxy

surfaces of leaves limit this exposure. Soil invertebrates may be exposed to chemicals in soil through direct contact, and chemicals may be absorbed from soil through the skin. Because the most organic matter is found in the top 0-6 inches, plant and invertebrate exposures are expected to occur primarily in surface soil. Therefore, exposure pathways linking plants and soil invertebrates to surface soil are complete and thus relevant for assessment.

Wildlife (Birds and Mammals)
The most significant exposure route for wildlife is ingestion of chemicals in contaminated media (EPA 2003a), which includes surface soil, sediment, surface water, and food items. Wildlife may ingest chemicals in environmental media by incidentally ingesting soil or sediment while grooming or foraging. Chemicals may bioaccumulate in animal tissues. Therefore, wildlife may also ingest chemicals through the animals that they consume as food. Ingestion of chemicals in soil/sediment, surface water, and/or food are considered complete and potentially significant exposure pathways for wildlife.

Wildlife may be exposed to chemicals in air, sediment, or water via direct contact during foraging or burrowing. Most wildlife have protective outer coverings such as fur, feathers, or scales that prevent or limit the dermal absorption of chemicals from environmental media (U.S. Army Center for Health Promotion and Preventative Medicine [USACHPPM] 2004). EPA guidance identifies that, in most cases, dermal exposures are likely to be less significant than exposures through ingestion, and their evaluation involves considerable uncertainty (EPA 2003a; USACHPPM 2004). This exposure route is considered complete but relatively insignificant for wildlife.

Inhalation is a potentially complete pathway for wildlife. These animals may inhale chemicals that have volatilized or that are adsorbed to airborne particulates. EPA guidance indicates that, in general, inhalation pathways are likely to be insignificant compared to ingestion pathways (EPA 2003a).

In summary, ingestion of chemicals in surface soil, sediment, surface water, and food are considered complete and significant exposure pathways for wildlife assessment in the SLERAs.

Aquatic and Benthic Organisms
Aquatic and benthic organisms may be exposed to chemicals in surface water and sediment through direct contact and absorption through the skin and gills. Direct exposure to these media is considered a complete and significant pathway for aquatic and benthic organisms, and therefore, relevant for the assessment of sediment and water exposures. While not quantitatively evaluated, aquatic organisms receive significant exposure via ingestion and food chain transfer of COPECs with biomagnification potential.

Table 4-1. Summary of Potential Human Receptors and Exposure Routes

Scenario Time Frame	Medium	Exposure Medium	Exposure Point	Receptor Populations	Recept or Age	Exposure Route	On-site/ Off-site	Type of Analysis[4]	Rationale for Selection or Exclusion of Exposure Pathway
Current and Future	Surface Soil[1]	Soil	Direct contact with surface soil outdoors at Curtis Bay Depot	Site Worker	Adult	Incidental Ingestion Dermal Contact Inhalation	On-Site	Quantitative	Under current site conditions, this exposure pathway is potentially complete.
				Construction Worker	Adult	Incidental Ingestion Dermal Contact Inhalation	On-Site	None	Construction worker is evaluated for contact with surface and subsurface soil combined.
				Trespasser	Adult	Incidental Ingestion Dermal Contact Inhalation	On-Site	Qualitative	The site worker scenario is a more conservative assessment of soil contact, due to longer exposure periods.
Future	Surface and sub-surface soil[2]	Soil	Direct contact with mixed surface/ subsurface soil outdoors at Curtis Bay Depot	Construction Worker	Adult	Incidental Ingestion Dermal Contact Inhalation	On-Site	Quantitative	In the future, these exposure pathways are potentially complete, if a release has occurred and construction occurs at the Depot.

Table 4-1. Summary of Potential Human Receptors and Exposure Routes

Scenario Time Frame	Medium	Exposure Medium	Exposure Point	Receptor Populations	Receptor Age	Exposure Route	On-site/ Off-site	Type of Analysis[4]	Rationale for Selection or Exclusion of Exposure Pathway
Current and Future	Surface water and sediment	Surface water and sediment	Direct contact with surface water and sediment in drainage channels	Site Worker	Adult	Incidental Ingestion Dermal Contact Inhalation	On-Site	Quantitative	Under current site conditions, these exposure pathways are potentially complete.
				Trespasser	Adult	Incidental Ingestion Dermal Contact Inhalation	On-Site	Qualitative	The site worker scenario is a more conservative assessment of surface water/sediment contact, due to longer exposure periods.
Future	Ground-water[3]	Ground-water	Theoretical Residential Use	Resident	Adult / Child	Ingestion Dermal Contact Inhalation	Off-Site	Quantitative	Although future use of groundwater from beneath the site is not expected, groundwater is considered a potential future pathway
			Construction	Construction Worker	Adult	Incidental Ingestion Dermal Contact Inhalation	Off-Site	Qualitative	In the future, these exposure pathways are potentially complete. However, the residential scenario is a more conservative assessment of groundwater risks.

1. Surface soil is defined as 0 to 6 inches.
2. Surface and subsurface soil is defined as 0 up to 9 ft bgs.
3. Future use of groundwater from beneath the site is not expected as the site will be deeded to restrict residential use and allow commercial/industrial, but this exposure route is included in the event there is a groundwater release or a potable water well is installed within or immediately outside the Depot boundaries.
4. The pathways labeled "quantitative" were evaluated in the risk assessment if the constituents in these media exceeded their applicable medium-specific screening levels media.

4.5 HHRA APPROACH

The HHRA for soil, surface water, sediment, and groundwater at each EC include the following steps:

- Identification of COPCs.
- Exposure assessment, including calculating exposure point concentrations (EPCs), and estimating the potential intake of COPCs.
- Identify toxicity information for each COPC.
- Characterize site-specific risks.
- Qualitatively discuss uncertainties associated with the HHRA.

The HHRA was prepared in accordance with USEPA and MDE guidance, as listed below. The HHRA used the following guidance documents:

- Risk Assessment Guidance for Superfund (RAGS), Volume 1, Human Health Evaluation Manual (Part A), Interim Final (USEPA, 1989);
- RAGS Volume I, Human Health Evaluation Manual (Part D) (USEPA, 2002a);
- RAGS, Volume I, Human Health Evaluation Manual (Part E), Supplemental Guidance for Dermal Risk Assessment, Final (USEPA, 2004);
- RAGS, Volume I, Human Health Evaluation Manual (Part F), Supplemental Guidance for Inhalation Risk Assessment (USEPA, 2009a);
- Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions (USEPA, 1991);
- Guidance for Risk Characterization (USEPA, 1995);
- Guidance for Data Usability in Risk Assessment (Part A) (USEPA, 1992a);
- Supplemental Guidance to RAGS: Calculating the Concentration Term (USEPA, 1992b);
- Soil Screening Guidance (USEPA, 1996a);
- Supplemental Guidance for Developing SSLs for Superfund Sites (USEPA, 2002b);
- Human Health Toxicity Values in Superfund Risk Assessments. OSWER Directive 9285.7-53 (USEPA, 2003a);

- Supplemental Guidance: Update of Standard Default Exposure Factors (USEPA, 2015a) [supersedes Exposure Factors Handbook, USEPA, 2011]; and

- Lead (Pb) Soil Screening Update Effective July 1, 2020 (MDE 2020).

4.5.1 Identification of Chemicals of Potential Concern

COPCs are the chemicals detected during the field investigation that warrant further evaluation in a quantitative HHRA. The COPC screening process consists of a comparison of site-related chemicals to health-based screening criteria.

The COPC screening process in each EC-specific HHRA followed these steps:

For soil:

- The maximum detected concentration of a chemical in soil was compared to the USEPA RSL for industrial soil protective to a cancer risk level of 1 x 10^{-6} for carcinogens or a non-cancer HQ level of 0.1, depending on the basis of the RSL (USEPA, 2020a). The generic industrial soil RSLs are based on potential exposures to soil for workers via the dermal, ingestion, and inhalation routes.

- For lead, the maximum detected concentration in soil was compared to the updated MDE soil screening value for both commercial and industrial land use (MDE 2020).

    - The MDE soil screening value represents the lead concentration in soil that would result in less than 5% of the population will have a blood-lead level of 5 µg of lead/dL of blood.
    - Per the guidance, a commercial land use represents an area where various ages of users may visit, such as a shopping center. Therefore, children and adolescents may visit these areas. The industrial land use represents an area where only adults would work or visit[7].

- Detected chemicals that exceed the industrial RSLs or lead screening level were retained as COPCs to be evaluated in the quantitative HHRA.

For sediment, because there are no screening criteria for human contact, the HHRA uses the same COPC screening process used for soil exposure. However, if detected sediment concentrations are selected as COPCs (that is, exceeded industrial soil RSLs), then more realistic, acceptable site-specific sediment concentrations for site worker contact with sediment (e.g., once per week, instead of five days per week) were calculated and used as comparison values.

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[7] Note: land use categories in the MDE guidance document do not necessarily align with County zoning allowances, as some Industrial zoning classifications in Anne Arundel County include permissible uses that involve children or adolescents.

For surface water, because there are no screening criteria for human contact in a work environment, the following screening criteria were used:

- USEPA Ambient Water Quality Criteria (AWQC) for human health, consumption of water and organisms[8]; it is noted that this is a conservative screening value because the surface water at the Depot is not used for drinking water or fishing.

- If the USEPA AWQC were exceeded, more realistic, acceptable site-specific surface water concentrations for site worker contact with surface water were calculated and used as comparison values.

To screen for COPCs in groundwater:

- The maximum detected concentration of a chemical in groundwater was compared to the National Primary Drinking Water Standards, MCLs (USEPA, 2009b).

- Chemicals in groundwater that exceeded the MCLs would be retained as COPCs to be carried through the quantitative HHRA.

Tables summarizing detected chemicals in surface soil, combined surface/subsurface soil, sediment, surface water, and groundwater are presented in each EC-specific section of the RI report, as applicable. The COPC screening tables show the process by which a chemical has been selected or eliminated as a COPC, along with the frequency of detection, detection limits, minimum and maximum detected concentrations, location of maximum detected concentration, screening criteria, and exceedances of the screening criteria.

4.5.2 Exposure Assessment

The exposure assessment lists the human receptors and exposure pathways presented in the CSM, outlines the approach to calculating EPCs, and presents the exposure assumptions that were used in the HHRAs to estimate intake.

Receptors and Exposure Pathways

Currently, the Depot has limited use with access restricted to authorized personnel and occasional visitors; potential future use was assumed to be industrial, and construction would likely occur.

Current and future potential receptors considered in the HHRAs included site workers, construction workers, and trespassers, and for groundwater, future residential use:

- Surface soil (0-0.5 ft) is a potential current and future exposure pathway for site workers and trespassers via incidental ingestion, dermal contact, and inhalation.

8 http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

- Site workers would have greater exposure frequency for surface soils than would trespassers, therefore, the potential risks for trespassers are discussed qualitatively.

- Surface/subsurface soil (combined data for surface soil, 0 to 0.5 ft, and subsurface soil, 1 to up to 9 ft) is a potential future exposure route for construction workers via incidental ingestion, dermal contact, and inhalation.

- Groundwater is a potential future complete pathway, in the event there is a groundwater release, or a potable water well is installed within or immediately outside the Depot boundaries. Therefore, if COPCs are selected in groundwater, potential residential use of groundwater at the Depot is evaluated for drinking water ingestion, dermal contact and inhalation.

- Incidental ingestion, dermal, and inhalation exposures to groundwater could occur in the future for construction workers conducting intrusive activities at the Depot; however, since the residential scenario is a more conservative assessment of groundwater risks, the potential risks for construction workers contacting groundwater (if groundwater COPCs are selected) is discussed qualitatively.

- Surface water and sediment within the Depot are potentially complete pathways for current site workers and trespassers via incidental ingestion and dermal contact. Although inhalation is a potential exposure route for surface water and sediment, the emission of particulates or volatiles would likely be very small, and the duration of worker exposure to these media would be short relative to their potential exposures to surface soils.

Depths of the soil samples (surface soil 0 to 0.5 ft, and subsurface soil 1 to up to 9 ft) were selected based on the Depot history and previous sampling investigations, such as the FRI (Parsons 2006), where MDE collaborated on the subsurface target depths. Depot history indicates that most site-related materials would not be deeper than 6 ft (although some sampling occurred at depths up to 9 ft), thus it would be more likely to find contamination, if it exists in soils at the Depot, at the depths used in this RI sampling.

Calculation of Exposure Point Concentrations

The EPC is a conservative estimate of the average concentration of a COPC, calculated using the results for a particular environmental medium to which a receptor may be exposed. The 95% UCL of the mean was estimated using USEPA's ProUCL (USEPA, 2016) for discrete soil samples and is estimated using the ITRC calculator for ISM samples. The 95%UCL is used as the EPC for each COPC in each medium unless the maximum detected concentration was smaller than the calculated 95% UCL of the mean, then the maximum concentration was used as the EPC (USEPA, 1989). In addition, for sample sets with few detects (either <4-6 detected samples, or <4-5% detects) or a small sample size (<5 samples), the maximum detected concentration was used as the EPC. For lead, the EPC is represented by the average concentration in accordance with EPA guidance (1994).

Per USEPA (1996a and 2002), EPCs for COPCs in airborne fugitive dust were based on soil EPCs and were estimated using the following equation:

$$C_{air} = \frac{C_{soil}}{PEF}$$

Where:

C_{air} = COPC concentration in air at the exposure point (mg/m^3)
C_{soil} = COPC exposure-point concentration soil (mg/kg)
PEF = Particulate emission factor (m^3/kg)

The PEF relates the concentration of the soil COPC to the concentration of dust particles in the air. This calculation addresses dust generated from open sources, which is termed "fugitive" because it is not discharged into the atmosphere in a confined flow. The USEPA's default PEF of 1.27E+09 m^3/kg was used for the determination of the COPC concentration in air.

Estimating Potential Intake of COPCs

Reasonable maximum exposure (RME) risk estimates were calculated in the HHRA. The RME scenario is defined as the maximum exposure that is reasonably expected to occur (USEPA, 1989), and the exposure parameters were selected with the understanding that the combination of variables for a given pathway would result in an estimate of the RME for that pathway. Average or central tendency exposure scenarios were not evaluated.

Tables 4-2 through 4-6 summarize the exposure factors used in the HHRA for the RI-level ECs for surface soil, surface/subsurface soil, surface water, sediment, and groundwater.

USEPA (1996a and 2002) guidance does not recommend estimating intakes (i.e., mg/kg-day) for the air inhalation pathway. Rather, risks and hazards are determined by comparing estimated particulate air concentrations, adjusted for exposure frequencies/durations/time, with inhalation toxicity values. Chronic inhalation toxicity factors developed by USEPA assume continuous (i.e., daily, 24-hour exposure) long-term exposure. Therefore, it was necessary to adjust for the fraction of time breathing contaminated air for daily exposures less than 24 hours, using the Exposure Time (ET) factor; it was assumed that site workers could be exposed for 8 of 24 hours per day.

USEPA RAGS Part E (USEPA, 2004) recommends limited dermal absorption factors (in their Exhibit 3-4), based on a literature review and states that chemicals for which data on dermal absorption are limited or do not exist should be qualitatively evaluated. Therefore, hazard indices and cancer risks via the dermal exposure pathway are not calculated for some of the selected COPCs. Of the selected COPCs, dermal absorption factors are available for SVOCs (0.1), PAHs (0.13), arsenic (0.03), Aroclors (0.14), and dioxins/furans (0.03). According to USEPA (2004), inorganics have relatively low dermal absorption; because there are limited data for the dermal absorption of inorganic compounds from soil, therefore dermal absorption, except for arsenic, was not assessed.

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Table 4-2. Exposure Assumptions for Site Worker (Surface Soil)

Scenario Timeframe: Current and Future
Exposure Media: Surface Soil (0-0.5 ft)
Exposure Routes: Incidental ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	95% UCL of the mean	--	Chronic Daily Intake (CDI) (mg/kg/day) =
	IR	Ingestion Rate	mg/day	100	USEPA, 2015a	CS x IR x FI x EF x ED x CF / (BW x AT)
	FI	Fraction Ingested from Depot	unitless	100%	Assumed	--
Dermal	CS	Chemical Concentration in Soil	mg/kg	95% UCL of the mean	--	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	3,527	USEPA 2015a [2]	CS x SA x AF x DA x CF x EF x ED / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.12	USEPA 2015a [3]	
	DA	Dermal Absorption Fraction	unitless	chemical-specific	USEPA 2004	0.13 for PAHs and 0.03 for arsenic (USEPA, 2004)
	CF	Conversion Factor	kg/mg	1.0E-06		
Inhalation	Cair	Chemical Concentration in Air	mg/m^3	95% UCL of the mean	--	Estimated Air Exposure Concentration (mg/m^3) =
	ET	Exposure Time	8 hrs/24 hrs	0.33	Assumed	(Cair x ET X EF x ED)/(AT)
For all exposure routes	EF	Exposure Frequency	days/year	250	USEPA 2015a	
	ED	Exposure Duration	year	25	USEPA 2015a [1]	
	BW	Body Weight	kg	80	USEPA 2015a	
	AT-NC	Averaging Time - Noncancer	days	9,125	(25 years * 365 days/year) USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	(70 years * 365 days/year) USEPA 1989	

Notes: mg/kg=milligrams/kilogram; mg/m^3=milligrams/cubic meter, cm^2= centimeter squared

Table 4-3. Exposure Assumptions for Construction Worker (Surface and Subsurface Soil)

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0 – up to 9 ft)
Exposure Routes: Incidental ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	CS	Chemical Concentration in Soil	mg/kg	95% UCL of the mean	--	Chronic Daily Intake (CDI) (mg/kg/day) =
	IR	Ingestion Rate	mg/day	330	USEPA, 2002a	CS x IR x FI x EF x ED x CF / (BW x AT)
	FI	Fraction Ingested from Depot	unitless	100%	Assumed	--
Dermal	CS	Chemical Concentration in Soil	mg/kg	95% UCL of the mean	--	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	3,527	USEPA 2015a	CS x SA x AF x DA x CF x EF x ED / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.12	USEPA 2015a	
	DA	Dermal Absorption Fraction	unitless	chemical-specific	USEPA 2004	0.13 for PAHs and 0.03 for arsenic (USEPA, 2004)
	CF	Conversion Factor	kg/mg	1.0E-06		
Inhalation	Cair	Chemical Concentration in Air	mg/m^3	95% UCL of the mean	--	Estimated Air Exposure Concentration (mg/m^3) =
	ET	Exposure Time	8 hrs/24 hrs	0.33	Assumed	(Cair x ET X EF x ED)/(AT)
For all exposure routes	EF	Exposure Frequency	days/year	250	USEPA 2015a	
	ED	Exposure Duration	year	1	Assumed one year of construction	
	BW	Body Weight	kg	80	USEPA 2015a	
	AT-NC	Averaging Time - Noncancer	days	365	(1 year * 365 days/year) USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	(70 years * 365 days/year) USEPA 1989	

Notes: mg/kg=milligrams/kilogram; mg/m^3=milligrams/cubic meter; cm^2= centimeter squared.

Table 4-4. Exposure Assumptions for Site Worker (Sediment)

Scenario Timeframe: Current and Future
Exposure Media: Sediment
Exposure Routes: Incidental ingestion, dermal contact, inhalation
Exposure Point: Sediment
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	Csed	Chemical Concentration in Sediment	mg/kg	95% UCL of the mean	--	Chronic Daily Intake (CDI) (mg/kg/day) =
	IR	Ingestion Rate	mg/day	100	Assumed same as soil ingestion rate (USEPA, 2015a).	Csed x IR x FI x EF x ED x CF / (BW x AT)
	FI	Fraction Ingested from Depot	unitless	100%	Assumed	--
Dermal	Csed	Chemical Concentration in Sediment	mg/kg	95% UCL of the mean	--	CDI (mg/kg/day) =
	SA	Surface Area for Contact	cm^2/event	3,527	USEPA 2015a	Csed x SA x AF x DA x CF x EF x ED / (BW x AT)
	AF	Adherence Factor	mg/cm^2	0.12	USEPA 2015a	
	DA	Dermal Absorption Fraction	unitless	chemical-specific	USEPA 2004	0.13 for PAHs and 0.03 for arsenic (USEPA, 2004)
	CF	Conversion Factor	kg/mg	1.0E-06		
For all exposure routes	EF	Exposure Frequency	days/year	52	Assumed one exposure per week to sediment	
	ED	Exposure Duration	year	25	USEPA 2015a	
	BW	Body Weight	kg	80	USEPA 2015a	
	AT-NC	Averaging Time - Noncancer	days	9,125	(25 years * 365 days/year) USEPA 1989	
	AT-C	Averaging Time - Cancer	days	25,550	(70 years * 365 days/year) USEPA 1989	

Notes: mg/kg=milligrams/kilogram; mg/m^3=milligrams/cubic meter; cm^2= centimeter squared

Table 4-5. Exposure Assumptions for Site Worker (Surface Water)

Scenario Timeframe: Current and Future
Exposure Media: Surface Water
Exposure Routes: Incidental ingestion, dermal contact, inhalation
Exposure Point: Surface Water
Receptor Population: Site Worker
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	Intake Equation/ Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L	95% UCL of the mean-- or maximum (if few samples are taken)	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	0.053	USEPA 2011 [1]	CW x IR x EF x ED / (BW x AT)
Dermal Absorption			--			CDI = Devent x CF x SA x ED x EF/ (BW x AT)
	CF	Conversion Factor	L/cm^3	0.001	--	
	SA	Skin Surface Area Available for Contact	cm^2/event	3,527	USEPA 2015a	For inorganics: Devent = Cw x CF x Kp x t_{event} If t_{event} < or = t*, then Devent = $2(FA)(Kp)(Cw)(CF)(6 \times t_{event} \times t_{event} \times 1/p)^{1/2}$ If t_{event} > t*, then Devent = $(FA)(Kp)(CF)(Cw)[t_{event}/(1+B) + 2t_{event}((1+3B+B^2/(1+B)^2)]$
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	USEPA 2004	
	t_{event}	Exposure time	hours	0.25	USEPA 2004 [2]	
	FA	Fraction absorbed	unitless	chemical specific	USEPA 2004	
	Kp	Permeability Coefficient (for inorganics)	cm/hr	0.001	USEPA 2004[3]	
	t_{event}	Lag time per event	hr/event	calculated	USEPA 2004	
	B	Dimensionless constant	unitless	calculated	USEPA 2004	
	t*	Time to reach steady-state	hrs	calculated	USEPA 2004	
For all exposure routes	EF	Exposure Frequency	days/year	52	Assumed one exposure per week to surface water	
	ED	Exposure Duration	years	25	USEPA 2015a	
	BW	Body Weight	kg	80	USEPA 2015a	
	AT-C	Averaging Time (Cancer)	days	25,550	(70 years * 365 days/year) USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,125	(25 years * 365 days/year) USEPA 1989	

Notes: mg/L=milligrams/liter; L/cm^3=liters/cubic centimeter
1. Based on upper bound surface water ingestion rate while swimming for adults of 53 mL/event.
2. Receptor assumed to spend 0.25 hour per day contacting the surface water.
3. Dermal permeability coefficient-Kp (cm/hr) = for inorganics, a default value of 1×10^{-3} cm/hr is recommended (USEPA, 2004)

Table 4-6. Exposure Assumptions for Future Residents (Groundwater)

Scenario Timeframe: Future
Exposure Media: Groundwater
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Groundwater
Receptor Population: Future Resident
Receptor Age: Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/Reference	Intake Equation / Model Name
Ingestion	Cw	Chemical Concentration in Water	mg/L	--	--	Chronic Daily Intake (CDI) (mg/kg-day) =
	IR	Ingestion Rate	L/day	2.5	USEPA 2015a	CW x IR x EF x ED / (BW x AT)
Dermal Absorption						CDI = Devent x CF x SA x ED x EF/ (BW x AT)
	CF	Conversion Factor	L/cm^3	0.001	--	
	SA	Skin Surface Area Available for Contact	cm^2/event	19,652	USEPA 2015a	For inorganics: Devent = Cw x CF x Kp x tevent If t_{event} < or = t*, then Devent = $2(FA)(Kp)(Cw)(CF)(6 \times t_{event} \times t_{event} \times 1/p)^{1/2}$ If t_{event} > t*, then Devent = $(FA)(Kp)(CF)(Cw)[t_{event}/(1+B)+2t_{event}((1+3B+B^2/(1+B)^2)]$
	Devent	Dermally Absorbed Dose per Event	mg/cm^2-event	calculated	USEPA 2004	
	t_{event}	Exposure time	hours	0.71	USEPA 2015a	
	FA	Fraction absorbed	unitless	chemical specific	USEPA 2004	
	Kp	Permeability Coefficient (for inorganics)	cm/hr	0.001	USEPA 2004[1]	
	t_{event}	Lag time per event	hr/event	calculated	USEPA 2004	
	B	Dimensionless constant	unitless	calculated	USEPA 2004	
	t*	Time to reach steady-state	hrs	calculated	USEPA 2004	
For all exposure routes	EF	Exposure Frequency	days/year	350	USEPA 2015a	
	ED	Exposure Duration	years	26	USEPA 2015a	
	BW	Body Weight	kg	80	USEPA 2015a	
	AT-C	Averaging Time (Cancer)	days	25,550	(70 years * 365 days/year) USEPA 1989	
	AT-N	Averaging Time (Non-Cancer)	days	9,490	(26 years * 365 days/year) USEPA 1989	

Notes:
1. Dermal permeability coefficient-Kp (cm/hr) = for inorganics, a default value of 1×10^{-3} cm/hr is recommended (USEPA, 2004)

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4.5.3 Toxicity Assessment

Reference doses (RfD), reference concentrations (RfC), and cancer slope factors (SF) estimate the potential for COPCs to result in health risks. These values are listed in Table 4-7a, and were obtained from:

- USEPA's Integrated Risk Information System (IRIS) (on-line) (USEPA, 2020b);
- USEPA's RSL Table (November, 2020a);
- USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs); (http://hhpprtv.ornl.gov/); and
- Other sources as necessary

Dermal RfDs and SFs can be estimated from oral values (USEPA, 2004). Specifically, oral SFs can be converted to dermal SFs by dividing by the oral absorption efficiency (GIABS), while oral RfDs can be converted to dermal RfDs by multiplying by the oral absorption efficiency (GIABS). These adjustments were made, as shown on Table 4-7b, based on the oral absorption efficiencies recommended by USEPA (2004).

For the inhalation of particulates pathway for future site and construction workers, the inhalation chronic toxicity factors derived by USEPA (i.e., inhalation unit risks [IURs] and RfCs) are expressed as air concentrations. As recommended by USEPA (1996a), air concentrations were directly compared to inhalation toxicity factors rather than using daily inhalation rates to convert to internal doses (i.e., mg/kg-day).

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), and dioxin-like PCBs, typically occur as mixtures in environmental media. However, there are limited toxicity values available for dioxins and furans.

For the non-cancer assessment of dioxins and furans, toxicity values identified were an RfD and an RfC for 2,3,7,8-TCDD and an RfD for dibenzofuran. Therefore, individual dioxin congeners were converted to a dioxin TEQ and used the 2,3,7,8-TCDD RfD and RfC as surrogates to evaluate toxicity.

To evaluate carcinogenic risks for individual dioxin and furan congeners, the HHRA used the 2,3,7,8-TCDD cancer SF and IUR for dioxins.

Because the toxicity of dioxins and furans varies, their toxicity is addressed by considering their toxicity relative to TCDD, which is assigned a Toxicity Equivalence Factor (TEF) of 1 (EPA, 2010a). In ECs for which dioxins and furans were selected as COPCs, TEFs were applied to each individual compound's exposure concentration; each concentration is multiplied by its specific TEF, yielding the individual dose that is equivalent to a dose of the index chemical.

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Table 4-7a. Non-Cancer Toxicity Data for COPCs – Oral/Dermal/Inhalation

Chemical of Potential Concern	Chronic Oral RfD (mg/kg-day)	Oral to Dermal Adjustment Factor (GI ABS) (1)	Absorbed RfD for Dermal (oral RfD x GIABS) (mg/kg-day)	Primary Target Organ(s)	Combined un-certainty/ modifying factors	Source	Notes	Chronic Inhalation RfC (mg/m^3)	Primary Target Organ(s)	Combined un-certainty/ modifying factors	Source
Antimony	4.00E-04	0.15	6.00E-05	hematological	1000	IRIS		3.4E-05	NA	NA	RSL(ATSDR)
Arsenic	3.00E-04	1	3.00E-04	cardiovascular, dermal	3	IRIS	Soil ingestion intakes are modified by an RBA of 0.6	1.50E-05			RSL (CalEPA)
Chromium	3.00E-03	0.025	7.50E-05	None	300/3	IRIS	Chromium 6	1.00E-04	Respiratory	NA	IRIS
Lead	NA	1	NA	nervous system and male reproductive impairment	NA	IRIS	No toxicity value; blood lead model	NA	NA	NA	IRIS
Manganese	2.4E-02	0.04	9.60E-04	nervous system	1	IRIS (manganese, non-diet)		5.00E-05	nervous system	1000	IRIS (Mn, non-diet)
Benzo(a) anthracene	NA	1	NA	NA	NA	IRIS		NA	NA	NA	IRIS
Benzo(a)pyrene	3.00E-04	1	3.00E-04	Developmental	300	IRIS		2.00E-06	Developmental	3000	IRIS
Benzo(b) fluoranthene	NA	1	NA	NA	NA	IRIS		NA	NA	NA	IRIS
Dibenz(a,h) anthracene	NA	1	NA	NA	NA	IRIS		NA	NA	NA	IRIS
Indeno(1,2,3-cd) pyrene	NA	1	NA	NA	NA	IRIS		NA	NA	NA	IRIS
2,4-Dinitrotoluene	2.00E-03	1	NA	nervous system, hepatic, hematological	100	IRIS		NA	NA	NA	IRIS
Aroclor 1260	NA	1	NA	NA	NA	RSL table		NA	NA	NA	RSL table

Table 4-7a. Non-Cancer Toxicity Data for COPCs – Oral/Dermal/Inhalation

Chemical of Potential Concern	Chronic Oral RfD (mg/kg-day)	Oral to Dermal Adjustment Factor (GI ABS) (1)	Absorbed RfD for Dermal (oral RfD x GIABS) (mg/kg-day)	Primary Target Organ(s)	Combined un-certainty/ modifying factors	Source	Notes	Chronic Inhalation RfC (mg/m^3)	Primary Target Organ(s)	Combined un-certainty/ modifying factors	Source
2,3,7,8-TCDD (Tetrachlorodi-benzo-p-dioxin)	7.00E-10	1	7.00E-10	Reproductive	30	IRIS		4.00E-08	Hepatic	NA	RSL Table (noted as Cal EPA)

Table 4-7b. Cancer Toxicity Data for COPCs – Oral/Dermal/Inhalation

Chemical of Potential Concern	Oral Cancer Slope Factor (SF) $(mg/kg\text{-}day)^{-1}$	Oral Absorption Efficiency for Dermal SF Adjustment (1)	Absorbed Cancer SF for Dermal $(mg/kg\text{-}day)^{-1}$	Mutagenic Compound	Weight of Evidence/Notes (2)	Source (dates in footnotes)	Inhalation Unit Risk $(ug/m^3)^{-1}$	Weight of Evidence/Notes (2)	Source (dates in footnotes)
Antimony	NA	0.15	NA		Not assessed under the IRIS Program	IRIS	NA	Not assessed under the IRIS Program	IRIS
Arsenic	1.50E+00	1	1.5		Soil ingestion intakes are modified by an RBA of 0.6	IRIS	4.30E-03		IRIS
Chromium	5.00E-01	0.025	1.25E-02	M	For chromium 6	RSL	8.40E-02		
Lead	NA	1	NA		B2 (Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals)	IRIS	NA	B2 (Probable human carcinogen - based on sufficient evidence of carcinogenicity in animals)	IRIS
Manganese	NA	0.04	NA		D (Not classifiable as to human carcinogenicity)	IRIS	NA	D (Not classifiable as to human carcinogenicity)	IRIS
Benzo(a) anthracene	1.00E-01	1	1.00E-01	M	A (Carcinogenic to humans)	IRIS	6.00E-05	A (Carcinogenic to humans)	IRIS
Benzo(a)pyrene	1.00E+00	1	1.00E+00	M	A (Carcinogenic to humans)	IRIS	6.00E-04	A (Carcinogenic to humans)	IRIS
Benzo(b) fluoranthene	1.00E-01	1	1.00E-01	M	A (Carcinogenic to humans)	IRIS	6.00E-05	A (Carcinogenic to humans)	IRIS
Dibenz(a,h) anthracene	1.00E+00	1	1.00E+00	M	A (Carcinogenic to humans)	IRIS	6.00E-04	A (Carcinogenic to humans)	IRIS
Indeno(1,2,3-cd) pyrene	1.00E-01	1	1.00E-01	M	A (Carcinogenic to humans)	IRIS	6.00E-05	A (Carcinogenic to humans)	IRIS
2,4-Dinitrotoluene	3.10E-01	1	3.10E-01			IRIS	8.90E-05		IRIS
Aroclor 1260	2.00E+00	1	2.00E+00			RSL Table	5.70E-04		RSL Table
2,3,7,8-TCDD (Tetrachlorodibenzo-p-dioxin)	1.30E+05	1	1.30E+05		Considered carcinogenic by Cal EPA (http://oehha.ca.gov/risk/chemicaldb/index.asp)	RSL table (Cal EPA)	3.80E+01		RSL table (Cal EPA)

Notes for Tables 4-7a and 4-7b:
NA = not available or not applicable
M = Chemical has a mutagenic mode of action

mg/kg-day = milligrams per kilogram-day
ug/m3 = micrograms per meter cubed
PPRTV = Provisional Peer Reviewed Toxicity Value
CalEPA = California Environmental Protection Agency
ATSDR = Agency for Toxic Substances and Disease Registry
IRIS = USEPA Integrated Risk Information System (IRIS) database, 2020b
RSL Table = USEPA risk-based screening level (RSL) table (hazard quotient [HQ]=0.1) dated May 2020
NOAEL = no observed adverse effect level
RBA = Relative Bioavailability
TCDD = Tetrachlorodi-benzo-p-dioxin
1) USEPA 2004. RAGS Part E, Supplemental Guidance for Dermal Assessment. July. (Exhibit 4-1). For those organic and inorganic chemicals that do not appear in USEPA, 2004, Exhibit 4-1, assumed a 100% GIABS value as recommended by USEPA 2004
2) For cancer weight of evidence, some chemicals have letter classifications, and some are narratives. Under USEPA's 1986 guidelines for carcinogen risk assessment, the weight of evidence was described by categories "A through E"—Group A for known human carcinogens through Group E for agents with evidence of non-carcinogenicity. Under the USEPA's 2005 guidelines for carcinogen risk assessment, a narrative approach, rather than categories, is used to characterize carcinogenicity. Five standard weight-of-evidence descriptors (Carcinogenic to Humans, Likely to Be Carcinogenic to Humans, Suggestive Evidence of Carcinogenic Potential, Inadequate Information to Assess Carcinogenic Potential, and Not Likely to Be Carcinogenic to Humans) are used as part of the narrative.

4.5.4 Risk Characterization

The risk characterization step integrated the toxicity and exposure assessment outputs into quantitative estimates of risk.

4.5.4.1 Non-Cancer Hazard Assessment

The non-carcinogenic hazards posed by a chemical to a receptor were calculated using the following equation:

$$HQ = CDI/RfD$$

Where:

- HQ is the non-cancer hazard quotient posed by the chemical through the pathway
- CDI is the intake of the chemical through the pathway (mg/kg-day)
- RfD is the reference dose (acceptable oral or dermal intake level) for the chemical (mg/kg-day).

For the inhalation pathway, the following equation was used:

$$HQ = \text{Air Exposure Concentration}/RfC$$

Where:

- HQ is the non-cancer hazard quotient posed by the chemical through the pathway
- Air Exposure Concentration is the concentration to which the receptor is exposed (mg/m^3)
- RfC is the reference air concentration (acceptable inhalation intake level) for the chemical (mg/m^3).

The total pathway-specific non-cancer HI for the receptor was derived by summing all the HQs for all the chemicals in that pathway.

The total HI was compared to established risk management criteria, as follows:

- A target HI of 1 was used when evaluating total non-carcinogenic hazards for each receptor.
- If the target HI of 1 was exceeded, the target organ toxicity approach was applied. Groups of toxicants that affect the same target organ were separated; for each target organ-specific effect, individual HIs were calculated and compared to a HI of 1.

4.5.4.2 4.5.2 Carcinogenic Risk

The carcinogenic risks estimated for each receptor were calculated using the following equation for oral and dermal exposures:

$$\text{Risk} = (\text{CDI})(\text{SF})$$

Where:

- Risk is the carcinogenic risk posed by the chemical through the oral or dermal pathway
- CDI is the chronic daily intake of the chemical through the pathway
- SF is the cancer slope factor (oral or dermal) for the chemical by that pathway.

For air exposures, the following equation was used:

$$\text{Risk} = (\text{Air Exposure Concentration})(\text{Inhalation Unit Risk})$$

Where:

- Risk is the carcinogenic risk posed by the chemical through the inhalation pathway
- Air Exposure Concentration is the concentration to which the receptor is exposed (mg/m^3)
- Inhalation Unit Risk is the carcinogenic toxicity value for the inhalation pathway $(mg/m^3)^{-1}$.

The total pathway-specific carcinogenic risk for the receptor was derived by summing all the cancer risk estimates for each chemical in that pathway.

The total estimated carcinogenic risk was compared to established risk management criteria, as follows:

- The acceptable incremental cancer risk level of $1x10^{-5}$, as specified by MDE.

4.5.5 Uncertainty Discussion

The following section provides a qualitative discussion of the uncertainties associated with the estimation of human health risks that applies to the HHRAs conducted for all ECs evaluated in this risk assessment. These uncertainties included, but were not limited to, data evaluation and identification of COPCs, exposure assessment, toxicity assessment, and risk characterization. All HHRAs involve the use of assumptions, judgments, and imperfect data to varying degrees, resulting in uncertainties in the final estimates of risk. These uncertainties are associated with each step of the process (USEPA, 1989). The parameters used in the HHRA are characteristically conservative and tend to over-estimate potential site-related risks.

Data Evaluation and Identification of COPCs

Representative sampling at a site assumes that a sufficient number of samples have been collected to adequately characterize the site. However, not every sample was analyzed for every constituent and this represents an uncertainty in characterizing the site. All data used were

validated in accordance with USEPA procedures. All data were found to be usable for making project decisions.

The generic screening levels used for selection of COPCs are appropriately conservative and use assumptions that are presumed to be protective of current site workers and future construction workers.

For some analytes, detection limits were greater than screening levels. In the HHRAs conducted, it is assumed that the lack of detection of these constituents indicates that they do not exist at the EC, and thus they are not evaluated in the HHRA. This assumption could result in the under-estimate of site risks.

Exposure Assumptions

The exposure assumptions used in the HHRA are based, in many cases, on USEPA default values, which are presumably collated from the best available data, for example, for time spent at one workplace, body surface area, and gastrointestinal absorption factors. However, the USEPA default exposure assumptions may or may not actually be applicable to scenarios that could occur at the site. Overall, the selection of conservative exposure assumptions for the RME scenarios results in upper bound (i.e., high end) estimates of exposures and risks, while the potentially exposed populations could, in reality, have lower exposures and risks.

Toxicity Assessment

All published toxicity values have associated uncertainties based on their underlying toxicity studies, which are addressed by USEPA with the application of uncertainty or modifying factors. For example, the uncertainty associated with RfDs is addressed by the addition of safety factors. RfDs have varying levels of confidence and thus incorporate different uncertainty adjustments and modifying factors (e.g., to account for extrapolation from animals to humans, from lowest observed adverse effect levels [LOAELs] to no observed adverse effect levels [NOAELs], or from one exposure duration to another). Additionally, it should be noted that the level of concern for noncarcinogenic COPCs does not increase linearly as the reference dose is approached or exceeded, because the RfDs do not have equal accuracy or precision and are not based on the same severity of effect (USEPA, 1989).

Similarly, the cancer slope factors have varying levels of confidence, which are outlined for each substance by USEPA in the IRIS on-line database. However, it is noted that slope factors are inherently conservative, as they are upper bound estimates (approximating a 95% confidence limit) of increased cancer risk from a lifetime exposure to an agent.

COPCs without toxicity values were not quantified in the HHRA, therefore, total site risks may be under-estimated.

The uncertainties associated with the application of TEFs to dioxins and furans are outlined in USEPA, 2010a. For example, the TEF method assumes a common mode of toxic action (that is, mediated through aryl hydrocarbon receptor binding and downstream biochemical and toxic responses), while there is some evidence suggesting that certain dioxins and furans may be toxic by different mechanisms (that is, aryl hydrocarbon receptor independent), which is not accounted

for by the TEF method. In addition, the TEF method assumes dose additivity and does not consider that some of the toxic effects may be antagonistic, rather than additive. There is also uncertainty in the selection of the numerical values for the TEFs, as evidenced by the existence of a number of different TEF schemes.

Risk Characterization

There are uncertainties associated with the risk characterization step, in particular, the addition of risks across COPCs and exposure pathways. For example, HQs may be combined for substances with RfDs based on critical effects of varying toxicological significance.

Summing cancer risks or non-cancer HIs for several substances assumes dose additivity; however, the risks are not necessarily additive, since the various chemical effects could be synergistic or antagonistic. The potential for interactions between multiple chemicals, multiple pathways and other combinations was not evaluated quantitatively.

4.6 SLERA APPROACH

This section describes the general approach to the SLERAs for the entire Depot. Individual EC SLERAs are provided in the individual EC sections of this document. The primary purpose of the SLERA is to compare concentrations of site-related constituents to ecological screening values and to conduct a risk characterization. Based on the extent of potential ecological risk, additional work may be required at the EC.

Each SLERA consists of the screening steps of the ecological risk assessment process outlined by USEPA (USEPA, 1997), and includes the following steps which are outlined in this section:

- Identification of chemicals of potential ecological concern (COPECs)
- Exposure assessment
- Ecological effects evaluation
- Risk characterization
- Discussion of uncertainty

Each SLERA was prepared in accordance with USEPA guidance, as listed below. The SLERAs used the following guidance documents:

- USEPA Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final EPA 540-R-97-006 (June 1997) (USEPA, 1997);

- USEPA Guidelines for Ecological Risk Assessment Final. EPA 630-R-95-002F (April 1998) (USEPA, 1998);

- USEPA *Guidance for Developing Ecological Soil Screening Levels* (USEPA, 2005b); and,

- USEPA Bioaccumulative Testing and Interpretation for the Purpose of Sediment Quality Assessment, Status and Needs, EPA-823-R-00-001, February 2000 (USEPA, 2000).

4.6.1 Identification of Chemicals of Potential Ecological Concern

For ecological receptors, surface soil exposures, as well as potential exposures to surface water and sediment, were evaluated in the SLERAs. Soil pH was recorded at each of the eight EC areas as well as the Unnamed Tributary. Toxicity from aluminum is dependent on the soil pH. Aluminum in soil with pH greater than 5.5 is not expected to pose risk to ecological receptors (USEPA, 2003b). pH at the site ranged from 5.8 to 8.0, thus aluminum is not expected to pose risk to ecological receptors and was eliminated from further evaluation. COPECs were selected based on a comparison of maximum concentrations to the following media-specific screening levels:

- For surface soil:
  - USEPA Ecological Soil Screening Levels (EcoSSL) (available for metals and the following organics: DDT and metabolites, dieldrin, pentachlorophenol and total polycyclic aromatic hydrocarbons. http://www.epa.gov/ecotox/ecossl/)
- For sediment
  - USEPA Region III Biological Technical Assistance Group (BTAG) Soil Screening Benchmarks (USEPA, 2006a)
- For surface water:
  - USEPA Region III BTAG Fresh Water Screening Benchmarks (USEPA, 2006b).
- USEPA Region 4 Ecological Risk Assessment Supplemental Guidance was used to fill any gaps in screening levels, as available (USEPA 2018) (https://www.epa.gov/sites/production/files/2018-03/documents/era_regional_supplemental_guidance_report-march-2018_update.pdf)

The screening levels and their sources are presented in Table F-1. If a detected concentration exceeds the media-specific screening level, it was selected as a COPEC to be evaluated further in the SLERA. Chemicals that were not detected are not expected to pose risk to ecological receptors and are not further evaluated in the SLERAs. Chemicals that lack ecological screening values were evaluated in the SLERA.

Essential nutrients, although detected in media, are not included in the list of COPECs. Essential nutrients include calcium, iron, magnesium, sodium, and potassium. These chemicals are necessary for metabolic processes in organisms and, thus, are considered essential nutrients for wildlife. At naturally occurring concentrations, receptors are able to regulate uptake and metabolism of these elements. However, as with all chemicals, it is possible that nutrients may produce toxic effects at very highly elevated concentrations. These five chemicals generally do not have screening level concentrations or toxicity reference values (TRVs) (except iron). Although the detected results are presented in the initial screening tables, they are not further

evaluated in the SLERAs. The uncertainty associated with the toxicity of essential nutrients is discussed in Section 4.6.6.

4.6.2 Exposure Assessment

If COPECs are selected at an EC, the exposure assessment estimates the nature, extent, and magnitude of potential exposure of ecological receptors at each EC and the means by which potential ecological receptors may be exposed to soil, sediment and surface water via the exposure pathway analysis.

In some cases, chemical concentrations are used as the exposure estimate, and the calculated 95UCLM concentrations are identified as EPCs for comparison to benchmarks. In other cases, chemical concentrations are the EPC inputs for food web models that estimate exposures as ingested doses. The exposure assessment identifies the models and input parameters that were used in benchmark comparisons and food web dose modeling. These parameters include identification of EPCs, food web model assumptions, and literature-based uptake factors. These are discussed in the sections below as well as the receptor-specific TRVs. Because the entire Depot and all ECs are similar with respect to the ecological setting and potential exposure pathways, this section is relevant to each EC.

4.6.2.1 Exposure Point Concentrations

EPCs are the COPEC concentrations that a receptor is assumed to be exposed to within the site. Two separate EPCs were used in the SLERAs: the maximum and 95UCLM. First a screening-level comparison of the maximum case scenario exposure estimates are compared to no-effects benchmarks. Therefore, the maximum concentrations detected in onsite media via discrete or incremental sampling were used as the EPC in exposure estimation. The maximum EPC is a realistic estimate of hot-spot exposures to organisms that may spend their entire lives in a small area. However, use of the maximum EPCs for assessment of some organisms is conservative and is likely to overestimate risks because it assumes that individual organisms spend 100 percent of their time inhabiting and feeding from the most contaminated sample location at the site.

The 95UCLM is a more realistic, and yet still conservative, value for consideration of the site-wide populations and exposures for mobile receptors because it assumes an upper-bound estimate of the average exposure across the site. For discrete samples, the 95UCLM concentration of a chemical within a given sample data grouping was calculated with the EPA statistical software package ProUCL Version 5.1 following EPA guidance (EPA 2002, 2015a). ProUCL was used to calculate the 95UCLMs in the SLERAs, as this program allows the user to calculate distribution-specific UCLMs, as well as UCLMs for data that do not exhibit a specific distribution. If the calculated 95UCLM exceeded the maximum detected concentration, then the maximum concentration was used as the EPC. Where the 95UCLM could not be calculated because of low-detection frequencies, the maximum concentration was used. This creates uncertainties that are discussed further in 4.6.6; however, it is consistent with the methods used in ProUCL Version 5.1.

For incremental samples, the statistical analysis process includes a weighted Decision Unit (DU) calculation of the 95 UCLM for comparisons to screening levels in accordance with the Interstate Technology & Regulatory Council (ITRC) Incremental Sampling Methodology Guidance from October 2020. Statistical evaluations for the incremental sampling data following the ITRC 2020 guidance for a combined DU consist of equally weighted strata for which three independent incremental samples are collected using a systematic sampling design with a random start. For combined DUs consisting of strata with coefficient of variation (CV) less than or equal to 150 percent, the Student's t-statistic will be used to calculate the 95 percent UCLM. For combined DUs consisting of one or more strata with a CV greater than 150 percent, the Chebyshev inequality will be used to compute the 95 percent UCLM (ITRC 2020).

4.6.2.2 Evaluation of Lower Trophic Level Wildlife

For terrestrial plants, soil invertebrates, benthic invertebrates, and aquatic organisms, EPCs are compared toto TRVs protective of exposures to environmental media. The use of EPCs to represent exposures for these organisms is discussed further below.

Terrestrial Plants—Chemical concentrations measured in soil were used to evaluate the potential for adverse effects to terrestrial plants. Consistent with EPA guidance (EPA 1997), the maximum detected concentration was used as the initial EPC in comparisons against benchmarks protective of plants. In addition, the chemical concentrations at each sample location were used as sample-specific EPCs in comparisons to benchmarks. If a chemical was not detected at concentrations exceeding the available toxicity value, it was concluded that the chemical is not likely to adversely affect terrestrial plants in that area. Finally, a conservative estimate of the 95UCLM concentration was evaluated as an EPC in comparisons to indicate the potential for population-wide impacts.

Soil Invertebrates—Chemical concentrations measured in soil were used to evaluate the potential for adverse effects to soil invertebrates (i.e., earthworms). Consistent with EPA guidance (EPA 1997), the maximum detected concentration was used as the initial EPC in comparisons against benchmarks protective of soil invertebrates. In addition, the chemical concentrations at each sample location were used as sample-specific EPCs in comparisons to benchmarks. If a chemical was not detected at concentrations exceeding the available toxicity value, it was concluded that the chemical is not likely to adversely affect soil invertebrates in that area. Finally, a conservative estimate of the 95UCLM concentration was evaluated as an EPC in comparisons to indicate the potential for population-wide impacts.

Benthic Invertebrates—Chemical concentrations detected in sediment were used to evaluate the potential for adverse effects to benthic invertebrates. Data were compared to literature-based toxicity values for benthic invertebrates. The maximum detected concentrations of chemicals at the site were used in the evaluation of sediment contamination in accordance with EPA guidance (EPA 1997). Although use of the maximum concentration is conservative, it is relevant in the evaluation of potential adverse effects to benthic organisms. If a chemical was not detected at concentrations exceeding the available toxicity value, it was concluded that the chemical is not likely to adversely affect benthic organisms in that area. The 95UCLM sediment concentration was also evaluated as an indicator of site-wide risks.

Aquatic Organisms—Chemical concentrations measured in surface water samples were used to evaluate the potential for adverse effects to aquatic life. Data were compared to literature-based chronic toxicity values for aquatic life. Both the maximum and 95UCLM concentrations of chemicals were used to evaluate the potential for adverse effects to aquatic life from the presence of chemicals in surface water. If a chemical was not detected at concentrations exceeding the toxicity value, it was concluded that the chemical is not likely to adversely affect aquatic organisms in that area.

4.6.2.3 Exposure Modeling for Higher Trophic Level Wildlife

Food web modeling was used to derive the dose-based exposure estimates for wildlife (deer mouse, red fox, and osprey). This section presents the methods used to quantify the potential exposure of wildlife to chemicals via the ingestion of food, water, and surface soil/sediment. The methods are based on equations presented in EPA (1993) and Sample et al. (1996). The equations and exposure parameters discussed below are consistent with EPA (1997) guidance and standard risk assessment practice.

Chemicals in the exposure media for each receptor were evaluated in the exposure models. Tables F-2 through F-6 of Appendix F provide uptake factors for prey used in the exposure models.

Table F-7 provides a summary of exposure parameters for the avian and mammalian representative receptor species identified for evaluation and food web models are presented in Appendix F. It should be noted that, in general, conservative assumptions were used in the food web models. The objective of the models is to provide an upper bound risk estimate. Accordingly, in almost all cases, actual risks are likely to be overestimated by the models. Uncertainties associated with conservative assumptions and other exposure estimation factors are discussed in Chapter 6.

Two separate EPCs were used in food web dose modeling: the maximum concentration and the 95UCLM. The first comparisons for each bird and mammal receptor consist of a comparison of the maximum exposure estimate to benchmarks. Use of the maximum is highly conservative and is likely to overestimate risks because it assumes that that wildlife spend 100 percent of their time inhabiting and feeding from the most contaminated sample location at the site.

Food web modeling was also based on the 95UCLM concentration in the exposure media. The 95UCLM is a more realistic value for consideration of the site-wide population because it assumes an average exposure across the site. As discussed above, the 95UCLM concentration of a chemical was calculated using the EPA statistical software package ProUCL Version 5.1. Where the 95UCLM could not be calculated because of low detection frequencies, the maximum was used instead.

It is important to note that many fish and wildlife species are highly mobile and may forage over a wide home range. The SLERAs are conservative in that they assume that receptors receive 100 percent of their exposure from the site for which EPCs are calculated. This is useful for evaluating the role of each area in driving risk; however, it may overestimate the actual exposure for mobile species.

4.6.2.3.1 Ingestion of Chemicals from Abiotic Media

Wildlife may ingest soil/sediment while foraging or grooming. Therefore, food web models account for incidental ingestion of soil or sediment.

The following equation was used to calculate the dose of chemical wildlife would obtain from the ingestion of soil or sediment ($Dose_{soil}$, milligrams per kilogram body weight per day [mg/kg per day]):

$$Dose_{soil} = SI * C_{soil}$$

Where:

$Dose_{soil}$	=	Amount of COPEC ingested per day from soil or sediment (mg/kg bw-day)
SI	=	Soil and sediment ingestion rate (kilograms soil per kilogram body weight per day [kg/kg bw-day])
C_{soil}	=	COPEC concentration in surface soil or sediment (mg/kg).

Percent soil or sediment ingestion values were obtained from the scientific literature for the terrestrial wildlife species and multiplied by the food ingestion rates (FI) for these species to estimate soil or sediment ingestion rates. A summary of the percent soil or sediment ingestion rates and FI taken from the scientific literature is presented in Table F-7.

Exposures to surface water were calculated similar to those in soil by multiplying the daily drinking water ingestion rate by the concentrations of chemicals in surface water. The following equation was used to calculate the upper bound dose of COPEC that terrestrial wildlife could obtain from the ingestion of surface water:

$$Dose_{sw} = WI * C_{sw}$$

Where:

$Dose_{sw}$	=	Amount of COPEC ingested per day from surface water (mg/kg bw-day)
WI	=	Surface water ingestion rate (liters per kilogram of body weight per day [L/kg bw-day])
C_{sw}	=	COPEC concentration in surface water (milligram per liter [mg/L]).

4.6.2.3.2 Ingestion of Chemicals from Food

The following equation was used to calculate the dose of COPEC that a terrestrial wildlife species could obtain from the ingestion of food ($Dose_{food/prey}$, mg/kg bw-day):

Where:

$$Dose_{food/prey} = FI * C_{food/prey}$$

FI	=	Food ingestion rate (kilograms food per kilogram body weight per day [kg/kg bw-day])

$C_{food/prey}$ = Estimated concentration of COPEC in food (mg/kg).

A summary of the FI for each of the terrestrial wildlife species selected for evaluation is presented in Table F-7. The following section discusses the equations used to estimate chemical concentrations within each food group ($C_{plant/invert/prey}$).

Food item concentrations were calculated using bioaccumulation factors (BAFs)/ bioconcentration factors (BCFs). A hierarchy was used to select BAFs and BCFs. In general, values were selected from defensible, compilation- and consensus-based sources or sources that include validation models (i.e., EPA 2005a–h; Sample et al. 1998a) instead of values from single studies. First preference was given to regression equations derived from paired field- or laboratory-based measurements. Second preference was given to ratio-derived BAFs developed based on paired data of tissue concentrations compared to media concentrations unless validation studies showed these to be preferable to regressions. Examples of regression and ratio BAF development can be found in Sample et al. (1998a). Third preference was given to modeled equilibrium partitioning-derived BAFs based on physical or chemical characteristics. If no values could be identified, a BAF or BCF of 1 was selected.

EPCs in Plants—Plant tissue concentrations were derived from literature-based uptake factors for this receptor (Table F-2). Maximum case scenario dry weight plant tissue concentration was calculated by multiplying the dry weight soil (for terrestrial herbivorous receptors) or the dry weight sediment (for aquatic herbivorous receptors) times the uptake factor or, where a regression was used, by entering the dry weight soil or sediment concentration into the equation. 95UCLM case scenario tissue concentrations were calculated using the 95UCLM dry weight soil/sediment concentration. Where conversion to wet weight values was required, terrestrial plants were considered to contain 75 percent moisture as a default (USACHPPM 2004).

EPCs in Soil Invertebrates—Soil invertebrate concentrations were derived from literature-based uptake factors for uptake in earthworms (Table F-3). Maximum case scenario dry weight worm tissue concentration was calculated by multiplying the dry weight soil times the uptake factor or, where a regression was used, by entering the dry weight soil concentration into the equation. 95UCLM case scenario tissue concentrations were calculated using the 95UCLM dry weight soil concentration. Where conversion to wet weight values was required, soil invertebrates were considered to contain 75 percent moisture as a default (USACHPPM 2004).

EPCs in Small Mammals—Small mammal concentrations were derived from literature-based uptake factors for uptake in small mammals (Table F-4). Maximum case scenario dry weight mammal tissue concentration was calculated by multiplying the dry weight soil times the uptake factor or, where a regression was used, by entering the dry weight soil concentration into the equation. 95UCLM case scenario tissue concentrations were calculated using the 95UCLM dry weight soil concentration.

EPCs in Aquatic Prey Items—Fish were selected as representatives of the potential for chemicals to accumulate from surface water into aquatic food items. In the SLERAs, fish were used as model prey items to evaluate the potential for adverse effects to piscivorous wildlife, because they are important dietary components for these species.

Literature-based water-to-fish uptake factors or bioaccumulation equations were used to estimate concentrations of COPECs in fish tissue using the following equation:

Where: $C_{fish} = C_{water} * UF$

C_{water} = Concentration of COPEC in water (mg/L)
UF = Uptake factor for chemicals in fish (unitless).

The maximum concentrations of surface water detected were used as the C_{water} value in the equation. UFs and log K_{ow}s for organic chemicals, and their sources are summarized in Table F-5. First preference was given to measured UFs like the ones available in EPA water quality criteria documents, which are available for inorganic COPECs. For COPECs that have little or no uptake data, the Risk Assessment Information System was consulted for available uptake values. For COPECs that did not have data in Risk Assessment Information System, the EPA's Estimation Programs Interface (EPI Suite™) was used to find UF estimates. EPI Suite UF estimation is only available for organic COPECs. In the absence of a literature-based bioaccumulation model or UF for a COPEC, an accumulation factor of 1 was used to estimate chemical concentrations in fish. Use of this default accumulation factor is expected to provide a conservative estimate of accumulation for most chemicals and is expected to overestimate accumulation for non-bioaccumulative compounds.

EPCs in Benthic Invertebrates—Benthic invertebrates were selected as representatives of the potential for COPECs to accumulate from sediment into food items. In the SLERAs, benthic invertebrates were used as model prey items to evaluate the potential for adverse effects to aquatic insectivorous birds and piscivorous mammals because they are important dietary components for these species.

In the SLERAs for organic analytes, Biota-Sediment Accumulation Factors (BSAFs) were used to estimate benthos concentrations using the following equation:

$$\mathbf{BSAF} = \frac{\dfrac{\text{benthos concentration } (\frac{\text{mg}}{\text{kg}} \text{ wet weight})}{\text{lipid fraction of tissue } (\frac{\text{g lipid}}{\text{g tissue}} \text{ wet weight})}}{\dfrac{\text{sediment concentration } (\frac{\text{mg}}{\text{kg}} \text{ dry weight})}{\text{fraction of organic carbon } (\frac{\text{g carbon carbon}}{\text{g sediment}} \text{ dry weight})}}$$

Where:

- Lipid fraction was equal to the default of 3 percent on a wet weight basis
- Fraction of organic carbon was equal to the default of 1 percent on a dry weight basis

- Freshwater BSAFs from the EPA (2009) dataset were utilized as available. Where no BSAF was available, a default of 4 was utilized per guidance (EPA 1998).

The equation above was used with the sediment concentration to estimate the benthos tissue concentration of organic analytes. BSAFs and sources are presented in Table F-6.

For metals, literature-based sediment-to-benthos UFs (Bechtel Jacobs 1998a) and for dioxins, site-specific UFs were used to estimate concentrations of COPECs in benthos tissue using the following equation:

$$C_{benthos} = C_{sediment} \times UF$$

Where:

$C_{sediment}$ = Concentration of COPEC in sediment (mg/kg dry weight)
UF = Uptake factor for chemicals in benthos (unitless). Where no uptake factor was available, a default of 1 was used.

The sediment EPCs were used as the $C_{sediment}$ value in the equation. UFs for metals are from Bechtel Jacobs (1998b). In the absence of a literature-based UF for a metal, an accumulation factor of 1 was used to estimate chemical concentrations in benthos. Use of this default accumulation factor is expected to provide a conservative estimate of accumulation for most chemicals and is expected to overestimate accumulation for non-bioaccumulative compounds.

4.6.2.3.3 Total Chemical Ingestion

The total dietary exposure doses ($Dose_{total}$, mg/kg bw-d) to wildlife for the evaluated COPECs were determined using the following equation.

$$Dose_{total} = Dose_{food} + Dose_{soil} + Dose_{water}$$

Where:

$Dose_{food}$ = Amount of COPEC ingested per day from food (prey) (mg/kg bw-d)
$Dose_{soil}$ = Amount of COPEC ingested per day from soil or sediment (mg/kg bw-d)
$Dose_{water}$ = Amount of COPEC ingested per day from water (mg/kg bw-d).

The total dietary intakes are compared to dietary toxicity reference values (TRVs) to determine if adverse effects are likely to occur to wildlife from the ingestion of COPECs in food, soil/sediment, and surface water.

4.6.2.4 TRVs

Plants

To assess the potential for chemicals to adversely affect terrestrial plants, soil concentrations were compared to TRVs protective of plants (Table F-8). EcoSSLs for plants were used as available (EPA 2005c–j, 2006, 2007a-f). TRVs from studies by Efroymson et al. (1997a) were established at a level associated with a 20 percent reduction in growth or other measured

toxicological endpoints. This level is consistent with other screening-level benchmarks and the current regulatory approach. Because few toxicity values have been developed for organic chemicals, surrogate organic chemical TRVs were used for the evaluation of potential adverse effects to plants, as applicable; surrogates are identified in Table F-8.

Soil Invertebrates

To assess the potential for inorganic and organic chemicals to adversely affect soil invertebrates, soil concentrations were compared to TRVs protective of soil invertebrates (Table F-8). EcoSSLs for soil invertebrates were used as available (EPA 2005c–j, 2007a-f). TRVs protective of earthworms were used to assess the potential for inorganic and organic chemicals to adversely affect soil invertebrates (Efroymson et al. 1997b). TRVs from studies by Efroymson et al. (1997b) were established at a level associated with a 20 percent mortality or other measured toxicological endpoint for earthworms. This level is consistent with other screening-level benchmarks and the current regulatory approach. Because few toxicity values have been developed for organic chemicals, surrogate organic chemical TRVs were used for the evaluation of potential adverse effects to soil invertebrates, as applicable (Table F-8).

Wildlife

Chemicals identified as having the potential to adversely affect terrestrial and aquatic wildlife species were evaluated using dose-based toxicological benchmarks. Two types of benchmarks were used, each corresponding to a different level of ecological impacts for birds (Table F-9) and mammals (Table F-10). First, modeled doses were compared to dose-based NOAELs. NOAELs are doses that have been shown to cause no adverse impacts in test species. The NOAELs used in this ERA were derived from studies by Hill (1979), EPA Ecological Soil Screening Levels (EPA 2005c–j, 2006, 2007a–f, 2008b), and by Oak Ridge National Laboratory (Sample et al. 1996). The Oak Ridge National Laboratory NOAELs were generally derived based upon measurements of survival, growth, or reproduction in the laboratory. Values from EPA Ecological Soil Screening Levels were derived through statistical analyses of results from multiple toxicological studies with multiple endpoints (EPA 2005a). Because NOAELs are conservative and highly protective, they were used as TRVs in the SLERA.

The second set of benchmarks used was Lowest Observed Adverse Effects Levels (LOAELs). These are the lowest concentrations at which adverse effects are observed on individual test organisms. The severity of effects considered "low level" varies based on the study from which LOAELs are derived; in general, they correspond to minor changes in growth or reproduction. LOAELs are useful because there is considerable uncertainty associated with NOAELs. Because NOAELs are associated with no effects in a test study, it is uncertain whether they are close to or far below the threshold value at which effects would first be observed. LOAELs thus serve to bound the range of NOAELs, and the threshold of toxic effects is considered to lie between the NOAEL and the LOAEL. Therefore, LOAELs were also used as TRVs. In some cases, LOAELs were available from EPA Ecological Soil Screening Level sources or by Oak Ridge National Laboratory studies (Sample et al. 1996). The corresponding LOAEL was used from the EPA Ecological Soil Screening Level document when available. When there was no corresponding LOAEL value, the geometric mean of the LOAELs for growth and reproduction was calculated; this approach is similar to that used for derivation of many Ecological Soil Screening Level NOAELs.

In general, chemical exposures and toxicity were evaluated on a chemical-by-chemical basis. However, combined effects were evaluated for dioxins and furans, PAHs, DDTr, and xylenes. EPA studies show that the PAHs can be grouped into high molecular weight (HMW) and low molecular weight (LMW) groups and concentrations summed for comparison to benchmarks (EPA 2007d). Toxicity evaluation using summed PAH concentrations is performed for invertebrates, birds, and mammals for each SLERA.

TRVs were unavailable for certain chemicals due to a lack of available information in the scientific literature. The uncertainty associated with the lack of TRVs is discussed in Chapter 6.

Benthic Invertebrates

Several sources of toxicity data were used to identify the potential for chemicals in sediment to cause adverse effects to benthic communities (Table F-11). Wherever possible, Threshold Effects Levels (TELs) and Probable Effects Levels from Long et al. (1995) and MacDonald et al. (1996) were used as threshold and probable effect TRVs, respectively, to determine whether chemicals in the sediments are likely to impact benthic organisms. In the absence of the above TRVs, the following values were used: Assessment and Remediation of Contaminated Sediments *Hyalella* TELs for chronic TRVs, and Lowest Effects Levels from *Guidelines for the Protection and Management of Aquatic Sediment Quality in Ontario* (Ontario Ministry of Environment and Energy 1993) for acute TRVs.

Aquatic Organisms

Freshwater chronic and acute National Ambient Water Quality Criteria (EPA 2015b) were used as TRVs to evaluate the potential for adverse effects to aquatic life from chemicals measured in the surface water samples (Table F-12). When the National Ambient Water Quality Criteria values were not available, the Tier II value from Suter and Tsao (1996) or values from National Oceanic and Atmospheric Administration Quick Reference Screening Tables (Buchman 2008) were used to assess potential impacts to aquatic species from chemicals in surface water.

4.6.3 Ecological Effects Evaluation

Evaluation of ecological effects for each EC includes a general discussion of the potential toxicity of the COPECs in soil, sediment, and surface water that exceeded ecological screening criteria. Because the entire Depot and all ECs are similar with respect to potential ecological receptor exposures, this section is relevant to each EC SLERA. In general, metals, PAHs, and dioxins/furans have been selected as COPECs at one or more ECs. Therefore, a general discussion of the ecological effects of these chemicals in soil is presented here.

Screening levels and toxic effect levels, and the subsequent effects, of metals depend on how environmental conditions affect the speciation of a metal (e.g., whether an organism actively takes up or excludes metals in soils and how an organism processes metals internally). The relative importance of exposure pathways and routes varies by animal species and by metal, although, in general, wildlife exposure is primarily through diet and incidental ingestion of soils or sediments (USEPA, 2007a). In addition, certain metals (e.g., copper, iron) are essential for living organisms, which means there is an effect threshold for both deficiency and excess.

PAHs cause a wide variety of adverse biological effects in numerous species of organisms under laboratory conditions, including effects on survival, growth, metabolism, and tumor formation. However, inter- and intra-species responses to PAHs both in the laboratory and in the field are variable, and may be modified by exposure to other chemicals. For example, PAHs vary substantially in their toxicity to aquatic organisms. PAHs have a low potential for bioconcentration despite their high lipid solubility, possibly because most PAHs are rapidly metabolized (Eisler, 1987).

Dioxins and furans have highly variable structures and large numbers of isomers (congeners) are possible. The congeners differ in intrinsic toxicity and environmental behavior, and environmental media typically contain complex mixtures of congeners. Studies have shown that various dioxin congeners may cause impacts on wildlife by the same mode of toxic action; these studies also provide a means of weighting and summing the different dioxin congeners to determine their combined toxicity (Van den Berg 1998, 2006). This is done by multiplying the concentration of each dioxin congener by a receptor-specific toxicity equivalency factor (TEF) that relates all dioxin toxicity to that of 2,3,7,8-TCDD, which is most toxic. Concentrations are multiplied by the TEF and then summed to produce a toxic equivalents quotient (TEQ) that can be compared to benchmarks for 2,3,7,8-TCDD. Toxicity evaluation using TEQs is performed for birds and mammals for terrestrial exposures and birds, mammals, and fish for aquatic exposures.

4.6.4 Risk Characterization

The purpose of the risk characterization is to draw conclusions regarding the potential for risks to each representative receptor. This is done using a qualitative weight-of-evidence approach in which results for each measurement endpoint are considered as lines of evidence. In general, lines of evidence that provide results based on site-specific data applicable at the population level are given the greatest weight. Per EPA guidance (EPA 1997), the focus of the ERA is to protect the ecological values at the site-wide population or community level except where threatened or endangered species are concerned. The weight-of-evidence approach considered NOAELs, LOAELs, background concentrations, magnitude of exceedances, the strength of selected toxic endpoints, distribution of contaminants, and habitat considerations. Reliance strictly on HQ levels for population protection does not allow for the ability of the ecosystem to protect itself by mechanisms such as recruitment or adaptation. The weight-of-evidence approach provides a more accurate picture of potential ecological risks.

Risk calculation was performed by dividing EPCs or doses by TRVs. As defined in EPA guidance (EPA 1997), the ratio of a chemical's concentration to its TRV is called a Hazard Quotient (HQ). HQs greater than or equal to 1 indicate a potential for unacceptable risk, while HQs less than 1 indicate no potential for unacceptable risk.

$$\mathrm{HQ} = \frac{\text{EPC or dose}}{\text{TRV}}$$

The following receptors are evaluated in the SLERAs:

Terrestrial ECs:

- Terrestrial plant community: multiple species
- Soil invertebrate community: represented by earthworms:
- Herbivorous mammals: represented by deer mouse, a first-order consumer/prey with a relatively small foraging range
- Insectivorous birds: represented by American robin exposed to maintained grass cover type
- Predatory mammals: represented by red fox

Aquatic ECs:

- Benthic invertebrate community: multiple species in sediment.
- Aquatic organism community: multiple species in surface water (e.g., fish)
- Piscivorous birds: represented by osprey

4.6.4.1 Background Data

Background data specific to the project are used as comparison criteria as part of a weight-of-evidence approach to inform risk management. Section 3.2.6. details the background sampling performed at the site to develop site-specific BTVs. Comparisons to background are discussed as a factor relevant to risk characterization for receptors that may be exposed to surface soil and sediment.

4.6.5 Uncertainty Discussion

Each SLERA incorporates a number of uncertainties associated with the estimates of ecological risk. As directed in the ERA guidance (EPA 1997), a conservative approach was used in the SLERAs to ensure that chemicals eliminated from consideration do not pose risks to ecological receptors. Accordingly, the risks are likely to be overestimated. The primary areas of uncertainty are grouped under the following categories, each of which is discussed in the following subsections:

- Site Characterization
- Environmental Sampling and Analysis
- Analysis of Chemical Data
- Analysis of Estimated Exposure and Toxicity Data
- Assessment of Risks.

4.6.5.1 Site Characterization

The site characterization used in the SLERAs is based on ecological site surveys which occurred in the past. Ecological conditions at the Depot do not appear to have changed based on recent site visits. However, site characteristics that affect ecological receptors could potentially have changed, resulting in either over- or under-estimation of ecological risks.

In addition, over-estimation of risks may occur based on the assumption that concentrations of COPECs will remain constant over time. Fate and transport mechanisms, which would result in degradation of the COPECs, were not considered in the SLERAs. For example, the rates of PAH decomposition in soils and enhancement factors that increase degradation rates of PAHs have not been considered.

4.6.5.2 Environmental Sampling and Analysis

Of the potential uncertainties associated with environmental sampling, the sample design is likely to have the greatest impact on the evaluation of risks to ecological resources. The sample design was developed based on the available historical information regarding the activities that occurred at the site. Focusing the study design to provide analyses for certain chemicals to specific suspected source areas is a valid and accepted means of maintaining a practical and efficient limit on the field effort. However, there is always a possibility that the study design could miss samples where these chemicals are present or miss other types of chemicals in a specific sample.

In addition, surface soil samples were collected from the top 6 inches; the absence of data from 6 to 12 inches is an uncertainty for the SLERAs. However, the "root zone" in the top 6 inches of soil reflects the habitat of the majority of ecological receptors (including plants and soil invertebrates), consequently while this is an uncertainty, it is likely not significant.

In an effort to address the uncertainties discussed above, and in accordance with the conservative nature of SLERAs, samples were biased to areas of likely contamination. For example, the food web models assume that mammals and birds obtain all their food from within one exposure area; this is clearly a highly conservative assumption. With the exception of fixed or limited mobility receptors (e.g., benthic organisms), ecological receptors are unlikely to use only those areas of highest contamination, and are more likely to forage over a larger area that includes areas of contamination as well as less contaminated outlying areas.

4.6.5.3 Analysis of Chemical Data

Detection limits for some analytes (antimony and selenium, for example) are greater than applicable ecological screening values (as shown in the QAPP Worksheets #15 of ERT, 2013 and EA 2019). These analytes were not retained as COPECs unless they were detected. This approach could underestimate ecological risks.

The maximum concentration of a pair of duplicate or split samples (collected from the same location on the same date) was used to represent the concentration for that location. Selecting the maximum concentration of a chemical detected in duplicate samples for use in the SLERAs is a conservative measure and may overestimate risks.

The 95UCLM was used as an upper estimate of mean exposures. This exposure scenario is conservative and may also overestimate risks presented in this report.

Chemicals that are not detected in any onsite samples are considered not to be present at the site, because, based on the analytical tools and capabilities at the time of investigation, there is no

evidence indicating that these chemicals are present. Risks from chemicals below detection levels cannot be determined; therefore, the assessment of risk from chemicals below detection levels remains an uncertainty in the SLERAs.

4.6.5.4 Analysis of Estimated Exposure and Toxicity Data

A major source of uncertainty in each SLERA is the estimation of receptor exposure to COPECs. Generally, the models used to estimate exposures from abiotic media and prey are created to represent a worst-case scenario of possible risks to the receptor groups, and thus, many conservative assumptions are incorporated into the models.

Generic ecological screening levels are set at conservative levels in order to protect even the most sensitive ecological receptors. This approach might allow retention of COPECs that are not actually at levels of concern for ecological receptors and could result in an over-estimation of ecological risks. On the other hand, screening levels and/or TRVs may not exist for certain analytes or may be based on a limited number of studies, adding uncertainty to the ecological assessment of these analytes in the SLERAs.

Surface water results were compared to surface water freshwater criteria. The freshwater benchmarks are based on potential exposures and toxicity for the most sensitive freshwater aquatic organisms. Since surface water at the Depot provides limited aquatic habitat due to the intermittent presence of water, the use of these screening levels for Depot surface water is conservative and likely overestimates risks.

There is also uncertainty associated with toxicological evaluation of essential nutrients including calcium, iron, magnesium, potassium, and sodium. These five chemicals do not have screening-levels or TRVs, except iron, which has a screening-level concentration for surface soil. Adverse effects on organisms can occur if concentrations are either too low (causing deficiency symptoms) or too high (causing toxic symptoms). Organisms can adapt to different levels of these metals, although there is little information available regarding concentrations at which adverse effects of either type may be observed. Because screening-level concentrations and TRVs are not available for the essential nutrients, it is not possible to quantitatively assess the potential for risks to ecological receptors from them. However, because these nutrients are essential to flora and fauna, these essential nutrients are not maintained as COPECs.

4.6.5.5 Assessment of Risks

There are uncertainties associated with the assessment of risks. One apparent uncertainty results from the extrapolation of assumptions about the potential for adverse effects from individual organisms to populations. The intent of the SLERAs is to ultimately evaluate risks to populations. Few methods are available to extrapolate the potential for adverse effects from the individual level to the population level. It is generally assumed that if there is no potential for direct adverse effects to individual organisms then it is also unlikely for there to be the potential for direct adverse effects to populations. Similarly, it is assumed that if there is the potential for adverse effects to individual organisms there is also the potential for adverse effects to populations. However, it is conservative to assume that potential damage at the individual level will impact the populations in the surrounding ecosystem.

This uncertainty is one of several limitations associated with the use of HQs to determine the potential for risk to ecological receptors. While the HQ is a standard tool to evaluate risk, an article in the scientific literature points out a number of limitations with this method (Tannenbaum et al. 2003). The use of the HQ identifies a potential for risk as opposed to an actual risk, because the HQ result is not a probability. Because the HQ identifies whether a dose or concentration exceeds a benchmark, it is not a linear or scalable metric. Also, the HQ cannot be used to quantitatively extrapolate between individual and population level effects. All of these limitations should be considered before using HQ-based estimates of the potential for risk to draw conclusions or make decisions based on assessment results.

Another important uncertainty is the limited ability to assess combined and synergistic effects of chemicals. At the site, ecological receptors are exposed to a chemical mixture; however, comparison of individual chemicals to TRVs does not capture the potential for combined effects, with the exception of evaluating the risk of groups of chemicals such as dioxins, LMW PAHs, and HMW PAHs. Combined and synergistic effects are usually assessed by performing bioassays. As such, risk assessment conclusions conservatively identify the potential for synergistic effects and often recommended risk management of all detected chemicals.

4.7 MEC HAZARD ANALYSIS

During RI field activities, no MEC was encountered in any of the MMRP ECs; therefore, no MEC source is identified at any of the ECs and no explosive hazard exists. Based on these findings, and the updated CSM presented in Chapter 32, the project team has determined that calculation of a MEC Hazard (MEC HA) score is not warranted for any of the ECs at the Curtis Bay Depot.

4.8 MRSPP

MRSPP scores were also developed for each MMRP EC and are located in Appendix H. The MRSPP is a tool used to rank sites for further action based on a hazard rating for explosives, chemical warfare material, and contaminants.

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5. EC-3: PE PAINT STORAGE

5.1 HISTORY OF EC-3

EC-3 is located in the northwestern portion of the Depot (Figure 2). The building is no longer standing, but the concrete foundation is still in place and measures approximately 50 ft by 20 ft as observed during ERT's 2012 site visit.

5.2 DATA QUALITY OBJECTIVES

Table 5-1. DQO – Environmental Sampling for EC-3: PE Paint Storage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC, analyze for metals (Al, Cd, Co Cr, Pb, Ti, Zn) and paint related solvents (acetone; benzene, toluene, ethylbenzene and total xylenes (BTEX); carbon tetrachloride; methanol; methylene chloride; methyl ethyl ketone; ethyl alcohol).
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples around the existing building foundation. Subsurface samples at a depth lower than the foundation based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 3 co-located biased surface and subsurface soil samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs (see 2013 ERT QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; paint related solvents by SW-846 Method 8260B/8015C.

5.3 MC INVESTIGATION

5.3.1 Sampling Process

SI-level discrete sampling was conducted at EC-3 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Three biased surface and subsurface soil sample locations were selected based on field observations (i.e., staining, odor, etc.) (Figure 6). Samples were collected and submitted for laboratory analysis of metals (Al, Cd, Co, Cr, Pb, Ti, Zn) and paint related solvents (acetone; benzene, toluene, ethylbenzene and total

xylenes (BTEX); carbon tetrachloride; methanol; methylene chloride; methyl ethyl ketone; and ethyl alcohol).

5.3.2 Sampling Results

Three co-located surface and subsurface soil samples were collected and submitted for laboratory for the analysis listed in Section 5.3.1. Surface soil analytical results are summarized in Appendix E, Table E2-1 and subsurface soil analytical results are summarized in Table E2-2. Reported results, greater than the PSLs, are summarized below. All subsurface soil results were less than the PSLs.

- Chromium was reported at concentrations greater than the surface soil PSL (24.9 mg/kg) in the samples collected from EC-3-1-SO-0.5 (25.3 K mg/kg) and EC-3-3-SO-0.5 (30.8 K mg/kg). The K notes that the reported value may be biased high. Additional details on data validation qualifiers, such as the K, can be found in Appendix E-1.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

5.4 SLERA RESULTS

5.4.1 Identification of Chemicals of Potential Ecological Concern

Metals and VOCs were analyzed for at EC-3; seven metals and two VOCs were detected (Table EC3-1). Maximum concentrations of cobalt, 2-butanone, and acetone were below soil screening levels.

Maximum concentrations of four metals were greater than soil screening levels, and these metals are identified as COPECs at EC-3: cadmium, chromium, lead, and zinc. A soil screening level is not available for titanium, and therefore it is retained as a COPEC.

The COPEC screening for EC-3 is provided in Appendix F, Table EC3-1.

5.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC3-2. Because there are only three samples for this EC, 95UCLMs were not calculated. Therefore, EPCs are the maximum detected concentrations for all COPECs. The comparisons of concentrations and doses to receptor-specific TRVs for EC-3 are presented in Tables EC3-3 through EC3-6 and a comparison to background is provided in Table EC3-7. Food web models for individual receptors are included in Tables EC3-8 through EC3-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

5.4.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, only chromium and lead have HQs greater than 1; a TRV is not available for titanium and it was not evaluated. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Chromium
Chromium was detected in 3 of 3 surface soil samples at concentrations ranging from 22 to 30.8 mg/kg. The maximum concentration is greater than the TRV with an HQ of 31 (Table EC3-3). All of the detected concentrations are greater than the TRV of 1 mg/kg. The BTV for chromium is 24.9 mg/kg; while two of the detected concentrations are greater than the BTV, the maximum onsite concentration is only 1.2 times higher than background. Because the onsite chromium concentrations are so similar to background concentrations, population level adverse effects to plants are not expected, and chromium is not considered to cause risk to the plant community.

Lead
Lead was detected in 3 of 3 surface soil samples at concentrations ranging from 65.2 to 269 mg/kg. Two of the detected concentrations are greater than the TRV of 120 mg/kg, and the maximum concentration has an HQ of 2.2 (Table EC3-3). The maximum concentration (269 mg/kg) is approximately two times the BTV (124 mg/kg). Due to the relatively low magnitude of exceedance of background, lead is not expected to pose risk to plants.

5.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, only chromium and zinc have HQs greater than 1; a TRV is not available for titanium and it was not evaluated. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Chromium
Chromium was detected in 3 of 3 surface soil samples at concentrations ranging from 22 to 30.8 mg/kg. The maximum concentration is greater than the TRV of 0.4 mg/kg with an HQ of 77 (Table EC3-4). The BTV for chromium is 24.9 mg/kg; while two of the detected concentrations are greater than the BTV, the maximum onsite concentration is only 1.2 times higher than the BTV. Because the onsite chromium concentrations are so similar to background concentrations, population level adverse effects to soil invertebrates are not expected, and chromium is not retained as a COPEC.

Zinc
Zinc was detected in 3 of 3 surface soil samples at concentrations ranging from 47 to 179 mg/kg. The maximum concentration is greater than the TRV of 120 mg/kg with an HQ of 1.5 (Table EC3-4). The maximum concentration (179 mg/kg) is approximately two times the BTV (

83.9 mg/kg). Due to the relatively low magnitude of exceedance of background and the soil invertebrate TRV, zinc is not expected to pose risk to soil invertebrates.

5.4.2.3 Risk Characterization for Birds

When doses calculated from food web models using maximum concentrations were compared to NOAEL-based TRVs protective of birds, cadmium, chromium, lead, and zinc have HQs greater than 1. When the doses are compared to LOAEL-based TRVs, lead has an HQ greater than 1. No TRVs are available for titanium (Table EC3-5). Further discussion of the analytes with LOAEL-based HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Lead
Lead was detected in 3 of 3 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 13 (Table EC3-5). The maximum concentration (269 mg/kg) is approximately two times the BTV (124 mg/kg). The maximum case scenario dose is expected to overestimate the exposure of birds, which are mobile receptors, to surface soil at the site. Due to the relatively low magnitude of exceedance of background, lead is not expected to pose risk to birds.

5.4.2.4 Risk Characterization for Mammals

When doses calculated from food web models using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. No TRVs are available for titanium (Table EC3-6). A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-3 are expected.

5.4.3 SLERA Conclusions for EC-3

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no analytes are retained as COPECs at EC-3.

5.5 EC SUMMARY

Based on the history of this EC as detailed in the MC and HTW Sampling Rationale Memorandum (Appendix H of the Final ERT 2013 Work Plan), there was no historical evidence suggesting hexavalent chromium would be found at the EC. Therefore, analysis was conducted for chromium without speciation and the chromium results were compared to the chromium background level of 24.9 mg/kg rather than the hexavalent chromium PSL of 10 mg/kg. The reported concentration of chromium is less than the trivalent chromium USEPA RSL for industrial soil (1,800,000 mg/kg) and, therefore, does not constitute a release.

Based on the results of the SI-level sampling conducted at EC-3, no release has occurred at this EC. The SLERA found no potential unacceptable ecological risks. Therefore, EC-3 is recommended for NFA.

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6. EC-16: TRANSFORMERS

6.1 HISTORY OF EC-16

There are three pole-mounted transformers and one transformer bank proposed for investigation throughout the Depot (Figure 2). One single pole-mounted transformer is located in the northern tip of the Depot (EC-16A). Two transformer locations are located along the northeastern portion of the Depot; one is a fenced transformer bank, containing four transformers (EC-16B), and the other is west of A-Line Road and contains one single pole-mounted transformer and one triple pole-mounted transformer (EC-16C). The fourth location (EC-16D) is in the southern portion of the Depot along Patrol Bridge Road and contains three transformers situated between two poles (EA 2011).

Available information indicates that all former PCB-containing transformers were replaced with non-PCB transformers between 1986 and 1989 (Daniel, 1992; EA 2011). The transformers and poles do not contain placards consistent with Baltimore Gas and Electric markings and are therefore not likely owned by Baltimore Gas and Electric (EA 2011).

6.2 EC-16 HABITAT

EC-16 was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-16 includes four small but distinct areas at the site, described above, in successional old field upland areas; these areas are estimated at 5% impervious surface since only the actual utility poles are impervious within the areas. Within the successional old field habitats, dominant plant species include orchard grass (*Dactylis glomerata*), yellow foxtail grass (*Setaria pumila*), broomsedge bluestem (*Andropogon virginicus*) and common milkweed (*Asclepias syriaca*). Numerous scattered Bradford pear trees (*Pyrus calleryana*) were observed and provide minimal and low-quality avian cover and habitat. Common buckeye butterflies (*Junonia coenia*) and an abandoned osprey nest (*Pandion haliaetus*) were observed. No unique habitat, water features or other wildlife was observed within these four areas. Overall, the habitat quality of the four areas of EC-16 (A-D) is considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-16. EC-16 was ranked as providing minimal habitat quality.

6.3 DATA QUALITY OBJECTIVES

Table 6-1. DQO – Environmental Sampling for EC-16: Transformers SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of these EC locations, analyze for PCBs.
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	Biased surface soil samples at the base of each transformer pole/concrete pad at each of the four locations associated with this EC.

Table 6-1. DQO – Environmental Sampling for EC-16: Transformers SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Number of Samples Required	11 biased surface samples.
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, and USEPA Eco SSLs (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain biased surface soil samples via DPT, hand auger, or hand trowel.
Analytical Method	PCBs by SW-846 Method 8082A.

6.4 MC INVESTIGATION

6.4.1 Sampling Process

SI-level sampling was conducted at EC-16 in August 2013 to determine the absence or presence of HTW impacts to surface soil. Eleven biased surface soil sample locations at the four transformer sites described above, were selected based on the location of the transformer pole or concrete pad. Samples were collected and submitted for laboratory analysis of PCBs. PCBs were not detected at concentrations greater than the PSLs in 3 of the 4 transformer locations (EC-16A, EC-16B, EC-16C, EC-16D).

One PCB compound, Aroclor 1260, was reported at concentrations greater than the PSL (1.0 mg/kg) in two surface soil samples (EC-16-10-SO-0.5 [1.1 mg/kg] and EC-16-11-SO-0.5 [2.6 mg/kg]) collected from directly below the transformer bank located in the IRP Shop Area (EC-16B) (Figure 7). The SI-level sampling indicated that a release of Aroclor 1260 has occurred in the surface soil.

In order to determine the extent of the Aroclor 1260 release in the vicinity of the transformer in the IRP Shop Area, four additional co-located surface and subsurface soil samples were collected and submitted to the project laboratory for PCB analysis via Method SW-846 8082A (Figure 7). These sampling points were within the fenced in area surrounding the transformer bank and were no more than 10 ft from the transformer bank, which is the assumed source area. As the PCBs are not expected to migrate to any extent into the subsurface, the subsurface samples were collected from 1-2 ft bgs. The ERT RI/FS PDT determined that subsurface samples were necessary to confirm that Aroclor 1260 had not migrated to the subsurface soil. Table 6-2 provides the RI-level sampling DQO table.

Table 6-2. DQO – Environmental Sampling for EC-16B: Transformer (IRP Shop Area)

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine extent of the Aroclor 1260 release.
Data User Perspective(s)	To obtain additional data to determine the extent of the Aroclor 1260 release.
Contaminant or Characteristic of Interest	Based on the reported results greater than PSLs analyze for Aroclor 1260 release.
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	Obtain four co-located surface (0-6 inches bgs) and subsurface (1-2 ft bgs) soil samples within 10 ft of the transformer bank inside of the fence.

Table 6-2. DQO – Environmental Sampling for EC-16B: Transformer (IRP Shop Area)

Data Quality Objective Element	EC-Specific DQO Statement
Number of Samples Required	4 co-located surface and subsurface soil samples.
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs, and Curtis Bay PSLs (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Aroclor 1260 analysis by SW-846 Method 8082A

6.4.2 Soil Sampling Results

For the SI level sampling, 11 surface soil samples were collected and submitted for laboratory analysis of PCBs. The additional RI level samples included an additional four co-located surface and subsurface soil samples analyzed for Aroclor 1260 only.

Surface soil analytical results are summarized in Appendix E, Table E2-3 and subsurface soil analytical results are summarized in Table E2-4. Reported results for surface soil, greater than the PSLs, are summarized below. All subsurface soil sample results were less than PSLs.

The only results greater than PSLs were the initial SI-level samples collected at the transformer location in the IRP Shop Area. The additional RI-level samples were all less than PSLs for both the surface and subsurface soil.

- Aroclor 1260 was reported at a concentration greater than the PSL (0.99 mg/kg) in the samples collected from EC-16-10-SO-0.5 (1.1 mg/kg) and EC-16-11-SO-0.5 (2.6 mg/kg).

6.5 HHRA RESULTS

As described in the *Human Health Risk Assessment and Screening Level Ecological Risk Assessment Approach* (Chapter 4), the HHRA for EC-16B includes the following steps:

- Identification of COPCs.
- Exposure assessment, including calculate EPCs, and estimate the potential intake of COPCs.
- Identify toxicity information for each COPC.
- Characterize site-specific risks.
- Qualitatively discuss uncertainties associated with the HHRA.

6.5.1 Identification of Chemicals of Potential Concern

Detected analytes in EC-16 were compared to industrial soil RSLs.

As shown in Appendix F, Table EC16-1, for surface soil and Table EC16-2 Aroclor 1260 is a COPC in soil at EC-16. Appendix F, Tables EC16-1 (surface soil) and EC16-2 (surface/subsurface soil), show the data summary and the selection of COPCs for EC-16.

6.5.2 Exposure Assessment

The exposure assessment for the HHRA has been outlined in Section 4.5.2, and lists the human receptors and exposure pathways, outlines the approach to calculating EPCs, and presents the exposure assumptions that were used in the HHRAs to estimate intake. As for all Curtis Bay ECs considered in this RI, current and future receptors potentially exposed to soil at EC-16 include current site workers and trespassers exposed to surface soil and future construction workers exposed to mixed surface/subsurface soil.

The EPC (95% UCL) calculated for Aroclor 1260 using ProUCL, outputs are provided in Appendix F. RME factors (Section 4.5.2) were used for the two receptors assessed at EC-16.

6.5.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks. These values were obtained as specified in Section 4.5.3. For EC-16, only Aroclor 1260 is a COPC. This compound is listed in USEPA's RSL table (USEPA, 2020a) as having only SFs available; no non-cancer toxicity values are listed, therefore non-cancer hazards were not estimated for EC-16.

6.5.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as shown in Appendix F, Tables EC16-5 and EC16-6.

Non-Cancer Risk
Since the single selected COPC, Aroclor 1260, lacks any published non-cancer toxicity values, non-cancer risks were not estimated for this EC.

Carcinogenic Risk
The estimated incremental cancer risks estimated for each receptor were as follows:

- Current site worker exposed to surface soils: 1×10^{-6}
- Future construction worker exposed to surface and subsurface soils: 9×10^{-8}.

Thus, the acceptable incremental cancer risk level specified by MDE (1×10^{-5}) is not exceeded at EC-16 for current site workers or future construction workers, and trespassers intermittently contacting the EC would not face unacceptable risks.

Uncertainties associated with the HHRA are discussed for all ECs in Section 4.5.5.

6.5.5 HHRA Conclusions for EC-16

Based on these HHRA results NFA is recommended for EC-16.

6.6 SLERA RESULTS

6.6.1 Identification of Chemicals of Potential Ecological Concern

PCB Aroclors were analyzed for at EC-16, and only Aroclor 1260 was detected. The maximum concentration of Aroclor 1260 was greater than the soil screening level; therefore, Aroclor 1260 is identified as a COPEC. The screening for COPECs in EC-16 surface soil is provided in Appendix F, Table EC16-7.

6.6.2 Risk Characterization

EPCs for COPECs are presented in Table EC16-8. The comparisons of concentrations and doses to receptor-specific TRVs for EC-16 are presented in Tables EC16-9 through EC16-13 and a comparison to background is presented in Table EC16-14. Food web models for individual receptors are included in Tables EC16-15 through EC16-18. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

6.6.2.1 Risk Characterization for Plants

When the maximum concentration is compared to the TRV protective of terrestrial plants, Aroclor 1260 has an HQ less than 1 (Table EC16-9). Therefore, there is no potential for risk to plants from Aroclor 1260.

6.6.2.2 Risk Characterization for Soil Invertebrates

When the maximum concentration of Aroclor 1260 is compared to the TRV protective of soil invertebrates it yields an HQ of 8. When the 95UCLM concentration is compared to the TRV it yields an HQ of 4 (Table EC16-10). A BTV is not available for Aroclor 1260 (Table EC16-14). Aroclor 1260 was detected in 8 of 15 samples at concentrations ranging from 0.031 to 2.6 mg/kg and four of the detected concentrations are greater than the soil invertebrate TRV of 0.33 mg/kg. The risk is driven by the maximum sample concentration (EC-16-11-SO-0.5) which is more than two times greater the next sample concentration (1.1 mg/kg). With the exception of EC-16-11-SO-0.5, due to the low magnitude of exceedance of the soil invertebrate TRV, Aroclor 1260 is not expected to pose risk to soil invertebrates. Aroclor 1260 at EC-16-11-SO-0.5 may pose risks to soil invertebrates, but the conclusion of the weight-of-evidence approach found site-wide populations of soil invertebrates are not expected to be at potential risk from Aroclor 1260.

6.6.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds, Aroclor 1260 has an HQ of 20. When these doses are compared to LOAEL-based TRVs, the HQ is 2 (Table EC16-11).

When doses calculated using 95UCLM concentrations are compared to NOAEL-based TRVs protective of birds, Aroclor 1260 has an HQ of 7. When these doses are compared to LOAEL-based TRVs, the HQ is less than 1 (Table EC16-12). Because the LOAEL-based HQ based on the 95UCLM dose is less than 1, Aroclor 1260 is not retained as a COPEC for birds.

6.6.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL- and LOAEL-based TRVs protective of mammals, Aroclor 1260 has an HQ less than 1 (Table EC3-7). Therefore, Aroclor 1260 is not retained as a COPEC for mammals.

6.6.3 SLERA Conclusions for EC-16

No COPECs were retained for plants, soil invertebrates, birds, or mammals. Aroclor 1260 was not retained as a COPEC for soil invertebrates or birds based on the conclusion of the weight-of-evidence approach that there is no expected ecological risk to site-wide populations. However, the HQ at the location of the maximum concentration (EC-16-11-SO-0.5) indicates the potential for localized effects.

6.7 EC SUMMARY

Three of the four transformer locations (EC-16A, EC-16C, and EC-16D) were determined to not have a release and therefore are recommended for NFA. The transformer location in the IRP Shop Area did have two surface soil results greater than the PSL for Aroclor 1260. The HHRA and the SLERA found no unacceptable human health or ecological risks. Therefore, the IRP Shop Area transformer (EC-16B) is also recommended for NFA.

7. EC-27: BUILDING 831 – OIL HOUSE UTILITY AREA

7.1 HISTORY OF EC-27

EC-27 is located in the northeastern portion of the Depot and is associated with historical Building 831, referred to as "Diesel Oil Pump House" in some documents (Figure 2). The building no longer exists, but the concrete foundation is still in place. This building was a small metal building previously used to store oil drums, paints, and solvents for maintenance projects at the Depot (Daniel, 1992). Records indicate that two 275-gallon gasoline aboveground storage tanks (ASTs) and one 1,000-gallon diesel AST were located outside of the building within secondary containment structures (Daniel, 1992). The ASTs were removed from the Depot in the 1990s (EA 2011).

7.2 DATA QUALITY OBJECTIVES

Table 7-1. DQO – Environmental Sampling for EC-27: Bldg. 831–Oil House Utility Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.3 of the Work Plan (ERT 2013), analyze for metals (Al, Cd, Co Cr, Pb, Ti, Zn), naphthalene, and solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE).
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples around the existing building foundation. Subsurface samples at a depth lower than the foundation based on field observations (i.e., soil staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 2 co-located biased surface and subsurface soil samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A, BTEX and naphthalene by SW-846 Method 8260B; solvents by SW-846 Method 8260B/8015C.

7.3 MC INVESTIGATION

7.3.1 Sampling Process

SI-level sampling was conducted at EC-27 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Two biased surface and subsurface sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 8). Samples were collected and submitted for laboratory analysis of metals (Al, Cd, Co, Cr, Pb, Ti, Zn), naphthalene, and solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, tetrachloroethene [PCE], and trichloroethene [TCE]).

7.3.2 Sampling Results

Two co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of (Al, Cd, Co, Cr, Pb, Ti, Zn), naphthalene, and solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE).

Surface soil analytical results are summarized in Appendix E, Table E2-5, and subsurface soil analytical results are summarized in Table E2-6. Reported results were less than PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

7.4 SLERA Results

7.4.1 Identification of Chemicals of Potential Ecological Concern

Metals and VOCs were analyzed for at EC-27; some analytes of each group were detected (Table EC27-1). Maximum concentrations of VOCs, chromium, and cobalt were below soil screening levels. The soil screening level for aluminum is based on soil pH; as discussed in Section 4.6.2, aluminum is not identified as a COPEC for Curtis Depot sites in the Curtis Bay Depot.

Maximum concentrations of cadmium, lead, and zinc were greater than soil screening levels and are identified as COPECs at EC-27. A soil screening level is not available for titanium, and therefore it is retained as a COPEC. The screening for COPECs in EC-27 surface soil is provided in Appendix F, Table EC27-1.

7.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC27-2. Because there are only two samples for this EC, 95UCLMs were not calculated. Therefore, EPCs are the maximum detected concentrations for all COPECs. The comparisons of concentrations and doses to receptor-specific TRVs for EC-27 are presented in Tables EC27-3 through EC27-6 and a comparison to background is provided in Table EC27-7. Food web models for individual receptors are included in Tables

EC27-8 through EC27-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

7.4.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, lead has an HQ greater than 1 (Table EC27-3). A TRV is not available for titanium. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Lead was detected in 2 of 2 surface soil samples at concentrations of 48.9 and 188 mg/kg. The maximum concentration is greater than the TRV of 120 mg/kg with an HQ of 2. Only the maximum concentration is greater than the TRV and the BTV (124 mg/kg). Because the maximum concentration is similar to background and only slightly exceeds the TRV, population level adverse effects to plants are not expected, and lead is not retained as a COPEC.

7.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, no COPECs have HQs greater than 1 (Table EC27-4). Therefore, no COPECs are retained for soil invertebrates. A TRV is not available for titanium. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

7.4.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs, cadmium, lead, and zinc have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, lead has an HQ greater than 1 (Table EC27-5). No TRVs are available for titanium. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Lead was detected in 2 of 2 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 9. The BTV for lead is 124 mg/kg and 1 of the 2 onsite concentrations is slightly greater than this value (1.5 times higher). The maximum case scenario dose is expected to overestimate the exposure of birds, which are mobile receptors, to surface soil at the site. However, the sample size was too small to calculate a 95UCLM. Because the maximum concentration of lead is so similar to the BTV, and because of the conservative nature of the exposure models, it is expected that the potential for risks to birds as indicated by the HQ, is overestimated. Population-level risks to birds are considered unlikely based on the available data.

7.4.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. No TRVs are available for titanium (Table EC27-6). A discussion of the uncertainties associated with the

evaluation of potential risks for analytes without TRVs is included in Section 4.6.8. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-27 are expected.

7.4.3 SLERA Conclusions for EC-27

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no analytes are retained as COPECs at EC-27.

7.5 EC SUMMARY

Based on the results of the SI-level sampling conducted at EC-27, no release has occurred at this EC. The SLERA found no potential unacceptable ecological risks. Therefore, EC-27 is recommended for NFA.

8. EC-28: BUILDING 825 – POST ENGINEER SHOPS

8.1 HISTORY OF EC-28

EC-28 is located in the northeastern portion of the Depot and is associated with Building 825 (Figure 2). Building 825, also referred to as the Carpenter Shop, is still standing and was mainly used as a woodworking shop for maintenance and minor construction operations conducted at the Depot (Daniel, 1992). Treated lumber was likely stored here; no records indicate that lumber treatment operations took place at the Depot. Various saws and equipment for furniture repair and fabrication have also been noted at EC-28 (USAEHA, 1989).

Building 825 was also historically used as storage for paints and solvents (Daniel, 1992), confirmed by signage observed during EA's site visit in October 2010 indicating paint storage (EA 2011). EA also observed a drum filled with absorbent material (kitty litter) for spills, a work bench, and a gas fired furnace. The concrete floor within the paint storage room was observed to have oil stains. The concrete floors throughout Building 825 were degraded (i.e., pitting and cracks) and had holes from where machinery was previously bolted to the floor.

8.2 DATA QUALITY OBJECTIVES

Table 8-1. DQO – Environmental Sampling for EC-28: Bldg. 825-Post Engineer Shops SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.4 of the Work Plan (ERT 2013), analyze for metals (Al, As, Cd, Co, Cr, Cr+6, Cu, Ni, Pb, Ti, Zn), paint related solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol), pentachlorophenol, naphthalene, and PCBs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples collected around the existing building foundation. Subsurface samples at a depth lower than the foundation based on field observations (i.e., staining, odor). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 4 co-located biased surface and subsurface samples (A. above). B. 2 biased groundwater samples (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.

Table 8-1. DQO – Environmental Sampling for EC-28: Bldg. 825-Post Engineer Shops SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Analytical Method	Metals analysis by SW-846 Method 6020A; Cr+6 analysis by SW-846 Method 7196A; paint related solvents by SW-846 Method 8260B/8015C; naphthalene by SW-846 Method 8260B/8270SIM1; pentachlorophenol by SW-846 Method 8270SIM; PCBs by SW-846 Method 8082A.

8.3 MC INVESTIGATION

8.3.1 Sampling Process

SI-level sampling was conducted at EC-28 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Four biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 9). Samples were collected and submitted for laboratory analysis of metals (Al, As, Cd, Co, Cr, Cr^{+6}, Cu, Ni, Pb, Ti, Zn), paint related solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol), pentachlorophenol, naphthalene, and PCBs.

Based on the 2013 sample results, arsenic concentrations were greater than the surface soil PSL throughout the IRP Shop Area. Additional sampling was conducted in 2015 for the IRP Shop Area and is presented in Chapter 28 (Figure 29).

8.3.2 Sampling Results

Four co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of metals (Al, As, Cd, Co, Cr, Cr^{+6}, Cu, Ni, Pb, Ti, Zn), paint related solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol), pentachlorophenol, naphthalene, and PCBs. Surface soil analytical results are summarized in Appendix E, Table E2-7, and subsurface soil analytical results are summarized in Table E2-8.

Reported results for all parameters (other than arsenic) greater than the PSLs, are summarized below. No paint related solvents, pentachlorophenol, naphthalene, or PCBs were detected in the surface or subsurface soil samples.

- Chromium was reported at a concentration greater than the surface soil PSL (24.9 mg/kg) in the sample collected from EC-28-3-SO-0.5 (30.6 K mg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

8.4 SLERA Results

8.4.1 Identification of Chemicals of Potential Ecological Concern

Metals, PCBs, and VOCs were analyzed for at EC-28; some analytes of each group were detected (Table EC28-1). Maximum concentrations of VOCs, cobalt, and nickel were below soil screening levels. The soil screening level for aluminum is based on soil pH; as discussed in Section 4.6.2, aluminum is not identified as a COPEC at any ECs.

Maximum concentrations of arsenic, cadmium, chromium, copper, lead, zinc, and Aroclor 1260 were greater than soil screening levels and are identified as COPECs at EC-28. A soil screening level is not available for titanium, and therefore it is retained as a COPEC. The screening for COPECs in EC-28 surface soil is provided in Appendix F, Table EC28-1.

8.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC28-2. The sample size for all COPECs except arsenic was too small to calculate 95UCLMs. Therefore, arsenic is the only COPEC with a 95UCLM EPC. The comparisons of concentrations and doses to receptor-specific TRVs for EC-28 are presented in Tables EC28-3 through EC28-7 and a comparison to background is provided in Table EC28-8. Food web models for individual receptors are included in Tables EC28-9 through EC28-14. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

8.4.2.1 Risk Characterization for Plants

When maximum COPEC concentrations are compared to TRVs protective of terrestrial plants, arsenic, chromium, copper, lead, and zinc have HQs greater than 1 (Table EC28-3). The 95UCLM for arsenic also exceeds the TRV. A TRV is not available for titanium. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

<u>Arsenic</u>
Arsenic was detected in 10 of 10 surface soil samples at concentrations ranging from 13.7 to 106 mg/kg. The maximum concentration is greater than the TRV of 18 mg/kg with an HQ of 6, and the 95UCLM concentration is greater than the TRV with a HQ of 3. Six of the 10 detected concentrations are greater than the TRV. The BTV for arsenic is 9.09 mg/kg and all of the onsite concentrations are greater than this value. Because the 95UCLM concentration is greater than the TRV and because all of the onsite arsenic concentrations are greater than the BTV, arsenic is retained as a COPEC.

<u>Chromium</u>
Chromium was detected in 4 of 4 surface soil samples at concentrations ranging from 15.2 to 30.6 mg/kg. The maximum concentration is greater than the TRV of 1 mg/kg with an HQ of 31. All of the detected concentrations are greater than the TRV. The BTV for chromium is

24.9 mg/kg and only the maximum onsite concentration is slightly greater than this value (1.2 times higher). While the concentrations detected onsite are greater than the TRV, because the concentrations are less than or very similar to background, adverse effects to plant populations are not expected. Therefore, chromium is not retained as a COPEC.

Copper
Copper was detected in 4 of 4 surface soil samples at concentrations ranging from 65.4 to 207 mg/kg. The maximum concentration is greater than the TRV of 70 mg/kg with an HQ of 3. Three of the 4 detected concentrations are greater than the TRV. The BTV for copper is 32.8 mg/kg and all of the onsite concentrations are greater than this value. Due to the low magnitude of exceedance of the plant TRV by the maximum concentration, copper is not retained as a COPEC.

Lead
Lead was detected in 4 of 4 surface soil samples at concentrations ranging from 104 to 405 mg/kg. The maximum concentration is greater than the TRV of 120 mg/kg with an HQ of 3. Three of the 4 detected concentrations are greater than the TRV. The BTV for lead is 124 mg/kg and 3 of the onsite concentrations are greater than this value. Due to the low magnitude of exceedance of the plant TRV by the maximum concentration, lead is not retained as a COPEC.

Zinc
Zinc was detected in 4 of 4 surface soil samples at concentrations ranging from 104 to 365 mg/kg. The maximum concentration is greater than the TRV of 160 mg/kg with an HQ of 2. Two of the 4 detected concentrations are greater than the TRV. The BTV for zinc is 83.9 mg/kg and all of the onsite concentrations are greater than this value. Due to the low magnitude of exceedance of the soil invertebrate TRV by the maximum concentration, zinc is not retained as a COPEC.

8.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, arsenic, chromium, copper, zinc, and Aroclor 1260 have HQs greater than 1. A 95UCLM concentration is available for arsenic, and this value is less than the TRV (Table EC28-4). A TRV is not available for titanium. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Chromium
Chromium was detected in 4 of 4 surface soil samples at concentrations ranging from 15.2 to 30.6 mg/kg. The maximum concentration is greater than the TRV of 0.4 mg/kg with an HQ of 77. All of the detected concentrations are greater than the TRV. The BTV for chromium is 24.9 mg/kg and only the maximum onsite concentration is slightly greater than this value (1.2 times higher). While the concentrations detected onsite are greater than the TRV, because the concentrations are less than or very similar to background, adverse effects to soil invertebrate populations are not expected. Therefore, chromium is not retained as a COPEC.

Copper
Copper was detected in 4 of 4 surface soil samples at concentrations ranging from 65.4 to 207 mg/kg. The maximum concentration is greater than the TRV of 80 mg/kg with an HQ of 3. Two of the 4 detected concentrations are greater than the TRV. The BTV for copper is 32.8 mg/kg and all of the onsite concentrations are greater than this value. Due to the low magnitude of exceedance of the soil invertebrate TRV by the maximum concentration, copper is not retained as a COPEC.

Zinc
Zinc was detected in 4 of 4 surface soil samples at concentrations ranging from 104 to 365 mg/kg. The maximum concentration is greater than the TRV of 120 mg/kg with an HQ of 3. Three of the 4 detected concentrations are greater than the TRV. The BTV for zinc is 83.9 mg/kg and all of the onsite concentrations are greater than this value. Due to the low magnitude of exceedance of the soil invertebrate TRV by the maximum concentration, zinc is not retained as a COPEC.

Aroclor 1260
Aroclor 1260 was detected in 4 of 4 surface soil samples at concentrations ranging from 0.051 to 1 mg/kg. The maximum concentration is greater than the TRV of 0.33 mg/kg with an HQ of 3. Two of the 4 detected concentrations are greater than the TRV. A BTV is not available for Aroclor 1260. Due to the low magnitude of exceedance of the soil invertebrate TRV by the maximum concentration, Aroclor 1260 is not retained as a COPEC.

8.4.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds (Table EC28-5) arsenic, cadmium, chromium, copper, lead, zinc, and Aroclor 1260 have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, arsenic, copper, and lead have HQs greater than 1. However, when the dose of arsenic calculated using the 95UCLM concentration is compared to the LOAEL-based TRV the HQ is equal to 1 (Table EC28-6). No TRVs are available for titanium. Further discussion of the analytes with maximum or 95UCLM doses yielding a LOAEL-based HQ greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Copper
Copper was detected in 4 of 4 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 2. The BTV for copper is 32.8 mg/kg and all of the onsite concentrations are greater than this value. The exposure model uses conservative assumptions about area use, bioaccumulation, and uptake and is expected to overestimate the dose that receptors would receive, especially since the dose is based on the maximum concentration. Due to the low magnitude of exceedance of the LOAEL-based TRV by the maximum dose, copper is not retained as a COPEC.

Lead
Lead was detected in 4 of 4 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 19. The BTV for lead is 124 mg/kg and 3 of the 4

onsite concentrations are greater than this value. The exposure model uses conservative assumptions about area use, bioaccumulation, and uptake and is expected to overestimate the dose that receptors would receive, especially since the dose is based on the maximum concentration. However, insufficient quantitative data are available to refine this exposure estimate. Therefore, because the estimated dose exceeds the LOAEL-based TRV and because most of the onsite lead concentrations are greater than the BTV, lead is retained as a COPEC.

8.4.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. No TRVs are available for titanium (Table EC28-7). A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-28 are expected.

8.4.3 SLERA Conclusions for EC-28

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, the following analytes are retained as COPECs:

- Arsenic for plants
- Lead for birds.

No COPECs are anticipated to present risk to soil invertebrates or mammals.

Arsenic was evaluated by ERT in a site-wide investigation (ERT 2020). The SLERA found that ecological impacts were not likely due to arsenic at the DU associated with EC-28 (DU 2: the IRP Shop Area). Based on the site-wide arsenic investigation, NFA is recommended at EC-28 for arsenic.

8.5 EC SUMMARY

Reported results for chromium were greater than the surface soil background level of (24.9 mg/kg) in one surface soil sample (30.6 K mg/kg). However, the reported result for hexavalent chromium in this sample was less than the limit of detection. Therefore, the reported result from chromium is due to trivalent chromium; it is less than the trivalent chromium USEPA RSL for industrial soil (1,800,000 mg/kg) and does not constitute a release.

Additionally, the USEPA RSL for Aroclor 1260 was 1.0 mg/kg during the 2013 sampling event. The reported result for Aroclor 1260 from one sampling location (EC-28-2) was 1.0 mg/kg. Based on this, the site was not selected for additional sampling as the results did not exceed the PSLs. The November 2020 update to the USEPA RSLs changed the Aroclor 1260 RSL to 0.99 mg/kg; however, additional sampling was not conducted as the detected concentration was not greater than the previous RSL and is minimally above the current RSL. Based on the results of the SI-level sampling conducted at EC-28, no release has occurred at this EC. Arsenic was

not evaluated in an HHRA for EC-28 because it was evaluated in a site-wide investigation as part of DU-2 (ERT 2020). The HHRA determined no potential carcinogenic risks or noncancer hazards above acceptable levels for both the site worker, trespasser, and construction worker exposure to arsenic in soil at DU-2. Based upon the site-wide investigation, NFA to protect human health is recommended at EC-28 for arsenic.

The SLERA found potential unacceptable ecological risks due to arsenic and lead for at least one ecological receptor. Arsenic was evaluated by ERT in a site-wide investigation and the SLERA found that ecological impacts were not likely due to arsenic in the DU associated with EC-28 (ERT 2020). However, further action for soil is required to protect ecological receptors due to lead at EC-28. EC-28 is recommended for further evaluation in the FS.

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9. EC-29: BUILDING 822 – E.E. MACHINE SHOP

9.1 HISTORY OF EC-29

EC-29 is located in the northeastern portion of the Depot and consists of Building 822 (Figure 2). Building 822 still stands and was historically used for miscellaneous small-scale metal cleaning and degreasing operations involving solvents (USAEHA, 1989). Storage of mineral spirits, lubricating oils, hydraulic fluid, and anti-freeze in 55-gallon drums has also been documented (Daniel, 1992). The E.E. Machine Shop is also assumed to have been used as a machining or general shop as evidenced by an electrical panel listing equipment consistent with a machine shop (EA 2011).

During a 2010 site visit, EA noted oil stains on the concrete floors, degraded floor conditions (i.e., pitting, cracking and holes), and signage indicating paint and general "drum storage," as well as an empty, unlabeled drum. The 2010 site visit also noted signage indicating herbicide storage; however, there is no information available on the use and frequency of herbicide application at the Depot (EA 2011). These observations indicate that the building was repurposed during the Depot's operational history.

9.2 EC-29 HABITAT

EC-29 was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-29 includes the Building 822 E.E. Machine Shop in the northeastern corner of the site. This area is estimated at 90% impervious surface since the area includes an abandoned building and the old associated roads/parking areas. The habitat of EC-29 is characterized as developed and successional old field upland areas dominated by orchard grass, yellow foxtail grass, broomsedge bluestem, butter and eggs (*Linaria vulgaris*), white snakeroot (*Eupatorium rugosum*), and common milkweed. Similar to EC-16 above, numerous scattered Bradford pear trees were observed and provide minimal and low quality avian cover and habitat. White-tailed deer (*Odocoileus virginianus*) were observed utilizing the habitat and an abandoned osprey nest was present on a pole near EC-29. Overall, the habitat quality of EC-29 is considered poor due to low habitat complexity and low diversity of vegetation species. Little wildlife food/forage and cover is present within EC-29. EC-29 was ranked as providing minimal habitat quality.

9.3 DATA QUALITY OBJECTIVES

Table 9-1. DQO – Environmental Sampling for EC-29: Bldg. 822-E.E. Machine Shop SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of this EC as outlined in Section 1.4.2.5 of the Work Plan (ERT 2013), analyze for metals (Al, Cd, Co, Cr, Pb, Ti, Zn), solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, PCBs, and herbicides.

Table 9-1. DQO – Environmental Sampling for EC-29: Bldg. 822-E.E. Machine Shop SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples collected around the existing building foundation. Subsurface samples at a depth lower than the foundation based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 4 co-located biased surface and subsurface samples (A. above). B. 2 biased groundwater samples (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling locations, obtain soil samples via DPT. C. Obtain groundwater samples via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; solvents by SW-846 Method 8260B/8015C; naphthalene by SW-846 Method 8260B/8270SIM1; PCBs by SW-846 Method 8082A; herbicides by SW-846 Method 8151A.

9.4 MC INVESTIGATION

9.4.1 Sampling Process

SI-level sampling was conducted at EC-29 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Four biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor). Based on the historical use of this EC for paint storage, biased surface and subsurface soil samples were collected and analyzed for metals (Al, Cd, Co, Pb, Ti, Zn), solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, PCBs, and herbicides. The subsurface samples were collected below the building foundation from 3 to 4 ft bgs.

Reported results for Al, Cd, Co, Pb, Ti, Zn, solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, and herbicides were less than the PSLs; therefore, it was determined that a release of these constituents has not occurred. The reported result for one PCB, Aroclor 1260, was greater than the PSL (1.0 mg/kg) in one surface soil sample (1.33 mg/kg).

The reported result for chromium was greater than the surface soil PSL (24.9 mg/kg) in one surface soil sample (102 J mg/kg). Based on the history of this EC as detailed in the *MC and HTW Sampling Rationale Memo* (Appendix H of the Final Work Plan), there was no historical evidence suggesting hexavalent chromium would be found at the EC. Therefore, analysis was conducted for chromium without speciation and the chromium results were compared to the chromium PSL of 24.9 mg/kg rather than the hexavalent chromium PSL of 10 mg/kg. The

reported concentration of chromium in the sample collected from EC-29-4-SO-0.5 (102 J mg/kg) was greater than the chromium PSL, but less than the trivalent chromium USEPA RSL for industrial soil (1,800,000 mg/kg) and, therefore, does not constitute a release. Based on the sampling results, it was determined that only a release of Aroclor 1260 has occurred at EC-29.

In order to determine the extent of Aroclor 1260 in soil, six additional co-located surface and subsurface soil samples were collected as shown in Figure 10. The additional samples were collected within 25 ft of the original exceedance (EC-29-04); sampling location EC-29-06 was collected between the original sample and the concrete pad. The remaining samples were collected to determine the extent of the PCB contamination to the west, south and east; sampling location EC-29-09 was collected north of the drainage ditch that is located nearby. As the PCBs are not expected to migrate into the subsurface, subsurface samples were collected from 1-2 ft bgs and were requested by the PDT to confirm that PCB releases had not migrated to the subsurface soil. The DQO associated with the RI level sampling are summarized in Table 9-2.

Table 9-2. DQO – Environmental Sampling for EC-29, Building 822-E.E. Machine Shop

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of Aroclor 1260 contamination.
Data User Perspective(s)	To obtain data to determine extent of the PCB release to surface and subsurface soil.
Contaminant or Characteristic of Interest	Based on reported concentrations of Aroclor 1260 greater than PSLs in soil, analyze for Aroclor 1260 in soil.
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	Co-located biased surface (0-6 inches bgs) and subsurface (1-2 ft bgs) soil samples collected around sample location EC-29-SO-4 (within 25 ft).
Number of Samples Required	Six co-located biased surface and subsurface samples.
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs, (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Aroclor 1260 analysis by SW-846 Method 8082A

9.4.2 Sampling Results

Four co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of metals (Al, Cd, Co, Cr, Pb, Ti, Zn), solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, PCBs, and herbicides in July 2013.

Six additional surface soil samples were collected and submitted for laboratory analysis of Aroclor 1260 in October 2015 for the RI level sampling to determine extent. Due to the gravel base under the nearby railroad tracks, the subsurface samples could not be collected.

Surface soil analytical results are summarized in Appendix E, Table E2-9, and subsurface soil analytical results are summarized in Table E2-10. Reported results greater than the PSLs are summarized below. Reported results were less than PSLs in all subsurface soil samples.

- Chromium was reported at a concentration greater than the surface soil initial PSL (24.9 mg/kg) in the sample collected from EC-29-4-SO-0.5 (102 J [estimated result] mg/kg). This result is not greater than the RSL and therefore does not constitute a release.

- Aroclor 1260 was reported at a concentration greater than the PSL (1.0 mg/kg) in the surface soil sample collected from EC-29-4-SO-0.5 (1.3 mg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

9.5 HHRA RESULTS

9.5.1 Identification of Chemicals of Potential Concern

For the HHRA screening of COPCs, detected analytes in surface soil and combined surface/subsurface soil were compared to industrial soil RSLs. As shown in Appendix F, Table EC29-1 (surface soil) and Table EC29-2 (Surface/Subsurface Soil), the maximum detected concentration of lead and Aroclor 1260 exceeded screening levels. These tables also show the data summary and the selection of COPCs process for EC-29. Lead and Aroclor 1260 are COPCs in both surface soil and combined surface/subsurface soil.

9.5.2 Exposure Assessment

The exposure assessment for the HHRA has been outlined in Section 4.5.2, and lists the human receptors and exposure pathways, outlines the approach to calculating EPCs, and presents the exposure assumptions that were used in the HHRAs to estimate intake. Current and future receptors potentially exposed to soil at EC-29 include current site workers exposed to surface soil and future construction workers exposed to mixed surface/subsurface soil.

The EPC (the 95% UCL) calculated for Aroclor 1260 using ProUCL, outputs are provided in Appendix F. For lead, the average concentration was used, outputs from ProUCL are included in Appendix F. RME factors (Section 4.5.2) were used for the two receptors assessed at EC-29.

9.5.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks. These values were collated as specified in Section 4.5.3.

9.5.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as shown in Appendix F, Tables EC29-3 and EC29-4.

EC-29 has a maximum detected concentration of lead in surface soil of 559 mg/kg, which slightly exceeds the MDE soil screening criteria of 550 mg/kg for commercial use. The average

lead concentration in surface soil is 218 mg/kg, and the average lead concentration in combined surface soil/subsurface soil is 117 mg/kg. The average concentration of lead in surface soil and surface soil/subsurface soil combined is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use.

Non-Cancer Hazard Assessment
Non-carcinogenic HI were not calculated for EC-29, since the only COPC was Aroclor 1260, which does not have published non-cancer toxicity values.

Carcinogenic Risk
The carcinogenic risks estimated for each receptor at EC-29 were as follows:

- Current site worker (surface soil): 9×10^{-7}.
- Future construction worker (surface and subsurface soil): 5×10^{-8}.

Therefore, the acceptable incremental cancer risk level specified by MDE (1×10^{-5}) is not exceeded for current site workers or future construction workers, and trespassers intermittently contacting EC-29 would not face unacceptable risks.

9.5.5 HHRA Conclusion for EC-29

Based on these HHRA results, NFA is recommended for EC-29.

9.6 SLERA RESULTS

9.6.1 Identification of Chemicals of Potential Ecological Concern

Metals, PCBs, and VOCs were analyzed for at EC-29; some analytes of each group were detected (Table EC29-7). Maximum concentrations of VOCs were below soil screening levels.

Maximum concentrations of cadmium, chromium, cobalt, lead, zinc, and Aroclor 1260 were greater than soil screening levels and are identified as COPECs at EC-29. A soil screening level is not available for titanium, and therefore it is retained as a COPEC. The screening for COPECs in EC-29 surface soil is provided in Appendix F, Table EC29-7.

9.6.2 Risk Characterization

EPCs for COPECs are presented in Table EC29-8. The sample size for all COPECs except Aroclor 1260 was too small to calculate 95UCLMs. Therefore, Aroclor 1260 is the only COPEC with a 95UCLM EPC. The comparisons of concentrations and doses to receptor-specific TRVs for EC-29 are presented in Tables EC29-9 through EC29-13 and a comparison to background is provided in Table EC29-14. Food web models for individual receptors are included in Tables EC29-15 through EC29-20. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

9.6.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, chromium, lead, and zinc have HQs greater than 1 (Table EC29-9). A TRV is not available for titanium. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Chromium
Chromium was detected in 4 of 4 surface soil samples at concentrations ranging from 12 to 102 mg/kg. The maximum concentration is greater than the TRV of 1 mg/kg with an HQ of 102. All of the detected concentrations are greater than the TRV. The BTV for chromium is 24.9 mg/kg and only the maximum onsite concentration is greater than this value. While the concentrations detected onsite are greater than the TRV, because only the maximum concentration is greater than background, adverse effects to plant populations are not expected. Therefore, chromium is not retained as a COPEC.

Lead
Lead was detected in 4 of 4 surface soil samples at concentrations ranging from 69.2 to 559 mg/kg. The maximum concentration is greater than the TRV of 120 mg/kg with an HQ of 5. Two of the 4 detected concentrations are greater than the TRV. The BTV for lead is 124 mg/kg and two of the onsite concentrations are greater than this value, although only the maximum is notably higher (the second highest concentration is 142 mg/kg). While two of the concentrations detected onsite are greater than the TRV, because only the maximum concentration is notably greater than background, adverse effects to plant populations are not expected. Therefore, lead is not retained as a COPEC.

Zinc
Zinc was detected in 4 of 4 surface soil samples at concentrations ranging from 54.4 to 266 mg/kg. The maximum concentration is greater than the TRV of 160 mg/kg with an HQ of 2. Only the maximum concentration is greater than the TRV. The BTV for zinc is 83.9 mg/kg and two of the onsite concentrations are greater than this value. Because only the maximum concentration is slightly greater than the TRV, adverse effects to plant populations are not expected. Therefore, zinc is not retained as a COPEC.

9.6.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, chromium, zinc, and Aroclor 1260 have HQs greater than 1. A 95UCLM concentration is available for Aroclor 1260, and this value is also greater than the TRV (Table EC29-10). TRVs are not available for cobalt and titanium. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Chromium
Chromium was detected in 4 of 4 surface soil samples at concentrations ranging from 12 to 102 mg/kg. The maximum concentration (EC-29-4-SO-0.5) is greater than the TRV of 0.4

mg/kg with an HQ of 260. All of the detected concentrations are greater than the TRV. The BTV for chromium is 24.9 mg/kg and only the maximum onsite concentration is greater than this value. While the concentrations detected onsite are greater than the TRV, because only the maximum concentration is greater than background, adverse effects to soil invertebrate populations are not expected. Therefore, chromium is not retained as a COPEC based on the conclusion of the weight-of-evidence approach that there is no expected ecological risk to site-wide populations. However, based on the elevated HQ and exceedance of the BTV at EC-29-4-SO-0.5, there could be a potential for localized effects.

Zinc

Zinc was detected in 4 of 4 surface soil samples at concentrations ranging from 54.4 to 266 mg/kg. The maximum concentration is greater than the TRV of 120 mg/kg with an HQ of 2. Only the maximum concentration is greater than the TRV. The BTV for zinc is 83.9 mg/kg and two of the onsite concentrations are greater than this value. Because only the maximum concentration is slightly greater than the TRV, adverse effects to soil invertebrate populations are not expected. Therefore, zinc is not retained as a COPEC.

Aroclor 1260

Aroclor 1260 was detected in 8 of 10 surface soil samples at concentrations ranging from 0.023 to 1.3 mg/kg. The maximum concentration is greater than the TRV of 0.33 mg/kg with an HQ of 4 and the 95UCLM concentration has an HQ of 2. A BTV is not available for Aroclor 1260. Only the maximum concentration is greater than the TRV (EC-29-4-SO-0.5). With the exception of EC-29-4-SO-0.5, due to the lack of exceedance of the soil invertebrate TRV, Aroclor 1260 is not expected to pose risk to soil invertebrates. Aroclor 1260 at EC-29-4-SO-0.5 may pose risks to soil invertebrates. However, based on the conclusion of the weight-of-evidence approach, site-wide populations of soil invertebrates are not expected to be at potential risk from Aroclor 1260.

9.6.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds (Table EC29-11) cadmium, chromium, lead, zinc, and Aroclor 1260 have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, cadmium and lead have HQs greater than 1. The 95UCLM dose of Aroclor 1260 also exceeds the NOAEL but not the LOAEL (Table EC29-12). No TRVs are available for titanium. Further discussion of the analytes with maximum or 95UCLM doses yielding a LOAEL-based HQ greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Cadmium

Cadmium was detected in 4 of 4 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 2. The BTV for cadmium is 0.17 mg/kg and all of the onsite concentrations are greater than this value. It is noted however, that the maximum concentration of cadmium (11.8 mg/kg at EC-29-4-SO-0.5) is over 16 times higher than the next highest concentration (0.71 mg/kg) and risk is driven by the maximum concentration. Due to the low magnitude of exceedance of the LOAEL-based TRV by the maximum dose and the fact that the maximum concentration is 16 times the next highest sample

concentration, the conclusion of the weight-of-evidence approach is that site-wide populations of birds are not expected to be at potential risk from cadmium.

Lead
Lead was detected in 4 of 4 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 25. The maximum concentration (559 mg/kg) and exceeds the BTV (124 mg/kg). The maximum concentration was detected at EC-29-4-SO-0.5 and is nearly 4 times the next highest detected concentration (142 mg/kg). The next highest concentration is just over background. With the exception of EC-29-4-SO-0.5, due to the low magnitude of exceedance of background, lead is not expected to pose risks to birds. Lead at EC-29-4-SO-0.5 may pose risks to birds, but the conclusion of the weight-of-evidence approach is that site-wide populations of birds are not expected to be at potential risk from lead.

9.6.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. No TRVs are available for titanium (Table EC29-13). A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-29 are expected.

9.6.3 SLERA Conclusions for EC-29

No COPECs were retained for plants, soil invertebrates, birds, or mammals. It is noted that cadmium (birds only), chromium, lead (birds only), and Aroclor 1260 may pose risks to soil invertebrates or birds based on the HQ at the location of the maximum concentration for these analytes (EC-29-4-SO-0.5). However, based on the conclusion of the weight-of-evidence approach, site-wide populations are not expected to be at potential risk.

9.7 EC SUMMARY

Based on the 2013 and 2015 sampling results, Aroclor 1260 was selected as a COPC for the HHRA; however, the HHRA determined there is no risk to human health and NFA is recommended. Although there is potential for localized risks due to cadmium, chromium, lead, and Aroclor 1260 concentrations at EC-29-4-SO-0.5, the SLERA found no potential unacceptable ecological risks to site-wide populations based on the conclusion of the weight-of-evidence approach. Therefore, EC-29 is recommended for NFA.

10. EC-30: BUILDING 821 – LOCOMOTIVE HOUSE

10.1 HISTORY OF EC-30

EC-30 is located in the northeastern corner of the Depot and is associated with Building 821 (Figure 2). Building 821 is still standing and was historically used as a roundhouse to service boxcars. According to historical documents, the building provided storage for used nickel-cadmium and lead-acid batteries and motor oil (Daniel, 1992).

A review of documents associated with railroad operations also provided information on the types of activities that likely occurred within EC-30. A locomotive roundhouse is where 2nd and 3rd echelon levels of routine maintenance and repairs occur (USACE, 2005; War Department, 1945). General maintenance inspections and regular servicing include inspections of the firebox, which entails checking arch tubes, firebricks, grates, stay bolts, and back flue sheet. Fueling, watering traction sanding, and topping off lubricants are also part of the routine maintenance within a roundhouse (USACE, 2005). Minor repairs that do not require elaborate tools or heavy machinery for disassembly may also be performed. Such repairs include, but are not limited to, replacing worn out parts (i.e., headlights, wheels, brake hoses), repairs to lubricating and fuel systems (War Department, 1945). Typical materials utilized in 2nd and 3rd echelon maintenance activities include engine washing compound, cement, varnish for cables, solvents for cleaning, lubricating oils, minor painting tasks, and storage of electrolytes for battery maintenance (USACE, 2005). The echelon of maintenance was such that large-scale painting of the locomotives would have been outsourced to another location that performed higher level maintenance (USACE, 2005).

Building 821 was later utilized as a vehicle storage building for maintenance vehicles such as backhoes, cranes, and loaders (Daniel, 1992). The 2010 EA site visit noted two empty, unlabeled drums within Building 821. The roof on this building is intact. Oil stains on the concrete floor were observed during the site visit, along with two pits located at the end of each railroad track inside the building, presumably used for maintenance on the undercarriage of the rail cars. These pits were covered with heavy wood and while there is a small amount of water within these pits no discharge points were observed to be associated with these pits (EA 2011). A 275-gallon waste oil AST within a 133-cubic foot secondary containment area was located outside of Building 821 (Daniel, 1992); however, the AST was removed from the Depot in the early 1990s and was not observed during the 2010 site visit (EA 2011).

10.2 DATA QUALITY OBJECTIVES

Table 10-1. DQO – Environmental Sampling for EC-30: Bldg. 821-Locomotive House SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.

Table 10-1. DQO – Environmental Sampling for EC-30: Bldg. 821-Locomotive House SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.6 of the Work Plan (ERT 2013), analyze for naphthalene, Pb, and solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE).
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples collected around the existing building foundation. Subsurface samples at a depth lower than the foundation based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 4 biased surface and subsurface samples (A. above). B. 2 biased groundwater samples (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA EcoSSLs, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling locations, obtain soil samples via DPT. C. Obtain groundwater samples via DPT.
Analytical Method	Metals analysis (Pb) by SW-846 Method 6020A; solvents by SW-846 Method 8260B/8015C; naphthalene by SW-846 Method 8260B/8270SIM1.

10.3 MC INVESTIGATION

10.3.1 Sampling Process

SI-level sampling was conducted at EC-30 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Four biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor) (Figure 11). Samples were collected and submitted for laboratory analysis of lead, naphthalene, and solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, and TCE).

10.3.2 Sampling Results

Four co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of naphthalene, lead, and solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE).

Surface soil analytical results are summarized in Appendix E, Table E2-11, and subsurface soil analytical results are summarized in Table E2-12. Reported results were less than PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

10.4 SLERA Results

10.4.1 Identification of Chemicals of Potential Ecological Concern

Lead, PAHs, and VOCs were analyzed for at EC-30; lead, naphthalene, and six VOCs were detected (Table EC30-1). Maximum concentrations of naphthalene and the VOCs were below soil screening levels. The maximum concentration of lead was greater than the soil screening level, and lead is identified as a COPEC at EC-30. The screening for COPECs in EC-30 surface soil is provided in Appendix F, Table EC30-1.

10.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC30-2. Because there are only four samples for this EC, 95UCLMs were not calculated. Therefore, EPCs are the maximum detected concentrations for all COPECs. The comparisons of concentrations and doses to receptor-specific TRVs for EC-30 are presented in Tables EC30-3 through EC30-6, and a comparison to background is provided in Table EC30-7. Food web models for individual receptors are included in Tables EC30-8 through EC30-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

10.4.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, lead has an HQ greater than 1 (HQ of 4, Table EC30-3). Lead was detected in 4 of 4 surface soil samples at concentrations ranging from 28 to 489 mg/kg. The maximum concentration (EC-30-4-SO-0.5) is approximately two times the next highest detected concentration (191 mg/kg) which has an HQ of 2 when compared to the TRV of 120 mg/kg and is two times background. With the exception of EC-30-4-SO-0.5, due to the low magnitude of exceedance of the plant TRV and background, lead is not expected to pose risks to terrestrial plants. Lead at EC-30-4-SO-0.5 may pose risks to plants, but the site-wide populations of terrestrial plants are not expected to be at potential risk from lead based on the conclusion of the weight-of-evidence approach.

10.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, no COPECs have HQs greater than 1 (Table EC30-4).

10.4.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs greater than 1. The NOAEL-based HQ is 44 and the LOAEL-based HQ is 22 (Table EC30-5). The exposure model for birds uses conservative assumptions about area use, bioaccumulation, and uptake and is expected to overestimate the

dose that receptors would receive. The maximum concentration (EC-30-4-SO-0.5) is approximately two times the next highest detected concentration (191 mg/kg) which is two times background. With the exception of EC-30-4-SO-0.5, due to the low magnitude of exceedance of background, lead is not expected to pose risks to birds. Lead at EC-30-4-SO-0.5 may pose risks to birds, but the site-wide populations of birds are not expected to be at potential risk from lead based on the conclusion of the weight-of-evidence approach.

10.4.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1 (Table EC30-6). Because no COPECs have HQs greater than 1, no risks to mammals from exposure to soil at EC-30 are expected.

10.4.3 SLERA Conclusions for EC-30

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no COPECs are retained. It should be noted, however, that lead in the soil at EC-30-4-SO-0.5 may pose potential risks to terrestrial plants and birds, but the site-wide populations are not expected to be at potential risk from lead based on the conclusion of the weight-of-evidence approach.

10.5 EC SUMMARY

Based on the results of the SI-level sampling conducted at EC-30, no release has occurred at this EC. Although there is potential for localized risks due to lead in the soil at EC-30-4-SO-0.5, the SLERA found no potential unacceptable ecological risk to site-wide populations based on the conclusion of the weight-of-evidence approach. Therefore, EC-30 is recommended for NFA.

11. EC-31: BUILDING S833 – POST ENGINEER STORAGE

11.1 HISTORY OF EC-31

EC-31 is located in the northeastern portion of the Depot, associated with Building S833; however, the structure is no longer standing and there is no remnant concrete foundation (Figure 2). The assumed historical use of this building is that this area provided storage for materials in support of activities performed at Building 825 – Post Engineer Shop. As detailed in the Work Plan (ERT 2013), Building 825 was mainly used as a woodworking shop for maintenance and minor construction operations conducted at the Depot (Daniel, 1992). Treated lumber was likely stored here; no records indicate that lumber treatment operations took place at the Depot. Building S833 was also historically used as storage for paints and solvents (Daniel, 1992) and, therefore, these same materials are also assumed to have been stored in EC-31. The location of EC-31 was determined by ERT during a review of information provided in the ESAR.

11.2 DATA QUALITY OBJECTIVES

Table 11-1. DQO – Environmental Sampling for EC-31: Bldg. S833-Post Engineer Storage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.7 of the Work Plan (ERT 2013), analyze for metals (Al, As, Cd, Co, Cr, Cr+6, Cu, Ni, Pb, Ti, Zn), paint related solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol), pentachlorophenol, naphthalene, and PCBs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples in the location of the former building as determined through records review. Subsurface samples at a depth lower than the former foundation based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 2 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; Cr+6 analysis by SW-846 Method 7196A; paint related solvents by SW-846 Method 8260B/8015C;

Table 11-1. DQO – Environmental Sampling for EC-31: Bldg. S833-Post Engineer Storage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
	pentachlorophenol by SW-846 Method 8270SIM; naphthalene by SW-846 Method 8260B/8270SIM1; PCBs by SW-846 Method 8082A.

11.3 MC INVESTIGATION

11.3.1 Sampling Process

SI-level sampling was conducted at EC-31 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Two biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 12). Samples were collected and submitted for laboratory analysis of metals (Al, As, Cd, Co, Cr, Cr^{+6}, Cu, Ni, Pb, Ti, Zn), paint related solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol), pentachlorophenol, naphthalene, and PCBs.

Based on the 2013 sample results, arsenic concentrations were greater than the surface soil PSL throughout the IRP Shop Area. Additional sampling was conducted in 2015 for the IRP Shop Area and is presented in Chapter 28 (Figure 29).

11.3.2 Sampling Results

Two co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of metals (Al, As, Cd, Co, Cr, Cr^{+6}, Cu, Ni, Pb, Ti, Zn), paint related solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol), pentachlorophenol, naphthalene, and PCBs.

Surface soil analytical results are summarized in Appendix E, Table E2-13, and subsurface soil analytical results are summarized in Table E2-14. Reported results with the exception of arsenic, greater than the PSLs, are summarized below. No analytes were at concentrations greater than the PSLs in subsurface soil.

Metals – Surface

- Chromium was reported at a concentration greater than the initial surface soil PSL (24.9 mg/kg) in the sample collected from EC-31-1-SO-0.5 (51.3 mg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

11.4 SLERA Results

11.4.1 Screening to Identify Chemicals of Potential Ecological Concern

Metals, PCBs, PAHs, and VOCs were analyzed for at EC-31; some analytes of each group were detected (Table EC31-1). Maximum concentrations of PAHs and VOCs were below soil screening levels.

Maximum concentrations of arsenic, cadmium, chromium, copper, lead, nickel zinc, and Aroclor 1260 were greater than soil screening levels and are identified as COPECs at EC-31. A soil screening level is not available for titanium, and therefore it is retained as a COPEC. The screening for COPECs in EC-31 surface soil is provided in Appendix F, Table EC31-1.

11.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC31-2. The sample size for all COPECs was too small to calculate 95UCLMs. Therefore, EPCs are the maximum detected concentrations for all COPECs. The comparisons of concentrations and doses to receptor-specific TRVs for EC-31 are presented in Tables EC31-3 through EC31-6 and a comparison to background is provided in Table EC31-7. Food web models for individual receptors are included in Tables EC31-8 through EC31-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

11.4.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, chromium and nickel have HQs greater than 1 (Table EC31-3). A TRV is not available for titanium. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

<u>Chromium</u>
Chromium was detected in 2 of 2 surface soil samples at concentrations ranging of 19.1 and 51.3 mg/kg. Both concentrations are greater than the TRV of 1 mg/kg with a maximum HQ of 51. The BTV for chromium is 24.9 mg/kg and only the maximum onsite concentration is greater than this value. While the concentrations detected onsite are greater than the TRV, because only the maximum concentration is greater than background, adverse effects to plant populations are not expected. Therefore, chromium is not retained as a COPEC.

<u>Nickel</u>
Nickel was detected in 2 of 2 surface soil samples at concentrations of 18.5 and 149 mg/kg. The maximum concentration is greater than the TRV of 38 mg/kg with an HQ of 4. The BTV for nickel is 16 mg/kg and both of the onsite concentrations are greater than this value, although only the maximum is notably higher. Because only the maximum concentration is greater than the TRV and notably greater than background, adverse effects to plant populations are not expected. Therefore, nickel is not retained as a COPEC.

11.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, chromium has an HQ greater than 1 (Table EC31-4). A TRV is not available for titanium. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Chromium was detected in 2 of 2 surface soil samples at concentrations ranging of 19.1 and 51.3 mg/kg. Both concentrations are greater than the TRV of 0.4 mg/kg with a maximum HQ of 130. All of the detected concentrations are greater than the TRV. The maximum concentration (EC-31-1-SO-0.5) is approximately two times greater than background (24.9 mg/kg). While the concentrations detected onsite are greater than the TRV, due to the low magnitude of exceedance of background by the maximum concentration, adverse effects to soil invertebrate populations are not expected. Therefore, chromium is not retained as a COPEC.

11.4.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds (Table EC31-5) chromium, copper, lead, and nickel have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, lead has an HQ greater than 1. No TRVs are available for titanium. Further discussion of the analytes with maximum doses yielding a LOAEL-based HQ greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

<u>Lead</u>
Lead was detected in 2 of 2 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 4. The BTV for lead is 124 mg/kg and neither of the onsite concentrations are greater than this value. The exposure model uses conservative assumptions about area use, bioaccumulation, and uptake and is expected to overestimate the dose that receptors would receive, especially since the dose is based on the maximum concentration. Because onsite concentrations of lead are less than the BTV and in light of the conservative nature of the exposure model, lead is not retained as a COPEC.

11.4.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. No TRVs are available for titanium (Table EC31-7). A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-31 are expected.

11.4.3 SLERA Conclusions for EC-31

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no analytes are retained as COPECs.

11.5 EC SUMMARY

Reported results for chromium were greater than the initial surface soil PSL (24.9 mg/kg) in two surface soil samples collected from EC-31 (51.3 mg/kg and 36.7 mg/kg). However, reported results for hexavalent chromium in these samples were less than the limit of detection. Therefore, the reported results from chromium are due to trivalent chromium and the results are less than the trivalent chromium USEPA RSL for industrial soil (1,800,000 mg/kg). Therefore, it was determined that a release of chromium has not occurred.

Based on the results of the SI-level sampling conducted at EC-31, no release has occurred at this EC. Arsenic was not evaluated in an HHRA for EC-31 because it was evaluated in a site-wide investigation as part of DU-2 (ERT 2020). The HHRA determined no potential carcinogenic risks or noncancer hazards above acceptable levels for both the site worker, trespasser, and construction worker exposure to arsenic in soil at DU-2. The SLERA found no potential unacceptable ecological risk to site-wide populations based on the conclusion of the weight-of-evidence approach. Therefore, EC-31 is recommended for NFA.

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12. EC-32: BUILDING S832 – P.E. LUMBER STORAGE

12.1 HISTORY OF EC-32

EC-32 is located in the northeastern portion of the Depot and is associated with Building S832. The structure is no longer standing (Figure 2). The location of EC-32 was determined by ERT during a review of information provided in the ESAR. Based on the title of this building, treated lumber was likely stored at this EC.

12.2 EC-32 HABITAT

EC-32 was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-32 includes the former Building S832 P.E. Lumber Storage in the northeastern corner of the site. This area is 0% impervious surface since the area includes only successional old field upland habitat. An area consisting of dense, young Bradford pear trees exists within EC-32 that supports an understory dominated by Japanese honeysuckle (*Lonicera japonica*), switchgrass species, butter-and-eggs, and white snakeroot. With the exception of one small, abandoned bird nest, the habitat quality of EC-32 is considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-32. EC-32 was ranked as providing minimal habitat quality.

12.3 DATA QUALITY OBJECTIVES

Table 12-1. DQO – Environmental Sampling for EC-32: Bldg. S832-P.E. Lumber Storage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.8 of the Work Plan (ERT 2013), analyze for metals (As, Cu, Cr+6, Ni, Zn), PAHs, and pentachlorophenol.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples in the location of the former building. Subsurface samples at a depth lower than the former foundation based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 2 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.

Table 12-1. DQO – Environmental Sampling for EC-32: Bldg. S832-P.E. Lumber Storage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Analytical Method	Metals analysis by SW-846 Method 6020A; Cr+6 analysis by SW-846 Method 7196A; pentachlorophenol and PAHs by SW-846 Method 8270SIM.

12.4 MC INVESTIGATION

12.4.1 Sampling Process

SI-level sampling was conducted at EC-32 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Based on the historical use of the EC-32, two surface soil and two subsurface soil samples were analyzed for metals (As, Cu, Cr^{+6}, Ni, Zn), PAHs, and pentachlorophenol. The subsurface samples were collected from 3-4 ft bgs, which was below any building foundation. Reported results for Cu, Cr^{+6}, Ni, Zn, and pentachlorophenol in surface and subsurface soil samples collected from EC-32 were less than the PSLs. As a result it was determined that a release of these constituents has not occurred.

Reported results for four PAH compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene) were greater than PSLs in the samples collected from EC-32 and indicate a release has occurred. Reported results for arsenic that are greater than the PSLs constitute a release. As previously noted, based on the 2013 sample results, arsenic concentrations were greater than the surface soil PSL throughout the IRP Shop Area. Additional sampling was conducted in 2015 for the IRP Shop Area and is presented in Chapter 28.

In order to determine the extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene releases to soil, eight additional co-located surface and subsurface soil samples (Figure 13) were collected and submitted to the project laboratory for analysis of these PAHs via SW-846 8270/8270SIM. The DQO associated with additional sampling for EC-32 are summarized in Table 12-2.

Table 12-2. DQO – Environmental Sampling for EC-32: Building S832-P.E. Lumber Storage

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of PAH (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene) contamination.
Data User Perspective(s)	To obtain data to determine extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene releases to surface and subsurface soil.
Contaminant or Characteristic of Interest	Based on reported concentrations of greater than PSLs, analyze for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene.
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	Co-located surface (0-6 inches bgs) and subsurface (3-4 ft bgs) soil samples.
Number of Samples Required	Eight co-located biased surface and subsurface samples.

Table 12-2. DQO – Environmental Sampling for EC-32: Building S832-P.E. Lumber Storage

Data Quality Objective Element	EC-Specific DQO Statement
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, and Curtis Bay PSLs (see ERT 2013 updated QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene by SW-846 Method 8270/8270 SIM.

Additional sampling was conducted in early 2016 to completely delineate the horizontal and vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene (ERT 2016). Ten additional surface soil samples (EC-32-11 through EC-32-20) were collected, and three subsurface samples were collected from 3-4 ft bgs (EC-32-11, EC-32-12, and EC-32-20) and two subsurface samples were collected from 4-6 ft bgs (EC-32-05 and EC-36-06).

12.4.2 Sampling Results

Two co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of metals (As, Cu, Cr^{+6}, Ni, Zn), PAHs, and pentachlorophenol in 2013 for the SI-level sampling.

Additional RI-level sampling in 2015 was used to determine the extent of the release of PAHs. Eight surface soil and four subsurface soil samples were collected and analyzed for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene. Four of the subsurface soil samples could not be collected due to refusal of the auger due to gravel; this was assumed to be associated with the prior building foundation and parking area.

The 2016 samples (ten surface; five subsurface) were analyzed for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene.

Surface soil analytical results are summarized in Appendix E, Table E2-15, and subsurface soil analytical results are summarized in Table E2-16. Reported results, greater than the PSLs, are summarized below.

Metals – Surface Soil

- Chromium was reported at a concentration greater than the surface soil PSL (24.9 mg/kg) in the sample collected from EC-32-2-SO-0.5 (36.7 mg/kg).

PAHs – Surface Soil

- Benzo(a)anthracene was reported in five surface soil samples at concentrations exceeding the surface soil PSL (2,900 µg/kg); concentrations greater than the PSL range from

3,010 µg/kg in the sample collected from EC-32-01-SO-0.5 to 1,000,000 µg/kg in the sample collected from EC-32-06-SO-0.5.

- Benzo(a)pyrene was reported in 10 surface soil samples at concentrations exceeding the surface soil PSL (1,036 µg/kg); concentrations greater than the PSL range from 1,300 µg/kg in the sample collected from EC-32-17-SO-0.5 to 720,000 µg/kg in the sample collected from EC-32-06-SO-0.5.

- Benzo(b)fluoranthene was reported in nine surface soil samples at concentrations exceeding the surface soil PSL (2,900 µg/kg); concentrations greater than the PSL range from 3,500 µg/kg in the samples collected from EC-32-03-SO-0.5 and EC-32-20-SO-0.5 to 1,300,000 µg/kg in the sample collected from EC-32-06-SO-0.5.

- Dibenz(a,h)anthracene was reported in nine surface soil samples at concentrations exceeding the surface soil PSL (290 µg/kg); concentrations greater than the PSL range from 318 µg/kg in the sample collected from EC-32-01-SO-0.5 to 150,000µg/kg in the sample collected from EC-32-06-SO-0.5.

PAHs – Subsurface

- Benzo(a)anthracene was reported in one subsurface soil sample, EC-32-06-SO-4 (18,000 µg/kg), at a concentration exceeding the subsurface soil PSL (2,900 µg/kg).

- Benzo(a)pyrene was reported in two subsurface soil samples at concentrations exceeding the subsurface soil PSL (290 µg/kg); concentrations greater than the PSL were 870 µg/kg in the sample collected from EC-32-05-SO-4 and 14,000 µg/kg in the sample collected from EC-32-06-SO-4.

- Benzo(b)fluoranthene was reported in one subsurface soil sample, EC-32-06-SO-4 (25,000 µg/kg), at a concentration exceeding the subsurface soil PSL (2,900 µg/kg).

- Dibenz(a,h)anthracene was reported in one subsurface soil sample, EC-32-06-SO-4 (3,100 µg/kg), at a concentration exceeding the subsurface soil PSL (290 µg/kg).

Note that the chromium value is not considered a release as it is less than the industrial RSL of 1,800,000 mg/kg.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

12.5 HHRA RESULTS

12.5.1 Screening to Identify Chemicals of Potential Concern

For the HHRA screening of COPCs, detected analytes in surface soil and combined surface/subsurface soil at EC-32 were compared to industrial soil RSLs. As shown in Appendix

F, Table EC32-1 (surface soil) and Table EC32-2 (surface/subsurface soil), several individual sample results exceeded the industrial soil RSLs.

An analyte was selected as a COPC if its maximum detected concentration exceeded both the RSL and background. Appendix F, Tables EC32-1 and EC32-2, show the data summary and the selection of COPCs process for EC-32. Selected COPCs were the same for surface and for combined surface/subsurface soil.

EC-32 Surface Soil and Combined Surface/Subsurface COPC Screening Results: Selected COPCs

- Arsenic
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene.

12.5.2 Exposure Assessment

The exposure assessment for the HHRA is described in Section 4.5.2, and lists the human receptors and exposure pathways, outlines the approach to calculating EPCs, and presents the exposure assumptions that were used in the HHRAs to estimate intake. As for all the Curtis Bay ECs, current and future receptors potentially exposed to soil at EC-32 include current site workers and trespassers exposed to surface soil and future construction workers exposed to mixed surface/subsurface soil.

EPCs (the 95% UCL) were calculated for the COPCs at EC-32 using ProUCL, outputs are provided in Appendix F. RME factors (Section 4.5.2) were used for the two receptors assessed at EC-32.

12.5.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks. These values were collated as specified in Section 4.5.3.

12.5.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as shown in Tables EC32-3 through EC32-6.

Non-Cancer Hazard Assessment

- Current site worker (surface soil): HI=0.9.
- Future construction worker (surface and subsurface soil): HI=2.0.

The calculated HIs is less than one for the current site workers and greater than one for the future construction workers. Noncancer hazards for the construction worker are a result of benzo(a)pyrene.

Carcinogenic Risk
The carcinogenic risks estimated for each receptor at EC-32 were as follows:

- Current site worker (surface soil): 1×10^{-4}
- Future construction worker (surface and subsurface soil): 1×10^{-5}.

The estimated incremental cancer risk for current site workers exceeds the MDE acceptable risk level (10^{-5}); however, for future construction workers, it is equal to the acceptable risk level. Potential cancer risk concerns are due to PAHs. Therefore, the surface soil at EC-32 may result in unacceptable risks to site workers and trespassers at EC-32.

12.5.5 HHRA Conclusions for EC-32

Based on these HHRA results, further action for soil is required to protect human health at EC-32.

12.6 SLERA RESULTS

12.6.1 Screening to Identify Chemicals of Potential Ecological Concern

Select metals (As, Cu, Cr^{+6}, Ni, and Zn) and PAHs were analyzed for at EC-32; some analytes of each group were detected (Table EC32-9). Maximum concentrations of arsenic, chromium, copper, nickel, zinc, and HMW PAHs were greater than soil screening levels and are identified as COPECs at EC-32. The screening for COPECs in EC-32 surface soil is provided in Appendix F, Table EC32-9.

12.6.2 Risk Characterization

EPCs for COPECs are presented in Table EC32-10. The sample size for many COPECs was too small to calculate 95UCLMs. Therefore, arsenic and HMW PAHs are the only COPECs with a 95UCLM EPC. The comparisons of concentrations and doses to receptor-specific TRVs for EC-32 are presented in Tables EC32-11 through EC32-16 and a comparison to background is provided in Table EC32-17. Food web models for individual receptors are included in Tables EC32-18 through EC32-23. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

12.6.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, arsenic, chromium, nickel, and HMW PAHs have HQs greater than 1 (Table EC32-11). 95UCLM concentrations are available for arsenic and HMW PAHs, and these values are also greater than

the TRVs. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below.

Arsenic
Arsenic was detected in 5 of 5 surface soil samples at concentrations ranging from 16.7 to 44.6 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 18 mg/kg with HQs of 3 and 2, respectively. Due to the low magnitude of exceedance by the maximum and 95UCLM concentrations, arsenic is not retained as a COPEC.

Chromium
Chromium was detected in 2 of 2 surface soil samples at concentrations of 21.9 and 36.7 mg/kg. These concentrations are greater than the TRV of 1 mg/kg with a maximum HQ of 37. The BTV for chromium is 24.9 mg/kg and only the maximum onsite concentration is slightly greater than this value (1.5 times higher). While the concentrations detected onsite are greater than the TRV, because they are less than or similar to background, adverse effects to plant populations are not expected. Therefore, chromium is not retained as a COPEC.

Nickel
Nickel was detected in 2 of 2 surface soil samples at concentrations of 21.2 and 171 mg/kg. The maximum concentration is greater than the TRV of 38 mg/kg with an HQ of 5. Only the maximum concentration is greater than the TRV. The BTV for nickel is 16 mg/kg and both of the onsite concentrations are greater than this value, although only the maximum concentration is notably so. Because only the maximum concentration is greater than the TRV and notably greater than the BTV, adverse effects to plant populations are not expected. Therefore, nickel is not retained as a COPEC.

HMW PAHs
HMW PAHs were detected in 22 of 22 surface soil samples at concentrations ranging from 0.41 to 3,020 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 20 mg/kg with HQs of 150 and 37, respectively. Only 4 of the 22 detected concentrations are greater than the TRV. The maximum concentration (EC-32-06-SO-0.5) is 39 times higher than the next highest concentration (77 mg/kg) and is driving risk. With the exception of EC-32-06-SO-0.5, due to the relatively low magnitude of exceedance of the plant TRV, HMW PAHs are not expected to pose risks to terrestrial plants. HMW PAHs at EC-32-06-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from HMW PAHs.

12.6.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, chromium and HMW PAHs have HQs greater than 1. A 95UCLM concentration is available for HMW PAHs, and this value is also greater than the TRV (Table EC32-12). Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below.

Chromium
Chromium was detected in 2 of 2 surface soil samples at concentrations of 21.9 and 36.7 mg/kg. These concentrations are greater than the TRV of 0.4 mg/kg with a maximum HQ of 92. The

BTV for chromium is 24.9 mg/kg and only the maximum onsite concentration is slightly greater than this value (1.5 times higher). While the concentrations detected onsite are greater than the TRV, because they are less than or similar to background, adverse effects to soil invertebrate populations are not expected. Therefore, chromium is not retained as a COPEC.

HMW PAHs
HMW PAHs were detected in 22 of 22 surface soil samples at concentrations ranging from 0.41 to 3,020 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 18 mg/kg with HQs of 170 and 41, respectively. Only 4 of the 22 detected concentrations are greater than the TRV, and the maximum concentration (EC-32-06-SO-0.5) is 39 times higher than the next highest concentration (77 mg/kg). The maximum concentration is driving risk. With the exception of EC-32-06-SO-0.5, due to the relatively low magnitude of exceedance of the soil invertebrate TRV, HMW PAHs are not expected to pose risks to soil invertebrates. HMW PAHs at EC-32-06-SO-0.5 may pose risks to soil invertebrates, but the conclusion of the weight-of-evidence approach found site-wide populations of soil invertebrates are not expected to be at potential risk from HMW PAHs.

12.6.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds (Table EC32-13) arsenic, chromium, copper, nickel, and HMW PAHs have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, HMW PAHs have HQs greater than 1. The 95UCLM doses of arsenic and HMW PAHs also exceeds the NOAEL-based TRVs but only the 95UCLM dose of HMW PAHs exceeds the LOAEL (Table EC32-14). Further discussion of the analytes with maximum or 95UCLM doses yielding a LOAEL-based HQ greater than 1 is provided in the below.

HMW PAHs
HMW PAHs were detected in 22 of 22 surface soil samples. The 95UCLM dose is greater than the LOAEL-based TRV with an HQ of 6. The BTV for HMW PAHs is 8.9 mg/kg and 15 of the 22 onsite concentrations are lower than this value (only 7 are greater). As discussed above, the maximum concentration (detected at EC-32-06-SO-0.5) of HMW PAHs is 39 times higher than the next highest concentration (77 mg/kg); inclusion of this value in the calculation of the 95UCLM will skew the dataset and inflate the 95UCLM. In addition, the exposure model uses conservative assumptions about area use, bioaccumulation, and uptake. These assumptions combined with what is expected to be an inflated EPC will lead to an overestimate of the dose that receptors would receive. The maximum concentration is driving risk. With the exception of EC-32-06-SO-0.5, HMW PAHs are not expected to pose risks to birds. HMW PAHs at EC-32-06-SO-0.5 may pose risks to birds, but the conclusion of the weight-of-evidence approach found site-wide populations of birds are not expected to be at potential risk from HMW PAHs.

12.6.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, HMW PAHs have HQs greater than 1 for herbivorous and predatory mammals (Table EC32-15). When doses of HMW PAHs calculated using the 95UCLM concentration are compared to NOAEL-based TRVs, the HQs are greater

than 1 for both herbivorous and predatory mammals; when compared to the LOAEL-based TRVs, the HQ is greater than 1 for herbivorous mammals only.

The 95UCLM LOAEL-based HQ for herbivorous mammals is 3. As discussed above for birds, it is expected that the 95UCLM is biased high due to the extremely high maximum concentration (detected at EC-32-06-SO-0.5) of HMW PAHs. In addition, the assumptions used in the exposure model are also expected to overestimate the dose that a receptor would receive. The maximum concentration is driving risk. With the exception of EC-32-06-SO-0.5, HMW PAHs are not expected to pose risks to mammals. HMW PAHs at EC-32-06-SO-0.5 may pose risks to mammals, but the conclusion of the weight-of-evidence approach found site-wide populations of mammals are not expected to be at potential risk from HMW PAHs.

12.6.3 SLERA Conclusions for EC-32

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no COPECs are retained. It is noted that HMW PAHs may pose risks to ecological receptors at EC-32-06-SO-0.5, but the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk from HWM PAHs.

12.7 EC SUMMARY

Based on the history of this EC as detailed in the *MC and HTW Sampling Rationale Memo* (Appendix H of the Final Work Plan), there was no historical evidence suggesting hexavalent chromium would be found at the EC. Therefore, analysis was conducted for chromium without speciation and the chromium results were compared to the chromium PSL of 24.9 mg/kg rather than the hexavalent chromium PSL of 10 mg/kg. The reported concentration of chromium is less than the trivalent chromium USEPA RSL for industrial soil (1,800,000 mg/kg) and, therefore, does not constitute a release.

Based on the HHRA, there are potential non-cancer hazards for the construction worker due to benzo(a)pyrene, and the acceptable incremental cancer risk level is not exceeded for the construction worker at EC-32. However, incremental cancer risks for the site worker were greater than the MDE acceptable level ($1x10^{-5}$). The primary contributor to the unacceptable risk was PAHs. Trespassers may also potentially face unacceptable risk from intermittent access to surface soil in this this EC. Although there is potential for localized risks due to HMW PAHs in the soil at EC-32-06-SO-0.5, the SLERA found no potential unacceptable ecological risks to site-wide populations at EC-32 based on the conclusion of the weight-of-evidence approach.

Further action for soil is recommended to protect human health at EC-32. EC-32 is recommended for further evaluation in the FS.

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13. EC-33: BUILDING 835 – BTG. DIV. ON LUMBER STORAGE SHED

13.1 HISTORY OF EC-33

EC-33 is located in the northeastern portion of the Depot and is associated with Building 835. The structure is no longer standing, but the foundation remains (EA 2011) (Figure 2). Based on the title of this building, treated lumber was likely stored at this EC.

13.2 DATA QUALITY OBJECTIVES

Table 13-1. DQO – Environmental Sampling for EC-33: Bldg. 835-BTG. Div. on Lumber Storage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.9 of the Work Plan (ERT 2013), analyze for metals (As, Cu, Cr+6, Ni, Zn), PAHs, and pentachlorophenol.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples were planned to be collected in the location of the former building. Subsurface samples were planned to be collected at a depth lower than the former foundation and based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample collected at a co-located soil sampling location.
Number of Samples Required	A. 3 co-located biased surface and subsurface samples (A. above). B. 2 biased groundwater samples (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; Cr+6 analysis by SW-846 Method 7196A; PAHs and pentachlorophenol by SW-846 Method 8270SIM.

13.3 MC INVESTIGATION

13.3.1 Sampling Process

SI-level sampling was conducted at EC-33 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Three biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 14). Samples were collected and submitted for laboratory analysis of metals (As, Cu, Cr^{+6}, Ni, Zn), PAHs, and pentachlorophenol.

13.3.2 Sampling Results

Three co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of metals (As, Cu, Cr^{+6}, Ni, Zn), PAHs, and pentachlorophenol.

Surface soil analytical results are summarized in Appendix E, Table E2-17, and subsurface soil analytical results are summarized in Table E2-18. With the exception of arsenic, all reported results in the surface and subsurface soil were less than the PSLs.

As previously noted, based on the 2013 sample results, arsenic concentrations were greater than the surface soil PSL throughout the IRP Shop Area. Additional sampling was conducted in 2015 for the IRP Shop Area and is presented in Chapter 28 (Figure 29). The ERT site-wide investigation identified no unacceptable risk due to arsenic to site or construction workers.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

13.4 SLERA Results

13.4.1 Screening to Identify Chemicals of Potential Ecological Concern

PAHs and select metals (As, Cu, Cr^{+6}, Ni, and Zn) were analyzed for at EC-33; some analytes of each group were detected (Table EC33-1). Maximum concentrations of arsenic, zinc, and HMW PAHs were greater than soil screening levels and are identified as COPECs at EC-33. The screening for COPECs in EC-33 surface soil is provided in Appendix F, Table EC33-1.

13.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC33-2. Because there are only three samples for this EC, 95UCLMs were not calculated. Therefore, EPCs are the maximum detected concentrations for all COPECs. The comparisons of concentrations and doses to receptor-specific TRVs for EC-33 are presented in Tables EC33-3 through EC33-6 and a comparison to background is provided in Table EC33-7. Food web models for individual receptors are included in Tables EC33-8 through EC33-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

13.4.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, arsenic has an HQ greater than 1 (Table EC33-3). Arsenic was detected in 3 of 3 surface soil samples at concentrations ranging from 3.8 to 38.7 mg/kg. The maximum concentration is greater than the TRV of 18 mg/kg with an HQ of 2. Only the maximum concentration is greater than the TRV and the BTV (9.09 mg/kg), and it is 9 times higher than the other two concentrations detected onsite. Because only the maximum concentration is greater than the TRV and the BTV, adverse effects to plant populations are not expected. Therefore, arsenic is not retained as a COPEC.

13.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, no COPECs have HQs greater than 1 (Table EC33-4). Therefore, no COPECs are retained for soil invertebrates.

13.4.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs, arsenic has an HQ greater than 1. When these doses are compared to LOAEL-based TRVs, no COPECs have HQs greater than 1 (Table EC33-5). Because no COPECs have LOAEL-based HQs greater than 1, no COPECs are retained for birds.

13.4.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. Because no COPECs have NOAEL-based HQs greater than 1, no COPECs are retained for mammals.

13.4.3 SLERA Conclusions for EC-33

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no analytes are retained as COPECs at EC-33.

13.5 EC SUMMARY

Based on the results of the SI-level sampling conducted at EC-33, no release has occurred at this EC. Arsenic was not evaluated in an HHRA for EC-33 because it was evaluated in a site-wide investigation as part of DU-2 (ERT 2020). The HHRA determined no potential carcinogenic risks or noncancer hazards above acceptable levels for both the site worker and construction worker exposure to arsenic in soil at DU-2. Therefore, trespassers intermittently accessing the EC are unlikely to face unacceptable risk.

The SLERA found no potential unacceptable ecological risk. Therefore, EC-33 is recommended for NFA.

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14. EC-34: BUILDING 1025 – BOILER HOUSE – WAREHOUSE AREA

14.1 HISTORY OF EC-34

EC-34 is located in the southeastern corner of the Depot, adjacent to Building 1022 (EC-57B) (Figure 2). The concrete foundation is still present. Based on the building title and the proximity to Building 1022, Building 1025 is presumed to have housed the material and equipment (boilers) used to heat Building 1022.

14.2 DATA QUALITY OBJECTIVES

Table 14-1. DQO – Environmental Sampling for EC-34: Bldg. 1025-Boiler House-Warehouse Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.10 of the Work Plan (ERT 2013), analyze for BTEX and naphthalene.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples collected around the existing foundation. Subsurface samples taken at a depth lower than the foundation and based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample collected at a co-located soil sampling location.
Number of Samples Required	A. 3 biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, and USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	BTEX and naphthalene by SW-846 Method 8260B.

14.3 MC INVESTIGATION

14.3.1 Sampling Process

SI-level sampling was conducted at EC-34 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Three biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 15). Samples were collected and submitted for laboratory analysis of BTEX and naphthalene.

14.3.2 Sampling Results

Three co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of BTEX and naphthalene.

Surface soil analytical results are summarized in Appendix E, Table E2-19, and subsurface soil analytical results are summarized in Table E2-20. Reported results were less than PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

14.4 SLERA Results

14.4.1 Screening to Identify Chemicals of Potential Ecological Concern

PAHs and VOCs were analyzed for at EC-34; only naphthalene and benzene were detected (Table EC34-1). Maximum concentrations of naphthalene and benzene were less than soil screening levels; therefore, no analytes are identified as COPECs at EC-34. The screening for COPECs in EC-34 surface soil is provided in Appendix F, Table EC34-1.

14.4.2 SLERA Conclusions for EC-34

Based on the initial screening of maximum concentrations to media-specific screening levels, no analytes are identified as COPECs at EC-34.

14.5 EC SUMMARY

Based on the results of the SI-level sampling conducted at EC-34, no release has occurred at this EC. The SLERA found no potential unacceptable ecological risk. Therefore, EC-34 is recommended for NFA.

15. EC-35: BUILDING 1026 – OIL HOUSE – WAREHOUSE AREA

15.1 HISTORY OF EC-35

EC-35 is located in the southeastern corner for the Depot, adjacent to Building 1021 (Figure 2). The concrete foundation is still present. Based on the building title and the proximity to Building 1021, Building 1026 is presumed to have housed the material and equipment used to heat Building 1021.

15.2 DATA QUALITY OBJECTIVES

Table 15-1. DQO – Environmental Sampling for EC-35: Bldg. 1026-Oil House-Warehouse Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.11 of the Work Plan (ERT 2013), analyze for BTEX and naphthalene.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples around the existing foundation. Subsurface samples at a depth lower than the foundation and based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 2 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, and USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	BTEX and naphthalene by SW-846 Method 8260B.

15.3 MC INVESTIGATION

15.3.1 Sampling Process

SI-level sampling was conducted at EC-35 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Two biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 16). Samples were collected and submitted for laboratory analysis of BTEX and naphthalene.

15.3.2 Sampling Results

Two co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of BTEX and naphthalene.

Surface soil analytical results are summarized in Appendix E, Table E2-21, and subsurface soil analytical results are summarized in Table E2-22. Reported results were less than PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

15.4 SLERA Results

15.4.1 Screening to Identify Chemicals of Potential Ecological Concern

Two samples from EC-35 were analyzed for naphthalene and BTEX and no analytes were detected. Therefore, no analytes are identified as COPECs at EC-35.

15.4.2 SLERA Conclusions for EC-35

Based on the initial screening of maximum concentrations to media-specific screening levels, no analytes are identified as COPECs at EC-35.

15.5 EC SUMMARY

Based on the results of the SI-level sampling conducted at EC-35, no release has occurred at this EC. The SLERA found no potential unacceptable ecological risk. Therefore, EC-35 is recommended for NFA.

16. EC-36: BUILDING 515 – INCINERATOR PLANT

16.1 HISTORY OF EC-36

Building 515 is located in the northern portion of the Depot (Figure 2). The structure is made of brick and concrete, is partially collapsed, and contains a brick-lined oven-like feature (EA 2011). While there is no written information on the historical operations conducted at the incinerator, this is a small building that appears to have been used for incineration of general trash. Based on a review of previous reports, neither Building 515 nor the area around the building has been investigated. The area surrounding Building 515 may have been used for ash disposal (EA 2011).

16.2 EC-36 HABITAT

EC-36 was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-36 includes the Building 1515 Incinerator Plant in the north-central portion of the site. This area is 50% impervious surface since the area includes the developed then abandoned (but still standing) incinerator plant and surrounding successional old field upland habitat. The successional old field upland areas are dominated by orchard grass, yellow foxtail grass, broomsedge bluestem, butter and eggs, white snakeroot, and nodding thistle (*Carduus nutans*). There are several young black cherry (*Prunus serotina*) trees growing up around the old incinerator; Carolina mantis (a native species) egg cases were observed on the black cherry trees. Additionally, an Eastern cottontail rabbit (*Sylvilagus floridanus*) was observed dead in the road by EC-36, eight white-tailed deer were recorded and a red tail hawk (*Buteo jamaicensis*) was observed in the vicinity of the EC-36. EC-36 was ranked as providing minimal habitat quality.

16.3 DATA QUALITY OBJECTIVES

Table 16-1. DQO – Environmental Sampling for EC-36: Bldg. 515-Incinerator Plant SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.12 of the Work Plan (ERT 2013), analyze for metals (As, Cd, Cr, Cu, Hg, Pb, Zn), dioxins/furans, and PAHs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples around the existing building foundation, as well as extending out into the field surrounding the incinerator building. Subsurface samples near the building will be taken at a depth lower than the foundation, remaining samples will be based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 7 co-located biased surface and subsurface samples (A. above). B. 2 biased groundwater samples (B. above).

Table 16-1. DQO – Environmental Sampling for EC-36: Bldg. 515-Incinerator Plant SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling locations, obtain soil samples via DPT. C. Obtain groundwater samples via DPT.
Analytical Method	Metals analysis (excluding Hg) by SW-846 Method 6020A; Hg by SW-846 Method 7471B/7470A; dioxins/furans by SW-846 Method 8290; PAHs by SW-846 Method 8270SIM; PCBs by SW-846 Method 8082A.

16.4 MC INVESTIGATION

16.4.1 Sampling Process

SI-level sampling was conducted at EC-36 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Seven biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.). Based on the historical use of the EC surface soil and subsurface (3-4 ft bgs) soil was analyzed for metals (As, Cd, Cr, Cu, Hg, Pb, Zn), dioxins/furans, and PAHs.

Reported results for As, Cd, Cr, Cu, Hg, Zn, and PAHs were less than PSLs; as a result it was determined that a release of these constituents has not occurred. Dioxin/furan compounds (total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin) were reported at concentrations greater than the PSLs in four of seven surface soil samples. Lead was reported at a concentration greater than the PSL (800 mg/kg) in the surface soil sample collected from EC-36-6 (1,150 mg/kg). Results greater than the PSLs indicated a release to surface soil has occurred from the activities associated with the incineration of general trash and possibly disposal of the ashes around the incinerator. In order to determine the extent of the total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin release to soil, eight additional co-located surface and subsurface soil samples were collected and submitted to the project laboratory for analysis via Method SW-846 8290. To determine the extent of the lead release to soil, three additional co-located surface and subsurface samples were collected in 2015 and analyzed for lead via Method SW-846 6020A (Figure 17).

Additionally, to support FS determinations for disposal options, one sample was collected from this EC by ERT and analyzed for RCRA characteristics including toxicity characteristic leaching procedure (TCLP) (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity. As sampling location EC-36-06 had the highest levels of dioxins/furans and lead, the RCRA characterization sample was collected from the surface of this location. The DQOs associated with this sampling are summarized in Table 16-2.

Table 16-2. DQO - Environmental Sampling for EC-36: Building 515-Incinerator Plant

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of the lead and dioxins/furans (total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin) release to soil identified during the SI sampling and support disposal options in the FS.
Data User Perspective(s)	To obtain data to determine the extent of the lead and total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin and support disposal options in the FS.
Contaminant or Characteristic of Interest	Based on the reported results of the SI sampling, analyze for lead and total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin. RCRA characteristics of TCLP (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity to provide disposal information for the FS.
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	• Co-located surface (0-6 inches bgs) and subsurface (3-4 ft bgs) soil samples collected for total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin and lead. • Surface sample (0-6 inches bgs) for RCRA characteristics (from location EC-36-06)
Number of Samples Required	• 8 co-located surface and subsurface soil samples for total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin. • 3 co-located surface and subsurface soil samples for lead. • 1 surface sample for RCRA.
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSLs, and Curtis Bay PSLs (see ERT updated QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment. RCRA guidelines for disposal of hazardous materials (40 CFR Part 260).
Sampling Method	Obtain surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Lead analysis by SW-846 Method 6020A; total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin by SW-846 Method 8290;VOCs by SW-846 1311/8260B, SVOCs by SW-846 1311/8270C, pesticides by SW-846 1311/8082, herbicides by SW-846 1311/8081, metals by SW-846 1311/6010B, and RCRA Characteristics.

Based on the results of the 2015 sampling, the delineation of lead was complete. However, additional samples were collected in 2016 in order to complete delineation of dioxins/furans. In 2016, six additional surface and six subsurface soil samples were collected and analyzed for dioxins/furans in order to achieve delineation associated with PSL exceedances at EC-36-09 and EC-36-13. Subsurface samples were collected from 2-4 ft bgs.

16.4.2 Sampling Results

Seven co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of metals (As, Cd, Cr, Cu, Hg, Pb, Zn), PAHs, and dioxin/furan compounds for the SI-level sampling. For the RI level sampling, a total of 14 surface and 16 subsurface soil samples were collected and analyzed for lead and dioxins/furans.

Surface soil analytical results are summarized in Appendix E, Table E2-23, and subsurface soil analytical results are summarized in Table E2-24. Reported results, greater than the PSLs, are summarized below.

Metals – Surface

- Lead was reported at a concentration greater than the surface soil PSL (800 mg/kg) in the surface soil sample collected from EC-36-6-SO-0.5 (1,150 mg/kg).

Dioxin/Furan Compounds – Surface

- Total pentachlorodibenzofuran was reported at concentrations greater than the PSL (22.4 picograms per gram [pg/g]) in six surface sample locations; concentrations ranged from 94.2 pg/g in the sample collected from EC-36-03-SO-0.5 to 317 pg/g in the sample collected from EC-36-06-SO-0.5.

- Total pentachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (22.4 pg/g) in the surface soil samples collected from EC-36-06-SO-0.5 (32.9 pg/g) and EC-36-09-SO-0.5 (31.4 pg/g).

- Total tetrachlorodibenzofuran was reported at a concentration greater than the PSL (219 pg/g) in the surface soil sample collected from EC-36-06-SO-0.5 (576 pg/g).

- Total tetrachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (21.6 pg/g) in the surface soil samples collected from EC-36-06-SO-0.5 (35.8 pg/g) and EC-36-09-SO-0.5 (22 pg/g).

Dioxin/Furan Compounds – Subsurface

- 1,2,3,7,8- pentachlorodibenzo-p-dioxin (PeCDD)was reported at a concentration greater than the PSL (22.3 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (26.4 pg/g).

- 2,3,4,6,7,8- hexachlorodibenzofuran (HxCDF) was reported at a concentration greater than the PSL (223 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (300 pg/g).

- 2,3,4,7,8- PeCDD was reported at a concentration greater than the PSL (74.4 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (305 pg/g).

- Total hexachlorodibenzofuran was reported at a concentration greater than the PSL (223 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (2,010 pg/g).

- Total hexachlorodibenzo-p-dioxin was reported at a concentration greater than the PSL (223 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (301 pg/g).

- Total pentachlorodibenzofuran was reported at concentrations greater than the PSL (74.4 pg/g) in the subsurface soil samples collected from EC-36-09-SO-2 (2,830 pg/g) and EC-36-13-SO-4 (131 pg/g).

- Total pentachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (22.3 pg/g) in the subsurface soil samples collected from EC-36-09-SO-2 (265 pg/g) and EC-36-13-SO-4 (22.4 pg/g).

- Total tetrachlorodibenzofuran was reported at a concentration greater than the PSL (219 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (2,660 pg/g).

- Total tetrachlorodibenzo-p-dioxin was reported at a concentration greater than the PSL (21.6 pg/g) in the subsurface soil sample collected from EC-36-09-SO-2 (193 pg/g).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

16.5 HHRA RESULTS

16.5.1 Screening to Identify Chemicals of Potential Concern

For the HHRA screening of COPCs, detected analytes in surface soil and combined surface/subsurface soil at EC-36 were compared to industrial soil RSLs. As shown in Appendix F, Table EC36-1 (surface soil) and Table EC36-2 (combined surface/subsurface soil), individual samples results exceeded the industrial soil RSLs.

An analyte was selected as a COPC if its maximum detected concentration exceeded the RSL. Appendix F, Tables EC36-1 and EC36-2, show the data summary and the selection of COPCs process for EC-36.

EC-36 Surface Soil COPC Screening Results: Selected COPCs

- Arsenic
- Chromium
- Lead.

EC-36 Combined Surface/Subsurface Screening Results: Selected COPCs

- Arsenic
- Chromium
- Lead
- Dioxin TEQ.

16.5.2 Exposure Assessment

The exposure assessment for the HHRA (Section 4.5.2), and lists the human receptors and exposure pathways, outlines the approach to calculating EPCs, and presents the exposure assumptions that were used in the HHRAs to estimate intake. As for all Curtis Bay ECs considered in this RI, current and future receptors potentially exposed to soil at EC-36 include current site workers and trespassers exposed to surface soil and future construction workers exposed to mixed surface/subsurface soil.

The EPC (the 95% UCL) calculated for COPCs using ProUCL, outputs are provided in Appendix F. RME factors (Section 4.5.2) were used for the two receptors assessed at EC-36.

16.5.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks. These values were collated as specified in Section 4.5.3.

16.5.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as shown in Appendix F, Tables EC36-3 through EC36-6.

Non-Cancer Hazard Assessment
The non-carcinogenic HI posed by the EC-36 COPCs in soil for the two receptors evaluated were as follows:

- Current site worker (surface soil), using all surface soil COPCs: HI=0.03.

- Future construction worker (surface and subsurface soil), using all COPCs: HI=0.1.

Since the calculated HIs are less than one for both current site workers and future construction workers, the surface soil at EC-36 is not likely to pose unacceptable hazards to trespassers who would contact the EC intermittently.

The maximum detected concentration of lead in surface soil is 1,150 mg/kg. The average lead concentration in surface soil is 301 mg/kg, and the average lead concentration in surface soil/subsurface soil is 217 mg/kg. The average concentration of lead in surface soil and surface soil/subsurface soil combined is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use.

Carcinogenic Risk
The carcinogenic risks estimated for each receptor at EC-36 were as follows:

- Current site worker (surface soil), for the selected COPCs: 7×10^{-6}.
- Future construction worker (surface / subsurface soil), for the selected COPCs: 8×10^{-7}.

Therefore, the acceptable incremental cancer risk level specified by MDE ($1x10^{-5}$) is not exceeded, and trespassers who might contact the EC surface soil intermittently would not face unacceptable risk.

16.5.5 HHRA Conclusions for EC-36

The acceptable incremental cancer risk level specified by MDE ($1x10^{-5}$) is not exceeded at EC-36 for current site workers or future construction workers. Furthermore, trespassers intermittently contacting the EC would not face unacceptable risks. All HIs are less than 1, indicating that non-cancer hazards are unlikely. Additionally, average lead concentrations in surface soil and surface soil/subsurface soil combined are less than the MDE screening criteria for both commercial and industrial land use.

Based on these HHRA results, NFA is recommended for EC-36.

16.6 SLERA RESULTS

16.6.1 Screening to Identify Chemicals of Potential Ecological Concern

Select metals (As, Cd, Cr, Cu, Hg, Pb, and Zn), dioxins, and PAHs were analyzed for at EC-36; some analytes of each group were detected (Table EC36-11). Maximum concentrations of cadmium, copper, lead, mercury, zinc, dioxin TEQs, and HMW PAHs were greater than soil screening levels and are identified as COPECs at EC-36. The screening for COPECs in EC-36 surface soil is provided in Appendix F, Table EC36-11.

16.6.2 Risk Characterization

EPCs for COPECs are presented in Table EC36-12. The comparisons of concentrations and doses to receptor-specific TRVs for EC-36 are presented in Tables EC36-13 through EC36-17 and a comparison to background is provided in Table EC36-18. Food web models for individual receptors are included in Tables EC36-19 through EC36-24. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

16.6.2.1 Risk Characterization for Plants

When maximum and 95UCLM concentrations are compared to TRVs protective of terrestrial plants, copper, lead, and zinc have HQs greater than 1. A TRV is not available for dioxins. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below.

A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Copper
Copper was detected in 7 of 7 surface soil samples at concentrations ranging from 2 to 121 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 70 mg/kg with HQs of 2 (Table EC36-13). Only the maximum detected concentration is greater than the TRV. The BTV for copper is 32.8 mg/kg and 2 of the 7 onsite concentrations are greater than this value, although only the maximum concentration is notably higher than the BTV. Because only the maximum concentration is greater than the TRV and is the only concentration notably higher than the BTV, adverse effects to plant populations are not expected. Therefore, copper is not retained as a COPEC.

Lead
Lead was detected in 10 of 10 surface soil samples at concentrations ranging from 3.5 to 1,150 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 120 mg/kg with HQs of 10 and 4, respectively (Table EC36-13). Five of the 10 detected concentrations are greater than the TRV and greater than the BTV of 124 mg/kg. Because the 95UCLM concentration is greater than the TRV and because half of the onsite concentrations are greater than the TRV and the BTV, lead is retained as a COPEC.

Zinc
Zinc was detected in 7 of 7 surface soil samples at concentrations ranging from 6 to 622 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 160 mg/kg with HQs of 4 and 2, respectively (Table EC36-13). Three of the 7 detected concentrations are greater than the TRV and greater than the BTV of 83.9 mg/kg. Due to the relatively low magnitude of exceedance of the TRV by the maximum and 95UCLM concentrations, zinc is not retained as a COPEC for terrestrial plants.

16.6.2.2 Risk Characterization for Soil Invertebrates

When maximum and 95UCLM concentrations are compared to TRVs protective of soil invertebrates, copper, mercury, and zinc have HQs greater than 1. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below.

Copper
Copper was detected in 7 of 7 surface soil samples at concentrations ranging from 2 to 121 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 80 mg/kg with HQs of 2 (Table EC36-14). Only the maximum detected concentration is greater than the TRV. The BTV for copper is 32.8 mg/kg and 2 of the 7 onsite concentrations are greater than this value, although only the maximum concentration is notably higher than the BTV. Because only the maximum concentration is greater than the TRV and is the only concentration notably higher than the BTV, adverse effects to soil invertebrate populations are not expected. Therefore, copper is not retained as a COPEC.

Mercury
Mercury was detected in 4 of 7 surface soil samples at concentrations ranging from 0.071 to 0.24 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 0.1 mg/kg with HQs of 2 (Table EC36-14). Three of the detected concentrations are greater than the TRV and greater than the BTV of 0.11 mg/kg. However, the onsite concentrations are only slightly higher than the BTV. Because the exceedances of the TRV and BTV are of low magnitude and because the spatial distribution of detections and elevated concentrations is minimal, adverse effects to soil invertebrate populations are not expected. Therefore, mercury is not retained as a COPEC.

Zinc
Zinc was detected in 7 of 7 surface soil samples at concentrations ranging from 6 to 622 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 120 mg/kg with HQs of 5 and 3, respectively (Table EC36-14). Three of the detected concentrations are greater than the TRV and greater than the BTV of 83.9 mg/kg. Due to the relatively low magnitude of exceedance of the TRV by the maximum and 95UCLM concentrations, zinc is not retained as a COPEC for soil invertebrates.

16.6.2.3 Risk Characterization for Birds

When doses calculated using maximum and 95UCLM concentrations are compared to NOAEL-based TRVs protective of birds, cadmium, copper, lead, and zinc have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, cadmium and lead have HQs greater than 1 (Tables EC36-15 and EC36-16). Further discussion of the analytes with LOAEL-based HQs greater than 1 is provided in the paragraphs below.

Cadmium
Cadmium was detected in 6 of 7 surface soil samples. The maximum case scenario dose is greater than the NOAEL and LOAEL-based TRVs with HQs of 9 and 2. The BTV for cadmium is 0.17 mg/kg, which is exceeded by all of the onsite concentrations which range from 0.37 to 10.2 mg/kg. The risk is driven by the maximum sample concentration (detected at EC-36-5-SO-0.5) which is four times greater the next sample concentration (2.6 mg/kg). With the exception of EC-36-5-SO-0.5, cadmium is not expected to pose risk to birds. Cadmium at EC-36-5-SO-0.5 may pose risks to birds, but the site-wide populations of birds are not expected to be at potential risk from cadmium based on the conclusion of the weight-of-evidence approach.

Lead
Lead was detected in 10 of 10 surface soil samples. The maximum and 95UCLM case scenario doses are greater than the LOAEL-based TRV with HQs of 49 and 23, respectively (Tables EC36-15 and EC36-16). The BTV for lead is 124 mg/kg, which is exceeded by half of the onsite concentrations. While the exposure model uses conservative assumptions about area use, bioaccumulation, and uptake, and despite the limited spatial extent of elevated concentrations relative to background, because the 95UCLM dose exceeds the LOAEL-based TRV and because half of the onsite concentrations are greater than the BTV, lead is retained as a COPEC.

16.6.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-36 are expected.

16.6.3 SLERA Conclusions for EC-36

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, lead is retained as a COPEC for plants and birds. It is noted that while cadmium may pose risks to birds based on the HQ at the location of the maximum concentration (EC-36-5-SO-0.5), the site-wide populations are not expected to be at potential risk based on the conclusion of the weight-of-evidence approach. No COPECs were identified for soil invertebrates or mammals.

16.7 EC SUMMARY

The sampling results determined lead and select dioxins/furan concentrations were greater than the PSLs at EC-36. The HHRA determined that the acceptable incremental cancer risk level specified by MDE ($1x10^{-5}$) and HIs are not exceeded at EC-36 for current site workers or future construction workers, and trespassers intermittently contacting the EC would not face unacceptable risks. Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, lead is retained as a COPEC for plants and birds. No COPECs were identified for soil invertebrates or mammals. It is noted that while cadmium was not retained as a COPEC for birds based on the conclusion of the weight-of-evidence approach, the HQ at the location of the maximum concentration (EC-36-5-SO-0.5) indicates the potential for localized effects. Further action for soil is recommended to protect ecological receptors at EC-36 due to lead; this will be evaluated in the FS.

17. EC-50: BUILDING 724-G – TIRE RETREADING SHOP

17.1 HISTORY OF EC-50

EC-50 is located in the center of the Depot and is associated with Building 724-G, which is still present but partially collapsed (Figure 2). During a 2010 EA site visit, equipment and material associated with tire retreading, including six 55-gallon drums used for part storage (originally labeled for oil storage) and racks of tires, were observed. EA also noted a generator or engine labeled "General Motors." The site visit also noted the remnants of an electrical panel that was speculated to contain dielectric fluids that could potentially contain PCBs. The building was also noted to contain a 500-gallon fiberglass AST; no markings were on the AST and it was determined to be empty during the June 2012 site visit. No prior investigations have been conducted at Building 724-G.

No specific information is documented on the history of EC-50; however, based on site conditions, activities that likely occurred within this shop not only included retreading and patching tires, but may have also included grinding tires.

17.2 DATA QUALITY OBJECTIVES

Table 17-1. DQO – Environmental Sampling for EC-50: Bldg. 724-G-Tire Retreading Shop SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a HTW release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of HTW has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.2.14 of the Work Plan (ERT 2013), analyze solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, PCBs, and PAHs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples around the existing foundation. Subsurface samples will be taken at a depth lower than the foundation and based on field observations (i.e., staining, odor, etc.). B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 6 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater samples (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel or DPT. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater samples via DPT.
Analytical Method	Solvents and naphthalene by SW-846 Method 8260B; PCBs by SW-846 Method 8082A; PAHs by SW-846 Method 8270SIM.

17.3 MC INVESTIGATION

17.3.1 Sampling Process

SI-level sampling was conducted at EC-50 in July 2013 to determine the absence or presence of HTW impacts to surface and subsurface soil. Six biased surface and subsurface soil sample locations were selected based on field observations (i.e., soil staining, odor, etc.) (Figure 18). Samples were collected and submitted for laboratory analysis of solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, PCBs, and PAH.

17.3.2 Sampling Results

Six co-located surface and subsurface soil samples were collected and submitted for laboratory analysis of solvents (acetone, BTEX, carbon tetrachloride, methanol, methylene chloride, methyl ethyl ketone, ethyl alcohol, PCE, TCE), naphthalene, PCBs, and PAHs.

Surface soil analytical results are summarized in Appendix E, Table E2-25, and subsurface soil analytical results are summarized in Table E2-26. Reported results were less than PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

17.4 SLERA Results

17.4.1 Screening to Identify Chemicals of Potential Ecological Concern

PCBs, PAHs, and VOCs were analyzed for at EC-50; some analytes of each group were detected (Table EC50-1). Maximum concentrations of VOCs were below soil screening levels. The maximum concentration of Aroclor 1260 and HMW PAHs were greater than soil screening levels and are identified as COPECs. The screening for COPECs in EC-50 surface soil is provided in Appendix F, Table EC50-1.

17.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC50-2. The comparisons of concentrations and doses to receptor-specific TRVs for EC-50 are presented in Tables EC50-3 through EC50-6 and a comparison to background is presented in Table EC50-7. Food web models for individual receptors are included in Tables EC50-8 through EC50-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

17.4.2.1 Risk Characterization for Plants

When maximum and 95UCLM concentrations are compared to TRVs protective of terrestrial plants, no COPECs have an HQ greater than 1 (Table EC50-3).

17.4.2.2 Risk Characterization for Soil Invertebrates

When maximum and 95UCLM concentrations are compared to TRVs protective of soil invertebrates, no COPECs have an HQ greater than 1 (Table EC50-4).

17.4.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of birds, no COPECs have an HQ greater than 1 (Table EC3-5). Therefore, no analytes are retained as COPECs for birds.

17.4.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have an HQ greater than 1 (Table EC3-6). Therefore, no analytes are retained as COPECs for mammals.

17.4.3 SLERA Conclusions for EC-50

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors, no analytes are retained as COPECs for any receptors evaluated (plants, soil invertebrates, birds, and mammals).

17.5 EC SUMMARY

Based on the results of the SI-level sampling conducted at EC-50, no release has occurred at this EC. The SLERA found no potential unacceptable ecological risk. Therefore, EC-50 is recommended for NFA.

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18. EC-21: LANDFILL/"OPEN DUMP" AND BARRICADE 645 (SHELL BURNING PIT)

18.1 HISTORY OF EC-21

EC-21 is located on the western portion of the Depot, on the north side of Back Creek Road, and consists of a historical landfill/open dump and Barricade 645 shell burning pit where controlled dumping and burning activities reportedly occurred (Figure 2) (USAEHA, 1989). The boundary for EC-21 was provided in the ESP (USACE, 2012), which is based on recommendations from the ESAR that were developed based on the historical maps presented in the Final Work Plan (ERT 2013).

According to historical documents, dumping activities were surficial only; no burial or cover was applied to the open dump area. Additionally, no trenching or landfill operations were visible in the historical photographs. Waste materials disposed of in this location include pallets, appliances, dunnage, and scrap (USAEHA, 1989). Unwanted materials awaiting disposal or recycling were stored on the surface of the open dump area. Munitions items have not been reported within this open dump area.

Barricade 645 is one of the four burn cages proposed for investigation during the RI activities. Wire cage burning operations reportedly consisted of open burning on concrete pads within barricades covered in wire mesh. Little documented information is available pertaining to the cage burning operations; however, train cars containing smokeless powder were moved into the barricades and were reportedly ignited within the barricades in the post-Korean war timeframe for munitions handling and disposal (USAEHA, 1989). The barricades were also used as safety areas where the train cars with smokeless powder could be stored. Historical documents and figures provide the locations of the presumed barricades where cage burning operations took place (Office of Post Engineer, 1957 and n.d; USACE, St. Louis 1993). While historical documents do not mention burial activities, based on previous DGM and intrusive investigations burial activities may have occurred in this EC.

EC-21 was previously investigated through geophysical and trenching activities by MKM and Zapata. Several Zapata trenches uncovered MD, which was removed and disposed of offsite. MD recovered consisted of small arms projectiles, cartridge cases, and cartridge case flash tubes (Zapata 2009); no indications of landfill materials were found within these trenches. Zapata additionally conducted MC soil sampling in one out of five trenches within EC-21, analyzing four samples for explosives, antimony, copper, lead, and zinc. The concentration of lead in two of the four samples collected within EC-21 was greater than the 2008 USEPA industrial soil RSL of 800 mg/kg (CEHNC, 2011). The concentration of 2,4-DNT in three of the four samples collected from within EC-21 was greater than the 2008 Industrial USEPA RSL of 0.040 mg/kg (Zapata 2009).

EC-21 also contains a visible propellant grain dumping area on the ground surface in the southern portion of the EC. A known MC release is associated with the dumping and burning operations and with the propellant grain dump.

Residual propellant grains were identified in the top 3 inches of soil within a portion of EC-21 (USACE 2020). Soil sampling has indicated this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant would impact soils through elevated nitrogen thereby, inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events and largely clay remains in this area. The lack of vegetation will continue to allow accelerated erosion of soil into the Unnamed Tributary (USACE 2020).

18.2 EC-21 HABITAT

EC-21 was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-21 is located in the southwest corner of the site near the Unnamed Tributary and along Back Creek Road to the southwest and Shell Road to the north. This EC area includes a large expanse of upland meadow and successional old field habitat. This area is estimated at 5% impervious surface since some abandoned roads and gravel parking areas still exist within EC-21. There are some narrow areas of immature trees located on the magazine berms. Within the successional old field habitats, dominant plant species include orchard grass, yellow foxtail grass, broomsedge bluestem, switchgrass, black cherry, and common milkweed. Some scattered Bradford pear trees were observed and provide minimal and low-quality avian cover and habitat. Other tree species observed include pin oak (*Quercus palustris*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), willow oak (*Quercus phellos*), tree-of-heaven (*Ailanthus altissima*) and persimmon (*Diospyros virginiana*). A small pocket of wetland area and standing water was observed approximately 2 inches deep that appears to originate from surface water runoff in EC-21. An aquatic diving beetle was observed within the standing water/wetland area. Dominant wetland vegetation includes rush species (*Juncus* species and *Rhynchospora species*), woolgrass (*Scirpus cyperinus*), and black willow (*Salix nigra*). A red fox was observed utilizing the habitat at EC-21 and evidence of white-tailed deer (tracks) was recorded. EC-21 was ranked as providing medium habitat quality due to the larger size of this EC, the presence of numerous habitat types, and the observation of many types of wildlife, including birds, mammals, and invertebrate species.

18.3 DATA QUALITY OBJECTIVES

Table 18-1. DQO – DGM/Intrusive Investigation for EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) RI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the nature and extent of MEC.
Data User Perspective(s)	To obtain data to determine nature and extent of MEC to determine the associated hazard level and if immediate or additional actions are warranted.
Contaminant or Characteristic of Interest	MEC
Media of Interest	Soil based on historical burning and possible burial activities and the propellant grain dump.

Table 18-1. DQO – DGM/Intrusive Investigation for EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) RI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Required Sampling Locations or Areas and Depths	A. Perform DGM survey of EC using EM61-MK2. B. DGM survey coverage will be 100% with a line spacing of 2.5 ft of the area that was not previously investigated by MKM. MKM covered approximately 66% or 6.9 acres of the 10.4-acre EC. ERT's DGM survey will cover approximately 3.5 acres.
Number of Samples Required	A. Intrusively investigate potential burial sites with trenches based on DGM results. B. Determination of trench and MC sampling locations and numbers will be based on a discussion of the Trenching and MC Sampling Locations Recommendation Memo (developed based on DGM results) with the PDT.
Reference Concentration of Interest or Other Performance Criteria	Ensure coverage goal is met. DGM data will be compared against daily DGM QC tests to ensure data are valid.
Sampling Method	Excavation of up to 3 trenches in potential burial areas. The exact number of trenches will be determined during PDT review and acceptance of the Trenching and MC Sampling Locations Recommendation Memo.
Analytical Method	EM61-MK2

Table 18-2. DQO – Environmental Sampling for EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) RI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the nature and extent of MC.
Data User Perspective(s)	To obtain data to determine nature and extent of MC by performing a comparison of results against defined screening levels to determine if an exceedance has occurred that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.1 of the ERT Work Plan, analyze the media of interest for the following: Propellant grain dump area: 2,4 DNT, 2,6 DNT, nitroglycerin, and nitroguanidine. Remainder of the EC: PAHs, dioxins/furans, metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, TNT and PCBs. Groundwater sample: MDE Solid Waste Table I & II analytes as requested by MDE at TPP#2. Analyte list located in Attachment 7 of the ERT UFP-QAPP (Appendix E).
Media of Interest	Soil and groundwater.

Table 18-2. DQO – Environmental Sampling for EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) RI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Required Sampling Locations or Areas and Depths	A. Co-located discrete surface and subsurface soil samples based on a 50-ft grid developed over the propellant grain dump area. B. Randomly placed co-located discrete surface and subsurface soil samples will be taken at locations determined by VSP throughout the entire EC. C. Collect one surface and one subsurface biased discrete soil samples from the side wall of each trench. D. Biased discrete soil samples collected at locations based on DGM results and field observations, such as evidence of energetic material (breached munitions items) or in areas of significant MD, where at least 50% of the munition could be identified by UXO Technicians, such that an assumption of MC in the vicinity could be tested by taking a sample. The depth for the biased soil samples will be just below the depth of the associated munition, or in the case of samples collected where there is visible evidence of energetic material on the surface in the top few inches of soil. If there are no notable DGM results from within the barricade, a memo will be submitted detailing a revised sampling approach and proposed number of samples. E. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 15 co-located discrete surface and subsurface soil samples (A. above). B. 13 random discrete co-located surface and subsurface soil samples (B. above). C. Up to 6 biased discrete soil samples from the trenches (C. above). D. Up to 3 biased discrete soil samples (D. above). E. 1 biased groundwater sample (E. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA Regional Screening Levels (RSLs), USEPA Region III Biological Technical Assistance Group (BTAG), USEPA Region 4 Ecological Screening Values, USEPA Ecological Soil Screening Levels (SSL),. Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain randomly placed discrete and biased discrete surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via direct push technology (DPT). C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; explosives analysis by SW-846 Method 8330B; nitroglycerin and nitroguanidine by SW-846 Method 8330; dioxins/furans by SW-846 Method 8290; PCBs by SW-846 Method 8082A; PAHs by SW-846 Method 8270SIM. MDE Solid Waste Tables I & II by ASTM method D 6919-03; USEPA 410.4; SM 2320B, 2340C, 2540C; and SW-846 Methods 6020A/7470A, 8260B, 9056.

Table 18-2A. DQO – Supplemental RI Incremental Sampling at EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To address human and ecological risk.
Data User Perspective(s)	To obtain additional surface soil and sediment data and incorporate the data into the HHRA (surface soil) and SLERA (sediment) using incremental sampling.
Contaminant or Characteristic of Interest	TAL Metals and PAHs

Table 18-2A. DQO – Supplemental RI Incremental Sampling at EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)

Data Quality Objective Element	EC-Specific DQO Statement
Media of Interest	Soil and Sediment
Required Sampling Locations or Areas and Depths	A. Standing Water/Wetland Area – collect one incremental sample (30 increments in triplicate) of sediment (Figure 3); analyze for TAL metals, PAHs. B. Approximately 2-acre area in the northeast portion of EC-21; one DU with six SUs - six incremental samples (30 increments each, with one SU completed in triplicate) of surface soil (Figure 3); analyze for lead and PAHs.
Number of Samples Required	See A and B above
Reference Concentration of Interest or Other Performance Criteria	USEPA Regional Screening Levels (RSLs), USEPA Region III Biological Technical Assistance Group (BTAG), USEPA Region 4 Ecological Screening Values, USEPA Ecological Soil Screening Levels (SSL), and Curtis Bay background dataset (see the EA 2019 Work Plan Addendum QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	ISM
Analytical Method	TAL Metals (Method 6020A, 7471B) and PAHs (Method 8270 SIM (sediment); Method 8270D soil)

18.4 MEC INVESTIGATION

18.4.1 Geophysical Results

MKM had collected data with the EM61 covering part of EC-21 and mapped several clusters of anomalies. Some low-response areas were mapped to the north of barricade 645, and a large area of intense anomalies (greater than 100 mV) were mapped to the northeast of the barricade. ERT collected data with the EM61-MK2A within and around the barricade, in an irregular data gap parallel to the road leading into the barricade, and in the area on and to the east of the propellant grain dump. It is notable that no anomalies were mapped in the area of the propellant grain dump. Only small, scattered, low-response anomalies were mapped by ERT. The geophysical map is shown in Appendix B-1, Figure B-1. The August 19, 2013 memorandum (Appendix I.4) details the rationale ERT used to determine the locations for the trenches based on the geophysical results. Three trenches were proposed (21A, 21B, and 21C).

18.4.2 Intrusive Investigation Results

Three trenches were excavated within EC-21. No MEC was found in any of the three trenches. MD was found in trench 21B (cartridge cases, bullets, flash tubes) in the top 12 inches of the trench along the entire 20 ft length of the trench. Trench 21A contained asphalt, and trench 21C had cultural debris including 55-gallon drums and scrap metal to a depth of 4 ft bgs. Drawings of the trench profiles and trench photographs are provided in Appendix C-2.

One-hundred sixty-six CS grenade bodies and nine 37-38mm CS/CN riot control projectiles were found on the surface of EC-21.

18.5 MC INVESTIGATION

18.5.1 Sampling Process

RI-level sampling was conducted in July and August 2013 at EC-21 to determine the nature and extent of MEC and/or MC impacts to surface and subsurface soil. Environmental sampling DQOs are shown in Table 3.2.

Surface and subsurface soil grid-based samples were collected from the propellant grain dump area and submitted for laboratory analysis of 2,4-DNT, 2,6-DNT, nitroglycerin, and nitroguanidine.

For the remainder of EC-21, 13 random surface and subsurface sample locations were selected via VSP; two biased surface and subsurface sample locations were selected based on DGM results; and three surface and two subsurface soil sample locations were selected based on trench locations. A subsurface soil sample was not collected from location EC-21-A-SO due to the presence of asphalt at 5 to 6 inches bgs. Samples were collected and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and 2,4,6-TNT).

Based on the 2013 results, additional samples were collected in September 2015 in order to further delineate MC impacts to surface and subsurface soil (Figure 19). Sample locations EC-21-10 and EC-21-C were re-sampled in the 7-9 ft bgs interval to provide vertical delineation. Ten additional surface and subsurface samples were collected to provide horizontal delineation. Samples were collected and submitted for laboratory analysis of metals (Sb, Mn, and Pb), PAHs, and dioxins/furans. DQOs for the additional sampling are provided in Table 18-3. Additionally, DQOs for incremental samples of surface soil and sediment were collected from EC-21 in 2019 are presented in Table 18-2A.

Table 18-3. DQO – Environmental Sampling for EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) RI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of Sb, Mn, Pb, benzo(a)pyrene, and dioxin/furan compounds and to support the evaluation of disposal options in the FS.
Data User Perspective(s)	To obtain data to determine extent of Sb, Mn, Pb, benzo(a)pyrene, and dioxin/furan compounds by performing a comparison of results against defined screening levels and support the evaluation of disposal options in the FS.
Contaminant or Characteristic of Interest	Based on the RI results for the EC, analyze for metals (Sb, Pb, and Mn), benzo(a)pyrene, dioxins/furans. RCRA characteristics of TCLP (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity; TOC, grain size, and soil moisture to provide disposal information for the FS.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located surface (0-6 inches bgs) and subsurface (1-6 ft bgs) soil samples to delineate extent. B. Subsurface (7-9 ft bgs) soil to delineate vertical extent. C. Surface samples (0-6 inches bgs) along the barricade walls. D. Surface soil (0-6 inches bgs) for FS samples.

Table 18-3. DQO – Environmental Sampling for EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) RI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
	E. Groundwater sample between trenches with subsurface soil exceedances.
Number of Samples Required	A. 10 co-located surface and subsurface soil samples (A. above). B. 11 subsurface at 7-9 ft bgs (B. above). C. 6 surface (C. above). D. 1 surface sample (0-6 inches bgs) for RCRA characteristics (from location EC-21C) (C. above) E. 1 groundwater (D. above)
Reference Concentration of Interest or Other Performance Criteria	USEPA Regional Screening Levels (RSLs), USEPA Region III Biological Technical Assistance Group (BTAG), USEPA Region 4 Ecological Screening Values, USEPA Ecological Soil Screening Levels (SSL), and Curtis Bay PSLs (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment. RCRA guidelines for disposal of hazardous materials (40 CFR Part 260).
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Metals analysis by SW-846 Method 6020A; dioxins/furans by SW-846 Method 8290; PAHs by SW-846 Method 8270SIM; VOCs by SW-846 1311/8260B, SVOCs by SW-846 1311/8270C, pesticides by SW-846 1311/8082, herbicides by SW-846 1311/8081, metals by SW-846 1311/6010B, and RCRA Characteristics.

18.5.2 Sampling Results

Fifteen surface and subsurface soil samples were collected from the propellant grain dump area and submitted for laboratory analysis of 2,4-DNT, 2,6-DNT, nitroglycerin, and nitroguanidine. Analytical results for surface soil are summarized in Appendix E, Table E2-27. There were no reported detections in the surface or subsurface samples in the propellant grain dump area.

Initially, 18 surface soil samples were collected from the remainder of EC-21 and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and 2,4,6-TNT). An additional 16 surface soil samples were collected in 2015 and analyzed for metals (Sb, Mn, and Pb), benzo(a)pyrene, and dioxin/furan compounds as necessary to delineate areas of impact identified during the 2013 sampling. Discrete surface soil analytical results are summarized in Appendix E, Table E2-28. Reported results, greater than the PSLs, for the remainder of EC-21 are summarized below.

Fifteen discrete subsurface soil samples were collected from the propellant grain dump area and submitted for laboratory analysis of 2,4-DNT, 2,6-DNT, nitroglycerin, and nitroguanidine. Analytical results for subsurface soil are summarized in Appendix E, Table E2-29. There were no reported detections in the subsurface samples from the propellant grain dump area.

Eighteen discrete subsurface soil samples were collected from the remainder of EC-21 and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and 2,4,6-TNT). An additional 15 discrete

surface soil samples were collected in 2015 and analyzed for metals (Sb, Mn, and Pb), benzo(a)pyrene, and dioxin/furan compounds as necessary to delineate areas of impact identified during the 2013 sampling. Analytical results for subsurface soil are summarized in Appendix E, Table E2-30. Reported results, greater than the PSLs, are summarized below.

Eight incremental surface soil samples from EC-21 were analyzed for lead and PAHs. The 95% UCL of the sample results were compared to the applicable screening criteria USEPA Region 3 industrial soil RSLs. The analytical results are summarized in Appendix E, Table E6-1. Reported results greater than the applicable screening criteria are depicted on Figure 27a.

Three incremental sediment samples from EC-21 were analyzed for TAL metals and PAHs. The analytical results are summarized in Appendix E, Table E6-2. See also Section 18.6.5 for additional detail regarding the HHRA performed using the 2019 incremental samples. The incremental surface soil samples were evaluated separately from the discrete samples because it is not appropriate to combine discrete and incremental sample results.

Metals – Surface

- Antimony was reported at concentrations greater than the surface soil PSL (47 mg/kg) in the surface soil samples collected from EC-21-A-SO-0.5 (80 mg/kg) and EC-21-B-SO-0.5 (47.7 mg/kg).

- Lead was reported at concentrations greater than the surface soil PSL (800 mg/kg) in the surface soil samples collected from EC-21-8-SO-0.5 (1,630 mg/kg), EC-21-38-SO-0.5 (1,600 mg/kg), EC-21-41-SO-0.5 (954 mg/kg), EC-21-A-SO-0.5 (3,230 mg/kg), and EC-21-B-SO-0.5 (3,220 mg/kg).

- Of the 2019 surface soil samples collected by ISM from EC-21, lead was reported at concentrations greater than the surface soil PSL (800 mg/kg USEPA Region 3 industrial soil RSLs) in one sample (EC-21-IS-SO-05) that was collected from Sampling Unit (SU) 5. The concentration of lead in this sample was 974 mg/kg. The remaining seven samples collected from this Decision Unit (DU) exhibited lead concentrations that ranged from 167 mg/kg in the sample from SU2 (EC-21-IS-SO-02) and 668 mg/kg lead in the sample collected from SU4 (EC-21-IS-SO-04).

- Manganese was reported at concentrations greater than the surface soil PSL (2,600 mg/kg) in the surface soil samples collected from EC-21-12-SO-0.5 (3,830 mg/kg), EC-21-38-SO-0.5 (61,600 J mg/kg), and EC-21-39-SO-0.5 (6,440 J mg/kg).

PAHs – Surface

- Benzo(a)anthracene was reported at concentrations greater than the surface soil PSL (2,900 µg/kg) in six surface soil samples. Concentrations ranged from 7,700 µg/kg in the sample collected from EC-21-41-SO-0.5 to 36,000 µg/kg in the sample collected from EC-21-33-SO-0.5.

- Of the 2019 surface soil samples collected by ISM from EC-21, benzo(a)anthracene was reported at concentrations greater than the surface soil PSL (21,000 µg/kg) in six of eight surface soil samples. Concentrations ranged from 10,100 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 55,500 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Benzo(a)pyrene was reported at concentrations greater than the surface soil PSL (1,036 µg/kg) in seven surface soil samples. Concentrations ranged from 2,200 µg/kg in sample collected from EC-21-37-SO-0.5 to 33,000 µg/kg in the sample collected from EC-21-33-SO-0.5.

- Of the 2019 surface soil samples collected by ISM from EC-21, benzo(a)pyrene was reported at concentrations greater than the surface soil PSL (2,100 µg/kg) in eight of eight surface soil samples. Concentrations ranged from 13,500 µg/kg in the sample collected from SU7 (EC-21-IS-SO-07) to 47,900 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Benzo(b)fluoranthene was reported at concentrations greater than the surface soil PSL (2,900 µg/kg) in seven surface soil samples. Concentrations ranged from 3,500 µg/kg µg/kg in sample collected from EC-21-37-SO-0.5 to 50,000 µg/kg in the sample collected from EC-21-33-SO-0.5

- Of the 2019 surface soil samples collected by ISM from EC-21, benzo(b)fluoranthene was reported at concentrations greater than the surface soil PSL (21,000 µg/kg) in six of eight surface soil samples. Concentrations ranged from 11,600 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 64,200 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Dibenz(a,h)anthracene was reported at concentrations greater than the surface soil PSL (290 µg/kg) in seven surface soil samples. Concentrations ranged from 300 µg/kg in sample collected from EC-21-37-SO-0.5 to 6,600 µg/kg in the sample collected from EC-21-33-SO-0.5.

- Of the 2019 surface soil samples collected by ISM from EC-21, dibenzo(a,h)anthracene was reported at concentrations greater than the surface soil PSL (2,100 µg/kg) in six of eight surface soil samples. Concentrations ranged from 1,220 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 6,320 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Indeno(1,2,3-cd)pyrene was reported at concentrations greater than the surface soil PSL (2,900 µg/kg) in six surface soil samples. Concentrations ranged from 7,080 J µg/kg collected from EC-21-10-SO-0.5 to 30,000 µg/kg in the sample collected from EC-21-33-SO-0.5.

- Of the 2019 surface soil samples collected by ISM from EC-21, indeno(1,2,3-cd)pyrene was reported at concentrations greater than the surface soil PSL (21,000 µg/kg) in three of eight surface soil samples. Concentrations ranged from 34,300 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06) to 5,010 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Of the 2019 surface soil samples collected by ISM from EC-21, phenanthrene was reported at concentrations greater than the surface soil PSL (17,000 µg/kg) in seven of eight surface soil samples. Concentrations ranged from 13,300 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 73,400 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

Dioxin/Furan Compounds – Surface

- 1,2,3,4,6,7,8-HpCDF was reported at a concentration greater than the surface soil PSL (2,210 pg/g) in the sample collected from EC-21-A-SO-0.5 (3,670 pg/kg).

- 1,2,3,4,7,8-HxCDF was reported at a concentration greater than the surface soil PSL (219 pg/g) in the sample collected from EC-21-A-SO-0.5 (892 pg/kg).

- 1,2,3,6,7,8-hexachlorodibenzo-p-dioxin (HxCDD) was reported at a concentration greater than the surface soil PSL (223 pg/g) in the sample collected from EC-21-A-SO-0.5 (336 pg/kg).

- 1,2,3,6,7,8-HxCDF was reported at a concentration greater than the surface soil PSL (219 pg/g) in the sample collected from EC-21-A-SO-0.5 (817 pg/kg).

- 1,2,3,7,8,9-HxCDD was reported at a concentration greater than the surface soil PSL (223 pg/g) in the sample collected from EC-21-A-SO-0.5 (255 pg/kg).

- 1,2,3,7,8,9-HxCDF was reported at a concentration greater than the surface soil PSL (223 pg/g) in the sample collected from EC-21-A-SO-0.5 (289 pg/kg).

- 1,2,3,7,8-PeCDD was reported at a concentration greater than the surface soil PSL (22.3 pg/g) in the sample collected from EC-21-A-SO-0.5 (164 K pg/kg).

- 2,3,4,6,7,8-HxCDF was reported at a concentration greater than the surface soil PSL (223 pg/g) in the sample collected from EC-21-A-SO-0.5 (1,330 pg/kg).

- 2,3,4,7,8-pentachlorodibenzofuran (PeCDF) was reported at a concentration greater than the surface soil PSL (74.4 pg/g) in the sample collected from EC-21-A-SO-0.5 (852 pg/kg).

- 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) was reported at a concentration greater than the surface soil PSL (21.6 pg/g) in the sample collected from EC-21-A-SO-0.5 (38.2 pg/kg).

- 2,3,7,8- tetrachlorodibenzofuran (TCDF) was reported at a concentration greater than the surface soil PSL (219 pg/g) in the sample collected from EC-21-A-SO-0.5 (466 pg/kg).

- Total heptachlorodibenzofuran was reported at a concentration greater than the surface soil PSL (2,210 pg/g) in the sample collected from EC-21-A-SO-0.5 (4,850 pg/kg).

- Total heptachlorodibenzo-p-dioxin was at concentrations greater than the surface soil PSL (2,170 pg/g) in the samples collected from EC-21-37-SO-0.5 (4,070 pg/g) and EC-21-A-SO-0.5 (4,250 pg/kg).

- Total hexachlorodibenzofuran was reported at concentrations greater than the PSL (223 pg/g) in the samples collected from EC-27-37-SO-0.5 (285 pg/g) and EC-21-A-SO-0.5 (9,010 pg/kg).

- Total hexachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (223 pg/g) in four surface soil samples. Concentrations ranged from 251 pg/g in the sample collected from EC-21-C-SO-0.5 to 9,180 pg/g in the sample collected from EC-21-A-SO-0.5.

- Total pentachlorodibenzofuran was reported at concentrations greater than the PSL (74.4 pg/g) in five surface soil samples. Concentrations ranged from 79.3 pg/g in the sample collected from EC-21-12-SO-0.5 to 10,300 pg/g in the sample collected from EC-21-A-SO-0.5.

- Total pentachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (22.3 pg/g) in six surface soil samples. Concentrations ranged from 24 pg/g in the sample collected from EC-21-37-SO-0.5 to 5,430 pg/g in the sample collected from EC-21-A-SO-0.5.

- Total tetrachlorodibenzofuran was reported at a concentration greater than the PSL (219 pg/g) in the sample collected from EC-21-A-SO-0.5 (13,100 J pg/g).

- Total tetrachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (22.4 pg/g) in four surface soil samples. Concentrations ranged from 29.63 pg/g in the sample collected from EC-21-41-SO-0.5 to 3,760 pg/g in the sample collected from EC-21-A-SO-0.5.

Explosives – Surface

- 2,4-DNT was reported at concentrations greater than the PSL (7.4 mg/kg) in the surface soil samples collected from EC-21-8-SO-0.5 (13.7 mg/kg), EC-21-29-SO-0.5 (14.3 mg/kg) and EC-21-B-SO-0.5 (19.8 mg/kg).

PAHs – Subsurface

- Benzo(a)pyrene was reported at concentrations greater than the subsurface soil PSL (290 µg/kg) in the subsurface soil samples collected from EC-21-10-SO-06 (321J µg/kg) and EC-21-C-SO-05 (878 µg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

18.6 HHRA RESULTS

18.6.1 Screening to Identify Chemicals of Potential Concern

For the HHRA screening of COPCs using discrete samples, detected analytes in surface soil and combined surface/subsurface soil at EC-21 were compared to industrial soil RSLs. As shown in Appendix F, Tables EC21-1 (surface soil) and EC21-2 (surface/subsurface soil), individual discrete samples results exceeded the industrial soil RSLs.

An analyte was selected as a COPC if its maximum detected concentration exceeded the RSL. Appendix F, Tables EC21-1 (surface soil) and EC21-2 (surface/ subsurface soil), show the data summary and the selection of COPCs process for EC-21. At EC-21, COPCs were the same in surface and in combined surface/subsurface soil. Note Section 18.6.5 provides detail regarding the HHRA performed using the 2019 incremental samples. The 2019 incremental surface soil samples were evaluated separately from the discrete samples because it is not appropriate to combine discrete and incremental sample results.

EC-21 Surface and Combined Surface/Subsurface Soil COPC Screening Results: Selected COPCs

- Antimony
- Lead
- Manganese
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Dioxin TEQ
- 2,4-DNT.

18.6.2 Exposure Assessment

The exposure assessment for the HHRA (Section 4.5.2), and lists the human receptors and exposure pathways, outlines the approach to calculating EPCs, and presents the exposure assumptions that were used in the HHRAs to estimate intake. As for all Curtis Bay ECs considered in this RI, current and future receptors potentially exposed to soil at EC-21 include

current site workers and trespasser exposed to surface soil and future construction workers exposed to mixed surface/subsurface soil.

EPCs (the 95% UCL) were calculated for the COPCs at EC-21 using ProUCL, outputs are provided in Appendix F. RME factors (Section 4.5.2) were used for the receptors assessed at EC-21.

18.6.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks. These values were collated as specified in Section 4.5.2.

18.6.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as shown in Appendix F, Tables EC21-3 through EC21-6.

EC-21 has a maximum detected concentration of lead in surface soil of 3,230 mg/kg (sample location EC-21-A in the Barricade Area); this is the highest lead concentration measured in surface soil from all ECs in this RI. The reported concentration of lead at sample location EC-21-B is 3,220 mg/kg. The average lead concentration in surface soil is 434 mg/kg, and the average lead concentration in combined surface soil/subsurface soil is 229 mg/kg. The average concentration of lead in surface soil and surface soil/subsurface soil combined is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use. However, the two highest detected concentrations of lead are significantly higher than both the commercial and industrial land use soil screening criteria. These detections of lead are a potential concern for human health.

Non-Cancer Hazard Assessment
The non-carcinogenic HI posed by the EC-21 COPCs in soil for the receptors evaluated were as follows:

- Current site worker (surface soil), using the selected COPCs: HI=0.4.
- Future construction worker (surface and subsurface soil), using the selected COPCs and total dioxins and furans: HI=0.9.

Thus, the target HI of 1 was not exceeded for both the site worker and the construction worker, and the surface soil at EC-21 is not likely to pose unacceptable hazards to trespassers who would contact the EC intermittently.

Carcinogenic Risk
The carcinogenic risks estimated for each receptor at EC-21 were as follows:

- Current site worker (surface soil)-for all COPCs: 1×10^{-5}.
- Future construction worker (surface and subsurface soil)-for all COPCs: 1×10^{-6}.

Therefore, the acceptable incremental cancer risk level specified by MDE ($1x10^{-5}$) is not exceeded for the current site worker and construction worker, and trespassers intermittently contacting the EC would not face unacceptable risks.

18.6.5 2019 Additional Sampling Investigation

After review of sample results, MDE requested additional delineation of lead and carcinogenic PAH (i.e., benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene) concentrations along the northeastern section of EC-21. This area had identified elevated concentrations of lead (i.e., >1,000 mg/kg) and carcinogenic PAHs in the prior discrete samples. ISM was used by EA to evaluate the MDE-identified area of concern within EC-21 as one DU. Due to the size of this DU (approximately 2 acres), the DU was divided into six SUs. Each SU had 30 increments, with SU-3 completed in triplicate. The location of the DU and SUs are shown on Figures 2a and 27a.

The incremental surface soil samples were evaluated separately from the discrete samples because it is not appropriate to combine discrete and incremental sample results. Results of the incremental surface soil sample results at EC-21 are repeated from Section 18.5.2 below:

- Lead was reported at concentrations greater than the surface soil PSL (800 mg/kg USEPA industrial soil RSLs) in one sample (EC-21-IS-SO-05) that was collected from SU5. The concentration of lead in this sample was 974 mg/kg. The remaining seven samples collected from this DU exhibited lead concentrations that ranged from 167 mg/kg in the sample from SU2 (EC-21-IS-SO-02) and 668 mg/kg lead in the sample collected from SU4 (EC-21-IS-SO-04).

- Benzo(a)anthracene was reported at concentrations greater than the surface soil PSL (21,000 µg/kg) in six of eight surface soil samples. Concentrations ranged from 10,100 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 55,500 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Benzo(a) pyrene was reported at concentrations greater than the surface soil PSL (2,100 µg/kg) in eight of eight surface soil samples. Concentrations ranged from 13,500 µg/kg in the sample collected from SU7 (EC-21-IS-SO-07) to 47,900 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Benzo(b)fluoranthene was reported at concentrations greater than the surface soil PSL (21,000 µg/kg) in six of eight surface soil samples. Concentrations ranged from 11,600 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 64,200 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Dibenzo(a,h)anthracene was reported at concentrations greater than the surface soil PSL (2,100 µg/kg) in six of eight surface soil samples. Concentrations ranged from 1,220 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 6,320 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Indeno(1,2,3-cd)pyrene was reported at concentrations greater than the surface soil PSL (21,000 µg/kg) in three of eight surface soil samples. Concentrations ranged from 34,300 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06) to 5,010 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

- Phenanthrene was reported at concentrations greater than the surface soil PSL (17,000 µg/kg) in seven of eight surface soil samples. Concentrations ranged from 13,300 µg/kg in the sample collected from SU5 (EC-21-IS-SO-05) to 73,400 µg/kg in the sample collected from SU6 (EC-21-IS-SO-06).

The intended layout of the SUs included six equal areas for the SUs. However, field conditions resulted in unequal areas for SUs-2, -4, and -6. As a result, the variance determined by triplicates collected within DU-2, DU-7, and DU-8 were used to estimate the variance for the remaining SUs. Once an upper and lower estimate of the SU COPC concentration was determined, these results were entered into the Interstate Technology and Regulatory Council (ITRC) Weighted 95UCL calculator (ITRC, 2012). The procedure followed and outputs from the ITRC calculator are provided in Appendix F-2.

The 95% UCL determined by the ITRC calculator was entered into the original risk spreadsheets to determine potential non-carcinogenic HI and carcinogenic risk from the incremental sample results. These spreadsheets are provided in Appendix F-2. Note that these spreadsheets only contain the COPC results from the incremental surface soil samples and do not present the results of other COPCs evaluated based upon the prior discrete sample results.

Non-Cancer Hazard Assessment

The non-carcinogenic HI posed by the EC-21 COPCs in soil for the two receptors evaluated were as follows:

- Current site worker (surface soil), using the selected COPCs: HI=0.1.
- Future construction worker (surface soil), using the selected COPCs: HI=0.3.

Thus, the target HI of 1 was not exceeded for either the site worker or construction worker.

Carcinogenic Risk

The carcinogenic risks estimated for each receptor at EC-21 were as follows:

- Current site worker (surface soil)-for selected COPCs: 2×10^{-5}.
- Future construction worker (surface soil)-for selected COPCs: 2×10^{-6}.

Therefore, the acceptable incremental cancer risk level specified by MDE (1×10^{-5}) is exceeded for the current site worker, and the surface soil at EC-21 may pose unacceptable risks to trespassers intermittently contacting the EC. The incremental cancer risk level for the future construction worker exposed to combined surface soil/subsurface soil is less than a level of concern.

Lead was detected at a concentration greater than the MDE soil screening level of 550 mg/kg in SU-5 and SU-4. An average lead concentration of 490 mg/kg was determined for the ISM samples. The average lead concentration in surface soil is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use.

18.6.6 HHRA Conclusions for EC-21

The HHRA determined that the incremental cancer risk level for the current site worker exceed the acceptable level specified by MDE ($1x10^{-5}$) for PAHs in incremental samples. As a result, there are may be potential risk concerns for trespassers intermittently contacting the EC. However, both the discrete and incremental samples revealed noncancer HIs below 1 for both the current site worker and future construction worker. The discrete samples also revealed cancer risks less than the MDE acceptable level.

EC-21 has a maximum detected concentration of lead in surface soil of 3,230 mg/kg (sample location EC-21-A in the Barricade Area); this is the highest lead concentration measured in surface soil from all ECs in this RI. Lead was reported at sample location EC-21-B at 3,220 mg/kg. The average lead concentration in surface soil is 434 mg/kg, and the average lead concentration in combined surface soil/subsurface soil is 229 mg/kg. The average concentration of lead in surface soil and surface soil/subsurface soil combined is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use. However, the two highest detected concentrations of lead are significantly higher than both the commercial and industrial land use soil screening criteria. These detections of lead are a potential concern for human health to site workers, construction workers and trespassers.

For ISM samples, an average lead concentration in surface soil of 490 mg/kg is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use. The ISM samples indicate that the high lead concentrations are not pervasive in the northern portion of EC-21. This indicates that these high lead detections are anomalies and represent small “hot spot” areas. EC-21 will be further evaluated in the FS.

18.7 SLERA RESULTS

18.7.1 Screening to Identify Chemicals of Potential Ecological Concern

Surface soil and sediment samples were collected from EC-21 and the screening for COPECs in EC-21 is provided in Appendix F, Table EC21-13.

Surface soil samples from EC-21 were analyzed for metals, dioxins, PAHs, PCB Aroclors, SVOCs, and explosives. The maximum concentrations of the following analytes were greater than the soil screening levels and are identified as COPECs: 5 metals (antimony, copper, lead, manganese, zinc), dioxin TEQ, Aroclor 1260, LMW PAHs, HMW PAHs, and 2,4-dinitrotoluene.

Three sediment samples collected via incremental sampling from EC-21 were analyzed for metals and PAHs. The maximum concentrations of 8 metals and PAHs were greater than the sediment screening levels, so these analytes are identified as COPECs.

18.7.2 Risk Characterization

EPCs for COPECs are presented in Table EC21-14. The comparisons of concentrations and doses to receptor-specific TRVs for EC-21 are presented in Tables EC21-15 through EC21-21 and a comparison to background is presented in Table EC21-22 and EC21-23. Food web models for individual receptors are included in Tables EC21-24 through EC21-33. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, osprey, deer mouse, and red fox), and benthic invertebrates are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

18.7.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, Aroclor 1260 falls below the TRV (Table EC21-15). The maximum concentration of antimony, copper, lead, manganese, zinc, LMW PAHs, HMW PAHs, and 2,4-dinitrotoluene are in exceedance. There is no plant TRV for dioxins, so the risk to plants from dioxins in the surface soil cannot be evaluated. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Antimony

Antimony was detected in 33 of 34 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 16 and 2, respectively (Table EC21-15). The maximum concentration (80 mg/kg) and 95UCLM concentrations (9.87 mg/kg) exceed background (0.95 mg/kg)(Table EC21-22). The three highest sample detections (EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5) range from 80 mg/kg to 25.4 mg/kg and are approximately 10 to 3 times the next highest detected concentration (8.11 mg/kg). The next highest concentration has an HQ of 2 when compared to the plant TRV. EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 have large magnitudes of exceedance compared to the plant TRV and background. With the exception of those samples, due to the low magnitude of exceedance of the plant TRV, antimony is not expected to pose risks to terrestrial plants. Antimony at EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from antimony.

Copper

Copper was detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 50 and 32, respectively (Table EC21-15). The maximum concentration (3,530 mg/kg) is approximately 100 times the background soil concentration (32.8 mg/kg) (Table EC21-22). The three highest sample detections (EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5) range from 3,530 mg/kg to 395 mg/kg and are approximately 40 to 5 times the next highest detected concentration (86 mg/kg). The next highest concentration has an HQ of 1 when compared to the plant TRV and is less than 3 times background. EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 have large magnitudes of exceedance compared to the plant TRV and background. With the exception of those samples, due to the low magnitude of exceedance of the plant TRV and background, copper is not expected to pose risks to terrestrial plants. Copper at EC-21-A-SO-0.5, EC-21-B-SO-0.5, and

EC-21-8-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach site-wide found populations of terrestrial plants are not expected to be at potential risk from copper.

Lead

Lead was detected in 34 of 34 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 27 and 8, respectively (Table EC21-15). The maximum concentration (3,230 mg/kg) is approximately 26 times the background soil concentration (124 mg/kg) (Table EC21-22). The five highest sample detections (EC-21-A-SO-0.5, EC-21-B-SO-0.5, EC-21-8-SO-0.5, EC-21-38-SO-0.5, and EC-21-41-SO-0.5) range from 3,230 mg/kg to 954 mg/kg and are approximately 8 to 2 times the next highest detected concentration (420 mg/kg). The next highest concentration has an HQ of 4 when compared to the plant TRV and is 3 times background. EC-21-A-SO-0.5, EC-21-B-SO-0.5, EC-21-8-SO-0.5, EC-21-38-SO-0.5, and EC-21-41-SO-0.5 have large magnitudes of exceedance compared to the plant TRV and background. With the exception of these samples, due to the low magnitude of exceedance of the plant TRV and background, lead is not expected to pose risks to terrestrial plants. Lead at EC-21-A-SO-0.5, EC-21-B-SO-0.5, EC-21-8-SO-0.5, EC-21-38-SO-0.5, and EC-21-41-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from lead.

Manganese

Manganese was detected in 29 of 29 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 280 and 15, respectively (Table EC21-15). The maximum concentration (61,600 mg/kg) is 88 times the background soil concentration (700 mg/kg) (Table EC21-22). The five highest sample detections (EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5) range from 61,600 mg/kg to 2,030 mg/kg and are approximately 49 to 2 times the next highest detected concentration (1,260 mg/kg). The next highest concentration has an HQ of 6 when compared to the plant TRV and is less than 2 times background. EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5 have large magnitudes of exceedance compared to the plant TRV and background. With the exception of these samples, due to the relatively low magnitude of exceedance of the plant TRV and background, manganese is not expected to pose risks to terrestrial plants. Manganese at EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from manganese.

Zinc

Zinc was detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 6 and 3, respectively (Table EC21-15). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the plant TRV by the 95UCLM concentration, the conclusion of the weight-of-evidence approach found zinc is not expected to pose risks to site-wide populations of terrestrial plants.

LMW PAHs

LMW PAHs were detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 2 for both of the concentrations (Table EC21-15). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the plant TRV by the maximum and 95UCLM concentrations, LMW PAHs are not expected to pose risks to terrestrial plants.

HMW PAHs
HMW PAHs were detected in 34 of 34 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 10 and 3, respectively (Table EC21-15). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the plant TRV by the 95UCLM concentration, the conclusion of the weight-of-evidence approach found HMW PAHs are not expected to pose risks to site-wide populations of terrestrial plants.

2,4-Dinitrotoluene
2,4-Dinitrotoluene was detected in 6 of 33 surface soil samples. The maximum concentration exceeds the plant TRV with an HQ of 3 and the 95UCLM concentration falls below the plant TRV (Table EC21-15). Due to the relatively low magnitude of exceedance of the plant TRV by the maximum concentration and lack of exceedance by the 95UCLM concentration, 2,4-dinitrotoluene is not expected to pose risks to terrestrial plants.

18.7.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, the dioxin TEQ and Aroclor 1260 concentrations fall below the TRVs (Table EC21-16). The maximum concentration of antimony, copper, lead, manganese, zinc, LMW PAHs, HMW PAHs, and 2,4-dinitrotoluene are in exceedance. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Antimony
Antimony was detected in 33 of 34 surface soil samples. The HQ for the maximum concentration compared to the soil invertebrate TRV is equal to 1 and the 95UCLM concentration falls below the plant TRV (Table EC21-16). Therefore, antimony is not expected to pose risks to soil invertebrates.

Copper
Copper was detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the soil invertebrate TRV with HQs of 44 and 28, respectively (Table EC21-16). The maximum concentration (3,530 mg/kg) is approximately 100 times the background soil concentration (32.8 mg/kg) (Table EC21-22). The three highest sample detections (EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5) range from 3,530 mg/kg to 395 mg/kg and are approximately 40 to 5 times the next highest detected concentration (86 mg/kg). The next highest concentration has an HQ of 1 when compared to the soil invertebrate TRV and is less than 3 times background. EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 have large magnitudes of exceedance compared to the soil invertebrate TRV and background. With the exception of EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5,

due to the low magnitude of exceedance of the soil invertebrate TRV and background, copper is not expected to pose risks to soil invertebrates. Copper at EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 may pose risks to soil invertebrates, but the conclusion of the weight-of-evidence approach found site-wide populations of soil invertebrates are not expected to be at potential risk from copper.

Lead

Lead was detected in 34 of 34 surface soil samples. The maximum concentration exceeds the soil invertebrate TRV with an HQ of 2 and the 95UCLM concentration falls below the soil invertebrate TRV (Table EC21-16). Due to the low magnitude of exceedance of the soil invertebrate TRV by the maximum concentration and lack of exceedance by the 95UCLM concentration, soil invertebrates are not expected to be at potential risk from lead.

Manganese

Manganese was detected in 29 of 29 surface soil samples. The maximum and 95UCLM concentrations exceed the soil invertebrate TRV with HQs of 137 and 7, respectively (Table EC21-16). The maximum concentration (61,600 mg/kg) is 88 times the background soil concentration (700 mg/kg) (Table EC21-22). The five highest sample detections (EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5) range from 61,600 mg/kg to 2,030 mg/kg and are approximately 49 to 2 times the next highest detected concentration (1,260 mg/kg). The next highest concentration has an HQ of 3 when compared to the soil invertebrate TRV and is less than 2 times background. EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5 have large magnitudes of exceedance compared to the soil invertebrate TRV and background. With the exception of these samples, due to the relatively low magnitude of exceedance of the soil invertebrate TRV and background, manganese is not expected to pose risks to soil invertebrates. Manganese at EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5 may pose risks to soil invertebrates, but the conclusion of the weight-of-evidence approach found site-wide populations of soil invertebrates are not expected to be at potential risk from manganese.

Zinc

Zinc was detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the soil invertebrate TRV with HQs of 9 and 4, respectively (Table EC21-16). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the soil invertebrate TRV by the 95UCLM concentration, the conclusion of the weight-of-evidence approach found zinc is not expected to pose risks to site-wide populations of soil invertebrates.

LMW PAHs

LMW PAHs were detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the soil invertebrate TRV with HQs of 1 for both of the concentrations (Table EC21-16). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the soil invertebrate TRV by the maximum and 95UCLM concentrations, LMW PAHs are not expected to pose risks to soil invertebrates.

HMW PAHs
HMW PAHs were detected in 34 of 34 surface soil samples. The maximum and 95UCLM concentrations exceed the soil invertebrate TRV with HQs of 11 and 4, respectively (Table EC21-16). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the soil invertebrate TRV by the 95UCLM concentration, the conclusion of the weight-of-evidence approach found HMW PAHs are not expected to pose risks to site-wide populations of soil invertebrates.

2,4-Dinitrotoluene
2,4-Dinitrotoluene was detected in 6 of 33 surface soil samples. The maximum concentration exceeds the soil invertebrate TRV with an HQ of 1 and the 95UCLM concentration falls below the soil invertebrate TRV (Table EC21-16). Due to the relatively low magnitude of exceedance of the soil invertebrate TRV by the maximum concentration and lack of exceedance by the 95UCLM concentration, 2,4-dinitrotoluene is not expected to pose risks to soil invertebrates.

18.7.2.3 Risk Characterization for Birds

When maximum doses are compared to NOAEL-based TRVs protective of birds, the maximum doses for barium, copper, lead, manganese, vanadium, zinc, dioxin TEQ, HMW PAHs, and 2,4-dinitrotoluene are in exceedance for at least one avian receptor. There is no available avian TRVs for antimony or beryllium. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Barium
Barium was detected in 3 of 3 sediment samples collected via incremental sampling. When doses for benthos eating piscivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, barium has HQs of 1 and below 1, respectively (Table EC21-17). The maximum barium concentration exceeds the background sediment concentration (Table EC21-23). Due to the HQ of 1 when the maximum dose is compared to the NOAEL-based TRV and lack of exceedance of the LOAEL-based TRV, birds are not expected to be at potential risk from barium.

Copper
Copper was detected in 18 of 18 surface soil samples and 3 of 3 sediment samples collected via incremental sampling. The surface soil concentrations were used to model exposure to terrestrial species and the sediment concentrations were used to model exposure to aquatic species. The evaluations of risk to terrestrial and aquatic receptors are presented in the subsections below.

Terrestrial
When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, copper has HQs of 84 and 28, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, copper has HQs of 53 and 18, respectively (Table EC21-18). The maximum surface soil concentration (3,530 mg/kg) is approximately 100 times the background soil concentration (32.8 mg/kg) (Table EC21-22). The three highest sample detections (EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-

8-SO-0.5) range from 3,530 mg/kg to 395 mg/kg and are approximately 40 to 5 times the next highest detected concentration (86 mg/kg). EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 have large magnitudes of exceedance compared to background. With the exception of EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5, due to the low magnitude of exceedance of background, copper is not expected to pose risks to omnivorous birds. Copper at EC-21-A-SO-0.5, EC-21-B-SO-0.5, and EC-21-8-SO-0.5 may pose risks to omnivorous birds, but the conclusion of the weight-of-evidence approach found site-wide populations of omnivorous birds are not expected to be at potential risk from copper.

Aquatic
When doses for benthos eating piscivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, copper has HQs of 4 and 1, respectively (Table EC21-17). The maximum copper sediment concentration exceeds the background sediment concentration (Table EC21-23). Due to the relatively low magnitude of exceedance of the NOAEL-based TRV and HQ of 1 when the 95UCLM dose is compared to the NOAEL-based TRV, benthos eating piscivorous birds are not expected to be at potential risk from copper.

Lead
Lead was detected in 34 of 34 surface soil samples and 3 of 3 sediment samples collected via incremental sampling. The surface soil concentrations were used to model exposure to terrestrial species and the sediment concentrations were used to model exposure to aquatic species. The evaluations of risk to terrestrial and aquatic receptors are presented in the subsections below.

Terrestrial
When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs of 260 and 130, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs of 78 and 39, respectively (Table EC21-18). The maximum concentration (3,230 mg/kg) is approximately 26 times the background soil concentration (124 mg/kg) (Table EC21-22). The five highest sample detections (EC-21-A-SO-0.5, EC-21-B-SO-0.5, EC-21-8-SO-0.5, EC-21-38-SO-0.5, and EC-21-41-SO-0.5) range from 3,230 mg/kg to 954 mg/kg and are approximately 8 to 2 times the next highest detected concentration (420 mg/kg). The next highest concentration is approximately 3 times background. EC-21-A-SO-0.5, EC-21-B-SO-0.5, EC-21-8-SO-0.5, EC-21-38-SO-0.5, and EC-21-41-SO-0.5 have large magnitudes of exceedance compared to background. With the exception of these samples, due to the low magnitude of exceedance of background, lead is not expected to pose risks to omnivorous birds. Lead at EC-21-A-SO-0.5, EC-21-B-SO-0.5, EC-21-8-SO-0.5, EC-21-38-SO-0.5, and EC-21-41-SO-0.5 may pose risks to omnivorous birds, but the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk from lead.

Aquatic
When doses for benthos eating piscivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs of 2 and below 1, respectively (Table EC21-17). The maximum lead sediment concentration exceeds the

background sediment concentration (Table EC21-23). Due to the low magnitude of exceedance of the NOAEL-based TRV and lack of exceedance of the LOAEL-based TRV, benthos eating piscivorous birds are not expected to be at potential risk from lead.

Manganese

Manganese was detected in 29 of 29 surface soil samples. When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, manganese has HQs of 33 and 16, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, manganese has HQs of 2 and below 1, respectively (Table EC21-18). The maximum concentration (61,600 mg/kg) is 88 times the background soil concentration (700 mg/kg) (Table EC21-22). The five highest sample detections (EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5) range from 61,600 mg/kg to 2,030 mg/kg and are approximately 49 to 2 times the next highest detected concentration (1,260 mg/kg). The next highest concentration is less than 2 times background. EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5 have large magnitudes of exceedance compared to background. With the exception of these samples, due to the relatively low magnitude of exceedance of background and lack of exceedance of the LOAEL-based TRV by the 95UCLM dose, manganese is not expected to pose risks to omnivorous birds. Manganese at EC-21-38-SO-0.5, EC-21-39-SO-0.5, EC-21-12-SO-0.5, EC-21-10-SO-0.5, and EC-21-37-SO-0.5 may pose risks to omnivorous birds, but the conclusion of the weight-of-evidence approach found site-wide populations of omnivorous birds are not expected to be at potential risk from manganese.

Vanadium

Vanadium was detected in 3 of 3 sediment samples collected via incremental sampling. When doses for benthos eating piscivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, vanadium has HQs of 6 and below 3, respectively (Table EC21-17). The maximum vanadium sediment concentration is less than 3 times the background sediment concentration (Table EC21-23). Due to the relatively low magnitude of exceedance of the NOAEL and LOAEL-based TRVs as well as the background sediment concentration, benthos eating piscivorous birds are not expected to be at potential risk from vanadium.

Zinc

Zinc was detected in 18 of 18 surface soil samples. When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, zinc has HQs of 4 and 2, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, zinc has HQs of 3 and 1, respectively (Table EC21-18). The maximum concentration and 95UCLM concentrations exceed background (Table EC21-22). Due to the relatively low magnitude of exceedance of the NOAEL and LOAEL-based TRVs by the maximum and 95UCLM concentrations, the conclusion of the weight-of-evidence approach found zinc is not expected to pose risks to site-wide populations of omnivorous birds.

Dioxin TEQ
Dioxins were detected in 34 of 34 surface soil samples. When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, dioxin TEQ has HQs of 45 and 5, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, dioxin TEQ has HQs of 7 and below 1, respectively (Table EC21-18). Due to the relatively low magnitude of exceedance of the LOAEL-based TRV by the maximum and lack of exceedance of the LOAEL-based TRV by the 95UCLM concentrations, the conclusion of the weight-of-evidence approach found dioxin TEQ is not expected to pose risks to site-wide populations of omnivorous birds.

HMW PAHs
HMW PAHs were detected in 34 of 34 surface soil samples. When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, HMW PAHs has HQs of 15 and 2, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, HMW PAHs has HQs of 6 and below 1, respectively (Table EC21-18). Due to the relatively low magnitude of exceedance of the LOAEL-based TRV by the maximum and lack of exceedance of the LOAEL-based TRV by the 95UCLM concentrations, the conclusion of the weight-of-evidence approach found HMW PAHs are not expected to pose risks to site-wide populations of omnivorous birds.

2,4-Dinitrotoluene
2,4-Dinitrotoluene was detected in 6 of 33 surface soil samples. When doses for omnivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, 2,4-dinitrotoluene has HQs of 626 and 48, respectively (Table EC21-17). When doses for omnivorous birds calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, 2,4-dinitrotoluene has HQs of 94 and 7, respectively (Table EC21-18). The three highest sample detections (EC-21-B-SO-0.5, EC-21-29-SO-0.5, and EC-21-8-SO-0.5) range from 19.8 mg/kg to 13.7 mg/kg and are approximately 104 to 72 times the next highest detected concentration (0.19 mg/kg). The three highest sample detections have large magnitudes of exceedance compared to the next highest value. With the exception of these samples, 2,4-dinitrotoluene is not expected to pose risks to omnivorous birds. 2,4-Dinitrotoluene at EC-21-B-SO-0.5, EC-21-29-SO-0.5, and EC-21-8-SO-0.5 may pose risks to omnivorous birds, but the conclusion of the weight-of-evidence approach found site-wide populations of omnivorous birds are not expected to be at potential risk from 2,4-dinitrotoluene.

18.7.2.4 Risk Characterization for Mammals

When maximum doses are compared to NOAEL-based TRVs protective of mammals, the maximum doses for antimony, copper, lead, manganese, dioxin TEQ, HMW PAHs, and 2,4-dinitrotoluene are in exceedance for at least one avian receptor. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Antimony

Antimony was detected in 33 of 34 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, antimony has HQs of 20 and 26, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, antimony has HQs of 2 and 3, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the 95UCLM concentration are compared to NOAEL-based TRVs protective of mammals, antimony has HQs of 2 and 3, respectively and the HQs drop below 1 when compared to the LOAEL-based TRVs (Table EC21-20). Due to the low magnitude of exceedance of the NOAEL-based TRV and lack of exceedance of the LOAEL-based TRV by the 95UCLM doses to herbivorous and predatory mammals, antimony is not expected to pose risks to terrestrial mammals.

Copper

Copper was detected in 18 of 18 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, copper has HQs of 3 and 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, copper has HQs of 2 and below 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the 95UCLM concentration are compared to NOAEL-based TRVs protective of mammals, copper has HQs of 2 and below 1, respectively and both HQs are below 1 when compared to the LOAEL-based TRVs (Table EC21-20). Due to the low magnitude of exceedance of the NOAEL-based TRV by the maximum doses and HQs equal to one and below 1 when the maximum doses are compared to LOAEL-based TRV, copper is not expected to pose risks to terrestrial mammals.

Lead

Lead was detected in 34 of 34 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, lead has HQs of 3 and 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, lead has HQs of 2 and below 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of mammals, lead has HQs below 1 (Table EC21-20). Due to the low magnitude of exceedance of the NOAEL-based TRV by the maximum doses and lack of exceedance of the NOAEL and LOAEL-based TRVs by the 95UCLM doses, lead is not expected to pose risks to terrestrial mammals.

Manganese

Manganese was detected in 29 of 29 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, manganese has HQs of 20 and 4, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, manganese has HQs of 7 and 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals

calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of mammals, manganese has HQs equal to or below 1 (Table EC21-20). Due to the relatively low magnitude of exceedance of the LOAEL-based TRV by the maximum doses and lack of exceedance of the NOAEL and LOAEL-based TRVs by the 95UCLM doses, manganese is not expected to pose risks to terrestrial mammals.

Dioxin TEQ

Dioxins were detected in 34 of 34 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, dioxin TEQ has HQs of 4 and 2, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, dioxin TEQ HQs drop below 1 (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of mammals, dioxin HQs are below 1 (Table EC21-20). Due to the relatively low magnitude of exceedance of the NOAEL-based TRV by the maximum doses and lack of exceedance of the LOAEL-based TRVs by the maximum doses, dioxins are not expected to pose risks to terrestrial mammals.

HMW PAHs

HMW PAHs were detected in 34 of 34 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, HMW PAHs has HQs of 3 and below 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, HMW PAHs HQs drop below 1 (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of mammals, HMW PAHs HQs are equal to or below 1 (Table EC21-20). Due to the relatively low magnitude of exceedance of the NOAEL-based TRV by the maximum doses and lack of exceedance of the LOAEL-based TRVs by the maximum doses, HMW PAHs are not expected to pose risks to terrestrial mammals.

2,4-Dinitrotoluene

2,4-Dinitrotoluene was detected in 6 of 33 surface soil samples. When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to NOAEL-based TRVs protective of mammals, 2,4-dinitrotoluene has HQs of 3 and below 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the maximum concentration are compared to LOAEL-based TRVs protective of mammals, 2,4-dinitrotoluene HQs drop to 2 and below 1, respectively (Table EC21-19). When doses for herbivorous and predatory mammals calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of mammals, 2,4-dinitrotoluene HQs fall below 1 (Table EC21-20). Due to the relatively low magnitude of exceedance of the NOAEL and LOAEL-based TRV by the maximum doses and lack of exceedance of the NOAEL and LOAEL-based TRVs by the 95UCLM doses, 2,4-dinitrotoluene is not expected to pose risks to terrestrial mammals.

18.7.2.5 Risk Characterization for Benthic Invertebrates

When maximum sediment concentrations of are compared to TRVs protective of benthic invertebrates, the beryllium and vanadium concentrations fall below the TRV (EC21-21). When maximum concentrations are compared to TRVs protective of benthic invertebrates, the following analytes are in exceedance: antimony, barium, copper, lead, and zinc. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Antimony
Antimony was detected in 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, copper has HQs of 3 and below 1, respectively (Table EC21-21). The maximum antimony concentration exceeds the background sediment concentration (Table EC21-23). Due to the low magnitude of exceedance of the threshold effects TRV and lack of exceedance of the probable effects TRV, benthic invertebrates are not expected to be at potential risk from antimony.

Barium
Barium was detected in 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold effects TRV protective of benthic invertebrates, barium has an HQ of 3 (Table EC21-21). There is no probable effect TRV for barium. The maximum barium concentration exceeds the background sediment concentration (Table EC21-23). Due to the low magnitude of exceedance of the threshold effects TRV, benthic invertebrates are not expected to be at potential risk from barium.

Copper
Copper was detected in 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, copper has HQs of 2 and below 1, respectively (Table EC21-21). The maximum copper concentration exceeds the background sediment concentration (Table EC21-23). Due to the low magnitude of exceedance of the threshold effects TRV and lack of exceedance of the probable effects TRV, benthic invertebrates are not expected to be at potential risk from copper.

Lead
Lead was detected in 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, copper has HQs of 10 and 3, respectively (Table EC21-21). The maximum lead concentration exceeds the background sediment concentration (Table EC21-23). Due to the relatively low magnitude of exceedance of the probable effects TRV, benthic invertebrates are not expected to be at potential risk from lead.

Zinc
Zinc was detected in 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, zinc has HQs of 1 and below 1, respectively (Table EC21-21). The maximum zinc concentration exceeds the background sediment concentration (Table EC21-23).

Due to the low magnitude of exceedance of the threshold effects TRV and lack of exceedance of the probable effects TRV, benthic invertebrates are not expected to be at potential risk from zinc.

18.7.3 SLERA Conclusions for EC-21

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors, the conclusion of the weight-of-evidence approach found no analytes are retained as COPEC due to risk to site-wide populations of ecological receptors. However, for several analytes, high concentrations detected in three to five of the surface soil sample locations were greater than TRVs for plants, soil invertebrates, and omnivorous birds as well as background concentrations. These samples may contribute risk to ecological receptors. The samples, ecological receptors that may be at risk, and the COPECs are listed below.

Samples	Ecological Receptor	COPEC
EC-21-A-SO-0.5	Plants	Antimony
EC-21-B-SO-0.5 EC-21-8-SO-0.5	Plants Soil invertebrates Omnivorous birds	Copper
EC-21-A-SO-0.5 EC-21-B-SO-0.5 EC-21-8-SO-0.5 EC-21-38-SO-0.5 EC-21-41-SO-0.5	Plants Omnivorous birds	Lead
EC-21-38-SO-0.5 EC-21-39-SO-0.5 EC-21-12-SO-0.5 EC-21-10-SO-0.5 EC-21-37-SO-0.5	Plants Soil invertebrates Omnivorous birds	Manganese
EC-21-B-SO-0.5 EC-21-29-SO-0.5 EC-21-8-SO-0.5	Omnivorous birds	2,4-Dinitrotoluene

18.8 EC SUMMARY

Based on the geophysical results, three trenches were dug in EC-21. Only MD was found in one of the trenches (21B); this material was all located in the top 12 inches. Additionally, MD was found on the surface of this EC and consisted of 166 CS grenade bodies and nine 37-38mm CS/CN riot control projectiles. No MEC was found at EC-21.

Some metals, PAHs, and dioxins/furans were determined to be greater than the PSLs. Both the vertical extent and horizontal extent were determined through the additional sampling conducted in 2015. The results from the samples taken at the terminal depth of all sampling locations (varied from 2 to 9 ft bgs) were all less than the PSLs. While there were some results for PAHs greater than the screening criteria on the eastern side of the EC (EC-21-37, EC-21-38, EC-21-39), these sampling locations are along the soil and stream alluvial sediment boundary. Based on the typography of the site, any additional samples would be taken in the stream area and would

not be typical of 1) the type of media potentially impacted and 2) EC-21 activities. Additionally, the discrete sediment samples taken from the Unnamed Tributary do not show exceedances related to the parameters detected at concentrations greater than PSLs in the nearby soil samples (EC-21-37 through EC-21-39).

The HHRA determined that the incremental cancer risk level for the current site worker exceed the acceptable level specified by MDE ($1x10^{-5}$) for ISM samples. There may be potential risk concerns for trespassers intermittently contacting the EC based upon these results. The noncancer HIs do not exceed the acceptable level of one for both the current site worker and future construction worker in discrete and ISM samples.

The maximum detected concentrations of lead in both discrete and ISM samples exceed both the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use. For discrete samples, EC-21 has a maximum detected concentration of lead in surface soil of 3,230 mg/kg. However, the average lead concentration in discrete surface soil (434 mg/kg) surface soil/subsurface soil (229 mg/kg) and the average ISM lead concentration (490 mg/kg) is less than the MDE soil screening level of 550 mg/kg for commercial land use and 1,050 mg/kg for industrial land use.

The SLERA found no potential unacceptable ecological risks. It is noted that antimony, copper, lead, manganese, and 2,4-dinitrotoluene may pose risks at select sample locations. However, the conclusion of the weight-of-evidence approach found site-wide populations of ecological receptors are not expected to be at potential risk.

Residual propellant grains were identified in the top 3 inches of soil within a portion of EC-21 (USACE 2020). Soil sampling has indicated this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant would impact soils through elevated nitrogen thereby, inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events and largely clay remains in this area. The lack of vegetation will continue to allow accelerated erosion of soil into the Unnamed Tributary (USACE 2020). EC-21 is recommended for further evaluation in the FS.

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19. EC-22: BARRICADE 646-XK/FORMER EXPLOSIVE OPEN BURNING AREA

19.1 HISTORY OF EC-22

EC-22 is located on the western portion of the Depot, on the north side of Back Creek Road, northwest of EC-21 (Figure 2). This EC consists of Barricade 646-XK, a former explosives open burning area where controlled burning occurred, as well as alleged dumping activities. The EC-22 boundary was provided in the ESP (USACE, 2012), which is based on recommendations from the ESAR that were developed based on the historical maps.

Barricade 646-XK is the second of the four burn cage locations proposed for investigation. Open burning operations were conducted beneath wire enclosures where smokeless powder trains were ignited within built up barricades covered with a wire mesh material (USAEHA, 1989). The 1999 site visit performed by CEHNC reported that no ordnance contamination was observed in this EC; however, the west end of the barricade appeared to have been used as a dumping area, possibly for dirt and concrete debris. While there are no historical documents detailing burial activities at this EC, based on burial finds at other barricades at the Depot there is the possibility that burial activities occurred at this EC.

Historical activities involving radioactive material occurred in the proximity of this EC; however, no radiological concerns remain after removal activities targeting the radioactive material (EA 2011). No known HTW releases are associated with EC-22.

19.2 DATA QUALITY OBJECTIVES

Table 19-1. DQO - DGM/Intrusive Investigation for EC-22: Barricade 646-XK/ Former Explosive Open Burning Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine if MEC is present.
Data User Perspective(s)	To obtain data to determine presence/absence of MEC and if present, determine if additional investigations or immediate actions are warranted.
Contaminant or Characteristic of Interest	MEC.
Media of Interest	Soil based on burning and possible burial activities (Section 1.4.1.2 of the Work Plan (ERT 2013))
Required Sampling Locations or Areas and Depths	A. Perform DGM survey of EC using EM61-MK2. B. DGM survey coverage will be 100% of the area that was not previously investigated by MKM. MKM covered approximately 32% or 0.9 of the 2.8-acre EC. ERT's DGM survey will cover approximately 1.9 acres.
Number of Samples Required	A. Intrusively investigate potential burial sites with trenches based on DGM results. B. Determination of trench and sampling locations and numbers will be based on a discussion of the Trenching and MC Sampling Locations Recommendation Memo (developed based on DGM results) with the PDT.
Reference Concentration of Interest or Other Performance Criteria	Ensure coverage goal is met. DGM data will be compared against daily DGM QC tests to ensure data is valid.

Table 19-1. DQO - DGM/Intrusive Investigation for EC-22: Barricade 646-XK/ Former Explosive Open Burning Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Sampling Method	Excavation of up to 2 trenches in potential burial areas. The exact number of trenches will be determined during PDT review and acceptance of the Trenching and MC Sampling Locations Recommendation Memo.
Analytical Method	EM61-MK2

Table 19-2. DQO – Environmental Sampling for EC-22: Barricade 646-XK/ Former Explosive Open Burning Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.2, analyze for PAHs, dioxins/furans, metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4 DNT, 2,6-DNT, TNT, PCBs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Biased surface and subsurface soil samples based on DGM data. B. Collect one surface and one subsurface biased soil sample from the side wall of each trench. C. Biased soil samples based on field observations, such as evidence of energetic material (breached munitions items) or in areas of significant MD, where at least 50% of the munition could be identified by UXO Technicians, such that an assumption of MC in the vicinity could be tested by taking a sample. The depth for the biased soil samples will be just below the depth of the associated munition, or in the case of samples collected where there is visible evidence of energetic material at the surface in the top few inches of soil. At least 1 biased soil sample collected within the barricade based on historical burning activities. If there are no notable DGM results from within the barricade, a memo will be submitted detailing a revised sampling approach and proposed number of samples. D. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. Up to 5 biased co-located surface and subsurface soil samples (A. above). B. Up to 4 biased soil samples from the trenches (B. above). C. Up to 2 biased soil samples (C. above). D. 1 biased groundwater sample (D. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; explosives analysis by SW-846 Method 8330B; dioxins/furans by SW-846 Method 8290; PCBs by SW-846 Method 8082A; PAHs by SW-846 Method 8270SIM.

19.3 MEC INVESTIGATION

19.3.1 Geophysical Results

MKM had collected data with the EM61 covering part of EC-22 to the north and south of barricade 646-XK. The only major anomaly to the south of the barricade was subsequently excavated by ORISE in 2007, and hazardous materials were removed. ERT collected data with the EM61-MK2A within and around the barricade, along the road to the west of the barricade, and in an irregular area between the eastern EC boundary and the edge of the MKM data. Major anomalies detected by ERT were caused by culverts under the road or by partially buried railroad tracks. Only very low-response anomalies were mapped in the interior of the barricade. The geophysical map is shown in Appendix B-1, Figure B-2.

19.3.2 Intrusive Investigation Results

Based on the geophysical results, there were no anomaly clusters or large, broad anomalies indicative of possible burial pits. Therefore, no trenches were excavated within EC-22. All significant anomalies were caused by culvert pipes or railroad structures. A trench was considered for the interior of the barricade, but it was found to be paved. No MEC or MD was found at this EC.

19.4 MC INVESTIGATION

19.4.1 Sampling Process

SI-level sampling was conducted in August 2013 at EC-22 to determine the absence or presence of MC. Five biased surface and three subsurface soil sample locations were selected based on DGM results (Figure 20). Subsurface samples were not collected at EC-22-3-SO or EC-22-4-SO due to the presence of asphalt at 6 to 12 inches bgs. Samples were collected and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and TNT).

19.4.2 Sampling Results

Five surface and three subsurface soil samples were collected and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and TNT). Surface soil analytical results are summarized in Appendix E, Table E2-31, and subsurface soil analytical results are summarized in Table E2-32. Reported results were less than the PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

19.5 SLERA RESULTS

19.5.1 Screening to Identify Chemicals of Potential Ecological Concern

Metals, dioxins, and PAHs were analyzed for at EC-22; some analytes of each group were detected (Table EC22-1). Maximum concentrations of copper and PAHs were below soil screening levels.

Maximum concentrations of four metals (antimony, lead, manganese, and zinc) and dioxin TEQs were greater than soil screening levels and are identified as COPECs at EC-22. The screening for COPECs in EC-22 surface soil is provided in Appendix F, Table EC22-1.

19.5.2 Risk Characterization

EPCs for COPECs are presented in Table EC22-2. The comparisons of concentrations and doses to receptor-specific TRVs for EC-22 are presented in Tables EC22-3 through EC22-7 and a comparison to background is provided in Table EC22-8. Food web models for individual receptors are included in Tables EC22-9 through EC22-14. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

19.5.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, manganese has and HQ greater than 1, and a TRV is not available for dioxins. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Manganese
Manganese was detected in 5 of 5 surface soil samples at concentrations ranging from 37 to 448 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 220 mg/kg with HQs of 2 (Table EC22-3). Three of the 5 detected concentrations are greater than the TRV. The BTV for manganese is 700 mg/kg and none of the onsite concentrations are greater than this value. Because the onsite manganese concentrations are less than the BTV manganese is not retained as a COPEC.

19.5.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, zinc has an HQ greater than 1. Zinc was detected in 5 of 5 surface soil samples at concentrations ranging from 37.7 to 202 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 120 mg/kg with HQs of 2 (Table EC22-4). The BTV for zinc is 83.9 mg/kg; 2 of the 5 detected concentrations are greater than the TRV and the BTV. Because the 95UCLM exceedances of the TRV and BTV are of low magnitude and because the spatial distribution of

elevated concentrations is minimal, adverse effects to soil invertebrate populations are not expected. Therefore, zinc is not retained as a COPEC.

19.5.2.3 Risk Characterization for Birds

When doses calculated using maximum and 95UCLM concentrations are compared to NOAEL-based TRVs protective of birds, lead and zinc have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, lead has an HQ greater than 1. No TRVs are available for antimony (Tables EC22-5 and EC22-6). Further discussion of the analytes with LOAEL-based HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Lead
Lead was detected in 5 of 5 surface soil samples. The maximum and 95UCLM case scenario doses are greater than the LOAEL-based TRV with HQs of 8 (Tables EC22-5 and EC22-6). The maximum concentration (165 mg/kg) is 1.3 times the BTV for lead (124 mg/kg). Due to the low magnitude of exceedance of the BTV, lead is not retained as a COPEC for birds.

19.5.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-22 are expected.

19.5.3 SLERA Conclusions for EC-22

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no COPECs were identified for plants, soil invertebrates, birds, or mammals.

19.6 EC SUMMARY

Based on the results of the DGM and MC sampling conducted at EC-22, no release has occurred at this EC for either MEC or MC. The SLERA found no potential unacceptable ecological risk. Therefore, EC-22 is recommended for NFA.

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20. EC-25: DUMP/POWDER BURNING TOWER (BUILDING 1052)/ POWDER BURNING PLANT

This Chapter summarizes the data collected and reported in the EE/CA; an RI for EC-25 will be completed under separate contract.

20.1 HISTORY OF EC-25

EC-25 is located on the southeastern portion of the Depot along the banks of Furnace Creek (Figure 2) and was reportedly used for burial activities. EC-25 also consists of a Powder Burning Tower used for controlled burning operations. The EC-25 boundary was provided in the ESP (USACE, 2012), which is based on recommendations from the ESAR.

The types of material that were burned and dumped within the tower are unknown. However, train tracks terminate approximately 100 ft to the northwest of EC-25. Waste from the nearby warehouse (Building 1022) and possibly other areas, was likely transported to the Powder Burning Tower by train and burned.

Burial activities are assumed to have occurred within this EC based on findings from previous geophysical and trenching investigations. Specific activities resulting in surface MD are unknown but may be due to the dumping of residue or debris from the tower. Both MD and cultural debris were encountered on the surface and subsurface of EC-25 (MKM 1999; Zapata 2009). MD recovered consisted of small arms projectiles, cartridge cases, and cartridge case flash tubes (Zapata 2009). Zapata reported lead concentrations almost two times greater than the USEPA RSL in one trench at EC-25 after conducting confirmatory sampling as part of a previous investigation (Zapata 2009).

Due to the potential existence of MPPEH/MEC, an EE/CA was completed for EC-25 and was finalized in March 2016 (ERT 2016).

20.2 EE/CA INVESTIGATION SUMMARY

Based on the Final EE/CA, a MPPEH/MEC and MC release were considered to have occurred within this EC. It should be noted that the current terminology of MPPEH had not been developed during the period of previous inspections. The terminology used during those inspections was MD, which was an accurate description of items at that time. Per current DoD/Department of the Army guidance, items referred to as MD during these inspections may have been MPPEH and/or material determined as safe (MDAS). MDAS does not pose an explosive hazard. MPPEH presents a hazard until properly inspected and certified. Therefore, although the term MD is used in the EE/CA when discussing the investigation history of EC-25, it should be noted that material historically identified as MD may have been, in fact, MPPEH.

Based on the DGM results (Appendix B-1), a total of 23 trenches were excavated within EC-25 during 2013. Each trench was investigated to the bottom extent of fill material, which for this investigation is defined as containing MPPEH, scrap, or cultural debris, or until native soil was reached. Munitions items found within trenches consisted mainly of flash tubes and cartridge

cases and were all determined to be MD after inspection by UXO personnel. Scrap metal items included rings, rods, cables, and wires. Other fill material consisted of cultural debris such as wood scrap and concrete block. Drawings of the trench profiles and trench photographs are shown in Appendix C-2.

A fill thickness map was completed as a part of the EE/CA based on DGM, trenching, and other intrusive data, which showed that fill material ranges from 1 to 5 ft across much of the site. MD was abundant on the surface, especially in the southwestern portion of EC-25.

MC EE/CA sampling was conducted in July and August 2013 at EC-25 to determine the nature and extent of MC impacts to surface and subsurface soil. Twenty-seven biased surface and nine biased subsurface soil sample locations were selected based on trench locations and/or field observations (Figure 21). Samples were collected and submitted for laboratory analysis of metals (Al, Cu, Mn, Pb, Sb, Zn), PAHs, perchlorate, dioxins/furans, PCBs, and explosives (2,4-DNT, 2,6-DNT, and TNT).

In addition, in order to support soil disposal, two biased surface and subsurface soil samples were collected from trench locations and submitted to the laboratory for TCLP analysis of metals, VOCs, SVOCs, herbicides, pesticides, reactive cyanide, reactive sulfide, ignitability, and corrosivity.

Surface soil analytical results are summarized in Appendix E, Table E2-33, and subsurface soil analytical results are summarized in Table E2-34. Reported results were less than the PSLs in surface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

At the time of ERT RI sampling, soil samples at EC-25 were associated with supporting the EE/CA. The sampling regime conducted for EC-25 provides an overview of the presence/absence of MC within EC-25 and is summarized in detail in the EE/CA (ERT 2016). Antimony, copper, lead, and manganese were detected in the surface soil at most sampling locations with concentrations greater than their respective background criterion and/or RSL. No metals were detected in the subsurface soil at concentrations greater than the RSLs.

Several SVOCs were detected in the surface and subsurface soil at concentrations greater than the associated RSL and/or background, including benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

There were no detections of perchlorate in surface soil. The limited detections of one PCB species (Aroclor 1260), 2,3,7,8-TCDD, and explosives were less than both the background criteria and RSLs for surface soil. Dioxins/furans were detected in all surface soil samples.

Perchlorate and one PCB (Aroclor 1260) were detected at estimated concentrations in one subsurface soil sample. Explosives were detected at estimated concentrations less than the limit

of detection in one subsurface soil sample, and dioxins/furans were detected in all subsurface soil samples.

20.3 EC SUMMARY

The data presented in this RI is a summary of the EE/CA field investigation work that was conducted in support of the NTCRA conducted by USACE.

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21. EC-49: NORTHERN BANK OF FURNACE CREEK

This Chapter summarizes the data collected and reported in the EE/CA; an RI for EC-49 will be completed under separate contract.

21.1 HISTORY OF EC-49

EC-49 is located in the southern portion of the Depot, along the banks of Furnace Creek where potential burial/burning activities occurred (Figure 2). The EC-49 boundary was provided in the ESP (USACE, 2012), which is based on recommendations from the ESAR.

There is no specific detailed background information about the activities that may have occurred within EC-49; however, based on findings from previous geophysical and trenching investigations, burning/burial activities are presumed to have occurred. MKM investigated this EC in 1999 and encountered 3-inch stokes mortar training rounds and a 2.36-inch rocket; MKM further performed surface clearance and DGM of approximately 70% of the EC (MKM, 1999). In 2009, Zapata performed DGM validation and trenching activities, removing approximately 90 lbs of MD, some of which appeared to have been burned (Zapata 2009). Cultural debris and MD (small arms projectiles, cartridge cases, and cartridge case flash tubes) were encountered during both MKM's and Zapata's trenching investigations (2009).

EC-49 is adjacent to EC-25 and it was suspected that at least the eastern part of EC-49 was used for disposal in the same manner as EC-25 as similar material was located in the area between EC-25 and EC-49 during the EE/CA field investigation in 2013. Due to the potential existence of MPPEH/MEC, an NTCRA was conducted at EC-49 in conjunction with the EC-25 NTCRA. Detailed figures and sampling information for EC-49 is included in Appendix G of the EC-25 EE/CA (ERT 2016).

21.2 EE/CA INVESTIGATION SUMMARY

Based on the field observations, the material brought to EC-25 for burning and subsequent burial was also buried in EC-49 as the two areas appear continuous based on the DGM and intrusive investigation results. While the exact operations at these two ECs are unknown, it appears the material was spread out from the end of the railroad tracks/Powder Burning Tower into both ECs. MPPEH has been found in both ECs during previous investigations. MEC/MPPEH items recovered in EC-49 during prior investigations included a 2.36-inch rocket (bazooka round) and approximately 24 Stokes mortar training rounds.

It should be noted that the current terminology of MPPEH had not been developed during the period of previous inspections. The terminology used during those inspections was MD, which was an accurate description of items at that time. Per current DoD/Department of the Army guidance, items referred to as MD during these inspections may have been MPPEH and/or MDAS. MDAS does not pose an explosive hazard. MPPEH presents a hazard until properly inspected and certified. Therefore, although the term MD is used in this EE/CA when discussing the investigation history of EC-49, it should be noted that material historically identified as MD may have been, in fact, MPPEH.

Eight trenches (A-H) were excavated within EC-49. In addition, three trenches (3, 5, and 7) which were placed to investigate anomalies extending from EC-25, are also actually within EC-49 or between EC-25 and EC-49. No MEC was found in any trench. MD was found in trench C (cartridge cases), trench E (shipping plugs), and trench G (part of illumination round). Drawings of the trench profiles and photographs are shown in Appendix C-1. The EE/CA of EC-25 (ERT 2016) includes a map of fill thickness in both EC-25 and EC-49, based on DGM and intrusive results. Fill thickness across much of EC-49 is 1 to 2 ft.

MC sampling conducted by ERT at EC-49 was used to determine the presence/absence of MC in support of the NTCRA. Thirteen random surface and subsurface soil sample locations were selected using VSP and eight biased surface and five biased subsurface soil sample locations were selected based on trench locations (Figure 22). Samples were collected and submitted for laboratory analysis of metals (Al, Cu, Mn, Pb, Sb, Zn), PAHs, perchlorate, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and TNT).

Concentrations of copper, lead, manganese and zinc were greater than the background levels for most of the surface soil samples. Only one manganese concentration was greater than the RSL. PAHs in surface soil were detected infrequently, but at one location were greater than the background and/or RSL for almost every compound.

Select metals were detected infrequently in the subsurface soil at concentrations greater than the background levels and no concentrations were greater than the RSLs. The same subsurface soil sample co-located with the surface sample with PAHs had detection of every PAH either greater than the background or RSL. Surface soil analytical results are summarized in Appendix E, Table E2-35, and subsurface soil analytical results are summarized in Table E2-36.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

21.3 EC SUMMARY

The data presented in this RI is a summary of the EE/CA ERT field investigation work that supported the NTCRA conducted by USACE due to an MPPEH/MEC hazard and potential MC risk.

22. EC-52: DISTURBED AREAS AT THE END OF G-LINE ROAD

22.1 HISTORY OF EC-52

EC-52 is located in the southwestern portion of the Depot (Figure 2). The EC-52 boundary was provided in the ESP (USACE, 2012), which is based on recommendations from the ESAR.

Background information of EC-52 is based on anecdotal reports provided by two former employees of the Depot who described grenade and munitions burial activities at the Depot (USACE St. Louis 1993). The location of the described burial area remains unknown and unconfirmed. Zapata performed trenching in disturbed areas at the end of the G-line Road in 2009 and found cultural debris, including rolls of metal banding material and pieces of a wire reinforced culvert (CEHNC, 2011). A propellant grain dump is located in the western portion of the EC.

EC-52 was split into two areas for this investigation. All of EC-52 was evaluated as an SI-level investigation to determine if there was a release of MEC. The DQOs associated with this part of the investigation for EC-52 are shown in Table 22-1.

The portion of EC-52 that does not contain the propellant grain field was evaluated as an SI-level investigation to determine if there was a release of MC. The DQOs associated with this part of the investigation for EC-52 are shown in Table 22-2.

The portion of EC-25 that has the propellant grain area was determined to have a MC release and a RI-level investigation was conducted on this portion of the EC, as detailed in Table 22-3.

Residual propellant grains were identified in the top 3 inches of soil within a portion of EC-52 (USACE 2020). Soil sampling has indicated this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant would impact soils through elevated nitrogen thereby, inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events and largely (USACE 2020). EC-52 is recommended for further evaluation in a FS.

22.2 DATA QUALITY OBJECTIVES

Table 22-1. DQO - DGM/Intrusive Investigation for EC-52: Disturbed Areas at End of G-Line Road SI-Level Portion of EC

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine if MEC is present
Data User Perspective(s)	To obtain data to determine presence/absence of MEC and if present, determine if additional investigations or immediate actions are warranted.
Contaminant or Characteristic of Interest	MEC
Media of Interest	Soil based on possible burial activities (Section 1.4.1.5 of the Work Plan (ERT 2013).

Table 22-1. DQO - DGM/Intrusive Investigation for EC-52: Disturbed Areas at End of G-Line Road SI-Level Portion of EC

Data Quality Objective Element	EC-Specific DQO Statement
Required Sampling Locations or Areas and Depths	A. Perform DGM survey of EC using EM61-MK2. B. DGM survey coverage will be 100% of the area that was not previously investigated by MKM. MKM covered approximately 93% or 4.7 acres of the 5.0-acre EC. ERT's DGM survey will cover approximately 0.3 acres.
Number of Samples Required	A. Intrusively investigate potential burial sites with trenches based on DGM results. B. Determination of sampling location and number will be based on a discussion of the Trenching and MC Sampling Locations Recommendation Memo (developed based on DGM results) with the PDT.
Reference Concentration of Interest or Other Performance Criteria	Ensure coverage goal (Section 3.5.13.1) is met. DGM data will be compared against daily DGM QC tests (Section 3.5.12) to ensure data is valid.
Sampling Method	Excavation of up to 2 trenches in potential burial areas. The exact number of trenches will be determined during PDT review and acceptance of the Trenching and MC Sampling Locations Recommendation Memo.
Analytical Method	EM61-MK2

Table 22-2. DQO - Environmental Sampling for EC-52: Disturbed Areas at End of G-Line Road (Exclusive of Propellant Grain Dump) SI-Level Portion of EC

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.5, analyze for Soil: 2,4 DNT, 2,6 DNT, TNT, and metals (Al, Cu, Mn, Pb, Sb, Zn) Groundwater: MDE Solid Waste Table I & II analytes requested by MDE at TPP#2. Analyte list located in Attachment 7 of the UFP-QAPP (ERT 2013 Appendix E).
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Biased co-located surface and subsurface soil samples based on DGM results. B. Collect one surface and one subsurface biased soil sample from the side wall of each trench. C. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. Up to 2 co-located biased surface and subsurface samples (A. above). B. Up to 4 biased soil samples from the trenches (B. above). C. 1 biased groundwater sample (C. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.

Table 22-2. DQO - Environmental Sampling for EC-52: Disturbed Areas at End of G-Line Road (Exclusive of Propellant Grain Dump) SI-Level Portion of EC

Data Quality Objective Element	EC-Specific DQO Statement
Analytical Method	Explosives analysis by SW-846 Method 8330B; metals analysis by SW-846 Method 6020A. MDE Solid Waste Tables I & II by ASTM method D 6919-03; USEPA 410.4; SM 2320B, 2340C, 2540C; and SW-846 Methods 6020A/7470A, 8260B, 9056.

Table 22-3. DQO - Environmental Sampling for EC-52: Disturbed Areas at End of G-Line Road (Propellant Grain Dump) RI-Level Portion of EC

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the nature and extent of MC contamination.
Data User Perspective(s)	To obtain data to determine nature and extent of MC by performing a comparison of results against defined screening levels to determine if an exceedance has occurred that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.5, analyze for 2,4 DNT, 2,6 DNT, nitroglycerin, and nitroguanidine.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located surface and subsurface soil samples based on a 50-ft grid developed over the propellant grain dump area. B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. 13 co-located surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, and Curtis Bay background dataset (see ERT QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Explosives analysis by SW-846 Method 8330B; nitroglycerin and nitroguanidine by SW-846 Method 8330.

22.3 MEC INVESTIGATION

22.3.1 Geophysical Results

MKM had collected data with the EM61 covering most of EC-52 and mapped two clusters of anomalies (one near the center of the EC and one near the south end) with responses up to 100 mV, indicating buried metal. It is notable that no anomalies were mapped in the area of the propellant grain dump. ERT collected data with the EM61-MK2A in only two narrow strips along the perimeter fence and along the road. Anomalies mapped by ERT were caused by culverts, fences, and guardrails. The geophysical map is shown in Appendix B-1, Figure B-5. As detailed in the 13 August 2013 trenching memo (Appendix I.4), due to the fact that significant anomalies were investigated by Zapata, ERT biased confirmatory trenching to one location with the largest anomaly cluster, which was near the center of the EC.

22.3.2 Intrusive Investigation Results

A single trench (A) was excavated near the center of EC-52. No MEC or MD were found. A metal tray (cultural debris) was found in the top foot of the trench. A drawing of the trench profile and photographs is provided in Appendix C-2.

22.4 MC INVESTIGATION

22.4.1 Sampling Process

For the RI-level propellant grain area investigation, 13 surface and subsurface grid based soil samples were collected from the propellant grain dump area and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn) and explosives (2,4- DNT, 2,6-DNT, and TNT) (Figure 23).

SI-level sampling was conducted in August 2013 at EC-52 to determine the absence or presence of MC impacts to surface and subsurface soil. For the area excluding the propellant grain area, two biased surface and subsurface soil sample locations were selected based on the DGM results and one biased surface and subsurface soil sample location was selected based on the trench location (Figure 23). Samples were collected and submitted for laboratory analysis of metals (Al, Cu, Mn, Pb, Sb, Zn) and explosives (2,4- DNT, 2,6-DNT, and TNT).

22.4.2 Sampling Results

Thirteen co-located surface and subsurface soil samples were collected from the propellant grain dump area and submitted for laboratory analysis of 2,4-DNT, 2,6-DNT, nitroglycerin, and nitroguanidine. Reported results were less than the PSLs in all of the surface and subsurface soil samples. Surface soil analytical results are summarized in Appendix E, Table E2-37, and subsurface soil analytical results are summarized in Table E2-38.

Three co-located surface and subsurface soil samples were collected from the remainder of EC-52 (SI-level investigation) and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), and explosives (2,4-DNT, 2,6-DNT, and TNT). Reported results were less than the PSLs in the surface and subsurface soil samples.

Surface soil analytical results are summarized in Appendix E, Table E2-39, and subsurface soil analytical results are summarized in Table E2-40.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

22.5 SLERA Results

22.5.1 Screening to Identify Chemicals of Potential Ecological Concern

Metals and explosives were analyzed for at EC-52; only metals were detected (Table EC52-1). Maximum concentrations of copper were below soil screening levels.

Maximum concentrations of antimony, lead, manganese, and zinc were greater than soil screening levels and are identified as COPECs at EC-52. The screening for COPECs in EC-52 surface soil is provided in Appendix F, Table EC52-1.

22.5.2 Risk Characterization

EPCs for COPECs are presented in Table EC52-2. Because there are only three samples for this EC, 95UCLMs were not calculated. Therefore, EPCs are the maximum detected concentrations for all COPECs. The comparisons of concentrations and doses to receptor-specific TRVs for EC-52 are presented in Tables EC52-3 through EC52-6 and a comparison to background is provided in Table EC52-7. Food web models for individual receptors are included in Tables EC52-8 through EC52-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

22.5.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, manganese has an HQ greater than 1. Manganese was detected in 3 of 3 surface soil samples at concentrations ranging from 89.2 to 1,820 mg/kg. The maximum concentration is greater than the TRV of 220 mg/kg with an HQ of 8 (Table EC52-3). Two of the 3 detected concentrations are greater than the TRV. The BTV for manganese is 700 mg/kg and only the maximum onsite concentration is greater than this value. The maximum concentration is 5 times higher than the next highest concentration (367 mg/kg), which is only slightly higher than the TRV. This suggests that the spatial distribution of elevated concentrations is minimal. Because only the maximum concentration is greater than the BTV and is the only concentration notably higher than the TRV, adverse effects to plant populations are not expected. Therefore, manganese is not retained as a COPEC.

22.5.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, manganese has an HQ greater than 1. Manganese was detected in 3 of 3 surface soil samples at concentrations ranging from 89.2 to 1,820 mg/kg. The maximum concentration is greater than the TRV of 450 mg/kg with an HQ of 4 (Table EC52-4). Only the maximum concentration is greater than the TRV and the BTV. Because only the maximum concentration is greater than the TRV and BTV, adverse effects to soil invertebrate populations are not expected. Therefore, manganese is not retained as a COPEC.

22.5.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs greater than 1. No TRVs are available for antimony (Tables EC52-5). Further discussion of the analytes with LOAEL-based HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Lead
Lead was detected in 3 of 3 surface soil samples. The maximum case scenario dose is greater than the LOAEL-based TRV with an HQ of 3 (Table EC52-5). The BTV for lead is 124 mg/kg; all onsite concentrations are less than this value (Table EC52-7). The exposure model uses conservative assumptions about area use, bioaccumulation, and uptake and is expected to overestimate the dose that receptors would receive, especially since the dose is based on the maximum concentration. Because onsite concentrations of lead are less than the BTV and in light of the conservative nature of the exposure model, lead is not retained as a COPEC.

22.5.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based and LOAEL-based TRVs protective of mammals, no COPECs have HQs greater than 1. Because no COPECs have NOAEL-based HQs greater than 1, no risks to mammals from exposure to soil at EC-52 are expected.

22.5.3 SLERA Conclusions for EC-52

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, no analytes are retained as COPECs for EC-52.

22.6 EC SUMMARY

While this EC received both an SI-level and RI-level investigation for MC contamination, no concentrations for any samples taken within EC-52 were greater than the PSLs. Additionally, no MEC or MD were found during the geophysical and intrusive investigation. The SLERA found no potential unacceptable ecological risk. Therefore, there is no risk or hazard associated with EC-52.

Sampling conducted historically noted residual propellant grains remain in the top 3 inches of soil within a portion of EC-52. Soil sampling has indicated this material poses no chemical or explosive hazard to the site. However, the presence of nitrates in the propellant would impact soils through elevated nitrogen, thereby inhibiting plant growth. The lack of vegetative root mass in the surface soil facilitated erosion of the topsoil during rain events and largely clay remains in this area. The lack of vegetation will continue to allow accelerated erosion of soil (USACE 2020). EC-52 is recommended for further evaluation in a FS.

23. EC-57B: BUILDING 1022 - BRASS AND STEEL AREA

23.1 HISTORY OF EC-57B

EC-57B is located in the southeastern corner of the Depot, along the banks of Furnace Creek, and refers to a warehouse (Building 1022) (Figure 2). The boundary for EC-57B was provided by the ESAR and the ESP (EA 2011; USACE, 2012). Building 1022 served various functions throughout the Depot's operational history. In 1932 the warehouse was used for renovation of munitions; this involved disassembling 75mm shrapnel projectiles from the cartridge case, inspecting the propelling charge, re-priming, and reassembling the round. From 1938 to 1942, the warehouse operated as a bag loading plant where propelling charges for 155mm howitzer and guns were loaded per the specifications for the appropriate charge within the powder container. After the Depot's mission changed in 1942, portions of Building 1022 were used as a small arms packing plant where belting, linking, and clipping of .30 and .50 caliber cartridges occurred (Green, n.d.). Pre-1950 activities near Building 1022 also included popping furnace operations. A popping furnace was used to heat small arms ammunition to levels that would cause the unexploded primers to fire. The remaining brass was then loaded into railroad cars as part of the recovery and reuse of metal operations. No known release is associated with this EC.

23.2 EC-57B HABITAT

EC-57B was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-57B is estimated at 80% impervious surface; the entire area surrounding the building includes old sidewalks and rail beds and the shoreline along Curtis Creek is completely hardened/developed with no natural areas. Overall, the area that is not developed is characterized as successional old field upland habitat. Some young sycamores, eastern cottonwoods, persimmon, and tree-of-heaven are growing out of the building foundations and provide minimal food and cover habitat; poison ivy (*Toxicodendron radicans*) growing along the fence line by the Curtis Creek shoreline provides food for wildlife. The pervious areas along the old railroad bed includes an upland meadow area dominated by orchard grass, yellow foxtail grass, broomsedge bluestem, spreading dogbane (*Apocynum androsaemifolium*), common milkweed, and switchgrass species (including *Panicum virgatum*). Common buckeye butterflies as well as white-tailed deer scat and tracks were also observed. EC-57B was ranked as providing minimal habitat quality.

23.3 DATA QUALITY OBJECTIVES

Table 23-1. DQO – Environmental Sampling for EC-57B: Brass and Steel Area (Bldg. 1022) SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.6 of the Work Plan (ERT 2013), analyze for metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6 DNT, TNT, dioxins/furans, PCBs, and PAHs.
Media of Interest	Soil and groundwater.

Table 23-1. DQO – Environmental Sampling for EC-57B: Brass and Steel Area (Bldg. 1022) SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples around the perimeter of Building 1022 based on field observations, such as soil staining, grading of the area, presence/absence of asphalt or pavement, drain outlets, doorways, loading docks, debris piles, etc. If no notable field observations are made, sample the midpoint of each side of the building. B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. Up to 5 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; explosives analysis by SW-846 Method 8330B; dioxins/furans by SW-846 Method 8290; PCBs by SW-846 Method 8082A; PAHs by SW-846 Method 8270SIM.

23.4 MC INVESTIGATION

23.4.1 Sampling Process

SI-level sampling was conducted in August 2013 at EC-57B to determine the absence or presence of MC impacts to surface and subsurface soil. Five biased surface and subsurface soil sample locations were selected based on field observations (e.g., soil staining, debris piles, etc.). Based on the historical use of the EC, surface and subsurface soil samples were analyzed for metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, TNT, dioxins/furans, PCBs, and PAHs. The area surrounding the building was predominantly concrete and asphalt. Therefore, sampling locations were selected during field activities based on the availability of substrate from which to collect a soil sample. Subsurface samples were collected from 1-2 ft bgs, as there were no notable field observations per the Final Work Plan (ERT 2013).

Reported results for Al, Cu, Pb, Sb, Zn, 2,4-DNT, 2,6-DNT, TNT, and PCBs in surface and subsurface soil samples were less than PSLs. As a result, it was determined that a release of these constituents has not occurred. Reported results for manganese were greater than the PSL (2,600 mg/kg) in two surface soil samples (20,400 and 59,900 mg/kg). PAH compounds (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene) were reported at concentrations greater than the PSLs in four of five surface soil samples and three of five subsurface soil samples collected. Dioxin/furan compounds (total hexachlorodibenzofuran, total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, and total tetrachlorodibenzo-p-dioxin) were reported at concentrations greater than the PSLs in four of five surface soil samples collected during the SI.

Therefore, additional sampling and analysis is warranted to delineate the extent of the identified MC release at EC-57B.

There are approximately 10 to 20 ft of impervious area surrounding the building which limits sampling along the edge of the building. The additional sampling locations were selected based on the ability to collect a sample (i.e., outside of the building and not located within the concrete pad, asphalt, walkways, gravel areas, etc.). Sample locations are approximately 50 ft from the building because there are approximately 10 to 20 ft of impervious area surrounding the building, which limits sampling along the edge of the building. Seven additional co-located surface and subsurface soil samples were collected and submitted to the project laboratory for analysis of manganese, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and total hexachlorodibenzofuran, total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, and total tetrachlorodibenzo-p-dioxin (Figure 24). The DQO associated with this sampling are summarized in Table 23-2.

Table 23-2. DQO – Environmental Sampling for EC-57B: Brass and Steel Area (Building 1022)

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of the manganese, total hexachlorodibenzofuran, total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzo-p-dioxin benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene release identified during SI sampling.
Data User Perspective(s)	To obtain data to determine the extent of the release of MC.
Contaminant or Characteristic of Interest	Based on the SI sampling results, analyze for manganese, total hexachlorodibenzofuran, total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, and total tetrachlorodibenzo-p-dioxin, and benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene .
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	A. Co-located surface (0-6 inches bgs) and subsurface (1-2 ft bgs) soil samples. B. Additional co-located surface and subsurface biased soil samples if areas free of asphalt, concrete, etc. can be found adjacent to the building.
Number of Samples Required	A. 7 co-located surface and subsurface samples. B. Up to 4 biased (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, and Curtis Bay PSLs (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Metals analysis by SW-846 Method 6020A; dioxins/furans by SW-846 Method 8290; PAHs by SW-846 Method 8270/8270 SIM.

23.4.2 Sampling Results

Five surface soil samples were collected from EC-57B and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans and explosives (TNT,

2,4-DNT, and 2,6-DNT). Based on the initial analytical results an additional 16 surface soil samples were collected and analyzed for Mn, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene and necessary to delineate impacts identified during the initial sampling. Analytical results for surface soil are summarized in Appendix E, Table E2-41. Reported results, greater than the PSLs, are summarized below.

Five subsurface soil samples were collected from EC-57B and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxins/furans and explosives (TNT, 2,4-DNT, and 2,6-DNT). Based on the initial analytical results an additional 25 subsurface soil samples were collected and analyzed for Mn, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene and necessary to delineate impacts identified during the initial sampling. Analytical results for subsurface soil are summarized in Appendix E, Table E2-42. Reported results, greater than the PSLs, are summarized below.

Metals – Surface

- Manganese was reported at concentrations greater than the PSL (2,600 mg/kg) in the surface soil sample collected from EC-57B-4-SO-0.5 (20,400 mg/kg) and EC-57B-5-SO-0.5 (59,900 mg/kg).

PAHs – Surface

- Benzo(a)anthracene was reported at concentrations greater than the surface soil PSL (2,900 µg/kg) in the surface soil samples collected from EC-57B-1-SO-0.5 (4,920 µg/kg), EC-57B-3-SO-0.5 (7,940 µg/kg), and EC-57B-4-SO-0.5 (9,710 µg/kg).

- Benzo(a)pyrene was reported at concentrations greater than the surface soil PSL (1,036 µg/kg) in six surface soil samples. Concentrations ranged from 1,100 µg/kg in the sample collected from EC-57B-10-SO-0.5 to 9,570 µg/kg in the sample collected from EC-57B-3-SO-0.5.

- Benzo(b)fluoranthene was reported at concentrations greater than the surface soil PSL (2,900 µg/kg) in the surface soil samples collected from EC-57B-1-SO-0.5 (8,800 µg/kg), EC-57B-3-SO-0.5 (13,600 µg/kg), EC-57B-4-SO-0.5 (13,400 µg/kg) and EC-57B-5-SO-0.5 (5,110 µg/kg).

- Dibenz(a,h)anthracene was reported at concentrations greater than the surface soil PSL (290 µg/kg) in the surface soil samples collected from EC-57B-1-SO-0.5 (629 µg/kg), EC-57B-3-SO-0.5 (1,380 µg/kg), EC-57B-4-SO-0.5 (2,000 µg/kg) and EC-57B-5-SO-0.5 (382 µg/kg).

- Indeno(1,2,3-cd)pyrene was reported at concentrations greater than the surface soil PSL (2,900 µg/kg) in the surface soil samples collected from EC-57B-3-SO-0.5 (4,080 µg/kg) and EC-57B-4-SO-0.5 (5,810 µg/kg).

Dioxin/Furan Compounds – Surface

- Total hexachlorodibenzofuran was reported at a concentration greater than the PSL (223 pg/g) in the surface soil sample collected from EC-57B-4-SO-0.5 (225 pg/g).

- Total pentachlorodibenzofuran was reported at concentrations greater than the PSL (74.4 pg/g) in six surface soil samples. Concentrations ranged from 96 pg/g in the sample collected from EC-57B-1-SO-0.5 to 216 J pg/g in the sample collected from EC-57B-5-SO-0.5.

- Total pentachlorodibenzo-p-dioxin was reported at a concentration greater than the PSL (22.3 pg/g) in the surface soil samples collected from EC-57B-5-SO-0.5 (122 J pg/g) and EC-57B-16-SO-0.5 (36 pg/g).

- Total tetrachlorodibenzo-p-dioxin was reported at concentrations greater than the PSL (21.6 pg/g) in the surface soil sample collected from EC-57B-5-SO-0.5 (67.3 pg/g).

PAHs – Subsurface

- Benzo(a)anthracene was reported at concentrations greater than the subsurface soil PSL (2,900 µg/kg) in six subsurface soil samples. Concentrations ranged from 3,700 µg/kg in the sample collected from EC-57B-15-SO-1 to 35,000 µg/kg in the sample collected from EC-57B-06-SO-02.

- Benzo(a)pyrene was reported at concentrations greater than the subsurface soil PSL (290 µg/kg) in 13 subsurface soil samples. Concentrations ranged from 390 µg/kg in the sample collected from EC-57B-17-SO-2 to 27,000 µg/kg in the sample collected from EC-57B-06-SO-02.

- Benzo(b)fluoranthene was reported at concentrations greater than the subsurface soil PSL (2,900 µg/kg) in seven subsurface soil samples. Concentrations ranged from 3,000 µg/kg in the sample collected from EC-57B-13-SO-1 to 38,000 µg/kg in the sample collected from EC-57B-06-SO-02.

- Dibenz(a,h)anthracene was reported at concentrations greater than the subsurface soil PSL (290 µg/kg) in seven subsurface soil samples. Concentrations ranged from 330 µg/kg in the sample collected from EC-57B-04-SO-2 to4,700 µg/kg in the sample collected from EC-57B-06-SO-02.

- Indeno(1,2,3-cd)pyrene was reported at concentrations greater than the subsurface soil PSL (2,900 µg/kg) in the samples collected from EC-57B-06-SO-02 (22,000 µg/kg), EC-57B-15-SO-1 (3,000 µg/kg), EC-57B-15-SO-2 (6,100 µg/kg), and EC-57B-24-SO-1 (17,000 µg/kg).

Dioxin/Furan Compounds -Subsurface

- Total heptachlorodibenzo-p-dioxin was reported at concentrations greater than the subsurface soil PSL (2,170 µg/kg) in the sample collected from EC-57B-06-SO-2 (2,840 µg/kg).

- Total hexachlorodibenzofuran was reported at concentrations greater than the subsurface soil PSL (223 µg/kg) in the sample collected from EC-57B-06-SO-2 (1,060 µg/kg).

- Total hexachlorodibenzo-p-dioxin was reported at concentrations greater than the subsurface soil PSL (223 µg/kg) in the sample collected from EC-57B-06-SO-2 (434 µg/kg).

- Total pentachlorodibenzofuran was reported at concentrations greater than the subsurface soil PSL (74.4 µg/kg) in the sample collected from EC-57B-06-SO-2 (85.7 µg/kg).

- Total pentachlorodibenzo-p-dioxin was reported at concentrations greater than the subsurface soil PSL (22.3 µg/kg) in the samples collected from EC-57B-4-SO-02 (22.4 µg/kg), EC-57B-06-SO-2 (38.9 µg/kg) and EC-57B-14-SO-1 (29.4 µg/kg).

- Total tetrachlorodibenzo-p-dioxin was reported at concentrations greater than the subsurface soil PSL (21.6 µg/kg) in the sample collected from EC-57B-14-SO-1 (24.6 µg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

23.5 HHRA RESULTS

23.5.1 Screening to Identify Chemicals of Potential Concern

For the HHRA screening of COPCs, detected analytes in surface soil and combined surface/subsurface soil at EC-57B were compared to industrial soil RSLs. As shown in Appendix F, Table EC57B-1 (surface soil) and Table EC57B-2 (combined surface/subsurface soil), individual samples results exceeded the industrial soil RSLs.

An analyte was selected as a COPC if its maximum detected concentration exceeded the RSL. Appendix F, Tables EC57B-1 and EC57B-2, show the data summary and the selection of COPCs process for EC-57B.

EC-57B Surface Soil COPC Screening Results: Selected COPCs

- Manganese
- Benzo(a)pyrene
- Dioxin TEQ.

EC-57B Combined Surface/Subsurface COPC Screening Results: Selected COPCs

- Manganese
- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene
- Indeno(1,2,3-cd)pyrene
- Dioxin TEQ.

23.5.2 Exposure Assessment

The exposure assessment approach for the HHRA (Section 4.5.2) lists the human receptors and exposure pathways, outlines the approach to calculating EPCs, and presents the exposure assumptions used in the HHRAs to estimate intake. As for all Curtis Bay ECs considered in this RI, current and future receptors potentially exposed to soil at EC-57B include current site workers exposed to surface soil and future construction workers exposed to mixed surface/subsurface soil.

EPCs (the 95% UCL) were calculated for the COPCs at EC-57B using ProUCL, outputs are provided in Appendix F. RME factors (Section 4.5.2) were used for the two receptors assessed.

23.5.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks. These values were collated as specified in Section 4.6.7.

23.5.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as shown in Tables EC57B-3 through EC57B-6.

Non-Cancer Hazard Assessment
The non-carcinogenic HI posed by the EC-57B COPCs in soil for the two receptors evaluated do not exceed 1, and were as follows:

- Current site worker (surface soil): HI=1.

- Future construction worker (surface and subsurface soil), using total dioxins and furans: HI=2.

Thus, the target HI of 1 was not exceeded for the site worker, and the surface soil at EC-57B is not likely to pose unacceptable hazards to trespassers who would contact the EC intermittently. The target HI of 1 was exceeded for the construction worker due to manganese.

Carcinogenic Risk
The carcinogenic risks estimated for each receptor at EC-57B were as follows:

- Current site worker (surface soil): 3×10^{-6}.
- Future construction worker (surface and subsurface soil): 4×10^{-7}.

Therefore, the acceptable incremental cancer risk level specified by MDE ($1x10^{-5}$) is not exceeded. Current site worker and construction worker, and trespassers intermittently contacting the EC would not have unacceptable risks.

23.5.5 HHRA Conclusions for EC-57B

The MDE acceptable incremental cancer risk level is not exceeded at EC-57B for current site workers or future construction workers, and trespassers intermittently contacting the EC would not face unacceptable risks. The calculated HI does not exceed 1 for the site worker. However, the calculated HI for the construction worker does exceed 1 due to manganese, indicating potential non-cancer hazards are for this receptor.

Manganese was evaluated by ERT (2020) in a site-wide investigation. The HHRA found that human health impacts were not likely due to manganese at DU 1, which encompasses the Curtis Bay Depot areas where previous investigations indicated elevated manganese including EC-57B and excluding the IRP Shop Area and EC-57D. Based on the site-wide manganese investigation, further action is not warranted to address the manganese impacts to soil at EC-57B.

23.6 SLERA RESULTS

23.6.1 Screening to Identify Chemicals of Potential Ecological Concern

Select metals (Al, Sb, Cu, Pb, Mn, and Zn), dioxins, PCBs, PAHs, and explosives were analyzed for at EC-57B; some analytes of each group were detected (Table EC57B-13). Maximum concentrations of explosives were below soil screening levels.

Maximum concentrations of four metals antimony, copper, lead, manganese, zinc, dioxin TEQs, Aroclor 1260, and HMW PAHs were greater than soil screening levels and are identified as COPECs at EC-57B. The screening for COPECs in EC-57B surface soil is provided in Appendix F, Table EC57B-13.

23.6.2 Risk Characterization

EPCs for COPECs are presented in Table EC57B-14. The comparisons of concentrations and doses to receptor-specific TRVs for EC-57B are presented in Tables EC57B-15 through EC57B-20 and a comparison to background is provided in Table EC57B-21. Food web models for individual receptors are included in Tables EC57B-22 through EC57B-27. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

23.6.2.1 Risk Characterization for Plants

When maximum and 95UCLM concentrations are compared to TRVs protective of terrestrial plants, antimony, lead, manganese, zinc, and HMW PAHs have HQs greater than 1 (Table EC57B-15). A TRV is not available for dioxins. Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Antimony
Antimony was detected in 5 of 5 surface soil samples at concentrations ranging from 4.3 to 33.1 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 5 mg/kg with HQs of 7 and 5, respectively. Three of the 5 detected concentrations are greater than the TRV. Risk is driven by the maximum sample concentration (detected at EC-57B-1-SO-0.5). The next highest sample has an HQ of 3 when compared to the plant TRV. With the exception of EC-57B-1-SO-0.5, due to the relatively low magnitude of exceedance of the plant TRV, antimony is not expected to pose risks to plants. Antimony at EC-57B-1-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of plants are not expected to be at potential risk from antimony.

Lead
Lead was detected in 5 of 5 surface soil samples at concentrations ranging from 215 to 434 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 120 mg/kg with HQs of 4 and 3, respectively. All of the detected concentrations are greater than the TRV. The BTV for lead is 124 mg/kg, and the onsite concentrations are 2 to 4 times greater than this value. Due to the relatively low magnitude of exceedance of the TRV and BTV, lead is not retained as a COPEC.

Manganese
Manganese was detected in 12 of 12 surface soil samples at concentrations ranging from 485 to 59,900 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 220 mg/kg with HQs of 270 and 130, respectively. All of the detected concentrations are greater than the TRV. The BTV for manganese is 700 mg/kg and 10 of the onsite concentrations are greater than this value. Because all of the onsite concentrations of manganese are greater than the TRV and most are greater than the BTV, manganese is retained as a COPEC.

Zinc
Zinc was detected in 5 of 5 surface soil samples at concentrations ranging from 158 to 3,210 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 160 mg/kg with HQs of 20 and 14, respectively. Four of the 5 detected concentrations are greater than the TRV. The BTV for zinc is 83.0 mg/kg and all of the onsite concentrations are greater than this value. Because most of the onsite concentrations of zinc are greater than the TRV and all are greater than the BTV, zinc is retained as a COPEC.

HMW PAHs
HMW PAHs were detected in 17 of 17 surface soil samples at concentrations ranging from 0.238 to 90.34 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of

20 mg/kg with HQs of 5 and 4, respectively. Three of the 17 detected concentrations are greater than the TRV. The BTV for HMW PAHs is 89 mg/kg and only the maximum concentration is slightly greater than this value. While the maximum and 95UCLM concentrations are greater than the TRV, because the majority of the onsite concentrations are less than the TRV and because all of the onsite concentrations are less than or approximately equal to the BTV, HMW PAHs are not retained as a COPEC.

23.6.2.2 Risk Characterization for Soil Invertebrates

When maximum and 95UCLM concentrations are compared to TRVs protective of soil invertebrates, manganese, zinc, and HMW PAHs have HQs greater than 1 (Table EC57B-16). Further discussion of the analytes with HQs greater than 1 is provided in the paragraphs below.

Manganese
Manganese was detected in 12 of 12 surface soil samples at concentrations ranging from 485 to 59,900 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 450 mg/kg with HQs of 130 and 66, respectively. All of the detected concentrations are greater than the TRV. The BTV for manganese is 700 mg/kg and 10 of the onsite concentrations are greater than this value. Because all of the onsite concentrations of manganese are greater than the TRV and most are greater than the BTV, manganese is retained as a COPEC.

Zinc
Zinc was detected in 5 of 5 surface soil samples at concentrations ranging from 158 to 3,210 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 120 mg/kg with HQs of 27 and 19, respectively. All of the detected concentrations are greater than the TRV. The BTV for zinc is 83.0 mg/kg and all of the onsite concentrations are greater than this value. Because all of the onsite concentrations of zinc are greater than the TRV and the BTV, zinc is retained as a COPEC.

HMW PAHs
HMW PAHs were detected in 17 of 17 surface soil samples at concentrations ranging from 0.238 to 90.34 mg/kg. The maximum and 95UCLM concentrations are greater than the TRV of 18 mg/kg with HQs of 5. Four of the 17 detected concentrations are greater than the TRV. The BTV for HMW PAHs is 89 mg/kg and only the maximum concentration is slightly greater than this value. While the maximum and 95UCLM concentrations are greater than the TRV, because the majority of the onsite concentrations are less than the TRV and because all of the onsite concentrations are less than or approximately equal to the BTV, HMW PAHs are not retained as a COPEC.

23.6.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds, copper, lead, manganese, zinc, dioxin TEQ, and HMW PAHs have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, lead, manganese, and zinc have HQs greater than 1 (Table EC57B-17).

When doses calculated using 95UCLM concentrations are compared to NOAEL-based TRVs protective of birds, copper, lead, manganese, zinc, and HMW PAHs have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, lead, manganese, and zinc have HQs greater than 1 (Table EC57B-18).

No TRVs are available for antimony. Further discussion of the analytes with 95UCLM LOAEL-based HQs greater than 1 is provided in the paragraphs below. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8.

Lead
Lead was detected in 5 of 5 surface soil samples. The maximum and 95UCLM case scenario doses are greater than the LOAEL-based TRV with HQs of 20 and 17, respectively. The BTV for lead is 124 mg/kg, and the onsite concentrations are 2 to 4 times greater than this value. Due to the relatively low magnitude of exceedance of the BTV, lead is not retained as a COPEC.

Manganese
Manganese was detected in 12 of 12 surface soil samples. The maximum and 95UCLM case scenario doses are greater than the LOAEL-based TRV with HQs of 15 and 8, respectively. The BTV for manganese is 700 mg/kg and most of the onsite concentrations are greater than this value. While the exposure model uses conservative assumptions about area use, bioaccumulation, and uptake, because the 95UCLM dose exceeds the LOAEL-based TRV, manganese is retained as a COPEC.

Zinc
Zinc was detected in 5 of 5 surface soil samples. The maximum and 95UCLM case scenario doses are greater than the LOAEL-based TRV with HQs of 3. The BTV for zinc is 83.0 mg/kg and all of the onsite concentrations are greater than this value. While the exposure model uses conservative assumptions about area use, bioaccumulation, and uptake, because the 95UCLM dose exceeds the LOAEL-based TRV, zinc is retained as a COPEC.

23.6.2.4 Risk Characterization for Mammals

HQs for the comparison of estimated doses to TRVs protective of mammals are presented in Table EC57B-19 for the maximum case scenario and in Table EC57B-20 for the 95UCLM case scenario. No TRVs are available for dioxins. A discussion of the uncertainties associated with the evaluation of potential risks for analytes without TRVs is included in Section 4.6.8. The paragraphs below present the results for herbivorous and predatory mammals, and specifically discuss analytes with 95UCLM LOAEL-based HQs greater than 1.

Herbivorous Mammals (Deer Mouse)
When doses calculated using maximum concentrations are compared to NOAEL-based TRVs, antimony, manganese, and HMW PAHs have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, manganese has an HQ greater than 1 (Table EC57B-19).

When doses calculated using 95UCLM concentrations are compared to NOAEL-based TRVs, antimony and manganese have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, manganese has an HQ greater than 1 (Table EC57B-20).

Manganese was detected in 12 of 12 surface soil samples. The maximum and 95UCLM case scenario doses are greater than the LOAEL-based TRV with HQs of 7 and 3, respectively. The BTV for manganese is 700 mg/kg and most of the onsite concentrations are greater than this value. While the exposure model uses conservative assumptions about area use, bioaccumulation, and uptake, because the 95UCLM dose exceeds the LOAEL-based TRV, manganese is retained as a COPEC for herbivorous mammals.

Predatory Mammals (Red Fox)
When doses calculated using maximum and 95UCLM concentrations are compared to NOAEL-based TRVs, antimony and manganese have HQs greater than 1. When these doses are compared to LOAEL-based TRVs, no COPECs have HQs greater than 1 (Tables EC57B-19 and EC57B-20).

Because no COPECs have LOAEL-based HQs greater than 1, no analytes are retained as COPECs for predatory mammals.

23.6.3 SLERA Conclusions for EC-57B

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors and to BTVs, the following analytes are retained as receptor-specific COPECs:

- Manganese and zinc for plants, soil invertebrates, and birds
- Manganese for mammals.

Manganese was evaluated by ERT (2020) in a site-wide investigation. The SLERA found that ecological impacts were not likely due to manganese at DU 1, which encompasses the Curtis Bay Depot areas where previous investigations indicated elevated manganese including EC-57B and excluding the IRP Shop Area and EC-57D. Based on the site-wide manganese investigation, further action is not warranted to address the manganese impacts to soil at EC-57B.

Antimony was not retained as a COPEC for plants based on the conclusion of the weight-of-evidence approach that there are no expected ecological risks to site-wide populations. However, the HQ at the location of the maximum concentration (EC-57B-1-SO-0.5) indicates there could be a potential for localized effects.

23.7 EC SUMMARY

No MEC or MD was expected at this EC based on the historical activities. Manganese and dioxins/furans concentrations were greater than the PSLs in the surface soil. Five PAHs were greater than the PSLs in both the surface and subsurface soil. It should be noted that the locations of the majority of the exceedances at this EC are not right next to the building and do not appear to be related to munitions-based activities that occurred within the building.

Based on the HHRA, the MDE acceptable incremental cancer risk level is not exceeded at EC-57B for current site workers or future construction workers, and trespassers intermittently contacting the EC would not face unacceptable risks. In addition, the calculated HI for the site worker does not exceed 1. However, the calculated HI for the construction worker does exceed 1 due to manganese. Manganese was evaluated by ERT (2020) in a site-wide investigation. The HHRA found that impacts were not likely due to manganese at DU 1, which encompasses the Curtis Bay Depot areas where previous investigations indicated elevated manganese including EC-57B and excluding the IRP Shop Area and EC-57D. Based on the site-wide manganese investigation, further action is not warranted to address the manganese impacts to soil at EC-57B.

The SLERA found potential unacceptable ecological risks due to manganese and zinc. Manganese was evaluated by ERT in a site-wide arsenic and manganese investigation and the SLERA found that ecological impacts were not likely due to manganese (ERT 2020). It is noted that while antimony may pose potential risks at EC-57B-1-SO-0.5, the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk. Further action for soil is required to protect ecological receptors at EC-57B due to zinc. EC-57B is recommended for further evaluation in a FS.

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24. EC-57C: BUILDING J-408

24.1 HISTORY OF EC-57C

EC-57C is located in the central portion of the Depot and refers to the location of the 1928 explosion (Green, n.d.). ERT created the boundary for EC-57C based on ERT's research, which identified a row of buildings consecutively labeled J-404 to J-407 on the 1941 map and determined the location of former building J-408. Additionally, a second map in the *Environmental Program Review* (USAEHA, 1992) shows a spur of railroad tracks extending beyond building J-407, presumably to the former location of J-408 (Figure 2).

The fire occurred at Building J-408 in 1928, resulting in the building and its contents being entirely destroyed. The building reportedly stored smokeless powder (Green n.d.). No confirmed release is associated with this EC.

24.2 EC-57C HABITAT

EC-57C was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-57C is located in the central-western portion of the site where former Building J-408 was once located. Evidence of old stone and foundation is present in the area, but the area is successional old field habitat. Open areas of moss were observed, likely the result of small seeps/groundwater at the site. EC-57C is open meadow dominated by orchard grass, yellow foxtail grass, broomsedge bluestem and common milkweed with some pockets of shrubs dominated by Allegheny blackberry and few trees such as sweetgum and Bradford pear. No wildlife were observed at EC-57C. EC-57C was ranked as providing minimal habitat quality.

24.3 DATA QUALITY OBJECTIVES

Table 24-1. DQO - DGM/Intrusive Investigation for EC-57C: Bldg. J-408 SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	MC
Media of Interest	Soil based on known explosion of howitzer powder (also known as smokeless powder) (Section 1.4.1.6 of the Work Plan (ERT 2013)
Required Sampling Locations or Areas and Depths	A. Perform DGM survey of EC using EM31 to map changes in ground conductivity resulting from burning or contamination. B. DGM survey coverage will be approximately 100% of the EC with 15 ft on center transect spacing.
Number of Samples Required	Determination of sampling location and number will be based on a discussion of the Trenching and MC Sampling Locations Recommendation Memo (developed based on DGM results) with the PDT.

Table 24-1. DQO - DGM/Intrusive Investigation for EC-57C: Bldg. J-408 SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Reference Concentration of Interest or Other Performance Criteria	Determine the presence/absence of any burned soil that may represent locations for MC release. Should DGM results not provide enough support for determination of sampling locations, VSP module "Non-statistical Sampling Approach > Predetermined Number of Samples" will be used determine random sampling locations.
Sampling Method	No intrusive sampling for the EC (only MC sampling per Table 3-15 of the Work Plan (ERT 2013).
Analytical Method	EM31

Table 24-2. DQO – Environmental Sampling for EC-57C: Bldg. J-408 SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the history of the EC as outlined in Section 1.4.1.6 of the Work Plan (ERT 2013), analyze for: nitroglycerin, nitroguanidine, 2,4-DNT, 2,6-DNT, TNT, dioxins/furans, and PAHs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples based on burned soils as determined by DGM results. B. If DGM results do not show changes in conductivity due to possible burned soil, VSP module "Non-statistical Sampling Approach > Predetermined Number of Samples" will be used to place the co-located biased soil samples. C. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. Up to 4 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (C. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Nitroglycerin and nitroguanidine analysis by SW-846 Method 8330; explosives analysis by SW-846 Method 8330B; dioxins/furans by SW-846 Method 8290; PAHs by SW-846 Method 8270SIM

24.4 MEC INVESTIGATION

24.4.1 Geophysical Results

ERT collected data with the EM31 at EC-57C over a one-acre area covering the footprint of the former building J-408. Both conductivity and inphase channels only indicate anomalies correlating strongly with the concrete pad or possible ore debris adjacent to the pad. The DGM results did not indicate the presence of burn areas or anomalies. The geophysical maps are shown in Appendix B-1, Figure B-6 and B-7. As detailed in the August 19, 2013 memorandum (Appendix I.4), the results of the geophysics showed that both conductivity and inphase channels only indicated anomalies correlating strongly with the concrete pad or possible ore debris adjacent to the pad. The DGM results did not indicated the presence of burn areas or anomalies. Therefore, no trenching was conducted in this EC.

24.4.2 Intrusive Investigation Results

No pits or trenches were excavated at EC-57C as no anomalies were mapped.

24.5 MC INVESTIGATION

24.5.1 Sampling Process

SI-level sampling was conducted in August 2013 at EC-57C to determine the absence or presence of MC impacts to surface and subsurface soil. DGM results did not indicate the presence of MEC. Therefore, four randomly placed surface and subsurface soil sample locations were selected based on VSP. Samples were collected and submitted for laboratory analysis of explosives (nitroglycerin, nitroguanidine, 2,4-DNT, 2,6-DNT, and TNT), dioxins/furans, and PAHs. Subsurface samples were collected from 1-2 ft bgs.

Reported results for nitroglycerin, nitroguanidine, 2,4-DNT, 2,6-DNT, TNT, and dioxins/furans in surface and subsurface soil samples were less than PSLs. As a result, it was determined that a release of these constituents has not occurred. The reported result for benzo(a)pyrene at subsurface soil sample EC-57C-SO-3-02 (399 µg/kg) was greater than the PSL (290 µg/kg). Due to the reported result exceeding the PSL, additional sampling was conducted to delineate the extent of the benzo(a)pyrene release. Other PAHs are low-level or less than the limit of detection, suggesting benzo(a)pyrene is probably not due to the building explosion. Therefore, the source of the exceedance of benzo(a)pyrene is unclear. In order to determine if there is a source of contamination six additional subsurface soil samples were collected within 25 ft of the EC-57C-03 (Figure 25) and submitted to the project laboratory for analysis of benzo(a)pyrene. The DQO associated with this sampling are summarized in Table 24-3.

Table 24-3. DQO – Environmental Sampling for EC-57C: Building. J-408

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of the benzo(a)pyrene identified during SI sampling.
Data User Perspective(s)	To obtain data to determine the extent of the release of benzo(a)pyrene.
Contaminant or Characteristic of Interest	Based on the SI sample results, analyze for benzo(a)pyrene.

Table 24-3. DQO – Environmental Sampling for EC-57C: Building. J-408

Data Quality Objective Element	EC-Specific DQO Statement
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	Biased subsurface (1-2 ft bgs) soil samples.
Number of Samples Required	6 biased subsurface samples.
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, and Curtis Bay PSLs (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	PAH by SW-846 Method 8270/8270SIM

24.5.2 Sampling Results

Four co-located surface and subsurface soil samples were collected at EC-57C and submitted for laboratory analysis of PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, TNT, nitroglycerin, and nitroguanidine) for the SI-level sampling. An additional six subsurface soil samples were collected in September 2015 order to delineate the benzo(a)pyrene impacts identified during the initial sampling event (2013) at the RI-level.

Surface soil analytical results are summarized in Appendix E, Table E2-43, and subsurface soil analytical results are summarized in Table E2-44. Results greater than PSLs are summarized below.

PAHs – Subsurface

- Benzo(a)pyrene was reported at a concentration greater than the subsurface soil PSL (290 µg/kg) in the subsurface soil sample collected from EC-57C-3-SO-02 (399 µg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

24.6 HHRA RESULTS

24.6.1 Screening to Identify Chemicals of Potential Concern

For the HHRA screening of COPCs, detected analytes in surface soil and combined surface/subsurface soil at EC-57C were compared to industrial soil RSLs. Appendix F, Tables EC57C-1 (surface soil) and EC57C-2 (combined surface/ subsurface soil), show that no individual sample results exceeded the industrial soil RSLs in surface soil and in combined surface/subsurface soil. Appendix F, Tables EC57C-1 and EC57C-2, show the data summary and the selection of COPCs process for EC-57C.

EC-57C Surface Soil COPC Screening Results: Selected COPCs

- No COPCs selected.

EC-57C Combined Surface/Subsurface Screening Results: Selected COPCs

- No COPCs selected.

24.6.2 HHRA Conclusions for EC-57C

Based on these HHRA results and no COPCs identified, NFA is recommended for EC-57C.

24.7 SLERA RESULTS

24.7.1 Screening to Identify Chemicals of Potential Ecological Concern

Four samples were analyzed for dioxins, explosives, SVOCs, and PAHs at EC-57C, and only dioxins and PAHs were detected. The maximum concentration of dioxin TEQ and HMW PAHs were greater than the soil screening level; therefore, these analytes are identified as COPECs. The screening for COPECs in EC-57C surface soil is provided in Appendix F, Table EC57C-6.

24.7.2 Risk Characterization

EPCs for COPECs are presented in Table EC57C-7. The comparisons of concentrations and doses to receptor-specific TRVs for EC-57C are presented in Tables EC57C-8 through EC57C-12 and a comparison to background is presented in Table EC57C-8. Food web models for individual receptors are included in Tables EC57C-9 through EC57C-15. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

24.7.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, HMW PAHs have an HQ less than 1 (Table EC57C-8). There is no available terrestrial plant TRV for dioxin TEQ.

24.7.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, dioxin TEQ and HMW PAHs have HQs less than 1 (Table EC57C-9).

24.7.2.3 Risk Characterization for Birds

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of birds, dioxin TEQ and HMW PAHs have HQs less than 1 (Table EC57C-10).

24.7.2.4 Risk Characterization for Mammals

When doses calculated using maximum concentrations are compared to NOAEL-based TRVs protective of mammals, dioxin TEQ and HMW PAHs have HQs less than 1 (Table EC57C-11).

24.7.3 SLERA Conclusions for EC-57C

Based on the comparison of maximum concentrations and estimated doses to TRVs protective of ecological receptors, no analytes are retained as COPECs for ecological receptors at EC-57C.

24.8 EC SUMMARY

The results of the DGM did not suggest any burial pits or areas of burned ground. No MEC or MD was found at this EC. Benzo(a)pyrene was found in one subsurface sample at a concentration greater than the PSLs during the SI-level sampling. The RI-level sampling found no additional areas of concentration, suggesting this one exceedance was probably not due to the building explosion. The HHRA did not identify any COPCs. The SLERA found no potential unacceptable ecological risk. EC-57C is recommended for NFA.

25. EC-57D: BRASS AND STEEL STOCKPILE AREA

25.1 HISTORY OF EC-57D

EC-57D is also located in the southeastern corner of the Depot, adjacent to EC-57B (Figure 2). EC-57D is presumed to have been used as a stockpile area outside of Building 1022 where munitions were stored, awaiting dismantlement. The boundary for this EC was created by ERT based on the 1941 map and the proximity to Building 1022. The EC boundary is comprised of a large vegetated area proximate to Building 1022, where storage of munitions likely occurred. No known release is associated with this EC.

25.2 DATA QUALITY OBJECTIVES

Table 25-1. DQO – Environmental Sampling for EC-57D: Brass and Steel Stockpile Area SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.6 of the Work Plan (ERT 2013), analyze for metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, and TNT.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples based on field observations such as soil staining, grading of the area, low spots, etc. If the area is completely flat and no notable field findings are observed, ERT will utilize the VSP module "Non-statistical Sampling Approach > Predetermined Number of Samples" to place the co-located biased soil samples." B. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. Up to 5 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (B. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; explosives analysis by SW-846 Method 8330B.

25.3 MC INVESTIGATION

25.3.1 Sampling Process

SI-level sampling was conducted in August 2013 at EC-57D to determine the absence or presence of MC impacts to surface and subsurface soil. Based on the historical use of the EC surface and subsurface soil was analyzed for metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, and TNT. Sample locations were selected based on field observations including bare, un-vegetated areas and cartridge cases at location EC-57D-2. During sample collection at location EC-57D-2, .30-caliber shells and other metal debris were observed above 2.5 ft bgs. Therefore, per the Final Work Plan (ERT 2013), the subsurface sample at location EC-57D-2-SO was collected from 2.5 to 3.5 ft bgs. There were no field observations in the subsurface interval at the remaining sampling locations; therefore, the remaining subsurface samples were collected from 1-2 ft bgs.

Reported results for Al, Cu, Pb, Sb, Zn, 2,4-DNT, 2,6-DNT, and TNT were less than PSLs. As a result, it was determined that a release of these constituents has not occurred. Reported results for manganese were greater than the PSL (2,600 mg/kg) in two surface soil samples (7,370 mg/kg and 20,600 mg/kg) (Figure 26). Therefore, additional sampling was needed to delineate the extent of the manganese release. An additional six co-located surface and subsurface soil were collected and submitted to the project laboratory for analysis of manganese via Method SW-846 6020A (Figure 26) in order to delineate the impacted area.

Additionally, to support FS determinations for disposal options, one sample was collected from this EC by ERT and analyzed for RCRA characteristics including TCLP (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity. As sampling location EC-57D-4 had the highest levels of manganese, the RCRA characterization sample was collected from the surface of this location. The DQO associated with this sampling are summarized in Table 25-2.

Table 25-2. DQO – Environmental Sampling for EC-57D: Brass and Steel Stockpile Area

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the extent of the manganese release identified during SI sampling and support disposal options in the FS.
Data User Perspective(s)	To obtain data to determine the extent of the release of manganese and support disposal options in the FS.
Contaminant or Characteristic of Interest	Based on the SI sampling results, analyze soil for manganese. RCRA characteristics: TCLP (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity.
Media of Interest	Soil
Required Sampling Locations or Areas and Depths	Co-located surface (0-6 inches bgs) and subsurface (1-2 ft bgs) soil samples. Surface sample (0-6 inches bgs) for RCRA characteristics (from location 57D-4)
Number of Samples Required	6 co-located biased surface and subsurface samples. 1 surface soil for RCRA.

Table 25-2. DQO – Environmental Sampling for EC-57D: Brass and Steel Stockpile Area

Data Quality Objective Element	EC-Specific DQO Statement
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, and Curtis Bay PSLs (see ERT 2015 QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment. RCRA guidelines for disposal of hazardous materials (40 CFR Part 260).
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Manganese analysis by SW-846 Method 6020A; VOCs by SW-846 1311/8260B, SVOCs by SW-846 1311/8270C, pesticides by SW-846 1311/8082, herbicides by SW-846 1311/8081, metals by SW-846 1311/6010B, and RCRA Characteristics.

25.3.2 Sampling Results

Five co-located surface soil samples were collected at EC-57D and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn) and explosives (2,4-DNT, 2,6-DNT, and TNT) for the SI-level sampling. For the RI-level sampling, an additional 13 surface and 24 subsurface soil samples were collected and analyzed for manganese. Seven of the subsurface soil sampling locations had samples collected from both 1-2 ft bgs and 2-4 ft bgs. Surface soil analytical results are summarized in Appendix E, Table E2-45, and subsurface soil analytical results are summarized in Table E2-46. Reported results, greater than the PSLs, are summarized below.

Metals – Surface

- Manganese was reported at concentrations greater than the surface soil PSL (2,600 mg/kg) in 10 surface soil samples. Concentrations ranged from 3,930 mg/kg in the sample collected from EC-57D-16-SO-0.5 to 20,600 mg/kg in the sample collected from EC-57D-4-SO-0.5.

Metals – Subsurface

- Manganese was reported at a concentration greater than the subsurface soil PSL (2,600 mg/kg) in the sample collected from EC-57D-11A-SO-2 (5,030 mg/kg).

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

25.4 SLERA Results

25.4.1 Screening to Identify Chemicals of Potential Ecological Concern

Samples from EC-57D were analyzed for metals, SVOCs, and explosives. Six metals and 2,4,6,-trinitrotoluene were detected. The maximum concentration of antimony, copper, lead, manganese, and zinc were greater than the soil screening levels and these analytes are identified

as COPECs. The screening for COPECs in EC-57D surface soil is provided in Appendix F, Table EC57D-1.

25.4.2 Risk Characterization

EPCs for COPECs are presented in Table EC57D-2. The comparisons of concentrations and doses to receptor-specific TRVs for EC-57D are presented in Tables EC57D-3 through EC57D-8 and a comparison to background is presented in Table EC57D-9. Food web models for individual receptors are included in Tables EC57D-10 through EC57D-15. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

25.4.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, the antimony concentration falls below the TRV. The maximum concentration of copper, lead, manganese, and zinc are in exceedance. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Copper
Copper was detected in 5 of 5 surface soil samples. The maximum concentration exceeds the plant TRV with an HQ of 27 (Table EC57D-3) and the calculated 95UCLM concentration exceeds the maximum concentration. The maximum concentration (1,880 mg/kg) also exceeds the background soil concentration (32.8 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is over 20 times the next highest detected concentration (78.2 mg/kg). The next highest concentration has an HQ of 1 when compared to the plant TRV and is just over two times background. With the exception of EC-57D-2-SO-0.5, due to the low magnitude of exceedance of the plant TRV and background, copper is not expected to pose risks to terrestrial plants. Copper at EC-57D-2-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from copper.

Lead
Lead was detected in 5 of 5 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 4 and 3, respectively (Table EC57D-3). The maximum concentration (457 mg/kg) and 95UCLM concentration (326 mg/kg) also exceed the background soil concentration (124 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is over 3 times the next highest detected concentration (145 mg/kg). The next highest concentration has an HQ of 1 when compared to the plant TRV and is just over background. With the exception of EC-57D-2-SO-0.5, due to the low magnitude of exceedance of the plant TRV and background, lead is not expected to pose risks to terrestrial plants. Lead at EC-57D-2-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from lead.

Manganese
Manganese was detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 94 and 40, respectively (Table EC57D-3). The maximum concentration (20,600 mg/kg) and 95UCLM concentration (8,840 mg/kg) also exceed the background soil concentration (700 mg/kg) (Table EC57D-9). Due to the high magnitude of exceedance of the plant TRV and exceedance of background, manganese may pose risks to terrestrial plants. The ERT site-wide investigation evaluated EC-57D as part of DU 3. Unacceptable ecological risk was identified in this DU.

Zinc
Zinc was detected in 5 of 5 surface soil samples. The maximum concentration exceeds the plant TRV with an HQ of 4 (Table EC57D-3) and the calculated 95UCLM concentration exceeds the maximum concentration. The maximum concentration (625 mg/kg) also exceeds the background soil concentration (83.9 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is nearly 6 times the next highest detected concentration (106 mg/kg). The next highest concentration falls below the plant TRV and is just over background. With the exception of EC-57D-2-SO-0.5, due to the low magnitude of exceedance of the plant TRV and background, zinc is not expected to pose risks to terrestrial plants. Zinc at EC-57D-2-SO-0.5 may pose risks to plants, but the conclusion of the weight-of-evidence approach found site-wide populations of terrestrial plants are not expected to be at potential risk from zinc.

25.4.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, the antimony and lead concentrations fall below the TRVs. The maximum concentration of copper, manganese, and zinc are in exceedance. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Copper
Copper was detected in 5 of 5 surface soil samples. The maximum concentration exceeds the soil invertebrate TRV with an HQ of 24 (Table EC57D-3) and the calculated 95UCLM concentration exceeds the maximum concentration. The maximum concentration (1,880 mg/kg) also exceeds the background soil concentration (32.8 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is over 20 times the next highest detected concentration (78.2 mg/kg). The next highest concentration falls below the soil invertebrate TRV and is just over two times background. With the exception of EC-57D-2-SO-0.5, due to the lack of exceedance of the soil invertebrate TRV and low magnitude of exceedance of background, copper is not expected to pose risks to soil invertebrates. Copper at EC-57D-2-SO-0.5 may pose risks to soil invertebrates, but the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk from copper.

Manganese
Manganese was detected in 18 of 18 surface soil samples. The maximum and 95UCLM concentrations exceed the plant TRV with HQs of 46 and 20, respectively (Table EC57D-3). The maximum concentration (20,600 mg/kg) and 95UCLM concentration (8,840 mg/kg) also exceed the background soil concentration (700 mg/kg) (Table EC57D-9). Due to the high

magnitude of exceedance of the soil invertebrate TRV and exceedance of background, manganese may pose risks to soil invertebrates.

Zinc
Zinc was detected in 5 of 5 surface soil samples. The maximum concentration exceeds the soil invertebrate TRV with an HQ of 5 (Table EC57D-3) and the calculated 95UCLM concentration exceeds the maximum concentration. The maximum concentration (625 mg/kg) also exceeds the background soil concentration (83.9 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is nearly 6 times the next highest detected concentration (106 mg/kg). The next highest concentration falls below the soil invertebrate TRV and is just over background. With the exception of EC-57D-2-SO-0.5, due to the low magnitude of exceedance of the soil invertebrate TRV and background, zinc is not expected to pose risks to soil invertebrates. Zinc at EC-57D-2-SO-0.5 may pose risks to soil invertebrates, but the conclusion of the weight-of-evidence approach found site-wide populations of soil invertebrates are not expected to be at potential risk from zinc.

25.4.2.3 Risk Characterization for Birds

When maximum doses are compared to NOAEL-based TRVs protective of birds, the maximum doses for copper, lead, manganese, and zinc are in exceedance. There is no available avian TRVs for antimony. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Copper
Copper was detected in 5 of 5 surface soil samples. When doses calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, copper has HQs of 46 and 15, respectively (Table EC57D-5). The maximum concentration (1,880 mg/kg) exceeds the background soil concentration (32.8 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is over 20 times the next highest detected concentration (78.2 mg/kg). The next highest concentration is just over two times background. With the exception of EC-57D-2-SO-0.5, due to the low magnitude of exceedance of background, copper is not expected to pose risks to birds. Copper at EC-57D-2-SO-0.5 may pose risks to birds, but the conclusion of the weight-of-evidence approach found site-wide populations of birds are not expected to be at potential risk from copper.

Lead
Lead was detected in 5 of 5 surface soil samples. When doses calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs of 42 and 21, respectively (Table EC57D-5). When doses calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs of 30 and 15, respectively (Table EC57D-6). The maximum concentration (457 mg/kg) and 95UCLM concentration (326 mg/kg) also exceed the background soil concentration (124 mg/kg) (Table EC57D-9). The maximum concentration was detected at EC-57D-2-SO-0.5 and is over 3 times the next highest detected concentration (145 mg/kg). The next highest concentration is just over background. With the exception of EC-57D-2-SO-0.5, due to the low magnitude of exceedance of background, lead is not expected to pose risks to birds. Lead at EC-57D-2-SO-0.5

may pose risks to birds, but the conclusion of the weight-of-evidence approach found site-wide populations of birds are not expected to be at potential risk from lead.

Manganese
Manganese was detected in 18 of 18 surface soil samples. When doses calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, manganese has HQs of 11 and 5, respectively (Table EC57D-5). When doses calculated using the 95UCLM concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, manganese has HQs of 5 and 2, respectively (Table EC57D-6). The maximum concentration (20,600 mg/kg) and 95UCLM concentration (8,840 mg/kg) exceed the background soil concentration (700 mg/kg) (Table EC57D-9). Due to the exceedance of the NOAEL and LOAEL-based TRVs by the maximum and 95UCLM doses as well as the exceedance of background, manganese may pose risks to birds.

Zinc
Zinc was detected in 5 of 5 surface soil samples. When doses calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, zinc has HQs of 3 and 1, respectively (Table EC57D-5). Due to the low magnitude of exceedance of the NOAEL-based TRV and the HQ of 1 when the maximum concentration is compared to the LOAEL-based TRV, birds are not expected to be at potential risk from zinc.

25.4.2.4 Risk Characterization for Mammals

When maximum doses are compared to NOAEL-based TRVs protective of mammals, the HQs for antimony, lead, and zinc do not exceed 1. The maximum doses of copper and manganese are in exceedance of the NOAEL-based TRV for at least one receptor. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Copper
Copper was detected in 5 of 5 surface soil samples. When doses for herbivorous mammals calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of mammals, copper has HQs of 2 and 1, respectively (Table EC57D-7). Due to the low magnitude of exceedance of the NOAEL-based TRV and HQ of 1 when the maximum dose is compared to the LOAEL-based TRV, mammals are not expected to be at potential risk from copper.

Manganese
Manganese was detected in 18 of 18 surface soil samples. When manganese doses calculated using the maximum concentration are compared to the NOAEL-based TRV protective of birds, the HQs for herbivorous and predatory mammals are 7 and 1, respectively (Table EC57D-7). The HQs drop to 2 and below 1 when the LOAEL-based TRV is considered. When doses calculated using the 95UCLM concentration are compared to the LOAEL-based TRV protective of mammals, the HQs for mammals do not exceed 1 (Table EC57D-8). Due to the low magnitude of exceedance of the LOAEL-based TRV by the maximum dose and HQ of 1 when the 95UCLM dose is compared to the LOAEL-based TRV, mammals are not expected to be at potential risk from manganese.

25.4.3 SLERA Conclusions for EC-57D

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors, manganese is retained as a COPEC for terrestrial plants, soil invertebrates, and birds. Manganese was evaluated by ERT (2020) in a site-wide investigation. The SLERA found that ecological impacts were likely due to manganese at the DU associated with EC-57D (DU 3) and further action is warranted to address the manganese impacts to soil at DU 3.

Although the conclusion of the weight-of-evidence approach found site-wide populations are not expected to be at potential risk, elevated concentrations of copper, lead, and zinc at EC-57D-2-SO-0.5 may pose risks to terrestrial plants (copper, lead, and zinc), soil invertebrates (copper and zinc), and birds (copper and lead). No COPECs are retained for mammals.

25.5 EC SUMMARY

As the manganese concentrations were higher north of the EC boundary (Figure 26), ERT began reviewing the historical documentation for the Depot to determine if there were other sources of this manganese other than the storage of munitions in this EC. During this review, it was determined that a historical manganese ore stockpile existed just north of EC-57D (Parsons 2006). As this location correlates with the higher analytical concentrations around the historical stockpile area that decrease towards the EC-57D boundary, it appears that these manganese concentrations are not related to historical activities associated specifically with EC-57D and were redressed as part of a the site-wide RI as DU 3 (ERT 2020). Unacceptable noncancer hazards were identified for site and construction workers at DU 3 from manganese. Arsenic was not evaluated in an HHRA for EC-57D because it was evaluated in a site-wide investigation as DU-3 (ERT 2020). Based upon the site-wide investigation, further action is required to protect human health at EC-57-D to be evaluated in an FS.

The SLERA found potential unacceptable ecological risks due to manganese for at least one ecological receptor. The SLERA conducted as part of the site-wide manganese investigation (ERT 2020) also found likely ecological impacts due to manganese. It is noted that while copper, lead, and zinc may pose risk at EC-57D-2-SO-0.5, the weight-of-evidence approach indicated that site-wide populations are not expected to be at potential risk. Further action for soil is required to protect ecological receptors at EC-57D due to manganese.

EC-57D is recommended for further evaluation in the FS.

26. EC-58B: EXPLOSIVE OPEN BURNING/WIRE CAGE

26.1 HISTORY OF EC-58B

EC-58B is located along the northeastern boundary between A Line Road and Yard Office Road and contains the high explosive suspect area component of EC-58. The initial boundary for EC-58B was provided by the ESP (MRS 1) (USACE, 2012), which is based on the high explosive area annotated on historical maps along the northeastern boundary between A Line Road and Yard Office Road. There is no documentation in the available historical record regarding the specific operations conducted within EC-58B.

During the June 2011 site visit, USACE personnel observed a small wire cage in the suspected high explosives area, potentially related to burn cage activities. To date, information regarding the presence of the small wire cage is purely anecdotal as it was not documented via photograph or observed during subsequent site visits. Based on anecdotal information, EC-58 is designated as the third of the four burn cage locations to be investigated even though this area was not identified on historical maps as a barricade where cage burning activities typically occurred. Due to site observations, EC-58B is assumed to have been used for burn cage operations. Stereoscopic examination of aerial photographs also determined that the area was a possible pit, approximately 5 ft to 10 ft deep. Based on these observations, the EC boundary was expanded from the initial ESP boundary to include this open pit area (Figure 2). No known release is associated with this EC.

26.2 EC-58B HABITAT

EC-58B was surveyed as part of the 2017 Habitat Assessment (Appendix L; EA 2018). EC-58B has 0% impervious surface and located in the northeast portion of the site between A-Line Road and Office Road. EC-58B is dominated by an upland meadow habitat with successional old field upland areas. Within the meadow and successional old field habitats, dominant plant species include orchard grass, yellow foxtail grass, broomsedge bluestem and common milkweed. Lady bird beetles were observed in the meadow and milkweed bugs were observed utilizing the common milkweed pods in the open meadow areas; monarch butterfly larval habitat is present due to milkweed. Numerous scattered Bradford pear trees were observed and provide minimal and low-quality avian cover habitat. A small wetland dominated completely by common reed grass (*Phragmites australis*) is present within EC-58B. Small channels and standing water were observed within the wetland area, which is the low point of the survey area and receives stormwater runoff from adjacent impervious surface, including A-Line Road and Office Road. A great blue heron was observed within the wetland area during the survey but no other wildlife species utilizing the open water/wetlands areas was observed. Overall, the habitat quality of EC-58B would be considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-58B. EC-58B was ranked as providing minimal habitat quality.

26.3 DATA QUALITY OBJECTIVES

Table 26-1. DQO - DGM/Intrusive Investigation for EC-58B: Explosive Open Burning/Wire Cage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	MC
Media of Interest	Soil based on history of explosives or munitions burning (Section 1.4.1.7 of the Work Plan (ERT 2013)
Required Sampling Locations or Areas and Depths	A. Perform DGM survey of EC using EM31 to map changes in ground conductivity resulting from burning, contamination, or historical activities associated with the historical pit. B. DGM survey coverage will be approximately 100% of the EC with 15 ft on center transect spacing.
Number of Samples Required	Determination of sampling location and number will be based on a discussion of the Trenching and MC Sampling Locations Recommendation Memo (developed based on DGM results) with the PDT.
Reference Concentration of Interest or Other Performance Criteria	Determine the presence/absence of any changes in ground conductivity resulting from burning, contamination, or historical activities associated with the historical pit that may represent locations for MC release.
Sampling Method	No intrusive sampling for the EC (only MC sampling per Table 3-18 of the Work Plan (ERT 2013).
Analytical Method	EM31

Table 26-2. DQO – Environmental Sampling for EC-58B: Explosive Open Burning/ Wire Cage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.7 of the 2013 ERT Work Plan, analyze for 2,4-DNT, 2,6-DNT, TNT, dioxins/furans, and PAHs.
Media of Interest	Soil, groundwater, surface water, and sediment.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples based on burning, contamination, or historical activities associated with the historical pit as determined by DGM results. B. In the event that there are no notable DGM results, a memo will be submitted detailing a revised sampling approach and proposed number of samples for this EC. C. Biased direct push groundwater screening sample at a co-located soil sampling location. D. Co-located biased surface water and sediment samples from within the small wetland based on field observations (i.e., evidence of a burn cage, grade of the surface, direction of topography)."
Number of Samples Required	A. Up to 5 co-located biased surface and subsurface samples (A. above). B. 1 biased groundwater sample (C. above).

Table 26-2. DQO – Environmental Sampling for EC-58B: Explosive Open Burning/ Wire Cage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
	C. 1 biased surface water sample (D. above). D. 1 biased sediment sample (D. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Ambient Water Quality Criteria (AWQC), USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. Obtain groundwater sample via DPT. C. Obtain surface water sample via a disposable sampling device. D. Obtain biased sediment sample via a disposable sample device.
Analytical Method	Explosives analysis by SW-846 Method 8330B; dioxins/furans by SW-846 Method 8290; PAHs by SW-846 Method 8270SIM.

Table 26-2A. DQO – Supplemental RI Incremental Sampling at EC-58B: Explosive Open Burning/Wire Cage

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To address ecological risk.
Data User Perspective(s)	To obtain additional sediment data for use in the SLERA.
Contaminant or Characteristic of Interest	TAL Metals, PAHs, and dioxins/furans
Media of Interest	Sediment
Required Sampling Locations or Areas and Depths	A. Wetland Area – collect 1 incremental sample (30 increments in triplicate) of marsh sediment (Figure 4); analyze for TAL metals, PAHs, dioxins/furans
Number of Samples Required	See A above
Reference Concentration of Interest or Other Performance Criteria	USEPA Regional Screening Levels (RSLs), USEPA Region III Biological Technical Assistance Group (BTAG), USEPA Region 4 Ecological Screening Values, USEPA Ecological Soil Screening Levels (SSL), and Curtis Bay PSLs (see the EA 2019 Work Plan Addendum QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	ISM
Analytical Method	TAL Metals (Method 6020A, 7471B), PAHs (Method 8270 SIM), and dioxins/furans (Method 8290)

26.4 MEC INVESTIGATION

26.4.1 Geophysical Results

ERT collected data with the EM31 over a 2.2-acre area covering the footprint of a shallow pit discovered on historical air photos which correlated with the "H.E. suspect area," as described in the work plan (ERT 2013). In a memo to USACE dated 10 July 2013 and included in Appendix I, a change to the EM31 transect design was proposed, in order to collect data more efficiently around a stand of *Phragmites* with a permanent pond in the center; this approach was approved by USACE. Both the ground conductivity map and the inphase (metal detector) map

show significant anomalies. The ground conductivity map shows high conductivity in the center of the EC and smaller areas with high conductivity in the northwest corner. The inphase map shows several scattered anomalies indicating subsurface metals. The geophysical maps are shown in Appendix B-1, Figures B-8 and B-9. As detailed in the 19 August 2013 memorandum (Appendix 1.4), and based on the DGM results, one trench was recommended for investigation.

26.4.2 Intrusive Investigation Results

A single trench (A) was excavated near the center of EC-58B. No MEC or MD were found. A nail spike and wire (cultural debris) were found within the top 12 inches of the trench. A drawing of the trench profile and photographs are found in Appendix C-2.

26.5 MC INVESTIGATION

26.5.1 Sampling Process

SI-level sampling was conducted in August 2013 at EC-57B to determine the absence or presence of MC impacts to surface and subsurface soil. Five biased surface and four biased subsurface soil sample locations were selected based on DGM results. The subsurface soil sample was not collected from location EC-58B-2B-SO due to the presence of asphalt at 10 to 12 inches bgs. Based on the historical use of the EC, surface soil, subsurface soil, sediment, and surface water samples were analyzed for 2,4-DNT, 2,6-DNT, TNT, dioxins/furans, and PAHs.

Reported results for 2,4-DNT, 2,6-DNT, TNT, and dioxins/furans in surface and subsurface soil samples were less than PSLs. As a result, it was determined that a release of these constituents has not occurred. Reported results for benzo(a)pyrene at subsurface soil sample EC-58B-4B-SO-07 (504 µg/kg) were greater than the PSL (290 µg/kg). It should be noted that this sampling location had an asphalt layer at 1 ft bgs, where the subsurface sample was initially planned to be collected. Boring logs note that there was approximately 5 ft of asphalt, rocks and bricks in the interval between 1 and 6 ft bgs. Therefore, the sample was collected from 6 to 7 ft bgs. Based on the CSM that there were 4 burning cages and the finding of an asphalt layer approximately 6 inches to 2 ft bgs in all of the burning areas, it appears that any burning activities would have been conducted above the asphalt layer at all of the burning cages.

Based on the fact that there is only one detection of a single PAH compound (benzo(a)pyrene) at the EC, and benzo(a)pyrene is a major component of coal tar, one of the main ingredients in asphalt before the 1970s, this detection is most likely due to the asphalt material and not associated with historical burning activities. However, additional sampling was conducted to confirm that the benzo(a)pyrene detection is due to the presence of asphalt and not indicative of a point release from historical activities such as a spill, and that there are no additional locations with PAH concentrations greater than the PSL in the subsurface soil associated with suspected MC releases. An additional subsurface sample was collected from EC-58B-4B from 7 to 9 ft bgs; a groundwater sample was also collected from this location. Additionally, five subsurface soil samples were collected and submitted to the project laboratory for PAH analysis via Method SW-846 8270/8270 SIM (Figure 27). These discrete sampling locations were selected using the DGM in-phase results as provided in the 19 August 2013 Memorandum to bound not only the detection, but also the DGM response area that appears to be associated with this detection. One

additional groundwater sample was collected from EC-58B-4B, which has the subsurface soil exceedance to determine if there is a localized release to the groundwater.

To support future FS determinations for disposal options, one sample was collected from this EC and analyzed for RCRA characteristics including TCLP (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity. As sampling location EC-58B-4B had the highest concentration of benzo(a)pyrene the RCRA characterization sample was collected from the surface of this location. The DQO associated with this sampling are summarized in Table 26-3.

The DQO table for the EA April 2019 sediment sample collected by ISM is described on Table 26-2A and the DU location within EC-58B is shown on Figure 27a.

Table 26-3. DQO – Environmental Sampling for EC-58B: Explosive Open Burning/ Wire Cage

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine extent of benzo(a)pyrene release identified during SI and support disposal options in the FS.
Data User Perspective(s)	To obtain data to determine extent of benzo(a)pyrene release identified during SI and support disposal options in the FS.
Contaminant or Characteristic of Interest	Based on the SI results for the EC, analyze for benzo(a)pyrene. RCRA characteristics of TCLP (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	Subsurface (1-2 ft bgs) soil samples. Subsurface soil (7-9 ft bgs) at EC-58B-4B Groundwater sample from location EC-58B-4B
Number of Samples Required	5 subsurface samples. 1 subsurface sample at EC-58B-4B 1 groundwater sample at EC-58B-4B 1 surface sample (0-6 inches bgs) for RCRA characteristics (from location 58B-4B)
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Ambient Water Quality Criteria (AWQC), USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, and Curtis Bay PSLs (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	PAH by SW-846 Method 8270/8270 SIM; VOCs by SW-846 1311/8260B, SVOCs by SW-846 1311/8270C, pesticides by SW-846 1311/8082, herbicides by SW-846 1311/8081, metals by SW-846 1311/6010B, and RCRA Characteristics.

26.5.2 Sampling Results

Five discrete co-located surface and subsurface soil samples were collected at EC-58B and submitted for laboratory analysis of PAHs, dioxins/furans, and explosives (2,4-DNT, 2,6-DNT, and TNT) for the SI-level sampling. Due to the presence of benzo(a)pyrene in subsurface, an additional 6 subsurface soil samples were collected as RI-level sampling to determine the extent.

Analytical results for surface soil are summarized in Appendix E, Table E2-47, while analytical results for subsurface soil are summarized in Appendix E, Table E2-48. Reported results greater than the PSLs are summarized below.

PAHs – Subsurface

- Benzo(a)pyrene was reported at a concentration greater than the subsurface soil PSL (290 µg/kg) in the subsurface soil sample collected from EC-58B-4B-SO-07 (504 µg/kg) and EC-58B-4B-SO-9 (650 µg/kg).

Groundwater results are provided in Chapter 29, which discusses the groundwater results for all locations of the groundwater samples collected as part of this RI.

ISM sediment sample results are presented in Appendix E, Table E6-3.

26.6 HHRA RESULTS

26.6.1 Screening to Identify Chemical of Potential Concern

For the HHRA screening of COPCs, detected analytes in surface soil and combined surface/subsurface soil at EC-58B were compared to industrial soil RSLs. Appendix F, Tables EC58B-1 (surface soil) and EC58B-2 (combined surface/ subsurface soil), show that no individual sample results exceeded the industrial soil RSLs in surface soil and combined surface/subsurface soil. Appendix F, Tables EC58-1 and EC58-2, show the data summary and the selection of COPCs process for EC-58B.

EC-58B Surface Soil COPC Screening Results: Selected COPCs

- No COPCs selected.

EC-58B Combined Surface/Subsurface Screening Results: Selected COPCs

- No COPCs selected.

26.6.2 HHRA Conclusions for EC-58B

Based on these HHRA results and no COPCs selected, NFA is recommended for EC-58B.

26.7 SLERA RESULTS

26.7.1 Screening to Identify Chemicals of Potential Ecological Concern

Surface soil, sediment, and surface water samples were collected from EC-58B and the screening for COPECs in EC-58B is provided in Appendix F, Table EC58B-6.

Surface soil samples from EC-58B were analyzed for dioxins, PAHs, SVOCs, and explosives. Only dioxins and PAHs were detected. The maximum dioxin TEQ concentration was greater than the soil screening levels and dioxins are identified as COPECs.

Sediment samples from EC-58B were analyzed for metals, dioxins, PAHs, SVOCs, and explosives. Metals, dioxins, and PAHs were detected. The maximum concentrations of 6 metals, dioxin TEQ, and PAHs were greater than the sediment screening levels, so these analytes are identified as COPECs.

Surface water samples from EC-58B were analyzed for dioxins and PAHs. Metals, dioxins, and PAHs were detected and the maximum concentrations were greater than the sediment screening levels, so these analytes are identified as COPECs.

26.7.2 Risk Characterization

EPCs for COPECs are presented in Table EC58B-7. The comparisons of concentrations and doses to receptor-specific TRVs for EC-58B are presented in Tables EC58B-8 through EC58B-15 and a comparison to background is presented in Table EC58B-16 and EC58B-17. Food web models for individual receptors are included in Tables EC58B-18 through EC58B-27. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, osprey, deer mouse, and red fox), benthic invertebrates, and aquatic organisms are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

26.7.2.1 Risk Characterization for Plants

Dioxins are the only COPECs identified for surface soil. However, there is no plant TRV for dioxins, so the risk to plants from dioxins in the surface soil cannot be evaluated (Table EC58B-8). There are no background values for dioxins (Table EC58-11). The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

26.7.2.2 Risk Characterization for Soil Invertebrates

Dioxins are the only COPECs identified for surface soil. When maximum surface soil concentrations of dioxins are compared to TRVs protective of soil invertebrates, they fall below the TRV (EC58B-9). Due to the lack of exceedance of the TRV by the maximum concentration, dioxins are not expected to pose risks to terrestrial plants.

26.7.2.3 Risk Characterization for Birds

When maximum doses are compared to NOAEL-based TRVs protective of birds, the maximum doses for copper and vanadium are in exceedance. There is no available avian TRVs for antimony. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Copper
Copper was detected in 4 of 4 sediment samples collected via incremental sampling. When doses for benthos eating piscivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, copper has HQs of 4 and 1, respectively (Table EC58B-10). The maximum copper concentration exceeds the background sediment concentration (Table EC58B-17). Due to the low magnitude of exceedance of the NOAEL-based TRV and HQ of 1 when the maximum dose is compared to the LOAEL-based TRV, birds are not expected to be at potential risk from copper.

Vanadium
Vanadium was detected in 3 of 3 sediment samples collected via incremental sampling. When doses for benthos eating piscivorous birds calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, vanadium has HQs of 5 and 2, respectively (Table EC58B-10). The maximum vanadium concentration (30.2 mg/kg) exceeds the background sediment concentration (13.1 mg/kg) (Table EC58B-17). Due to the low magnitude of exceedance of the NOAEL and LOAEL-based TRVs and background sediment concentration, birds are not expected to be at potential risk from vanadium.

26.7.2.4 Risk Characterization for Mammals

When maximum doses are compared to NOAEL-based TRVs protective of mammals, the HQs for dioxins do not exceed 1 (Table EC58B-11). Therefore, there are no COPECs that are expected to pose risk to mammals.

26.7.2.5 Risk Characterization for Benthic Invertebrates

When maximum sediment concentrations of are compared to TRVs protective of benthic invertebrates, the concentrations of these analytes fall below the TRV (EC58B-12): barium, beryllium, and vanadium. When maximum concentrations are compared to TRVs protective of benthic invertebrates, the maximum doses for copper, lead, manganese, dioxins, and total PAHs are in exceedance. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Copper
Copper was detected in 4 of 4 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, copper has HQs of 2 and below 1, respectively (Table EC58B-13). The maximum copper concentration exceeds the background sediment concentration (Table EC58B-17). Due to the low magnitude of exceedance of the threshold effects TRV and lack of exceedance of the probable effects TRV, benthic invertebrates are not expected to be at potential risk from copper.

Lead
Lead was detected in 4 of 4 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, lead has HQs of 4 and 1, respectively (Table EC58B-13). The maximum lead concentration exceeds the background sediment concentration (Table EC58B-17). Due to

the low magnitude of exceedance of the threshold effects TRV and HQ of 1 when the maximum concentration is compared to the probable effects TRV, benthic invertebrates are not expected to be at potential risk from lead.

Manganese
Manganese was detected in 4 of 4 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, manganese has HQs of 3 and 1, respectively (Table EC58B-13). The maximum manganese concentration exceeds the background sediment concentration (Table EC58B-17). Due to the low magnitude of exceedance of the threshold effects TRV and HQ of 1 when the maximum concentration is compared to the probable effects TRV, benthic invertebrates are not expected to be at potential risk from manganese.

Dioxin TEQ
Dioxins were detected in 1 of 1 sediment samples. When the dioxin TEQ concentration calculated with nondetects equal to the detection limit (ND=DL) is compared to the threshold effects TRVs protective of benthic invertebrates, the HQ is 17 (Table EC58B-13). There is no available probable effects TRV for dioxin TEQ. The maximum dioxin TEQ (ND=DL) concentration exceeds the background sediment concentration (Table EC58B-17). When the dioxin TEQ concentratation calculated with nondetects equal to 0 (ND=0), the sample concentration falls below the threshold TRV protective of benthic invertebrates and the background sediment concentration. Due to the lack of exceedance of the threshold effects TRV and background sediment concentration by dioxin TEQ (ND=0), benthic invertebrates are not expected to be at potential risk from dioxins.

Total PAHs
PAHs were detected in 4 of 4 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold effects TRV protective of benthic invertebrates, total PAHs has an HQs of 1 (Table EC58B-13). When the 95UCLM mean concentration is compared to the threshold effects TRV or the maximum concentration is compared to the probable effects TRV, the HQs fall below 1. The maximum total PAH concentration exceeds the background sediment concentration (Table EC58B-17). Due to the low magnitude of exceedance of the threshold effects TRV and lack of exceedance of the probable effects TRV by the maximum concentration as well as the lack of exceedance of the threshold effects TRV by the 95UCLM concentration, benthic invertebrates are not expected to be at potential risk from PAHs.

26.7.2.6 Risk Characterization for Aquatic Organisms

When maximum surface water concentrations of are compared to TRVs protective of aquatic organisms, the PAH concentrations fall below TRVs (EC58B-12). When maximum concentrations are compared to TRVs protective of aquatic organisms, the maximum concentration of dioxin TEQ (ND=DL) is in exceedance. Further evaluation dioxin TEQ is provided in the following subsections.

Dioxin TEQ
Dioxins were detected in 1 of 1 surface water samples. When the dioxin TEQ concentration calculated with nondetects equal to the detection limit (ND=DL) is compared to the chronic TRV protective of aquatic organisms, the HQ is 9 (Table EC58B-14). The maximum dioxin TEQ (ND=DL) falls below the acute TRV protective of aquatic organisms (Table EC58B-15). When the dioxin TEQ concentration calculated with nondetects equal to 0 (ND=0), the sample concentration falls below the chronic TRV protective of aquatic organisms. Due to the lack of exceedance of the chronic TRV by dioxin TEQ (ND=0), benthic invertebrates are not expected to be at potential risk from dioxins.

26.7.3 SLERA Conclusions for EC-58B

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors, no analytes are retained as COPEC for ecological receptors.

26.8 EC SUMMARY

No MEC or MD were found within EC-58B. Benzo(a)pyrene exceeded the PSLs at one location to a depth of 9 ft. While the terminal level of contamination was not determined by the soil sampling, the groundwater depth at this location was 18 ft bgs. Groundwater was not impacted by benzo(a)pyrene as discussed in Chapter 29; therefore, the extent of the benzo(a)pyrene at the single location is known. No COPCs were identified for the HHRA. The SLERA found no potential unacceptable ecological risk.

EC-58B is recommended for NFA.

27. EC-58C: EXPLOSIVE OPEN BURNING/WIRE CAGE

27.1 HISTORY OF EC-58C

EC-58C is located on the western side of the depot and comprises the explosive open and burning/wire cage component of the EC as described in the ESAR (EA 2011). EC-58C is the location of the fourth burn cage area proposed for investigation and is located within Barricade 644-XK. ERT developed the boundary for this EC based on a review of historical maps and the CEHNC Trip Report (1999).

Wire cage burning operations reportedly consisted of open burning on concrete pads within barricades covered in wire mesh. Little documented information is available about the cage burning operations; however, train cars containing smokeless powder were moved into the barricades and were reportedly ignited within the barricades in the post-Korean war timeframe for munitions handling and disposal (USAEHA, 1989). The barricades were also used as safety areas where the train cars with smokeless powder could be stored. While there are no historical documents detailing burial activities at this EC, based on burial finds at other barricades at the Depot there is the possibility that burial activities occurred at this EC.

The CEHNC Trip Report documents that a revetment with a built-in bunker was also used to store acid grade fluorspar based on the remnants of the mineral on the black plastic (1999). During the ERT site visit in 2012, Barricade 644 was the only barricade that contained a bunker; therefore, it is assumed a fluorspar berm also historically existed at this EC. No remnants of black plastic or fluorspar minerals were observed during the 2012 site visit. No known release is associated with this EC.

27.2 DATA QUALITY OBJECTIVES

Table 27-1. DQO - DGM/Intrusive Investigation for EC-58C: Explosive Open Burning/Wire Cage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine if MEC is present.
Data User Perspective(s)	To obtain data to determine nature and extent of MEC to determine the associated hazard level and if immediate or additional actions are warranted.
Contaminant or Characteristic of Interest	MEC
Media of Interest	Soil based on history of explosives burning and possible burial activities (Section 1.4.1.7 of the Work Plan (ERT 2013)
Required Sampling Locations or Areas and Depths	A. Perform DGM survey of EC using EM61-MK2. B. DGM survey coverage will be approximately 100% of the interior of the barricade.
Number of Samples Required	A. Intrusively investigate potential burial areas with trenches based on DGM results. B. Determination of sampling location and number will be based on a discussion of the Trenching and MC Sampling Locations Recommendation Memo (developed based on DGM results) with the PDT.

Table 27-1. DQO - DGM/Intrusive Investigation for EC-58C: Explosive Open Burning/Wire Cage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Reference Concentration of Interest or Other Performance Criteria	Ensure coverage goal is met. DGM data will be compared against daily DGM QC tests to ensure data is valid.
Sampling Method	Excavation of up to 2 trenches in potential burial areas. The exact number of trenches will be determined during PDT review and acceptance of the Trenching and MC Sampling Locations Recommendation Memo.
Analytical Method	EM61-MK2

Table 27-2. DQO – Environmental Sampling for EC-58C: Explosive Open Burning/ Wire Cage SI-Level Site

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine whether a MC release has occurred.
Data User Perspective(s)	To obtain data to determine if a release of MC has occurred in which defined screening levels are exceeded that would warrant additional investigations or immediate actions.
Contaminant or Characteristic of Interest	Based on the historical use of the EC as outlined in Section 1.4.1.7 of the Work Plan (ERT 2013), analyze for metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4,-DNT, 2,6-DNT, TNT, dioxins/furans, PCBs, and PAHs.
Media of Interest	Soil and groundwater.
Required Sampling Locations or Areas and Depths	A. Co-located biased surface and subsurface soil samples based on DGM results. B. Collect one surface and one subsurface biased soil sample from the side wall of each trench. C. Biased direct push groundwater screening sample at a co-located soil sampling location.
Number of Samples Required	A. Up to 2 co-located biased surface and subsurface samples (A. above). B. Up to 4 biased soil samples from the trenches (B. above). C. 1 biased groundwater sample (C. above).
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL (see ERT 2013 QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	A. Obtain biased surface and subsurface soil using a hand auger or hand trowel, depending on depth. B. For co-located soil and groundwater sampling location, obtain soil samples via DPT. C. Obtain groundwater sample via DPT.
Analytical Method	Metals analysis by SW-846 Method 6020A; explosives analysis by SW-846 Method 8330B; dioxins/furans by SW-846 Method 8290; PCBs by SW-846 Method 8082A; PAHs by SW-846 Method 8270SIM.

27.3 MEC INVESTIGATION

27.3.1 Geophysical Results

MKM collected no data in EC-58C. ERT collected data with the EM61-MK2A in two areas within the barricade 644-XI. The two areas were separated by a mound of soil with steep slopes.

A few low-response anomalies were mapped in the southern area, and several higher-response anomalies were mapped in the northern area. The pattern of anomalies in the northern area suggested that most were caused by buried railroad tracks. The most intense anomaly (over 100 mV) was located just outside the door of the dome-shaped magazine on the west side of the barricade. The geophysical map is shown in Appendix B-1, Figure B-10. As detailed in the 19 August 2013 memorandum (Appendix I.4), three trenches were investigated within EC-58C associated with larger, burial like anomalies associated with the DGM results.

27.3.2 Intrusive Investigation Results

Three trenches (A, B, and C) were excavated within EC-58C. No MEC or MD were found. Trench A contained a signpost and a burned cinder layer at 1 to 2 ft bgs. Both trenches B and C were associated with buried railroad tracks. Drawings of the trench profiles and photographs are provided in Appendix C-2.

27.4 MC INVESTIGATION

27.4.1 Sampling Process

SI-level sampling was conducted in August 2013 at EC-58C to determine the absence or presence of MC impacts to surface and subsurface soil. One biased surface and subsurface soil sample locations were selected based on DGM results. Three biased surface and two biased subsurface soil sample locations were selected based on trench locations (Figure 28). The subsurface soil sample was not collected at EC-58C-B-SO due to the presence of a railroad rail along the length of the trench. Samples were collected and submitted for laboratory analysis of metals (Al, Cu, Mn, Pb, Sb, Zn), PAHs, dioxins/furans, PCBs, and explosives (2,4,-DNT, 2,6-DNT, and TNT).

27.4.2 Soil Sampling Results

Four surface and two subsurface soil samples were collected and submitted for laboratory analysis of metals (Al, Sb, Cu, Pb, Mn, and Zn), PCBs, PAHs, dioxin/furan compounds, and explosives (2,4-DNT, 2,6-DNT, and TNT). Surface soil analytical results are summarized in Appendix E, Table E2-49, and subsurface soil analytical results are summarized in Table E2-50. Reported results were less than PSLs in the surface and subsurface soil samples.

Groundwater results are provided in Chapter 29, which covers the groundwater results for all of the groundwater collected as part of this RI.

27.5 SLERA Results

27.5.1 Screening to Identify Chemicals of Potential Ecological Concern

Samples from EC-58C were analyzed for metals, dioxins, and PAHs. Six metals, dioxins, and were detected. The maximum concentration of antimony, lead, manganese, and zinc were greater than the soil screening levels and these analytes are identified as COPECs. The screening for COPECs in EC-58C surface soil is provided in Appendix F, Table EC58C-1.

27.5.2 Risk Characterization

EPCs for COPECs are presented in Table EC58C-2. The comparisons of concentrations and doses to receptor-specific TRVs for EC-58C are presented in Tables EC58C-3 through EC58C-6 and a comparison to background is presented in Table EC58C-7. Food web models for individual receptors are included in Tables EC58C-8 through EC58C-10. The results of the comparisons for plants, soil invertebrates, and wildlife receptors (American robin, deer mouse, and red fox) are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

27.5.2.1 Risk Characterization for Plants

When maximum concentrations are compared to TRVs protective of terrestrial plants, the antimony, lead, and zinc concentrations falls below the TRV. There is no available terrestrial plant TRV for dioxins. The maximum concentration of manganese is in exceedance. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Manganese
Manganese was detected in 4 of 4 surface soil samples. The maximum concentration exceeds the plant TRV with an HQ of 2 (Table EC58C-3). The maximum concentration (368 mg/kg) falls below the background soil concentration (700 mg/kg) (Table EC58C-7). Due to the low magnitude of exceedance of the plant TRV and lack of exceedance of background, manganese is not expected to pose risks to terrestrial plants.

27.5.2.2 Risk Characterization for Soil Invertebrates

When maximum concentrations are compared to TRVs protective of soil invertebrates, each of the COPEC concentrations fall below the TRVs. Therefore, no COPECs are expected to pose risk to soil invertebrates.

27.5.2.3 Risk Characterization for Birds

When maximum doses are compared to NOAEL-based TRVs protective of birds, the maximum doses for lead and zinc are in exceedance. There is no available avian TRV for antimony. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Lead
Lead was detected in 5 of 5 surface soil samples. When doses calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, lead has HQs of 10 and 5, respectively (Table EC58C-5). The maximum concentration (95.6 mg/kg) falls below the background soil concentration (124 mg/kg) (Table EC58C-7). Due to the lack of exceedance of the background soil concentration, lead in the surface soil is not expected to pose risk to birds.

Zinc
Zinc was detected in 5 of 5 surface soil samples. When doses calculated using the maximum concentration are compared to NOAEL and LOAEL-based TRVs protective of birds, zinc has

HQs of 2 and below 1, respectively (Table EC58C-5). The maximum concentration (116 mg/kg) exceeds the background soil concentration (83.9 mg/kg) (Table EC58C-7). Due to the low magnitude of exceedance of the NOAEL-based TRV and background as well as the lack of exceedance the LOAEL-based TRV, birds are not expected to be at potential risk from zinc.

27.5.2.4 Risk Characterization for Mammals

When maximum doses are compared to NOAEL-based TRVs protective of mammals, the HQs for each of the COPECs fall below the TRVs. Therefore, no COPECs are expected to pose risk to mammals.

27.5.3 SLERA Conclusions for EC-58C

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors, no COPEC are retained for ecological receptors.

27.6 EC SUMMARY

Based on the results of the DGM and MC sampling conducted at EC-58C, no release has occurred at this EC for either MEC or MC. The SLERA found no potential unacceptable ecological risk. Therefore, EC-58C is recommended for NFA.

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28. IRP SHOP ARSENIC AREA

Based on the arsenic results shown on Figure 29 as collected during the 2013 mobilization, there appears to be an area of arsenic exceedances throughout the IRP Shop Area in the surface soil. Based on discussions with the PDT regarding the 2013 sampling results, it was determined additional sampling was required to determine if the arsenic releases are from activities at each EC, from the overall storage/use of preserved wood throughout this area, or if there are impacts to the overall area due to activities not directly associated with each EC, such as the use of arsenic-based pesticides or herbicides or deposition from surrounding industrial activities. The area was designated as the IRP Shop Arsenic Area for discussions amongst the team and tracking purposes; however, this was not a newly formed EC.

The arsenic sampling was conducted in 2015 for the larger area IRP Shop Arsenic Area, which include the individual IRP sites with arsenic releases (EC-28, EC-31, EC-32, and EC-33) in Fall 2015. The IRP Shop Area in total encompasses EC-16B, EC-27, EC-28, EC-29, EC-30, EC-31, EC-32, and EC-33 (Figure 29). While arsenic is the only metal greater than PSLs, there are associated metals at each of these ECs that are greater than background levels, but not greater than PSLs. A review of these metals (mainly chromium, copper, nickel and zinc) show that this is the metals sampling set associated with the storage of preserved wood, which occurred at all four of these ECs.

Overall IRP Shop Arsenic Area sampling is discussed in this section, while the EC specific sampling is discussed by EC in the sections below.

28.1 OVERALL IRP SHOP SAMPLING

The VSP module "systematic sampling locations for comparing a mean with a fixed threshold" was used to determine the potential arsenic impacts to the IRP Shop Arsenic Area. The primary objective of this sampling design is to compare the site mean to a fixed threshold for the surface soil (0-0.5 ft bgs) where the mean value of the site is expected to equal or exceed a fixed threshold, which was determined to be the surface soil arsenic PSL (9.09 mg/kg). This module determined that 31 sampling locations collected in a systematic grid was required for the IRP Shop Arsenic Area site wide surface sampling. For any prior sampling locations with subsurface soil exceedances, additional subsurface interval samples were taken, as discussed below in the EC specific arsenic sampling. Figure 29 shows the sampling locations that were determined using VSP. All results in this section, even when presented by EC, support the overall arsenic sampling for the project designated IRP Shop Arsenic Area.

EC-28: Building 825 – Post Engineer Shop

Reported results for arsenic were greater than the surface soil PSL (9.09 mg/kg) in the four surface soil samples (17.5 K mg/kg to 60.2 K mg/kg) and greater than the subsurface soil PSL (9.26 mg/kg) in one subsurface soil sample (11.6 K mg/kg). The K qualifier denotes the results may be biased high. Even with the high bias, surface soil arsenic concentrations were twice the surface soil PSL. Thus, these surface soil samples are considered to exceed the screening value and indicate a release of arsenic. The subsurface soil arsenic concentration of 11.6 K mg/kg is similar to the subsurface soil PSL of 9.26 mg/kg. Thus, the exceedance of the subsurface soil

PSL may be due to the high bias of the concentration. As a result, there is uncertainty regarding whether there has been a release of arsenic to subsurface soil at EC-28-02.

In order to determine the extent of the arsenic release to soil that would be related specifically to only the building activities that occurred at EC-28, six co-located surface and subsurface (3-4 ft bgs) soil samples were collected (Figure 29). As the SI-level sampling locations were selected to be near building drainage points, additional sampling near these locations (EC-28-01, 28-02, and 28-04) can be compared to the results from the IRP Shop Area VSP sampling to determine if there is a significant difference from near the building versus the entire IRP Shop Area. ERT also collected a subsurface sample from 4-6 ft bgs at the location at which the subsurface soil sample exceeded the PSL (EC-28-2 shown on Figure 29) and two nearby samples (EC-28-9 and EC-28-10) to delineate vertical extent.

EC-31: S833-Post Engineer Storage

Reported results for arsenic were greater than the PSL (9.09 mg/kg) in both surface soil samples collected from EC-31. Reported results for arsenic that are greater than the PSLs constitute a release. Due to the proximity of EC-31 and EC-32 and the fact that the release mechanism for both EC's for arsenic is the same (i.e., storage of preserved wood), these ECs were grouped together for arsenic sampling purposes. VSP sampling locations SHOP-06, SHOP-07, and SHOP-18 and biased sampling locations EC-32-03, EC-32-09, and EC32-10 (Figure 29) were used to determine if there is a significant difference in arsenic concentrations from near the former building versus the entire IRP Shop Area. These sampling locations were sampled at the surface (0-0.5 ft bgs) and subsurface (3-4 ft bgs) intervals.

EC-32: Building S832-P.E. Lumber Storage

Reported results for arsenic were greater than the PSL (9.09 mg/kg) in both of the surface soil samples and one subsurface soil sample collected (PSL of 9.26 mg/kg, result of 13.4 mg/kg). As noted in the EC-31 section above, EC-31 and EC-32 have been combined for purposes of the arsenic release and the sampling plan is detailed above. ERT also collected a subsurface sample from 4-6 ft bgs at the location at which the subsurface soil sample exceeded the PSL (EC-32-01 shown on Figure 29) to delineate vertical extent.

EC-33: Building 835-BTG. Div. on Lumber Storage

Reported results for arsenic were greater than the PSL (9.09 mg/kg) in one of three surface soil samples (38.7 mg/kg) indicating a release has occurred. Reported results, greater than the PSLs, are shown in Figure A-5. In order to determine the extent of arsenic impacts to soil and if they are associated only with the activities that occurred at this EC or part of the larger IRP Shop Area issue, VSP soil sampling locations SHOP-01 and SHOP-04 (Figure 29) were used to provide additional data for EC-33.

The DQO associated with the IRP Shop Arsenic Area sampling are summarized in Table 28-1.

Table 28-1. DQO - Environmental Sampling for the IRP Shop Arsenic Area

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To determine the areas impacted by an arsenic release in soil.

Table 28-1. DQO - Environmental Sampling for the IRP Shop Arsenic Area

Data Quality Objective Element	EC-Specific DQO Statement
Data User Perspective(s)	To obtain data to determine if the arsenic impacts are from activities at each EC, from the overall storage/use of preserved wood throughout this area, or if there are impacts to the overall area due to activities not directly associated with each EC.
Contaminant or Characteristic of Interest	Based on the reported results greater than the PSL in soil, analyze for arsenic in soil.
Media of Interest	Soil.
Required Sampling Locations or Areas and Depths	VSP Sampling: A. Surface (0-6 inches bgs) EC-28 B. Co-located surface (0-6 inches bgs) and subsurface (3-4 ft bgs) C. Subsurface samples from 4-6 ft bgs at EC-28-02, 28-09 and 28-10. EC-31/32 D. Co-located surface (0-6 inches bgs) and subsurface (3-4 ft bgs). E. Subsurface sample from 4-6 ft bgs at EC-32-01
Number of Samples Required	A. 31 VSP surface soil samples B. 6 co-located surface and subsurface soil samples 3 subsurface sample (associated with C above) C. 5 co-located surface and subsurface soil samples (includes 3 EC-32 locations and 2 VSP locations) D. 1 subsurface sample (associated with E above)
Reference Concentration of Interest or Other Performance Criteria	USEPA RSLs, USEPA Region III BTAG, USEPA Region 4 Ecological Screening Values, USEPA Ecological SSL, and Curtis Bay PSLs (see updated ERT QAPP Worksheet #15). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	Obtain surface and subsurface soil using a hand auger or hand trowel, depending on depth.
Analytical Method	Arsenic analysis by SW-846 Method 6020A.

28.2 SOIL SAMPLING RESULTS

Surface soil analytical results are summarized in Appendix E, Table E2-51, and subsurface soil analytical results are summarized in Table E2-52. Reported results, greater than the PSLs, are summarized below.

Arsenic – Surface
Arsenic was reported at concentrations greater than the surface soil PSL (9.09 mg/kg) in 38 (of 46) surface soil samples. Concentrations ranged from 14.4 mg/kg in the sample collected from Shop-16-SO-0.5 to 397 mg/kg in the sample collected from Shop-05-SO-0.5.

Arsenic - Subsurface
Arsenic was reported at concentrations greater than the subsurface soil PSL (9.26 mg/kg) in the sample collected from EC-28-2-SO-04 (11.6 K mg/kg) and EC-32-1-SO-03 (13.4 mg/kg).

28.3 IRP SHOP AREA ARSENIC SUMMARY

At the conclusion of ERT discrete RI sampling, based on the distribution of arsenic concentrations through the IRP Shop Arsenic Area, the analytical results did not appear to

support the CSM for these ECs. The CSM identifies point sources of arsenic contamination, primarily treated wood storage and use. As the results are widespread and are not consistent in magnitude, these results did not appear to be related to the EC-specific activities. Instead, these results appeared to be more widespread. Historical Depot activities that may have contributed to the widespread, non-point source arsenic contamination potentially include herbicide/pesticide usage and/or material stockpiling. Material stockpiling was the Depot's primary mission between 1952 and 1958. Therefore, further evaluation including a reassessment of the CSM and data gap analysis was recommended to determine the source of the higher than PSL arsenic concentrations as part of a site-wide RI focused on arsenic (and manganese).

The ERT site-wide HHRA determined no potential carcinogenic risks or noncancer hazards greater than acceptable levels for both the site worker and construction worker exposure to arsenic in soil at DU-2, the IRP Shop Area (ERT 2020). Based upon the site-wide investigation, NFA is recommended at IRP Shop Area with respect to arsenic.

29. GROUNDWATER

29.1 GROUNDWATER SAMPLING PROCESS

Groundwater was sampled for the same analytes as the soil for each EC; therefore, as provided in Tables E2-53 through E2-71, the analytes vary between EC. The groundwater sampling locations were selected to be downgradient of a building or known source, associated with release areas, and if there were no field observations that would bias a sample, collected nearest to the closest water body as it is assumed groundwater will flow in that direction (as detailed in the UFP-QAPP, ERT 2013).

As noted in Section 3.2.5, the 2013 point-in-time wells contained significant turbidity levels, even after initial purging. Therefore, when there were elevated concentrations in the sample results, the data could not be directly correlated to the groundwater (as the sediment could have been the source of the analytes). For any point-in-time wells that had exceedances, temporary monitoring wells were installed in 2015 in order to get valid groundwater results. The point-in-time wells without exceedances, which were not resampled included: EC-28 (2 groundwater locations), EC-29 (1 groundwater location), EC-30 (2 groundwater locations), EC-33 (1 groundwater location), EC-35 (1 groundwater location) and EC-36 (2 groundwater locations).

Temporary monitoring wells were installed in 2015 at the following ECs in 2015: EC-3, EC-21, EC-22, EC-25, EC-27, EC-28, EC-29, EC-31, EC-32, EC-33, EC-34, EC-49, EC-52, EC-57D, and EC-58C. The groundwater samples collected in 2015 were analyzed for total and dissolved metals.

During the 2013 field activities, groundwater samples could not be collected from EC-57B (Brass and Steel Area Building 1022) as the sampling points were too close to the building for drill rig access. As the groundwater from EC-34 was resampled in 2015 and this location is next to EC-57B, the EC-34 groundwater location was used to represent both ECs. The groundwater was analyzed for the parameters for EC-34 and EC-57B. Sampling locations for these 2015 wells were offset from the original sampling location by approximately 1 ft.

The well at EC-21-31 could not be completed due to refusal during drilling at the original and multiple offset locations. ERT could not collect a groundwater sample at location EC-58B-4B as the well went dry during purging.

The total number of reported groundwater samples collected in 2013 and 2015 is 26.

29.2 GROUNDWATER SAMPLING RESULTS

Details on the groundwater sampling are provided in Section 3.2.5. Analytical results for groundwater are presented in Appendix E, Tables E2-53 through E2-71. The reported result for TCE was greater than the PSL (5 micrograms per liter [µg/L]) in the sample collected from the background well (BG-MW-01) in 2015. No reported results for site groundwater were greater than the PSLs.

29.3 GROUNDWATER HHRA

The Depot is supplied drinking water by public water supply systems and there are no drinking water wells at the Depot. In addition, the Depot will be deeded to restrict residential use. However, an evaluation of residential use of groundwater aids in the risk management decisions for the Depot by presenting an upper bound of the potential risks to groundwater if a release to groundwater has occurred.

Drinking water in the Depot vicinity is provided by Anne Arundel County, using the Glen Burnie Well System. This system comprises 15 municipal drinking water wells located within a 4-mile radius of the Depot. The 15 wells tap into a semi-confined aquifer and serve the majority of the area. The system well nearest the Depot is on Glendale Road, approximately 2.5 miles west of the Depot. An estimated 250,000 people are served by this system. The depth of the well system aquifer is reportedly greater than 170 ft and approximately 167 people use private drinking water wells within 1 mile of the Depot. Reportedly, the nearest private drinking water well is 0.25 miles from the Depot (Parsons 2006). Surface water is not used as a potable water source in the Depot vicinity.

As described in the Work Plan (ERT 2013), a SLERA is not conducted for groundwater. This is based on the fact that ecological receptors are not directly exposed to groundwater, although they may be indirectly exposed via plant uptake or to surface waters into which contaminated groundwater has discharged. Thus, as shown in the CSMs (Figures 4 through 5), exposure to groundwater is considered an incomplete pathway for ecological receptors at the Depot.

29.3.1 Identification of Chemical of Potential Concern

Detected analytes in groundwater were selected as COPCs based on comparisons to:

- The National Primary Drinking Water Standards MCLs (USEPA, 2009b).

Appendix F, Table GW-2, shows a summary of the groundwater data. Chemicals in groundwater that exceed the MCLs , would be retained as COPCs.

As shown in Appendix F, Table GW-1, there were no exceedances of available MCLs for Depot wells. Therefore, for this HHRA, there were no selected COPCs in groundwater, and potential exposure routes to groundwater at the Curtis Bay Depot were not further evaluated.

For detected analytes in groundwater without drinking water based MCLs, the following comparisons were made:

Detected Metals without Drinking Water Based MCLs

- Aluminum was detected at a maximum of 1.4 mg/L (total) and a maximum of 0.28 mg/L (dissolved). The average concentrations of total aluminum in groundwater[9] are much lower (0.19 mg/L) than the maximum. Aluminum has a secondary MCL of 0.05 to 0.2 mg/L; secondary MCLs are based on aesthetic considerations (e.g., the color of the water). Higher levels of detected total aluminum could be an indication that some particles were included in the sample. In addition, aluminum is only toxic at high intake levels. Thus, aluminum was not selected as a COPC in groundwater.

- Calcium, iron, magnesium, potassium, and sodium are essential elements and would only cause toxicity at high intake levels. Thus, these metals were not selected as COPCs in groundwater.

- Cobalt, nickel, and vanadium are metals that do not have MCLs, however, results for these metals were less than the detected levels in background wells. Thus, these metals were not selected as COPCs in groundwater.

- Manganese has a secondary MCL of 0.05 mg/L, based on aesthetic considerations (the color and taste of the water). Several detected concentrations, both dissolved and total, exceed this secondary MCL and exceed background concentrations. An alternate health-based groundwater screening level is the USEPA Health Advisory level[10] which is 1 mg/L for manganese. Only one well, EC-58C-02, exceeded this level with maximum detects of 3.04 mg/L (dissolved) and 2.8 mg/L (total). The average concentrations of manganese in groundwater[11] are much lower (0.4 to 0.5 mg/L). Since future residential use of groundwater at the Depot is unlikely and since the average concentrations of manganese in groundwater are low, the potential risks due to the detected manganese in groundwater are unlikely to be of human health concern. In addition, manganese is considered an essential dietary element and is only toxic at high intake levels. Thus, manganese in groundwater was not selected as a COPC.

- Some titanium results were greater than those in background wells. However, there are limited published data on the levels of titanium that are considered safe via ingestion;

9 Averages calculated using the detection limit for non-detects.
10 Children's health-based limit for 1-day exposure. The concentration of a chemical in drinking water that is not expected to cause any adverse, noncarcinogenic health effects for up to one day of exposure. The One-Day Health Advisory is typically set to protect a 10-kg child consuming 1 liter of water per day (USEPA, 2012).
11 Calculated using the detection limit for non-detects.

most toxicity data for titanium are related to occupational exposures via inhalation or dermal contact with industrial products. Titanium in drinking water has not been reported to be a public health hazard; consequently, there are no published drinking water standards for this metal. "Titanium has been reported in all samples from 15 rivers in the United States and Canada in concentrations ranging from 2 to 107 µg/L (Durum & Haffty, 1961, as cited in ICPS, 1982). Durfor & Becker (1964, as cited in ICPS, 1982) found titanium in 81 percent of 42 municipal water supplies in the United States at a mean concentration of 2.1 µg/L with a range of 0.5-15 µg/liter." The concentrations of titanium found in the environment and in drinking water, as reported by ICPS (1982) are greater than or similar to the maximum detected concentration in groundwater at the Depot (0.5 ug/L), thus, titanium was not selected as a groundwater COPC.

- Zinc has a secondary MCL of 5 mg/L (based on the taste of the water), and all detected concentrations were less than this level. Thus, zinc was not selected as a COPC in groundwater.

Detected PAHs without Drinking Water-Based MCLs

To evaluate detected carcinogenic PAHs that do not have published MCLs, the relative potency approach (USEPA, 2010b)[12] was used, along with the only published MCL for a PAH (that for benzo(a)pyrene of 0.2 ug/L). While some of the detected PAHs in groundwater had maximum detected concentrations greater than 0.2 ug/L, the average concentrations were less than 0.2 ug/L (as shown in Appendix F, Table GW-2), with the exception of two compounds, naphthalene and phenanthrene, which are discussed further below, along with dibenz(a,h)anthracene:

- Naphthalene had an average concentration of 0.24 ug/L, only slightly higher than the MCL for benzo(a)pyrene (0.2 ug/L), which is more toxic than naphthalene, based on the available literature. Naphthalene is classified as a C (possible human carcinogen) carcinogen in the IRIS, however, no cancer toxicity values are published for this compound. IRIS does publish non-cancer toxicity values for naphthalene (USEPA, 2020b). Based on its non-cancer effects, naphthalene has an alternate health-based groundwater screening level of 0.5 mg/L (USEPA Health Advisory level[13]; USEPA, 2005b), and the average naphthalene concentration (0.24 ug/L) is less than that level. Thus, naphthalene was not selected as a groundwater COPC.

- Phenanthrene had an average concentration of 0.29 ug/L, somewhat higher than the MCL for benzo(a)pyrene (0.2 ug/L), which is considerably more toxic than this compound,

12 Benzo(a)pyrene is used, by convention, as the index PAH, and relative potencies of individual carcinogenic PAHs are determined relative to the potency of benzo(a)pyrene. As a result, carcinogenic PAHs that have been experimentally determined to be more potent than benzo(a)pyrene have relative potency factors greater than 1, and those that are less potent than benzo(a)pyrene have relative potency factors less than 1. For example, a carcinogenic PAH ten-fold more potent than benzo(a)pyrene has a relative potency factor of 10, while one that is ten-fold less potent than benzo(a)pyrene has a relative potency factor of 0.10.

13 Children's health-based limit for 1-day exposure. The concentration of a chemical in drinking water that is not expected to cause any adverse, noncarcinogenic health effects for up to one day of exposure. The One-Day Health Advisory is typically set to protect a 10-kg child consuming 1 liter of water per day (USEPA, 2012).

based on the available literature. Phenanthrene does not have any USEPA published toxicity values, is not listed on the RSL table (USEPA, 2020a), and has limited published toxicity data. However, USEPA determined that enough data were available to classify phenanthrene as non-carcinogenic (USEPA, 2010b), and it is classified as a D carcinogen (not classifiable as to human carcinogenicity) in IRIS (USEPA, 2020b). Therefore, it was not selected as a COPC.

- Dibenz(a,h)anthracene is a detected PAH that is considered more toxic than benzo(a)pyrene, with a relative potency of 10, resulting in a screening level of 0.02 ug/L. The maximum detected concentration of this compound is 0.033 ug/L. However, there were only two detects out of 13 samples, and the average of detected concentrations was 0.0265 ug/l, only somewhat higher than its screening level, thus dibenz(a,h)anthracene was not selected as a groundwater COPC.

Detected Dioxins/Furans without Drinking Water-Based MCLs

For dioxins and furans, only one MCL is published, for 2,3,7,8-TCDD (30 pg/L). With the exception of three compounds (1,2,3,4,6,7,8,9-OCDD, 1,2,3,4,6,7,8-HpCDD, and total heptachlorodibenzo-p-dioxin), all other detected dioxins and furans have average and maximum concentrations less than 30 pg/L. This is a conservative screen, since most dioxin and furan compounds are less toxic than 2,3,7,8-TCDD.

For these three compounds (1,2,3,4,6,7,8,9-OCDD, 1,2,3,4,6,7,8-HpCDD, and total heptachlorodibenzo-p-dioxin), the TEF approach (as described in Section 4.5.2), which compares the toxicity of other dioxins and furans to 2,3,7,8-TCDD, the most toxic dioxin assigned a TEF of 1, was applied as a screening method to determine if any detected concentrations in groundwater could be of concern. These three compounds have TEFs less than one, indicating that they are less toxic than 2,3,7,8-TCDD, as follows:

- 1,2,3,4,6,7,8,9-OCDD: TEF for OCDD=0.0003, resulting in a screening level of 900,000 ug/L and no exceedances of that screening level. Thus, this compound was not selected as a COPC in groundwater.

- 1,2,3,4,6,7,8-HpCDD: TEF=0.01, resulting in a screening level of 3,000 ug/L and no exceedances of that screening level. Thus, this compound was not selected as a COPC in groundwater.

- Total heptachlorodibenzo-p-dioxin: using the TEF for 1,2,3,4,6,7,8-HpCDD: TEF=0.01, resulting in a screening level of 3,000 ug/L and no exceedances of that screening level. Thus, this compound was not selected as a COPC in groundwater.

29.3.2 HHRA Conclusions for Groundwater

A total of 26 groundwater samples were collected for this investigation. All results were less than the PSLs; however, the HHRA was conducted to aid in the risk management decision for the Depot by presenting an upper bound of the potential risks to groundwater if a release to groundwater had occurred.

Based on the HHRA results, NFA relative to Depot groundwater is recommended. Potential future exposures to construction workers would be much less than those calculated for future residents; therefore, the risks associated with this potential future groundwater contact are not likely to be of concern. Groundwater for the Curtis Bay Depot does not require additional investigation, as there has not been a release to the groundwater.

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30. UNNAMED TRIBUTARY SAMPLING

Details on the discrete tributary sampling are provided in Section 3.2.4. The DQOs and sampling and analysis plan associated with 2019 EA incremental sediment samples are summarized in Table 30-1 below.

Table 30-1. DQO – Supplemental RI Incremental Sampling at the Unnamed Tributary

Data Quality Objective Element	EC-Specific DQO Statement
Project Objective(s) Satisfied	To address ecological risk.
Data User Perspective(s)	To obtain additional sediment data and incorporate the data into the SLERA.
Contaminant or Characteristic of Interest	Arsenic and lead
Media of Interest	Sediment
Required Sampling Locations or Areas and Depths	A. Along the Unnamed Tributary Channel - 1 incremental sample (30 increments in triplicate) of sediment (RI Figures 2A and 31A); analyze for arsenic and lead
Number of Samples Required	See A above
Reference Concentration of Interest or Other Performance Criteria	USEPA Regional Screening Levels (RSLs), USEPA Region III Biological Technical Assistance Group (BTAG), USEPA Region 4 Ecological Screening Values, and Curtis Bay background dataset (see the 2019 Work Plan Addendum (EA 2019) QAPP Worksheet #15 for more information). Comparisons to these criteria are utilized to determine COPCs and COPECs for the risk assessment.
Sampling Method	ISM
Analytical Method	Arsenic and lead (Method 6020A)

Analytical results for discrete sediment samples and surface water samples are presented in Appendix E, Table E2-53. Incremental sediment sample results from the Unnamed Tributary are presented in Appendix E-6, Table E6-4.

30.1 UNNAMED TRIBUTARY HABITAT

The Unnamed Tributary is a small, perennial stream that bisects the central portion of the site and drains to Back Creek, then flows into Furnace Creek, and ultimately confluences with Curtis Creek. A narrow and forested riparian area exists along the left bank of this unnamed stream in the central portion of the site from Back Creek Road south to the Back Creek shoreline. This area supports wetlands, waters of the U.S., as well as forested habitat. The right bank of the stream is dominated by a large monotypic stand of common reed grass. There is a clearly defined channel south of Back Creek Road; the stream flows south into a wetland complex without a defined channel, then flows into a defined channel again before the confluence with Back Creek. A brief visual in-stream survey of the habitat included observations of undercut banks, snags, root wads, and woody debris. The adjacent riparian forest provides shading to the stream. No well-developed riffles or cobble were observed and as previously stated, the channel flows into a wetland complex. However, in-stream habitat includes numerous leaf packs as well as woody debris in the form of overhanging roots for aquatic habitat as well as some deeper pools. Mosquitofish (*Gambusia affinis*) were observed and recorded in the stream and an American bullfrog (*Lithobates catesbeianus*) was recovered within the leaf pack. Groundwater and seep areas that support small wetlands are present adjacent to the stream.

Trees are present along this stream that provide good quality habitat in an otherwise urban/industrial area. The narrow riparian forest is likely at least 50 years in age based upon the diameter at breast height (12 to 24 inches) and tree height (approximately 50 ft tall) estimated in the field as well as a survey of old aerial photographs of the site (See Appendix F, Figures 3 through 5). The canopy is dominated by red maple; tulip poplar (*Liriodendron tulipifera*), sweetgum, black willow, red oak (*Quercus rubra*), willow oak (*Quercus phellos*), and chestnut oak (*Quercus montana*); the understory is dominated by rosebay rhododendron (*Rhododendron maximum*), American holly (*Ilex opaca*), and greenbriar (*Smilax rotundifolia*). Mammals observed included typical urban species such as the Eastern gray squirrel and eight white-tailed deer. Avian species observed included an American woodcock (*Scolopax minor*), hairy woodpecker (*Leuconotopicus villosus*), and a great blue heron along the Unnamed Tributary.

Woodcock are attracted to moist, young forests and require a young, dense woodland to provide ample cover and food resources (Tefft 2014). They tend to use edges rather than the interior of big, even-age thickets. In Maryland, the woodcock is a migratory bird that passes through the area to their wintering grounds in Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, and Texas (Ruffed Grouse Society 2017). During both spring and fall migrations, the woodcock requires sufficient food resources and layover sites. The bird's bill, which appears too long for its body, is used to probe rich soils for earthworms; earthworms provide about 60% of the bird's diet. A lush, thick area of shrub or tree growth that is exposed to full sunlight is a highly desired habitat to the woodcock because a variety of food supplies and shelter would likely be available. Numerous earthworms and a large ground beetle (*Carabidae*) were observed during the November 2017 habitat assessment. It is likely that the mature forest and relatively open understory of this area provide the woodcock and other avian species suitable food and cover.

The Unnamed Tributary was ranked as providing high quality habitat in comparison to the other EC areas assessed. The forested riparian area that surrounds the Unnamed Tributary includes mature trees, a developed understory, food sources, shading for the stream, and adequate cover for wildlife species. Additionally, in-stream aquatic habitat is also present and includes undercut banks, overhanging roots, leaf pack, snags, root wads, and woody debris. Mosquitofish and an American bullfrog were observed and recorded in the stream. Groundwater and seep areas that support small wetlands are present adjacent to the stream. An American woodcock was observed in the understory of the mature forest along the stream and a hairy woodpecker was observed foraging on a standing dead tree in the riparian habitat.

30.2 SEDIMENT HHRA

30.2.1 Identification of Chemicals of Potential Concern

For the HHRA screening of COPCs in sediment, detected analytes were compared to industrial soil RSLs. This approach is taken as an initial screening step, since there are no human health risk-based sediment contact levels. This approach was conservative, as contact with sediment in the Unnamed Tributary is expected to be low, and likely lower than soil contact for site workers or trespassers.

An analyte was selected as a COPC in sediment if its maximum detected concentration exceeded the soil RSL. Appendix F, Tables SED-1 and SED-2, show the sediment discrete sample data summary and the selection of COPCs process. Arsenic was the only analyte selected as a COPC in sediment using these conservative screening criteria. Arsenic was not considered in this HHR, and instead was addressed as part of the ERT site-wide investigation indicated no unacceptable risk was identified for human health in soil (ERT 2020). Thus, no COPCs had been carried through the HHRA.

30.2.2 HHRA Conclusions for Sediment

Arsenic was assessed in the site-wide investigation. No potential noncancer hazards or carcinogenic risks were greater than acceptable levels for both the site worker and construction worker for arsenic in soil (ERT 2020). Therefore, trespassers intermittently contacting the EC would also not face unacceptable risk. Based on these HHRA results and the site-wide investigation for soil, NFA is recommended for sediment.

30.3 HHRA – SURFACE WATER

30.3.1 Identification of Chemical of Potential Concern

For the HHRA screening of COPCs in surface water, detected analytes were compared to USEPA AWQC for human health, consumption of water and organisms. In addition, Appendix F, Tables SW-1 and SW-2, show comparisons to the USEPA MCLs for drinking water, to provide some context for those detected analytes without available AWQC. It is noted that these are conservative screening levels because the surface water at the Depot is not used for drinking or fishing. This approach is taken as an initial screening step, since there are no published human-health risk-based surface water contact levels. If screening levels for swimming or wading contact were to be developed, they would be much higher than the drinking water criteria.

An analyte was selected as a COPC if its maximum detected concentration exceeded the USEPA AWQC. Appendix F, Tables SW-1 and SW-2, show the surface water data summary and the selection of COPCs process.

Arsenic exceeded both the AWQC for human health and the MCL, which are set at very low levels, based on the carcinogenicity of arsenic. However, since the Depot surface water will not be used for drinking water in the future, the comparison to these criteria are overly conservative
.

Manganese exceeded the AWQC for human health, but since the Depot surface water will not be used for drinking water or fishing in the future, and since manganese is a commonly occurring inorganic chemical found in surface water and soil, it was not selected as a COPC.

Aluminum exceeded its MCL, but was not carried through the HHRA, as the Unnamed Tributary will not be used in the future for drinking water or fishing. In addition, although the maximum

detected concentration of aluminum (3.44 mg/L) exceeds its secondary MCL (0.05 mg/L), this is not a health-based criterion, and aluminum is a naturally occurring element in water.

Several analytes do not have human health-based surface water screening criteria, and thus are discussed below:

- Cobalt: cobalt is toxic only at high intake levels, and since the Depot surface water will not be used for drinking water or fishing in the future, and since cobalt is a commonly occurring inorganic found in surface water and soil, it was not carried through the HHRA.

- Titanium: there are limited toxicity data available for titanium; since the Depot surface water will not be used for drinking water or fishing in the future, this inorganic chemical was not carried through the HHRA.

- Acetone: acetone is a common laboratory contaminant that is not site related.

- For detected PAHs in surface water without screening criteria, the MCL for benzo(a)pyrene (0.2 ug/L) was applied. No PAHs in surface water exceeded this screening level.

- For dioxins and furans detected in surface water, published TEFs were applied to the 2,3,7,8-TCDD MCL of 30 ug/L. No detected dioxins or furans exceeded their TEF-adjusted screening levels.

Based on this screening step, there were no COPCs in surface water.

30.3.2 Exposure Assessment

The exposure assessment for the HHRA has been described in Section 4.5.2, which lists current site workers and trespassers as potential receptors for Depot surface water via incidental ingestion and dermal contact. However, since no COPCs were selected in surface water for this HHRA, an exposure assessment was not done.

30.3.3 Toxicity Assessment

RfDs, RfCs, and cancer SFs estimate the potential for COPCs to result in health risks, as described in Section 4.5.2. However, since no COPCs were selected in surface water, a toxicity assessment as part of an HHRA for potential surface water receptors was not done.

30.3.4 Risk Characterization

The risk characterization step integrates the toxicity and exposure assessment outputs into quantitative estimates of risk, as described in Section 4.5.3. However, since no COPCs were selected in surface water, a risk characterization as part of a HHRA for the potential surface water human receptors was not done.

30.3.5 HHRA Conclusions for Surface Water

Based on the HHRA results, NFA is recommended for surface water.

30.4 SLERA RESULTS

30.4.1 Identification of Chemicals of Potential Ecological Concern

Sediment and surface water samples were collected from Unnamed Tributary. The COPEC screen in Unnamed Tributary is provided in Appendix F, Table SED-3.

Sediment samples from Unnamed Tributary were analyzed for metals, dioxins, PAHs, PCB Aroclors, SVOCs, VOCs, herbicides, and explosives. Only metals, dioxins, and PAHs were detected. The maximum concentrations of 6 metals, dioxins, and PAHs were greater than the sediment screening levels, so these analytes are identified as COPECs.

Surface water samples from Unnamed Tributary were analyzed for metals, dioxins, PAHs, PCB aroclors, SVOCs, VOCs, herbicides, and explosives. Only metals, dioxins, PAHs, and VOCs were detected. The maximum concentrations of 5 metals, dioxin TEQ, and PAHs were greater than the surface water screening levels, so these analytes are identified as COPECs.

30.4.2 Risk Characterization

EPCs for COPECs are presented in Table SED-4. The comparisons of concentrations and doses to receptor-specific TRVs for Unnamed Tributary are presented in Tables SED-5 through SED-8 and a comparison to background is presented in Table SED-9. Food web models for individual receptors are included in Tables SED-10 and SED-11. The results of the comparisons for osprey, benthic invertebrates, and aquatic organisms are presented in the subsections below. The uncertainties associated with the SLERA are discussed for all ECs in Section 4.6.5.

30.4.2.1 Risk Characterization for Birds

When maximum doses are compared to NOAEL-based TRVs protective of birds, the maximum dose for aluminum and dioxin TEQ have HQs greater than 1. There are no available avian TRVs for titanium. Further evaluation of aluminum and dioxin TEQ is provided below.

<u>Aluminum</u>
Aluminum was detected in 3 of 3 sediment samples and 4 of 4 surface water samples. When the dose for piscivorous birds (represented by osprey) calculated using the maximum concentration are compared to NOAEL-based TRVs protective of birds, aluminum has an HQ of 7 (Table SED-5). There is no available LOAEL-based TRV for birds. Aluminum was identified as a COPEC due to exceedance of the surface water criteria. However, the risk to birds is driven by the maximum sediment concentration, which falls below the sediment screening criteria. Therefore, piscivorous birds are not expected to be at potential risk from aluminum.

Dioxin TEQ
Dioxins were detected in 3 of 3 sediment samples and 1 of 1 surface water samples. When the dose for piscivorous birds (represented by osprey) calculated using the maximum concentration (with ND equal to the detection limit) is compared to NOAEL-based TRVs protective of birds, dioxin TEQ has an HQ of 5 (Table SED-5). There is no available LOAEL-based TRV for birds. When the dioxin TEQ concentration with nondetects equal to 0 is used, the HQ falls below 1. Due to the lack of exceedance of the NOAEL-based TRV by dioxin TEQ (ND=0), piscivorous birds are not expected to be at potential risk from dioxins.

30.4.2.2 Risk Characterization for Benthic Invertebrates

When maximum sediment concentrations of are compared to TRVs protective of benthic invertebrates, the concentrations of these analytes fall below the TRV (SED-6): aluminum, mercury, and total PAHs. There is no available benthic TRV for titanium. When maximum concentrations are compared to TRVs protective of benthic invertebrates, the maximum concentrations for arsenic, lead, and dioxins are in exceedance. Further evaluation of each of the remaining COPECs is provided in the following subsections.

Arsenic
Arsenic was detected in 3 of 3 discrete sediment samples and 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, arsenic has HQs of 18 and 5, respectively (Table SED-6). When the 95UCLM concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, arsenic has HQs of 5 and 2, respectively (Table SED-6). The maximum and 95UCLM arsenic concentrations exceed the background sediment concentration (Table SED-9). Due to the relatively low magnitude of exceedance of the threshold and probable effects TRVs by the 95UCLM concentration, benthic invertebrates are not expected to be at potential risk from arsenic.

Lead
Lead was detected in 3 of 3 discrete sediment samples and 3 of 3 sediment samples collected via incremental sampling. When the maximum concentration is compared to the threshold and probable effects TRVs protective of benthic invertebrates, lead has HQs of 1 and below 1, respectively (Table SED-6). The maximum and 95UCLM lead concentrations exceed the background sediment concentration (Table SED-9). Due to the low magnitude of exceedance of the threshold effects TRV and HQ of 1 when the maximum concentration is compared to the probable effects TRV, benthic invertebrates are not expected to be at potential risk from lead.

Dioxin TEQ
Dioxins were detected in 3 of 3 incremental sediment samples. When the dioxin TEQ concentration is compared to the threshold effects TRV protective of benthic invertebrates, the HQ is 3 (Table SED-6). There is no available probable effects TRV for dioxin TEQ. The maximum dioxin concentration exceeds the background sediment concentration (Table SED-9). Due to the relatively low magnitude of exceedance of the threshold effects TRV, benthic invertebrates are not expected to be at potential risk from dioxins.

30.4.2.3 Risk Characterization for Aquatic Organisms

When maximum surface water concentrations of are compared to TRVs protective of aquatic organisms, the following analytes are in exceedance (Table SED-7): aluminum, manganese, dioxin TEQ, and benzo(a)pyrene. Further evaluation of each of the COPECs is provided in the following subsections.

Aluminum
Aluminum was detected in 4 of 4 surface water samples. When the maximum aluminum concentration is compared to the chronic TRV protective of aquatic organisms, the HQ is 40 (Table SED-7). When the maximum aluminum concentration is compared to the acute TRV protective of aquatic organisms, the HQ is 5 (Table SED-8). The furthest downstream sample (EC-TRIB-1-SW) falls below the acute TRV. Aquatic receptors may be at risk due to aluminum, but since the surface water in the Unnamed Tributary is unlikely to support significant aquatic populations and the furthest downstream sample falls below the acute TRV, ecological risks are not likely and further ecological evaluation is not recommended.

Manganese
Manganese was detected in 4 of 4 surface water samples. When the maximum manganese concentration is compared to the chronic TRV protective of aquatic organisms, the HQ is 12 (Table SED-7). The maximum manganese concentration falls below the acute TRV protective of aquatic organisms (Table SED-8). The maximum sample location (EC-TRIB-2-SW) is 3 to 6 times greater than the other sample concentrations and is bound upstream and downstream by these lower concentrations. Therefore, the extent of the maximum concentration is limited. Due to the lack of exceedance of the acute TRV by the maximum concentration, limited extent of the maximum concentration, and the fact that surface water in the Unnamed Tributary is unlikely to support significant aquatic populations; ecological risks are not likely and further ecological evaluation is not recommended.

Dioxin TEQ
Dioxins were detected in 1 of 1 surface water samples. When the dioxin TEQ concentration calculated with nondetects equal to the detection limit (ND=DL) is compared to the chronic TRV protective of aquatic organisms, the HQ is 9 (Table SED-7). The maximum dioxin TEQ (ND=DL) falls below the acute TRV protective of aquatic organisms (Table SED-8). When the dioxin TEQ concentration calculated with nondetects equal to 0 (ND=0), the sample concentration falls below the chronic TRV protective of aquatic organisms. Due to the lack of exceedance of the chronic TRV by dioxin TEQ (ND=0), aquatic organisms are not expected to be at potential risk from dioxins.

Benzo(a)pyrene
Benzo(a)pyrene was detected in 2 of 4 surface water samples. When the maximum benzo(a)pyrene concentration is compared to the chronic TRV protective of aquatic organisms, the HQ is 2 (Table SED-7). The maximum manganese concentration falls below the acute TRV protective of aquatic organisms (Table SED-8). Due to the low magnitude of exceedance of the chronic TRV and lack of exceedance of the acute TRV by the maximum benzo(a)pyrene concentration, aquatic organisms are not expected to be at potential risk from benzo(a)pyrene.

30.4.3 SLERA Conclusions for Unnamed Tributary

Based on the comparison of maximum and 95UCLM concentrations and estimated doses to TRVs protective of ecological receptors, no analytes are retained as COPEC for ecological receptors. No potential unacceptable ecological risk was identified for the Unnamed Tributary. The Unnamed Tributary is recommended for NFA.

31. DATA QUALITY ASSESSMENT

Achievement of the DQOs provides the basis for concluding that the acquired investigation data are scientifically sound, legally defensible, and adequate for their intended use. An overview of the results of the DQA follows. The complete ERT DQA analysis and DQA tables are presented in Appendix E-1.

31.1 DATA QUALITY – DISCRETE SAMPLES

- The data validation process found no systematic problems, produced minor (e.g., "L" [estimated value, result may be biased low], "J" [estimated value], or "K" [estimated value, result may be biased high] qualified) qualifications of the majority of qualified results with only four rejected results.

- Completeness, regarding the number of regular and field QC samples collected compared to the number of regular and field QC samples that were planned to be collected, was 100%.

- Completeness, regarding the number of regular and field QC analytical results that were determined to be usable, was 99.9%.

- Data validation determined that the overall accuracy, based on the percentage of matrix spike (MS) and matrix spike duplicate (MSD) samples that were within the established percent recovery (%R) control limits, was acceptable. MS/MSD data are concluded to be not meaningful if the spiked concentration is less than one-fourth the concentration of the analyte in the native parent sample; i.e., detection of the spiked concentration is assumed to have been obscured by routine analytical measurement uncertainty. Due to the ratio of the spike concentrations to the sample concentrations, the actual accuracy of the data are likely greater than indicated based on the MS/MSD percent recoveries alone. The overall accuracy as measured by the percentage of MS and MSD samples within the established %R is a lower-bound estimate of overall accuracy.

- Data validation determined that the overall accuracy, based on the percentage of laboratory control samples (LCS) that were within the established %R control limits, was acceptable. Of 17,046 normal environmental samples analyzed a total of 161 results (approximately 1%) were qualified based on LCS %R.

- Overall field duplicate precision for soil samples was 76% and for sediment was 81%, based on the percentage of field duplicates that met the established relative percent difference (RPD) precision limits. Soil and sediment are inherently heterogeneous matrices as samples are difficult to homogenize completely without additional sample preparation (e.g. grinding). Therefore, the field duplicate precisions do not adversely affect the data usability.

- Overall the field duplicate precision DQO for groundwater and surface water samples were met in 96% and 93% of the parent field duplicate pairs analyzed, respectively, based on the established RPD precision limits.

- Data validation determined that the overall precision, based on the percentage of MS and MSD samples that met the established RPD control limits was acceptable. MS/MSD data are concluded to be not meaningful if the spiked concentration is less than one-fourth the concentration of the analyte in the native parent sample; i.e., detection of the spiked concentration is assumed to have been obscured by routine analytical measurement uncertainty. The actual precision of the data is likely greater than indicated based on the MS/MSD RPDs alone and the overall precision of 64% is a lower-bound estimate of the overall precision. Therefore, the MS/MSD precision does not adversely affect the data usability.

- Data validation determined that the overall precision based on the percentage of LCS that met the established RPD control limits was acceptable. No regular environmental samples were qualified based on LCS RPDs alone.

- Representativeness was evaluated by comparing preservation and analytical procedures to those described in the UFP-QAPP (ERT 2013), by evaluating holding times, and by examining blanks for possible contamination of samples during collection and analysis. All samples were preserved, prepared, and analyzed following methods specified in the UFP-QAPP (ERT 2013), except as noted in Appendix E1. Representativeness is also evaluated by assessing the RPDs for field duplicate, MS/MSD, and LCS/LCS Duplicate samples. RPDs were generally within acceptable limits, except as noted in Appendix E1. Therefore, representativeness was achieved.

- Comparability refers to the confidence with which one data set can be compared to another. To improve data comparability, the data set used for sampling activities for the RI was generated by employing standardized analytical methods and standardized data validation procedures. Project planning, including lab selection, incorporated various appropriate USEPA guidance documents, as well as direct input from USACE on field, laboratory, and data screening issues to ensure the comparability of the data. Because of the implementation of standard and consistent planning, field, analytical, and validation procedures during this investigation; the site data can be compared with confidence to historical site data of acceptable data quality. Therefore, comparability was achieved.

- Sensitivity of laboratory limits to screening level benchmarks was affected by extremely sensitive screening levels, sample dilutions, and soil moisture content. As noted in the ERT UFP-QAPP, Worksheet #15, the screening levels for several compounds are lower than the achievable laboratory limits. Soil and sediment moisture content and sample dilution increase the achievable limit of quantitation and limit of detection levels. Therefore, samples with high moisture content and samples that required dilution may exhibit limits of quantification (LOQs) and limits of detection (LODs) that are greater than the screening levels. Sensitivity is discussed in Appendix E1 and analytical results exhibiting sensitivity issues are presented per matrix in Appendix E, Table E1-38 (soil sampling), Table E1-39 (groundwater sampling), Table E1-40 (sediment sampling), and Table E1-41 (surface water sampling).

31.2 DATA QUALITY – INCREMENTAL SAMPLES

- The data validation process found no systematic problems and produced minor, "J" [estimated value], qualifications of the qualified results. No data was rejected during the data validation process.

- Completeness, regarding the number of regular and field QC samples collected compared to the number of regular and field QC samples that were planned to be collected, was 100%.

- Completeness, regarding the number of regular and field QC analytical results that were determined to be usable, was 100%.

- Data validation determined that the overall accuracy, based on the percentage of MS and MSD samples that were within the established %R control limits, was acceptable. MS/MSD data are concluded to be not meaningful if the spiked concentration is less than one-fourth the concentration of the analyte in the native parent sample; i.e., detection of the spiked concentration is assumed to have been obscured by routine analytical measurement uncertainty. Due to the ratio of the spike concentrations to the sample concentrations, the actual accuracy of the data is likely greater than indicated based on the MS/MSD percent recoveries alone. The overall accuracy as measured by the percentage of MS and MSD samples within the established %R is a lower-bound estimate of overall accuracy. Eight PAH and three metal analytes were qualified as estimated "J", due to recoveries outside QC limits.

- Data validation determined that the overall accuracy, based on the percentage of LCS that were within the established %R control limits, was acceptable. No data was qualified based on LCS recoveries.

- Incremental samples were collected in triplicate. Several soil and sediment triplicates had a relative standard deviation over 30% and have been "J" qualified during the validation process. Soil and sediment are inherently heterogeneous matrices as samples are difficult to homogenize. Therefore, the incremental samples' precisions do not adversely affect the data usability.

- Data validation determined that the overall precision based on the percentage of MS and MSD samples that met the established RPD control limits was acceptable. No data were qualified based on RPDs outside QC limits.

- Data validation determined that the overall precision based on the percentage of LCS that met the established RPD control limits was acceptable. No data was qualified based on LCS RPDs.

- Representativeness was evaluated by comparing preservation and analytical procedures to those described in the UFP-QAPP (EA 2019), by evaluating holding times, and by examining blanks for possible contamination of samples during collection and analysis. All samples were preserved, prepared, and analyzed following methods specified in the

UFP-QAPP (EA 2019) with the exception of the soil PAH SIM analysis. The PAH SIM analysis was not reported by the laboratory due to failing internal standards, failing end continuing calibration verification, and over-range levels or target analytes present. The soil samples were run and reported by the laboratory by method SW8270D with compliant QC. Representativeness is also evaluated by assessing the relative standard deviations for incremental samples, the RPD MS/MSD, and LCS/LCS Duplicate samples. Relative standard deviations and RPDs were generally within acceptable limits. Therefore, representativeness was achieved.

- Comparability refers to the confidence with which one data set can be compared to another. To improve data comparability, the data set used for sampling activities for the RI/FS was generated by employing standardized analytical methods and standardized data validation procedures. Project planning, including lab selection, incorporated various appropriate USEPA guidance documents, as well as direct input from USACE on field, laboratory, and data screening issues to ensure the comparability of the data. Because of the implementation of standard and consistent planning, field, analytical, and validation procedures during this investigation; the site data can be compared with confidence to historical site data of acceptable data quality. Therefore, comparability was achieved.

- Sensitivity of laboratory limits to screening level benchmarks was not affected by sample dilutions, and soil moisture content. The sensitivity DQO was met for the incremental samples collected for this investigation.

31.3 DATA UNCERTAINTY – DISCRETE SAMPLES

As with all datasets, a level of uncertainty is typically associated with the data and its usability. In order to reduce the data uncertainties and biases, field instrument calibration, sample collection, and laboratory analyses were conducted in accordance with the standard operating procedures as outlined in the UFP-QAPP (ERT 2013), except as noted in Appendix E-1. Additionally, laboratory analytical techniques have a degree of uncertainty associated with them. These uncertainties are documented by using data qualifiers to reflect the uncertainty of the measurement. The presence of "K", "L", "UL", "J", and "UJ" qualified data in this dataset could create a bias. The direction of bias is unclear for the "J" qualified data. The "K" qualifiers indicate a potential high bias. The "L" and "UL" qualifiers indicate a potential low bias. Note that the estimated result totals include samples that were qualified as estimated by the laboratory (reported results were less than the LOQ, but greater than the LOD).

Data that are flagged with "J", "L", "UL", or "K" qualifiers have more measurement uncertainty surrounding them than do un-flagged data. However, they are usable because they provide information that is considered valid, albeit with more measurement uncertainty that data classified as fully quantitative (un-flagged).

Qualified data are usable for risk assessment, but not for making a decision about a particular sampling location (e.g., whether to abandon a well because a clean-up goal was met). Data uncertainties are discussed in the HHRA and SLERA.

Qualified analytical data were used in risk assessments and not for making decisions about a particular sampling location. Therefore, the analytical results for soil, groundwater, sediment and surface water are useable for project purposes.

The presence of rejected data decreased the sample size for the data sets associated with the sampling at the Depot; however, the datasets were still large enough to provide valid statistical analysis of the datasets. There were four analytical results that were rejected (0.02%) and 16,397 analytical results that were determined to be useable for project purposes.

31.4 DATA UNCERTAINTY – INCREMENTAL SAMPLES

As with all datasets, a level of uncertainty is typically associated with the data and its usability. In order to reduce the data uncertainties and biases, field instrument calibration, sample collection, and laboratory analyses were conducted in accordance with the standard operating procedures as outlined in the UFP-QAPP (EA 2019). Additionally, laboratory analytical techniques have a degree of uncertainty associated with them. These uncertainties are documented by using data qualifiers to reflect the uncertainty of the measurement. The presence of "J", and "UJ" qualified data in this dataset could create a bias. The direction of bias is unclear for the "J" qualified data. Note that the estimated results include samples that were qualified as estimated by the laboratory (reported results were less than the LOQ, but greater than the detection limit).

Data that are flagged with "J", qualifiers have more measurement uncertainty surrounding them than do un-flagged data. However, they are usable because they provide information that is considered valid, albeit with more measurement uncertainty that data classified as fully quantitative (unflagged).

Qualified data are usable for risk assessment, but not for deciding about a particular sampling location (e.g., whether to abandon a well because a clean-up goal was met). Data uncertainties are discussed in the HHRA and SLERA.

Qualified analytical data were used in risk assessments and not for making decisions about a particular sampling location. Therefore, the analytical results for soil and sediment are useable for project purposes.

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32. UPDATED CONCEPTUAL SITE MODELS

A CSM identifies contaminant sources and transport mechanisms, potential human or ecological receptors, and exposure scenarios. A CSM is an effective tool in the planning phases of a RI to define the goals of the investigation, streamline the risk evaluation, and to develop appropriate response actions. It identifies complete exposure pathways for the media affected by site-related contamination. Understanding site conditions and land uses helps to accurately identify potential receptors under current and likely future scenarios, as well as the most appropriate corrective action, if necessary.

CSMs for current and future human and ecological receptor exposure scenarios at the Depot have been developed to aid in understanding and describing the ECs, and to present assumptions regarding:

- Suspected sources and types of constituents present,
- Constituent release and transport mechanisms,
- Affected media,
- Potential exposure routes, and
- Potential human and ecological receptors.

The preliminary CSMs are discussed in Section 3.1 and are presented in Figures 3 through 5 of Appendix A. The revised CSMs are presented in Figures 4 and 5 of Appendix A of this report.

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33. FATE AND TRANSPORT

An overview of fate and transport mechanisms are presented below.

33.1 DESCRIPTION OF FATE AND TRANSPORT MECHANISMS

33.1.1 Airborne Transport Process

Movement of COPCs absorbed to surface soil via atmospheric wind is a potential transportation pathway. Airborne transport is generally limited due to particle size, wind speed, and other site-specific conditions. Although the Depot is vegetated, COPC migration via airborne transport at the Depot could be a concern during future construction or other activities in which vegetation and soil are removed.

33.1.2 Aqueous Transport Process

Aqueous transport can be accomplished by one of two potential migration pathways or transport mechanisms, unsaturated gravitational flow of surface water or saturated advective flow of groundwater.

33.1.2.1 Surface Water

Conditions at the Depot enable some movement of surface water flow towards Curtis Creek. Surface water provides a potential critical pathway for chemical constituents to migrate from a source area. Based on the typical topography of the Depot, characterized by relatively level grade surface, during heavy rain events, sheet flow or overland flow of surface water may result in surface water flowing into Curtis Creek. Direct infiltration of surface water to the shallow groundwater can contribute to the migration of constituents. The vertical permeability of the surface soils is moderate (0.6 to 2.0 inches per hour). However, no COPCs were detected in groundwater at the Depot. In addition, vegetation typically inhibits the erosion of soil particles.

33.1.2.2 Groundwater

Groundwater recharge at the site occurs primarily from precipitation and snowmelt infiltration. As water filters through the surface soil and overburden and then into the soil pores, constituents can be transported via groundwater flow from areas of high hydraulic head to areas of low hydraulic head. Hydraulic head is the water level pressure at a point in an aquifer, which is determined by measuring the height of the water in a groundwater well and converting it to a water level height above a geodetic datum. In order to completely evaluate the groundwater migration horizontal groundwater flow, vertical groundwater flow, and residence time must be investigated.

Locally, groundwater occurs in the surficial sediments overlying the shallow clay, often under perched conditions.

Based on the results of the RI, the pathway to groundwater at the Depot is incomplete.

33.2 FATE PROCESSES

Acid-base reactions, volatilization, precipitation, complexation, sorption, oxidation-reduction, hydrolysis and isotopic reactions all affect constituent fate processes.

The organic carbon partition coefficient, K_{oc}, provides an indication of the tendency of a chemical to partition between particles containing organic carbon content and water. The greater the K_{oc}, the less likely the constituent will partition from soil to water.

Organic compounds under naturally occurring environmental conditions will ultimately revert to elemental forms due to exposure to the air, water, bacteria, sunlight, soil, or a combination of these factors. The persistence of organic constituents in the environment is directly related to its specific resistance to degradation. Surface soil and subsurface soil constituents are typically degraded due to biodegradation and hydrolysis. Most hydrolysis half-lives in soil are based upon rate data determined in water, since hydrolysis data in soil were rare to find (Howard, 1993). Surface soil and subsurface soil half-lives provide an estimate of the natural in-situ attenuation of the target compound. Surface soil and subsurface soil concentration were considered to be unaffected by additional source loading.

33.2.1 Potential Routes of Constituent Migration

Fate and transport mechanisms and characteristics of chemicals were used to evaluate site-specific analytical data in order to identify constituents with concentrations reported greater than the PSLs that have the potential to persist or migrate along potential transport pathways. Two potential routes of migration were evaluated, airborne transport and surface water transport. Due to the reported concentrations of COPCs in groundwater analytical data, the groundwater route is no longer considered.

Airborne Transport
Airborne transport of impacted surface soil is possible but considered unlikely due to the minimal amount of exposed soil at the Depot. The vegetation at the Depot will significantly reduce the likelihood of airborne transport of contaminated soil to onsite and/or offsite receptors.

Migration of constituents via soil and/or sediment erosion in exposed areas is possible; however, migration is laterally limited due to the vegetation. As a result of vegetation, soil and/or sediment are root bound and significantly reduced from transport via erosion.

Subsurface soil is not susceptible to airborne or surface water transport. Barring subsurface soil disturbance activities at the Depot, potential receptors will not interact with identified constituents in surface soil. Due to the lack of increasing or persistent constituent concentrations with depth, the migration of constituents in subsurface soil is minimal.

Surface Water Transport
Surface water transport of contaminated soil is possible, but laterally limited. The fate of identified constituents in surface water is inversely affected by degradation via natural attenuation and accumulation via overland flow.

34. SUMMARY OF RESULTS

An RI was conducted at 15 IRP ECs and 7 MMRP ECs and the Unnamed Tributary at the Depot to determine 1) if there had been a release, and 2) if a release had occurred determine the nature and extent of that release and if there were any human health or environmental risks. Additionally, for the MMRP ECs, DGM and intrusive investigations were conducted to determine if there was a MEC hazard at any of the ECs. Two of the original seven MMRP ECs were divided into different areas: EC-57 became EC-57B, EC-57C and EC-57D, while EC-58 became EC-58B and EC-58C. During project planning activities, two of the original 15 IRP ECs, EC-39 and EC-53, were recommended for NFA by the PDT and no samples were collected from these ECs. Additionally, EC-25 and EC-49 were investigated in support of the EE/CA by ERT; due to the then-upcoming NTCRA to address MEC/MPPEH hazards identified at these ECs, RIs were not completed for EC-25 and EC-49. An RI for both ECs will be conducted under a separate contract.

A total of 583 discrete primary surface and subsurface soil, 26 groundwater, 4 discrete sediment and 6 surface water samples were collected during this RI. An additional 183 QC samples were collected, for a total of 826 samples collected. In addition, 20 incremental samples, inclusive of QC samples, were collected by EA in April 2019 to address EC-21 (8 surface soil and 3 sediment[14]); EC-58B (3 sediment); and the Unnamed Tributary (3 replicates). A background incremental sediment sample (3 replicates) was collected from the stream channel of a separate Back Creek tributary along the southwestern site boundary. ISM samples within three DUs were also collected by ERT as part of the site-wide investigation (ERT 2020), and USACE collected 4 samples to address MDE concerns regarding residual propellant (USACE 2020)

34.1 NATURE AND EXTENT OF MEC/MPPEH

Historically, MEC was found only at EC-49, and by association, EC-25. No MEC was found during the field activities at any of the RI MMRP ECs, which includes the following ECs:

- EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)
- EC-22: Barricade 646-XK/Former Explosive Open Burning Area
- EC-52: Disturbed areas at the end of G-line Road noted on aerial photographs
- EC-57B: Building 1022 – Brass and Steel Area
- EC-57C: Building J-408
- EC-57D: Brass and Steel Stockpile Area
- EC-58B: Explosive Open Burning/Wire Cage
- EC-58C: Explosive Open Burning/Wire Cage.

MD was found at EC-21 in the surface and top 12 inches of one trench (21B), and consisted of cartridge cases, bullets, flash tubes, and grenade bodies. MD (.30 caliber shells) was also found at one of the subsurface soil sampling locations at EC-57D. At EC-21 and EC-52 residual

14 Incremental surface soil samples at EC-21 were collected as a primary, duplicate, and triplicate at one of the six SUs of this DU (SU3). Other DUs for incremental sediment samples had 3 replicates: one primary, duplicate, and triplicate sample.

propellent grains were identified and soil and the grain material were sampled by USACE (USACE 2020). Based on the field investigation results, there is no MEC hazard at any of the MMRP ECs at the Depot.

No MEC was found during the 2013 EE/CA field investigation at EC-25: Dump/Powder Burning Tower (Building 1052)/Powder Burning Plant and EC-49. Due to the exclusion of these sites from ERT RI sampling due to the NTCRA, this RI report provides only a summary of the EE/CA findings (ERT 2016). A full RI will be conducted at these ECs under a separate contract.

34.2 NATURE AND EXTENT OF MC CONTAMINATION

Surface and subsurface soil sampling was conducted at each MMRP EC: 1) to determine if a release had occurred, and/or 2) where a release had occurred, to determine the nature and extent of MC contamination. The analytes selected for each EC were based on specific historical information.

Based on the 2013 field activities, the following MMRP ECs were determined to not have a release of MC:

- EC-22: Barricade 646-XK/Former Explosive Open Burning Area
- EC-52: Disturbed areas at the end of G-line Road noted on aerial photographs
- EC-58C: Explosive Open Burning/Wire Cage

MC releases were found at the following ECs:

- EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)
- EC-57B: Building 1022 – Brass and Steel Area
- EC-57C: Building J-408
- EC-57D: Brass and Steel Stockpile Area
- EC-58B: Explosive Open Burning/Wire Cage

However, based on the results of the HHRAs there are no human health concerns for these ECs, except EC-21 and EC-57D. PAHs are the concern for potential unacceptable cancer risk for the site worker and trespassers intermittently contacting EC-21. Additionally, potential lead "hot spots" were identified within EC-21 that may present a concern for human health to site workers, construction workers and trespassers. The ERT site-wide HHRA determined there are potential non-cancer hazards for the site worker and construction worker for exposure to DU-3 (EC-57D) from manganese and, therefore, also for a trespasser intermittently contacting the EC.

The results of the SLERAs conducted individually for these ECs, found potential unacceptable ecological risks at EC-57B (due to zinc) and EC-57D (due to manganese).

Groundwater sampling was conducted at each of these MMRP ECs; there were no analytes with concentrations greater than the PSLs. Therefore, there have been no releases to groundwater from the MMRP ECs. Discrete sediment and surface water sampling were conducted at EC-58B and in 2019, incremental sediment sampling was also conducted at EC-58B by EA. No analytes

were identified at concentrations greater than the PSLs; therefore, there was no release to the sediment or surface water at EC-58B.

34.3 NATURE AND EXTENT OF HTW CONTAMINATION

Surface and subsurface soil sampling was conducted at each HTW EC: 1) to determine if a release had occurred, and/or 2) where a release had occurred, to determine the nature and extent of HTW contamination. The analytes selected for each EC were based on specific historical information.

Based on the 2013 field activities, the following IRP ECs were determined to not have a release of HTW:

- EC-3: PE Paint Storage
- EC-16: Transformers (EC-16A, EC-16C, EC-16D)
- EC-27: Building 831 – Oil House Utility Area
- EC-28: Building 825 – Post Engineer Shop
- EC-30: Building 821 – Locomotive House
- EC-31: Building S833 – Post Engineer Storage
- EC-33: Building 835 – BTG. Div. on Lumber Storage Shed
- EC-34: Building 1025 – Boiler House – Warehouse Area
- EC-35: Building1026 – Oil House – Warehouse Area
- EC-50: Building 724-G – Tire Retreading Shop

HTW releases were found at the following ECs:

- EC-16: Transformers (EC-16B)
- EC-29: Building 822 – E.E. Machine Shop
- EC-32: Building S832 – P.E. Lumber Storage
- EC-36: Building 515 – Incinerator Plant.

Potential human health risks were identified for EC-32 for site worker and construction worker exposure to PAHs; therefore, trespassers may also face potential risk from intermittent contact with soil in the EC.

The SLERAs found potential unacceptable ecological risk at EC-28 (lead) and EC-36 (lead).

In addition, arsenic concentrations were greater than the PSLs, primarily in surface soil samples, collected in the IRP Shop area. The distribution and concentrations of arsenic did not appear to support the current CSM. Therefore, further investigations of the elevated arsenic concentrations was completed in the ERT site-wide investigation with the IRP Shop Area represented by DU 2 (ERT 2020). The site-wide HHRA determined there were no potential human health concerns for the site worker and construction worker or trespasser to exposure to soil within the IRP Shop Area from arsenic.

Groundwater sampling was conducted at each of these IRP ECs; there were no analytes over the PSL. Therefore, there have been no releases to groundwater from the IRP ECs.

Surface water and discrete sediment samples collected from the Unnamed Tributary were analyzed for PAHs, pentachlorophenol, PCBs, dioxins/furans, select metals[15], select explosives, solvents and herbicides. Incremental sediment samples collected in 2019 by EA were analyzed for arsenic and lead. Based on the HHRA results, NFA for sediment and surface water is recommended.

34.4 SUMMARY OF ALL ECS

Table 34.1 provides an overall summary of the ECs and their status at the conclusion of this RI. No MEC was found during the field investigation, all of the MMRP ECs carried through the RI are recommended for NFA for MEC. However, MD, residual propellant grains, were identified at EC-21 and EC-52. EC-25 and EC-49 were not included in this RI due to the NTCRA and an RI will be conducted for those ECs under a separate contract.

15 Per the 2015 Final ERT Work Plan, discrete sediment samples and surface water were analyzed for PAHs, pentachlorophenol, PCBs, dioxins/furans, metals (Al, As, Cd, Co, Cr, Cr+6, Cu, Hg, Mn, Ni, Pb, Sb, Ti, Zn), explosives (2,4-DNT, 2,6-DNT, TNT, nitroglycerin nitroguanidine), solvents and herbicides.

Table 34-1. EC Summary Results at Completion of RI

NFA based on No MC/HTW Release Identified	NFA based on HHRA and SLERA results	ECs recommended for inclusion in the Feasibility Study
MMRP ECs[1] **EC-22**: Barricade 646-XK/Former Explosive Open Burning Area **EC-58C**: Open Burning Wire Cage	**MMRP ECs** **EC-57C**: Bldg. J-408 **EC-58B**: Explosive Open Burning/Wire Cage	**MMRP ECs** **EC-21:** Barricade 645 (HHRA and Propellant Area) **EC-52**: Disturbed Areas at End of G-Line Road (Propellant Area only) **EC-57B:** Building 1022 – Brass and Steel Area (SLERA) **EC-57D:** Brass and Steel Stockpile Storage Area (HHRA and SLERA)
IRP ECs[2] **EC-3**: PE Paint storage **EC-16A, EC-16C, EC-16D**: Transformers **EC-27**: Bldg. 831 Oil House Utility Area **EC-31**: Bldg. S8s33 - Post Engineer Storage **EC-33**: Bldg. S835 – BTG Lumber Storage Shed **EC-34**: Bldg 1025–Boiler House Warehouse Area **EC-35**: Bldg 1026 – Oil House Warehouse Area **EC-50**: Bldg 724-G Tire Retreading Shop **Groundwater**	**IRP ECs** **EC-16B:** Transformer located in IRP Shop Area **EC-29**: Bldg 822 - E.E. Machine Shop **EC-30**: Bldg. 821 – Locomotive House **Unnamed Tributary** **IRP Shop Area**	**IRP ECs** **EC-28**: Bldg. 825 – Post Engineer Shops (SLERA) **EC-32**: Bldg. S832 – Post Engineer Lumber Storage (HHRA) **EC-36:** Incinerator Plant (SLERA)

Notes:
1) An RI was not completed at EC-25 and EC-49 due to the NTCRA. An RI will be completed under separate contract at these ECs; therefore, they are not included in the summary table.
2) EC-39 and EC-53 were recommended for NFA during development of the ERT 2013 Work Plan; therefore, they are not included in the summary table.

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Maryland
Department of
the Environment

Larry Hogan, Governor
Boyd K. Rutherford, Lt. Governor

Ben Grumbles, Secretary
Horacio Tablada, Deputy Secretary

March 17, 2021

Sent via email from [redacted]@maryland.gov

Ms. [redacted]
Defense Logistics Agency, DS-E
8725 John J. Kingman Road
[redacted]
Fort Belvoir, Virginia 22060

RE: Final Remedial Investigation Report for Depot-Wide Remedial Investigation/Feasibility Study for Arsenic and Manganese in Soil at the Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland – October 2020

Dear [redacted]:

The Federal Facilities Installation Restoration Program of the Maryland Department of the Environment has reviewed the above referenced document and has enclosed comments for the Defense Logistic Agency's consideration.

If you have any questions, please contact me at [redacted]

Sincerely,

[redacted]
Remedial Project Manager
Federal Facilities Installation Restoration Program

Enclosure

cc: Mr. [redacted] Chief, Federal Assessment and Remediation Division

Maryland Department of the Environment
Land Restoration Program
Federal Facilities Installation Restoration Program

Comments on: Final Remedial Investigation Report for Depot-Wide Remedial Investigation/Feasibility Study for Arsenic and Manganese in Soil at the Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland – October 2020

General Comment:

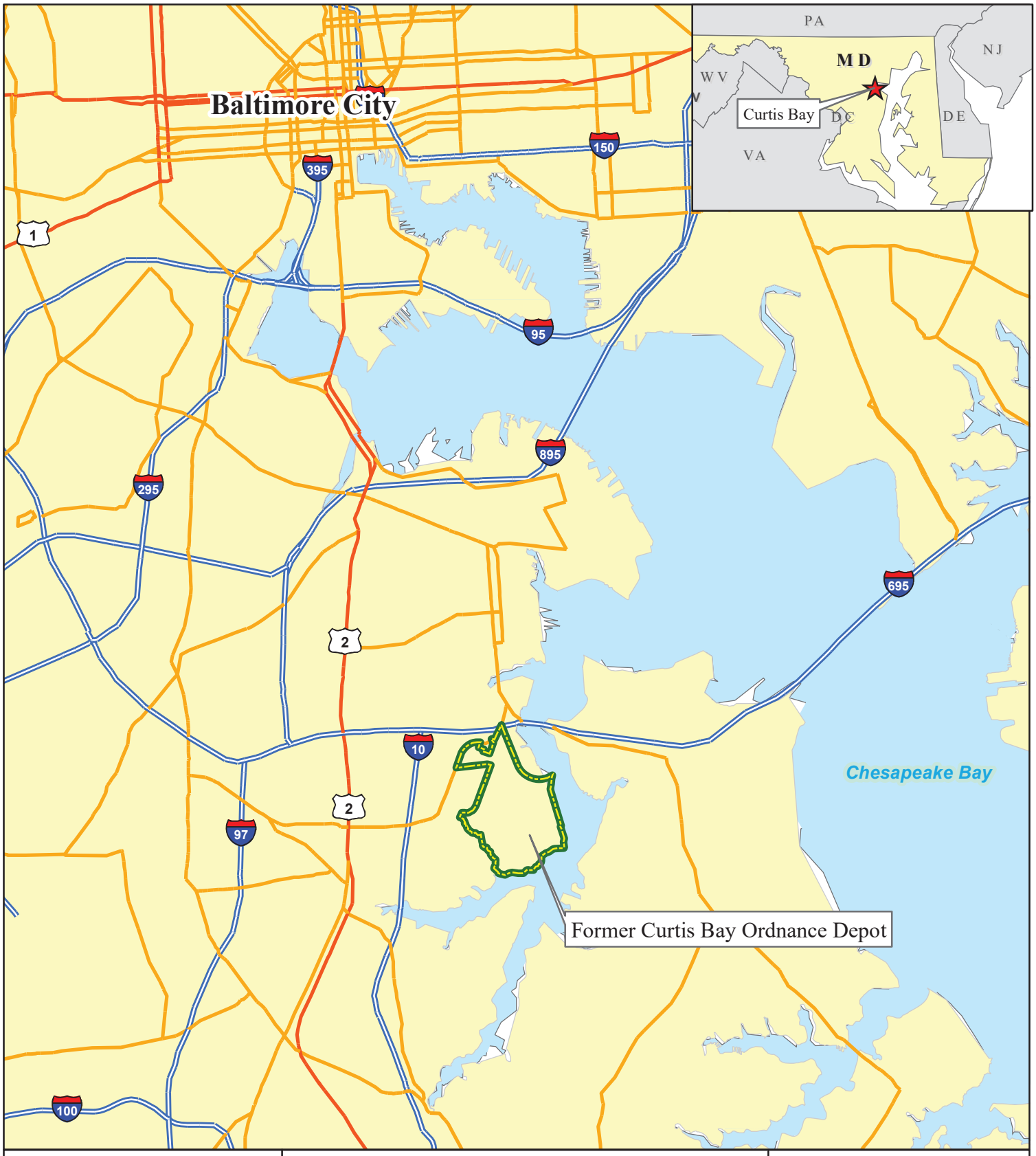
1. Table ES-2, Screening Level Ecological Risk Assessment Conclusions for the Former Curtis Bay Ordnance Depot Arsenic and Manganese Remedial Investigation, concludes that "Ecological Impacts are Unlikely" for Decision Units (DUs) 1 and 2 with respect to manganese in soil. The Federal Facilities Installation Restoration Program (FFIRP) has concerns with these conclusions, as the Hazard Quotients using the 95% Upper Confidence Limit for manganese in soil for DUs 1 and 2 for plants and soil invertebrates are 28 and 14, and 13 and 6.1, respectively. Review of individual sampling unit (SU) data for DUs 1 and 2 reveal an apparent pattern of significantly elevated concentrations of manganese in soil in the southwestern-most 2 SUs of DU2 (SUs 11 and 12) and 3 adjacent SUs of DU1 (SUs 12, 15, and 18). It is recommended that this area be evaluated in the Feasibility Study for remedial action to protect ecological receptors in the vicinity of these SUs. Results are included in the table below, with sample depth units as feet below ground surface (ft bgs) and concentrations in milligrams per kilogram (mg/kg):

DU/SU#	Sample Depth, in ft bgs	Arsenic, in mg/kg	Manganese, in mg/kg
DU1/SU12	0-1	11.5	27,700
	1-2	12.9	9,600
DU1/SU15	0-1	44.6	16,600
	1-2	8 J-	1,200
DU1/SU18	0-1	55.1	17,900
	1-2	13.4	2,400
DU2/SU11	0-1	43	5,890
	1-2	12	894
DU2/SU12	0-1	21.3	7,010
	1-2	10.6	784

There is an additional DU1 SU, SU37, which is located along the DU1 eastern boundary 300 feet north of DU3, where manganese in soil has been determined to adversely impact ecological receptors, which also contains unusually elevated concentrations of manganese in soil which might benefit from additional evaluation in the Feasibility Study. Concentrations are as below:

DU/SU#	Sample Depth, in ft bgs	Arsenic, in mg/kg	Manganese, in mg/kg
DU1/SU37	0-1	16.2	23,400
	1-2	12.4	18,500

It is the opinion of the FFIRP that if these SUs were to be remedially addressed, risk to ecological receptors from manganese in soil would be significantly reduced, as the majority of the SUs sampled in DU1 contain significantly lower concentrations of manganese compared to SUs 12, 15, 18, and 37. The entirety of DU2 has already been recommended for evaluation in a Feasibility Study due to unacceptable carcinogenic risk to future resident child receptors for both arsenic and manganese, and to future adult residents for arsenic.



US Army Corps of Engineers
BUILDING STRONG

ERT, Inc.

Legend

- Former Curtis Bay Depot Boundary
- Curtis Bay Depot Location
- Limited Access Road
- Highway
- Major Road
- Rivers and Bays

0 0.625 1.25 Miles

Date: June 2016

Figure 1
Site Location Map
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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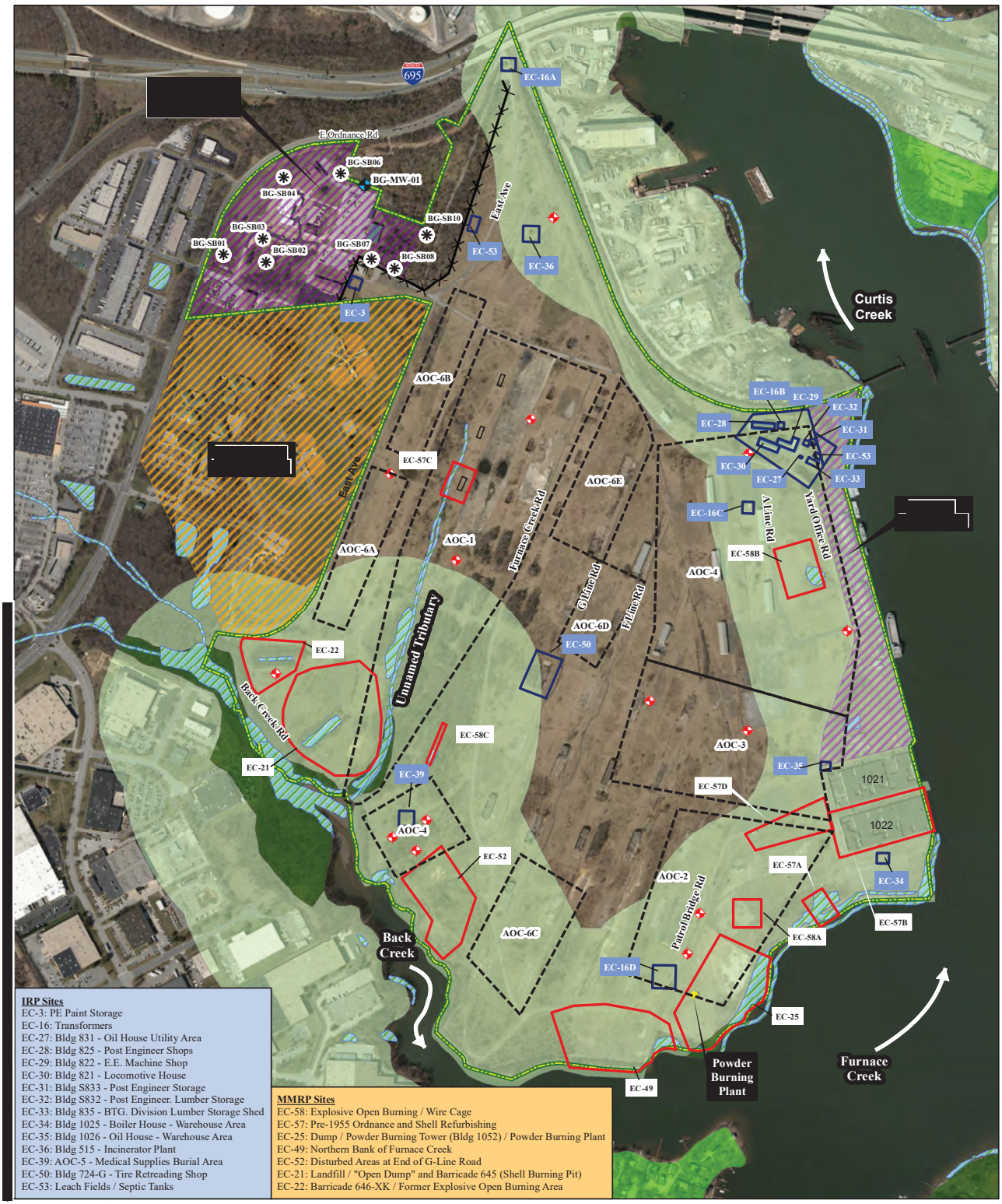

IRP Sites
EC-3: PE Paint Storage
EC-16: Transformers
EC-27: Bldg 831 - Oil House Utility Area
EC-28: Bldg 825 - Post Engineer Shops
EC-29: Bldg 822 - E.E. Machine Shop
EC-30: Bldg 821 - Locomotive House
EC-31: Bldg S833 - Post Engineer Storage
EC-32: Bldg S832 - Post Engineer. Lumber Storage
EC-33: Bldg 835 - BTG. Division Lumber Storage Shed
EC-34: Bldg 1025 - Boiler House - Warehouse Area
EC-35: Bldg 1026 - Oil House - Warehouse Area
EC-36: Bldg 515 - Incinerator Plant
EC-39: AOC-5 - Medical Supplies Burial Area
EC-50: Bldg 724-G - Tire Retreading Shop
EC-53: Leach Fields / Septic Tanks

MMRP Sites
EC-58: Explosive Open Burning / Wire Cage
EC-57: Pre-1955 Ordnance and Shell Refurbishing
EC-25: Dump / Powder Burning Tower (Bldg 1052) / Powder Burning Plant
EC-49: Northern Bank of Furnace Creek
EC-52: Disturbed Areas at End of G-Line Road
EC-21: Landfill / "Open Dump" and Barricade 645 (Shell Burning Pit)
EC-22: Barricade 646-XK / Former Explosive Open Burning Area

VICINITY MAP



0 500 1,000
Feet

N

Legend

- Background Monitoring Well (ERT 2013/2015)
- Existing Monitoring Well
- Discrete Background Soil Sampling Locations (Parsons 2006/ERT 2013)
- Fence
- MMRP EC Boundary
- Parsons AOCs
- IRP EC Boundary
- Curtis Bay Ordnance Depot Boundary
- [redacted]
- [redacted]
- Wetlands

Chesapeake Bay Critical Areas:

- Intensely Developed Area
- Limited Development Area
- Resource Conservation Area

Figure 2
Environmental Concern (EC) Areas
Curtis Bay Ordnance Depot
Baltimore, Maryland

Map Date: 11/13/2017
Source:
Aerial - MD Imap 2017
Wetlands - USFWS 2019
Critical Area - MD Imap 2019
Projection: NAD 1983 State Plane
Maryland FIPS 1900 Feet

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VICINITY MAP



0 500 1,000
Feet

N

Legend

- Background Monitoring Well (ERT 2013/2015)
- Existing Monitoring Well
- Discrete Background Soil Sampling Locations (Parsons 2006/ERT 2013)
- Fence
- MMRP EC Boundary
- Parsons AOCs
- IRP EC Boundary
- Curtis Bay Ordnance Depot Boundary
- Incremental Sampling Methodology (ISM) Decision Units (DU) (2019)
- [redacted]
- [redacted]

Figure 2A
2019 Soil and Sediment Sample
Environmental Concern (EC) Areas
Curtis Bay Ordnance Depot
Baltimore, Maryland

Map Date: 11/13/2017
Source: MD Imap 2017
Projection: NAD 1983 State Plane
Maryland FIPS 1900 Feet

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IRP Sites

EC-3: PE Paint Storage
EC-16: Transformers
EC-27: Bldg 831 - Oil House Utility Area
EC-28: Bldg 825 - Post Engineer Shops
EC-29: Bldg 822 - E.E. Machine Shop
EC-30: Bldg 821 - Locomotive House
EC-31: Bldg S833 - Post Engineer Storage
EC-32: Bldg S832 - Post Engineer Lumber Storage
EC-33: Bldg 835 - BTG. Division Lumber Storage Shed
EC-34: Bldg 1025 - Boiler House - Warehouse Area
EC-35: Bldg 1026 - Oil House - Warehouse Area
EC-36: Bldg 515 - Incinerator Plant
EC-39: AOC-5 - Medical Supplies Burial Area
EC-50: Bldg 724-G - Tire Retreading Shop
EC-53: Leach Fields / Septic Tanks

MMRP Sites

EC-58: Explosive Open Burning / Wire Cage
EC-57: Pre-1955 Ordnance and Shell Refurbishing
EC-25: Dump / Powder Burning Tower (Bldg 1052) / Powder Burning Plant
EC-49: Northern Bank of Furnace Creek
EC-52: Disturbed Areas at End of G-Line Road
EC-21: Landfill / "Open Dump" and Barricade 645 (Shell Burning Pit)
EC-22: Barricade 646-XK / Former Explosive Open Burning Area

Legend

- Existing Monitoring Well
- Groundwater Flow Direction
- Groundwater Contour Line Elevation Above Mean Sea Level (ft) EA, 2011
- Unnamed Tributary - Intermittent
- Unnamed Tributary - Permanent
- Fence
- IRP EC Boundary
- MMRP EC Boundary
- Depot Boundary

0 150 300 600 Feet

N W E S

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EA

ERT

ERT, Inc.

Date: January 2018

Imagery Source: U.S. Geological Survey, 2014

Figure 3
Groundwater Potentiometric Contours
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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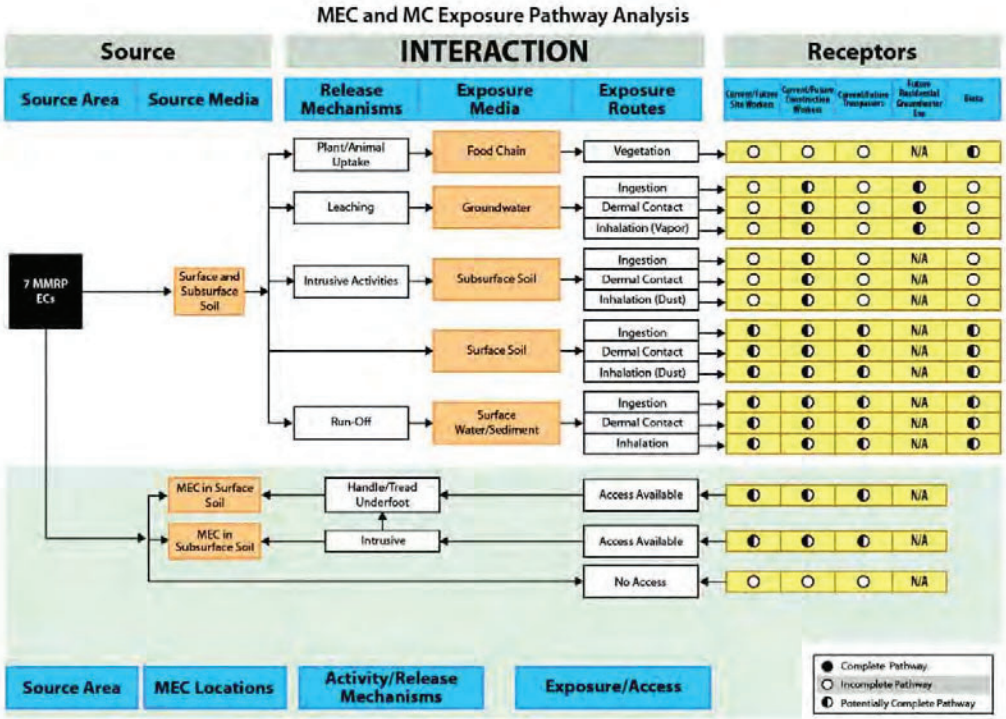
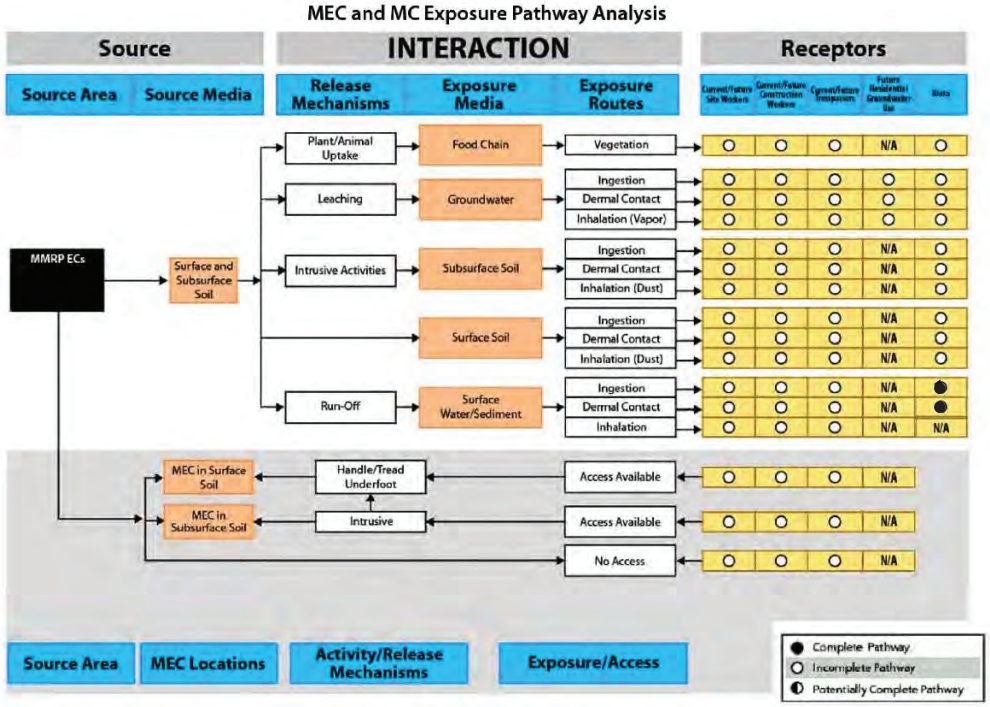


Preliminary Conceptual Site Model



Final Conceptual Site Model

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EA ERT

Revision Date: June 2016

Former Curtis Bay
Ordnance Depot
Anne Arundel County,
Maryland

Figure 4
Preliminary and Final Conceptual Site Models for MMRP Sites

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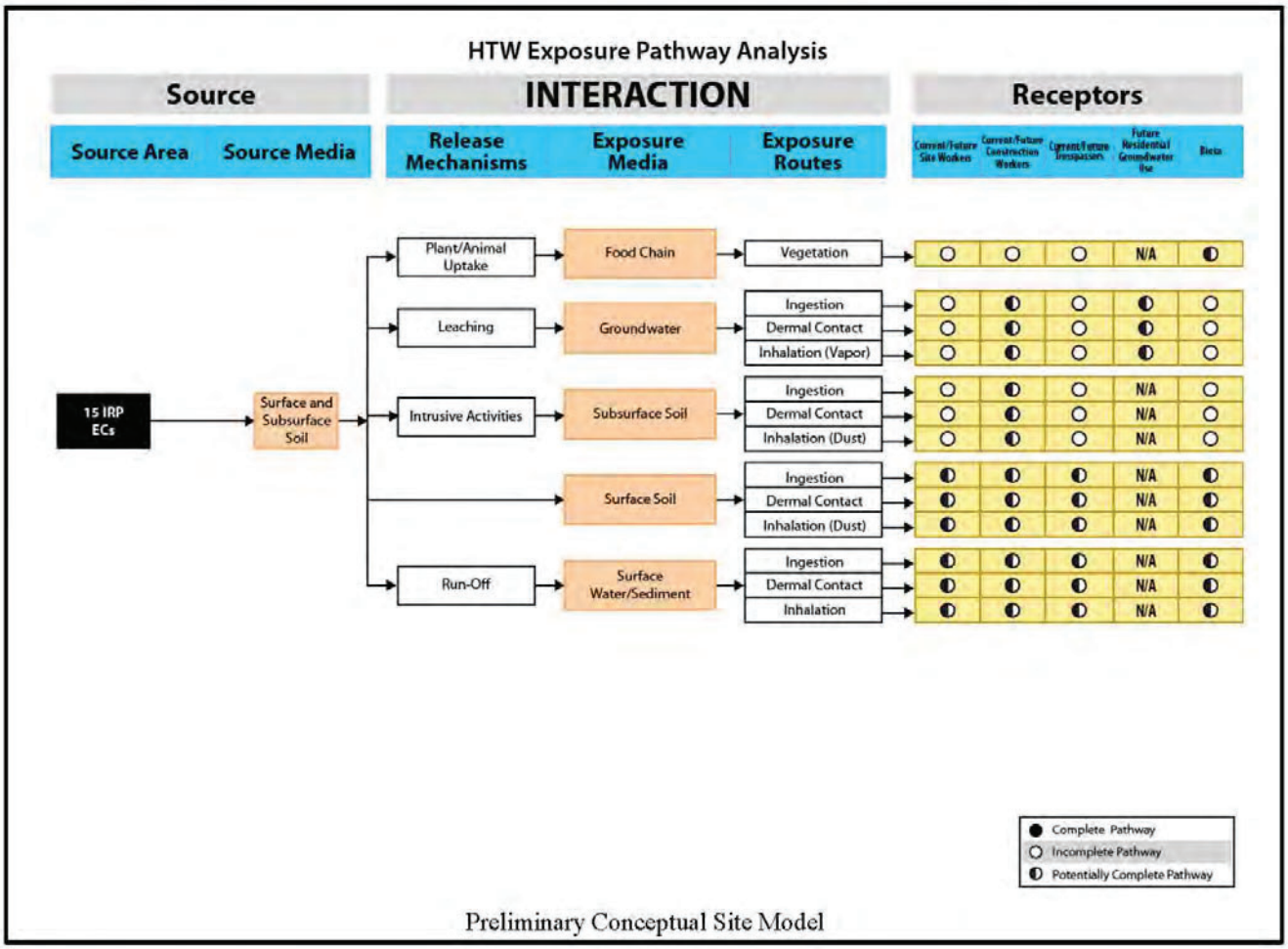
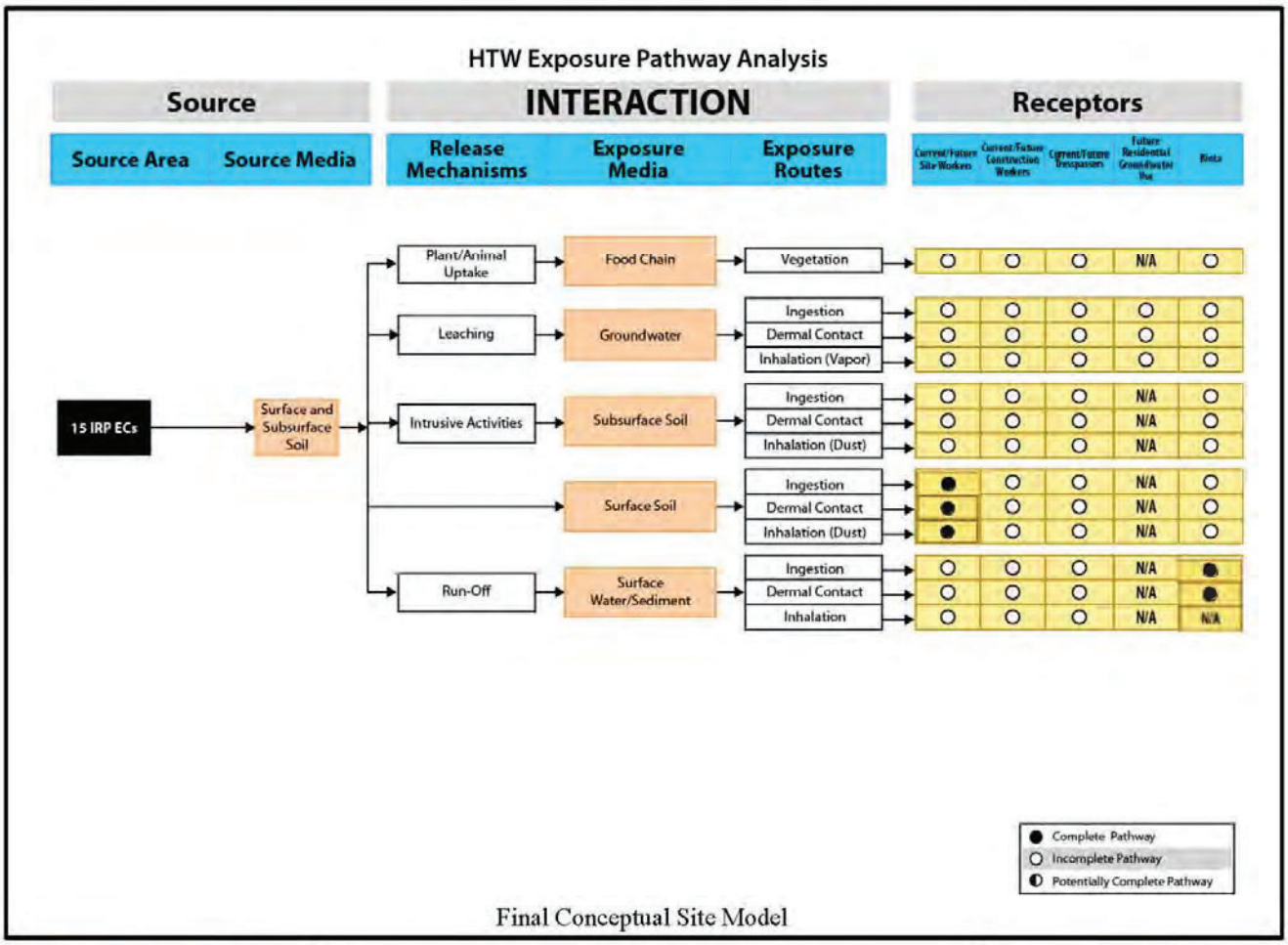


Preliminary Conceptual Site Model



Final Conceptual Site Model

US Army Corps of Engineers. BUILDING STRONG. EA ERT	Former Curtis Bay Ordnance Depot Anne Arundel County, Maryland	**Figure 5 Preliminary and Final Conceptual Site Models for IRP Sites**

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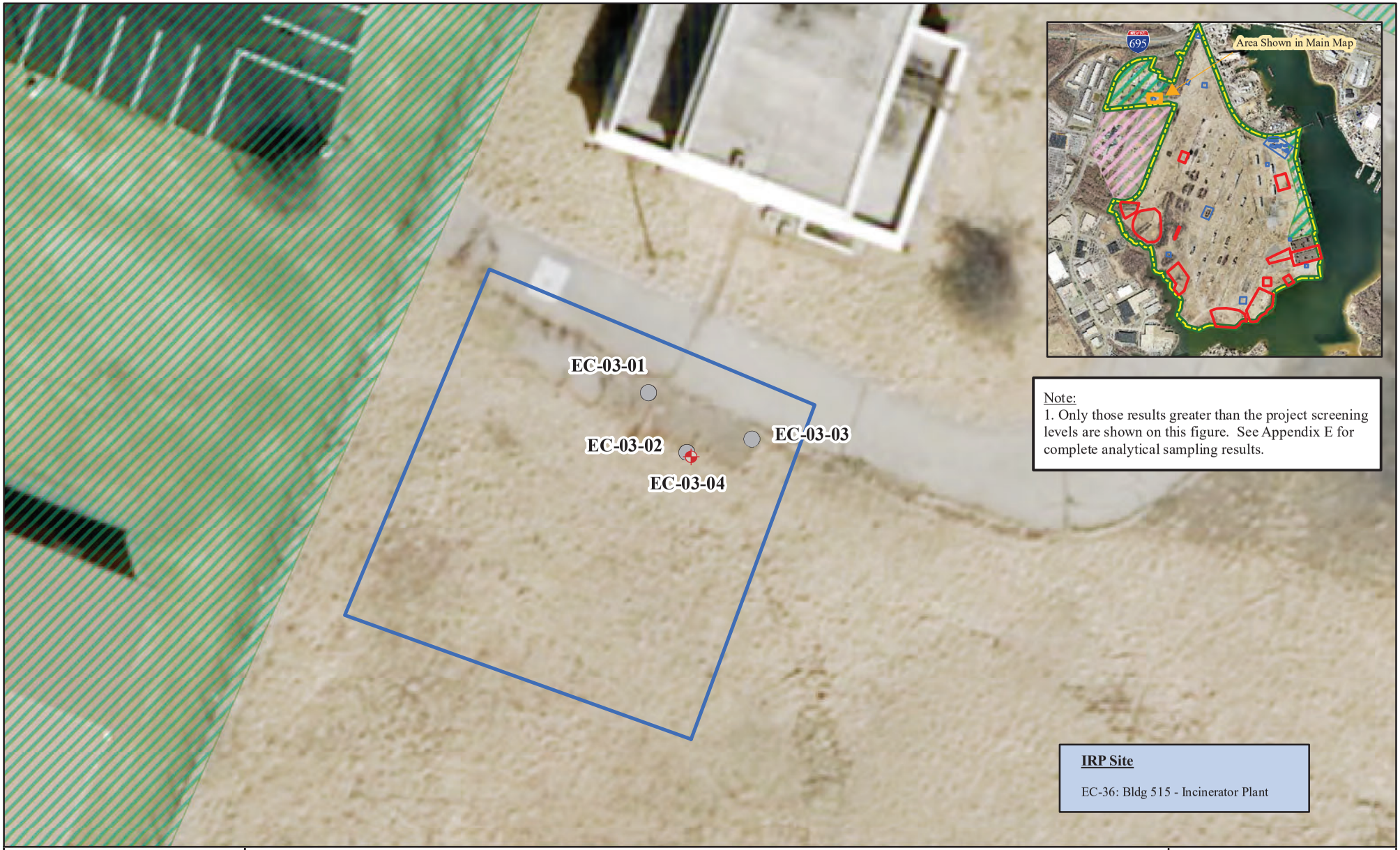

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Legend

Sampling Locations

- Groundwater Sampling Location
- Surface and Subsurface Soil Sampling Location Reported Results Were Less Than PSLs in Surface and Subsurface Soil Samples
- IRP Site Boundary
- MMRP EC Boundary
- Curtis Bay Ordnance Depot Boundary
- [redacted]

0 15 30 Feet

N W E S

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 6
IRP EC-3
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

[redacted].mxd

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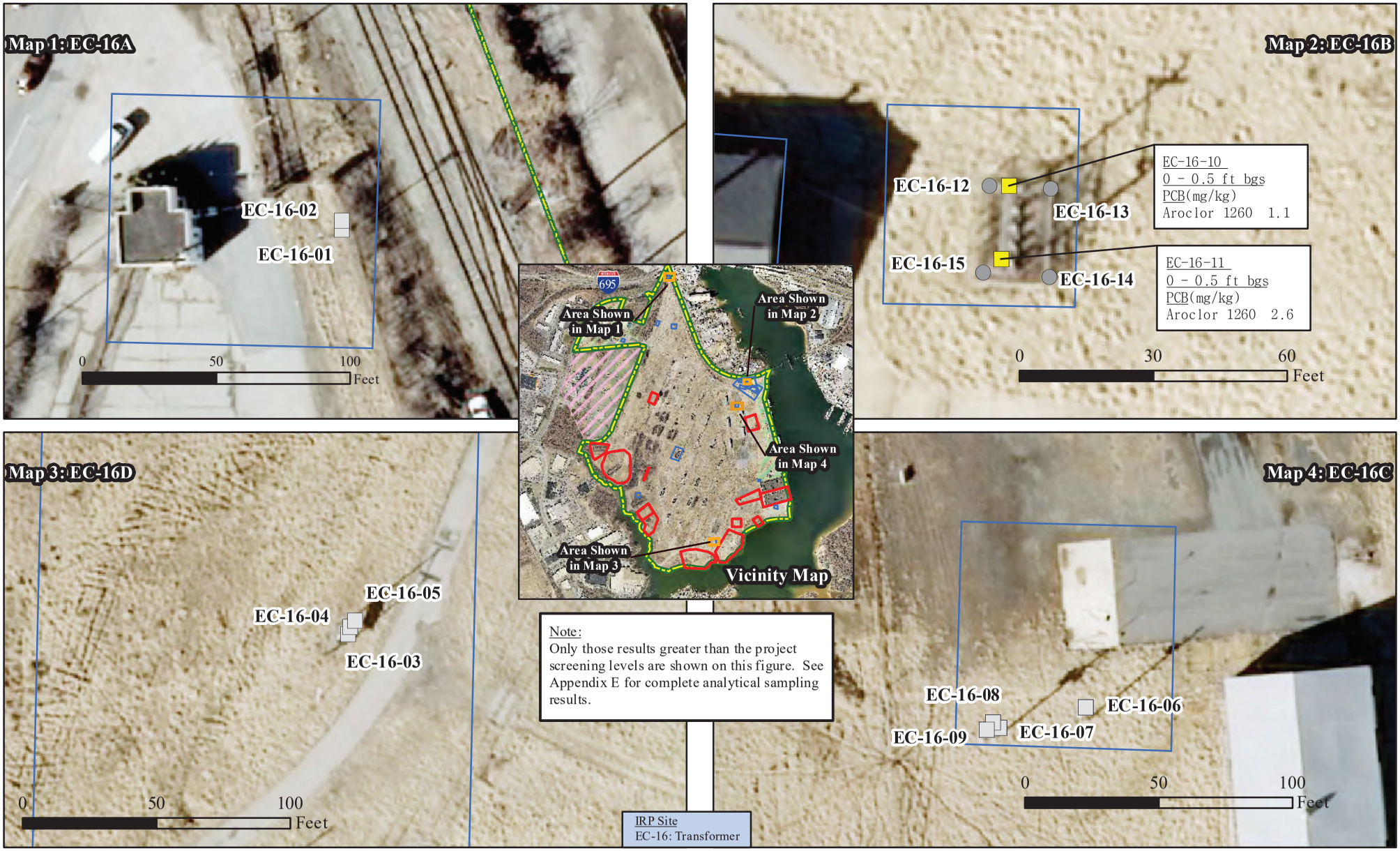

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EA
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Legend

- Surface Only -Reported Results Were Greater Than PSLs in Surface Samples
- Surface Only - Reported Results Were Less than PSLs in Surface Samples
- Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Former Curtis Bay Ordnance Depot Boundary
- [redacted]
- [redacted]

Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
PCB - polychlorinated biphenyls

N W E S

Revision Date: January 2018

Imagery Source: U.S. Gelogical Survey, 2011

Figure 7
IRP EC-16
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

[redacted]

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Legend

- Groundwater Sampling Location
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Soil Samples
- EC-27
- Former Curtis Bay Ordnance Depot Boundary

N
W E
S

0 25 50 Feet

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 8
IRP EC-27
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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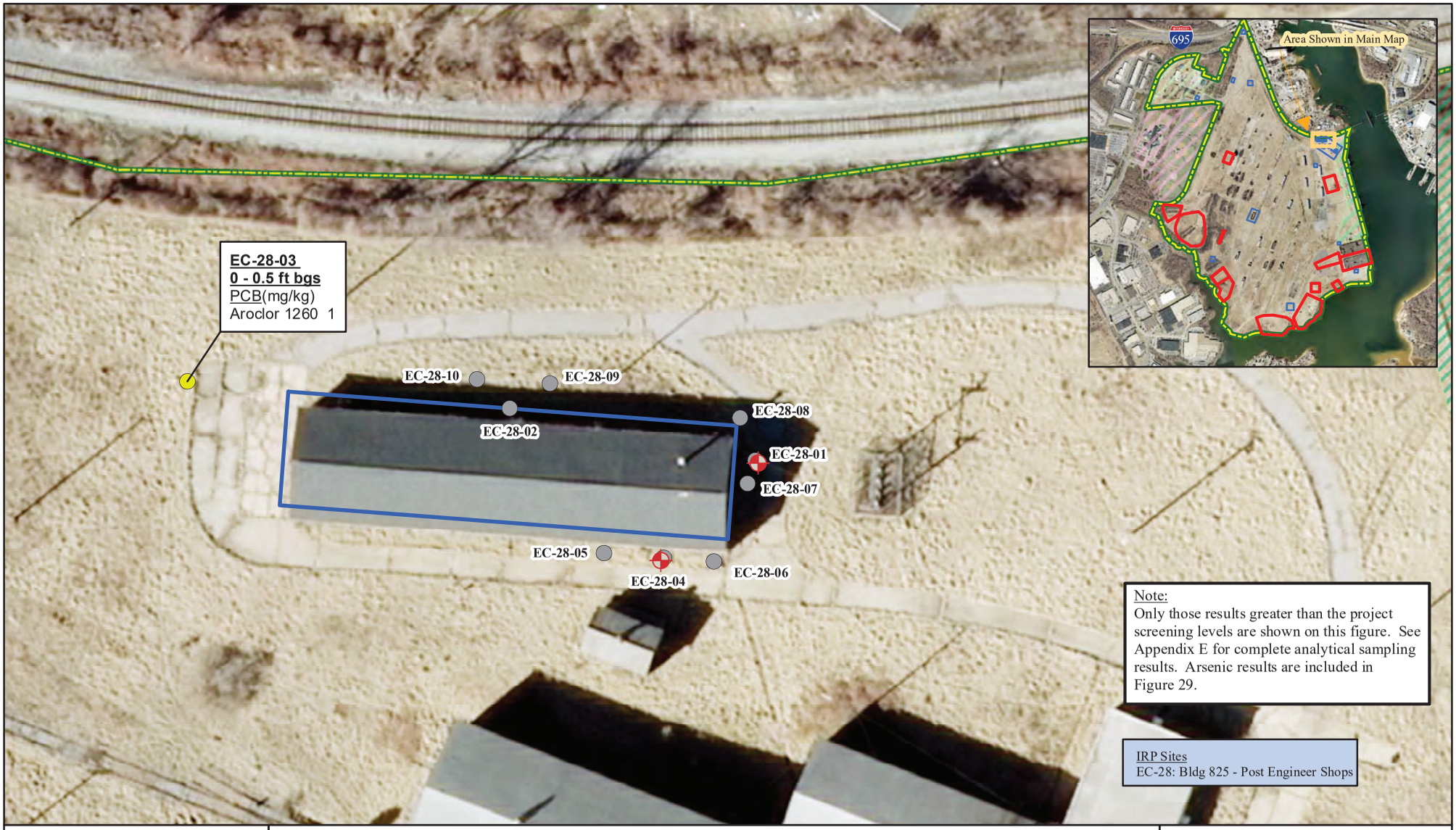

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples and Less Than PSLs in Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Groundwater Sampling Location
- EC-28
- Former Curtis Bay Ordnance Depot Boundary

Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
PCB - polychlorinated biphenyls

N W E S

0 25 50 Feet

Revision Date: October 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 9
IRP EC-28
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot Anne Arundel County, Maryland

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples and Less Than PSLs in Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Groundwater Sampling Location
- IRP EC Boundary
- Former Curtis Bay Ordnance Depot Boundary

Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
PCB - polychlorinated biphenyls

0 25 50 Feet

N W E S

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 10
IRP EC-29
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results are Less Than PSLs in Surface and Subsurface Soil Samples
- Reported Results are Less Than PSLs in Surface and Subsurface Soil Samples
- EC-30
- Former Curtis Bay Ordnance Depot Boundary

0 25 50 Feet

N W E S

Figure 11
IRP EC-30
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results are Less Than PSLs in Surface and Subsurface Soil Samples
- EC-31
- Former Curtis Bay Ordnance Depot Boundary

N
W E
S

0 25 50 Feet

Figure 12
IRP EC-31
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

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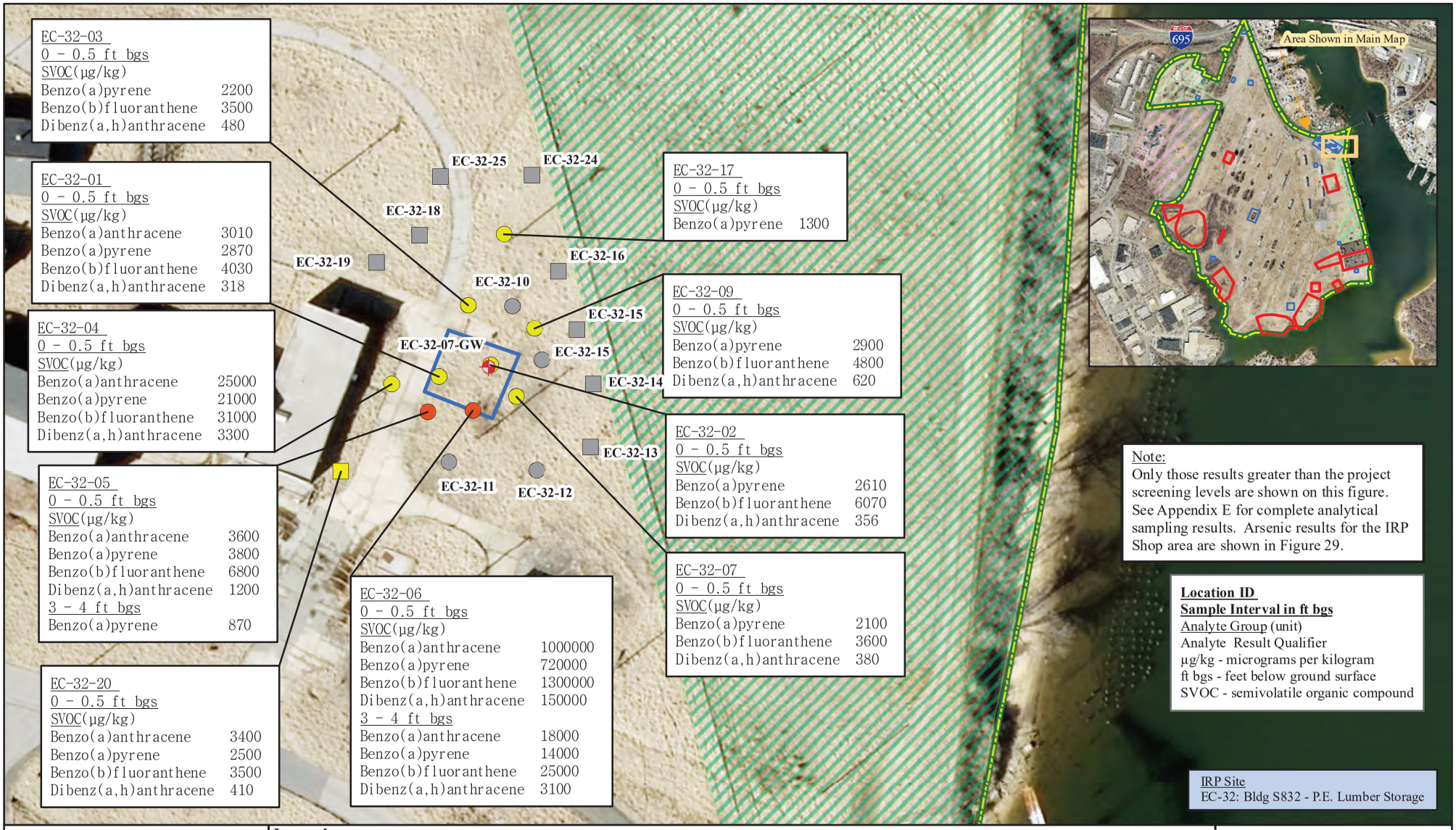

Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples and Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples and Less Than PSLs in Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Surface Soil Only Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples
- Surface Soil Only Sampling Location - Reported Results Were Less Than PSLs
- Groundwater Sampling Location
- EC-32
- Former Curtis Bay Ordnance Depot Boundary
- [redacted]

N, W, E, S

0 75 150 Feet

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Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 13
IRP EC-32
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Groundwater Sampling Location
- IRP_Sites_08012012
- Former Curtis Bay Ordnance Depot Boundary
- [redacted]

N
W E
S

0 50 100 Feet

Figure 14
IRP EC-33
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

[redacted]

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Groundwater Sampling Location
- EC-34
- Former Curtis Bay Ordnance Depot Boundary
- [redacted]

N
W E
S

0 50 100 Feet

Figure 15
IRP EC-34
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

[redacted]

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Groundwater Sampling Location
- EC-35
- Former Curtis Bay Ordnance Depot Boundary
- [redacted]

N
W E
S

0 50 100 Feet

Figure 16
IRP EC-35
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

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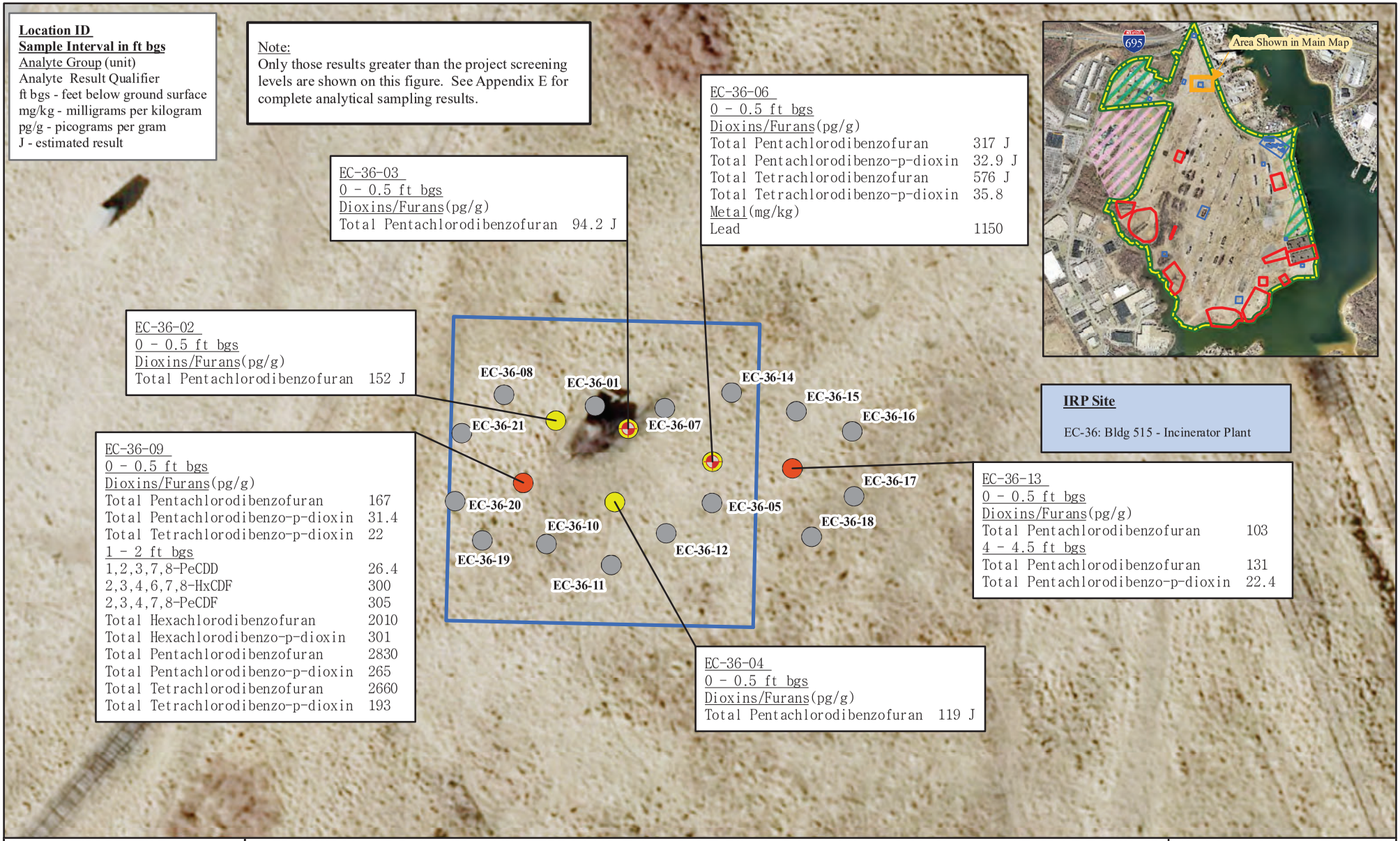

Figure 17
IRP EC 36
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- IRP Site Boundary IRP Site Boundary
- Curtis Bay Ordnance Depot Boundary

0 37.5 75 Feet

N W E S

Figure 18
IRP EC 50
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

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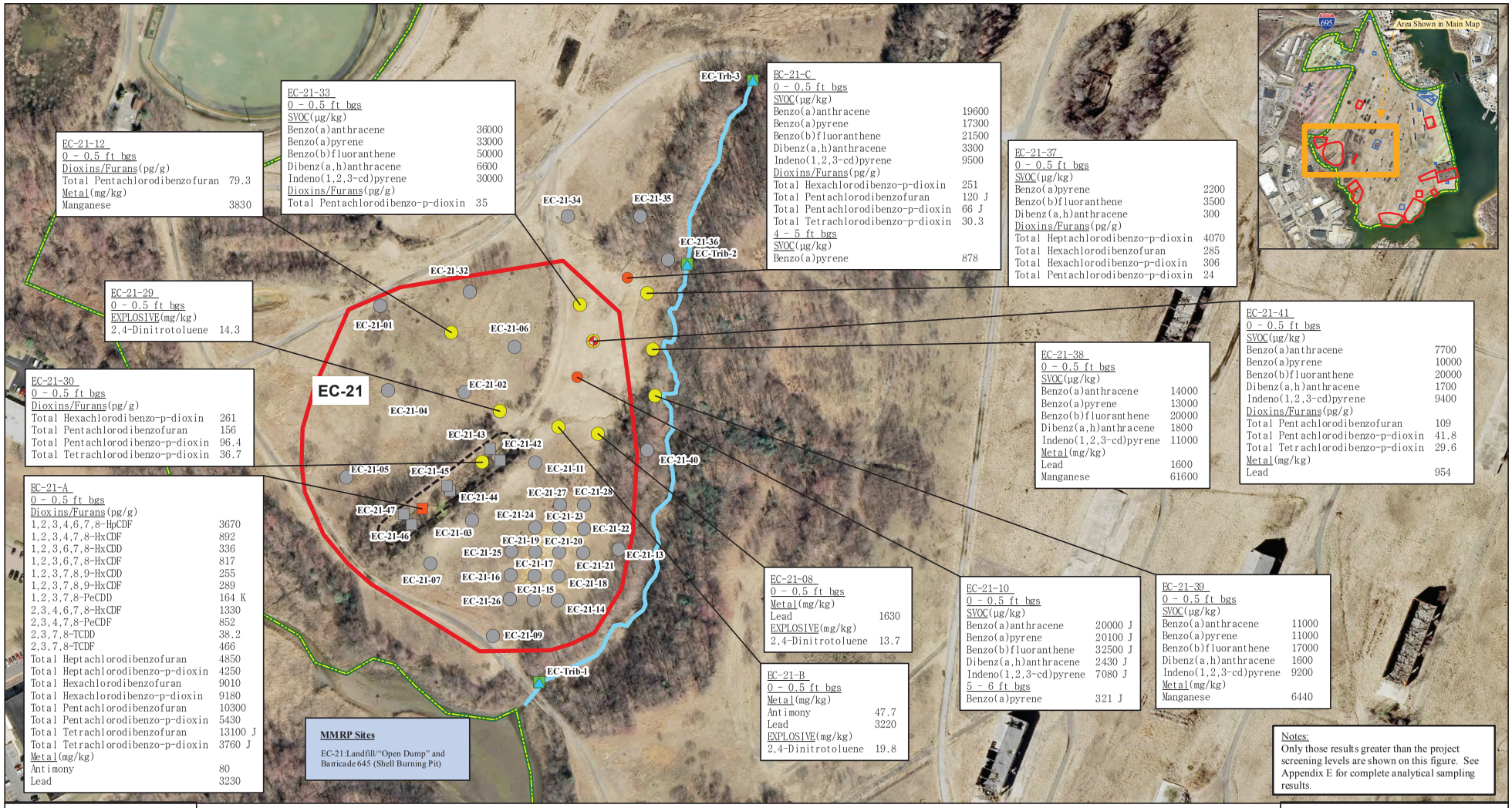

Figure 19
MMRP EC 21 and Tributary Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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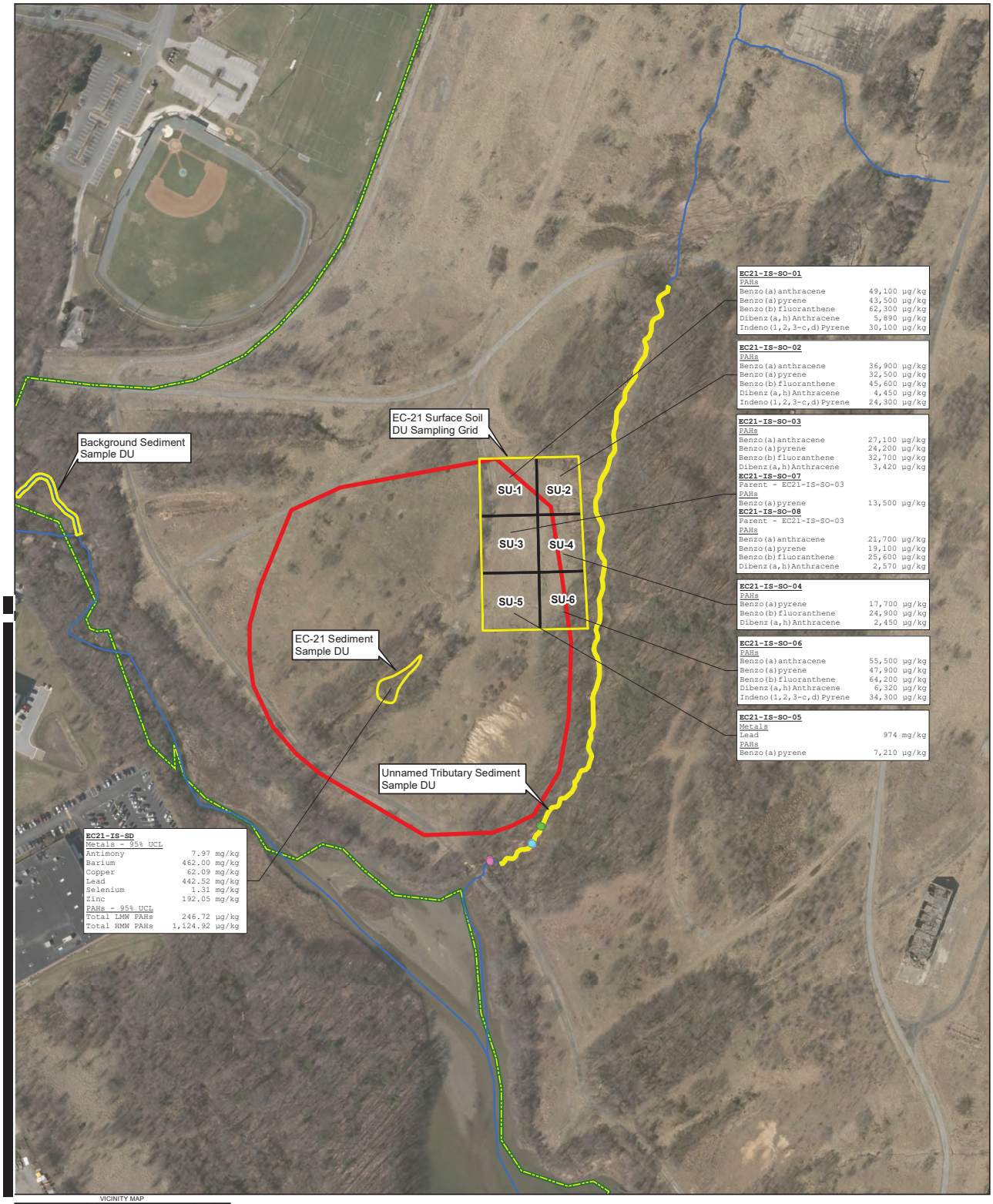

VICINITY MAP



Legend

- Primary Sediment Sample Start (2019)
- Duplicate Sediment Sample Start (2019)
- Triplicate Sediment Sample Start (2019)
- ISM Decision Unit (DU) (2019)
- ISM Sampling Unit (SU) (2019)
- Stream
- MMRP EC Boundary
- Former Curtis Bay Ordnance Depot Boundary

0 200 400
Feet

N

Notes:
1) Sediment results presented are the 95% UCL that exceed the screening criteria (USEPA Region 3 BTAG / USEPA Region 4 Ecological Sediment Screening Levels).
2) Soil results presented are the analytes that exceed the screening criteria (USEPA Region 3 Industrial Soil RSL).
3) Results for Unnamed Tributary sediment are presented on Figure 31A; background sediment results are presented on Figure 32.

Figure 19A
EC-21 Decision Unit Location and Sample Results
Additional Sampling Curtis Bay Depot Draft Final RI
Curtis Bay, Maryland

Map Date: 8/5/2019
Source: MD Imap 2017
Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet

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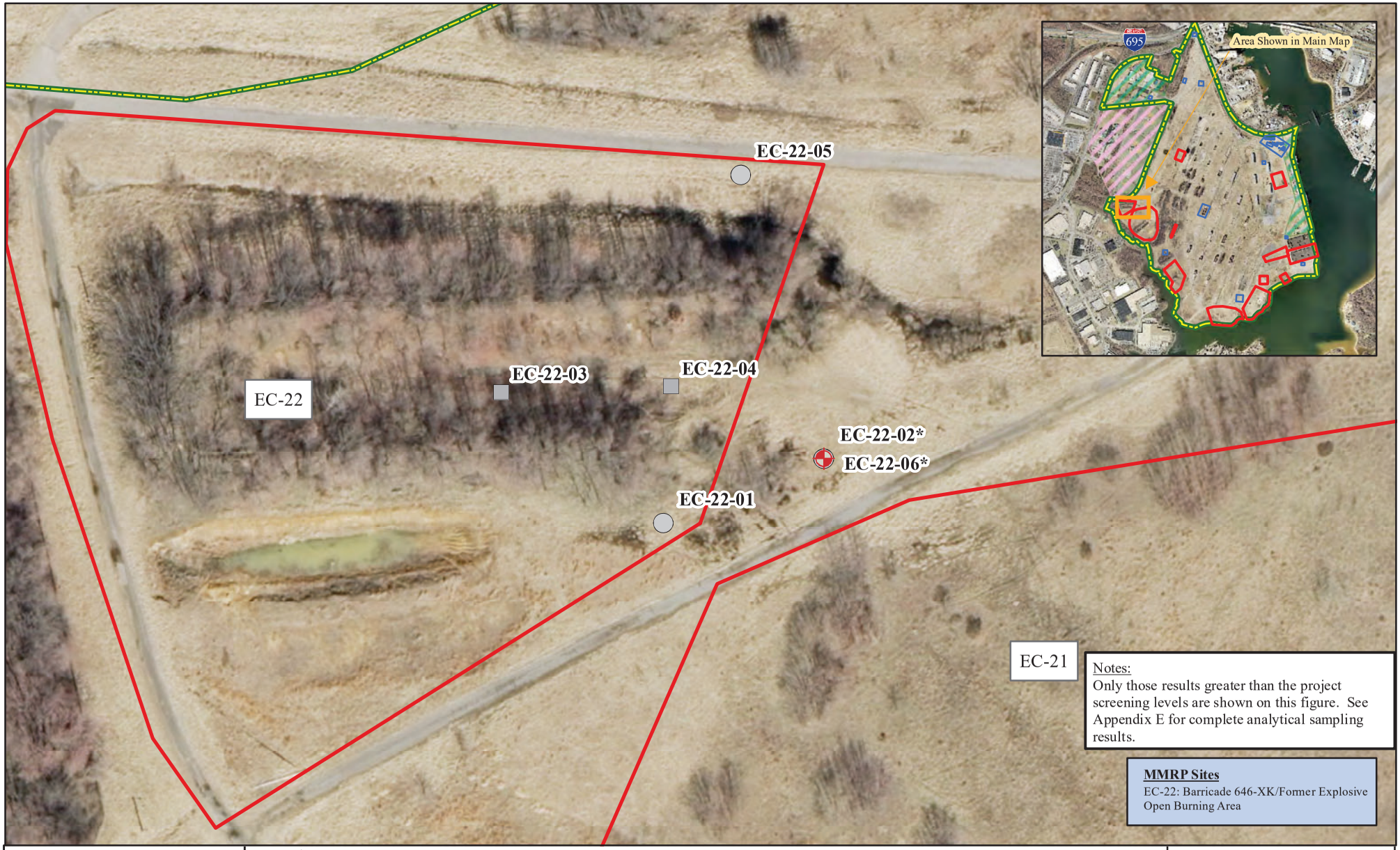

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Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 20
MMRP EC 22
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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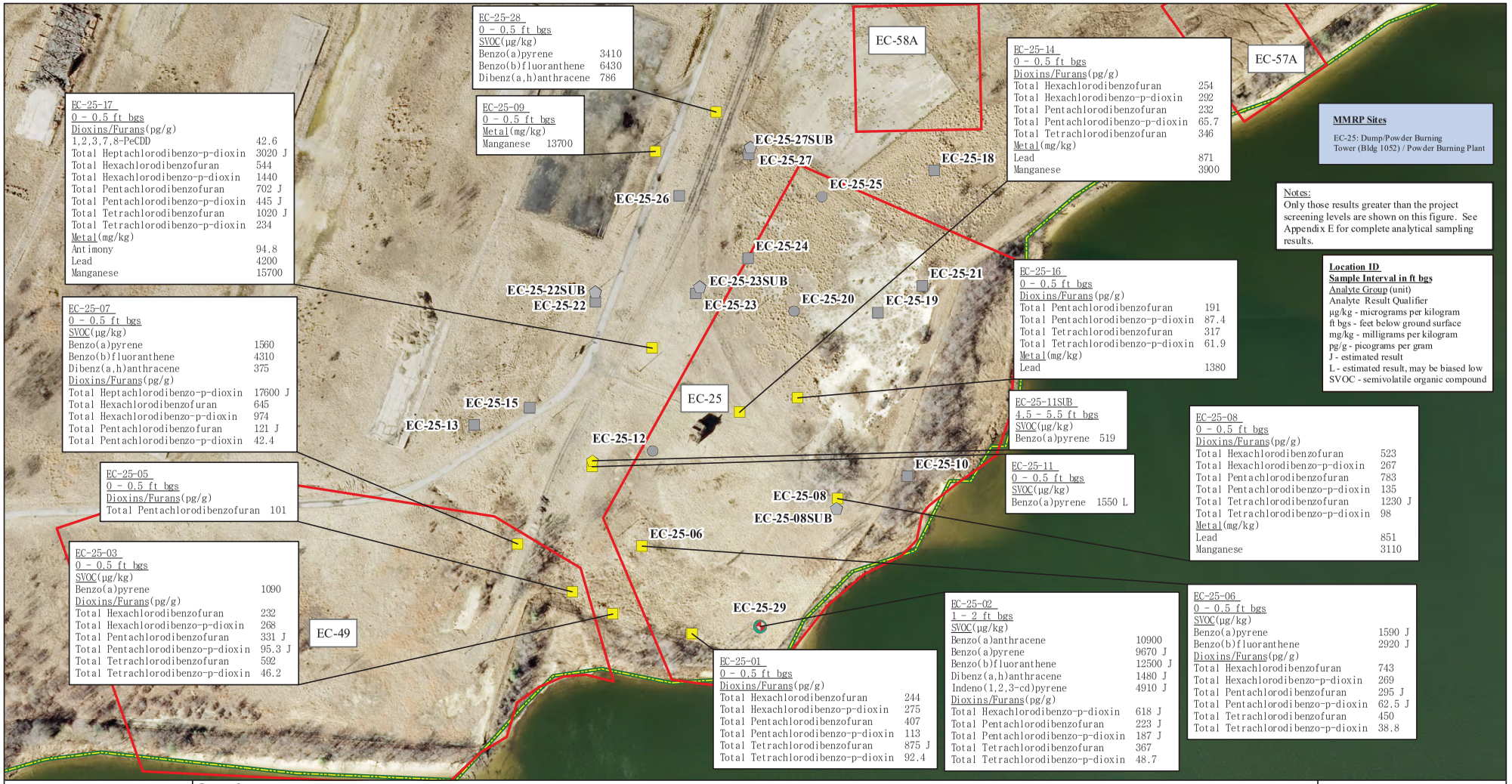

Figure 21
EC-25
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot Anne Arundel County, Maryland

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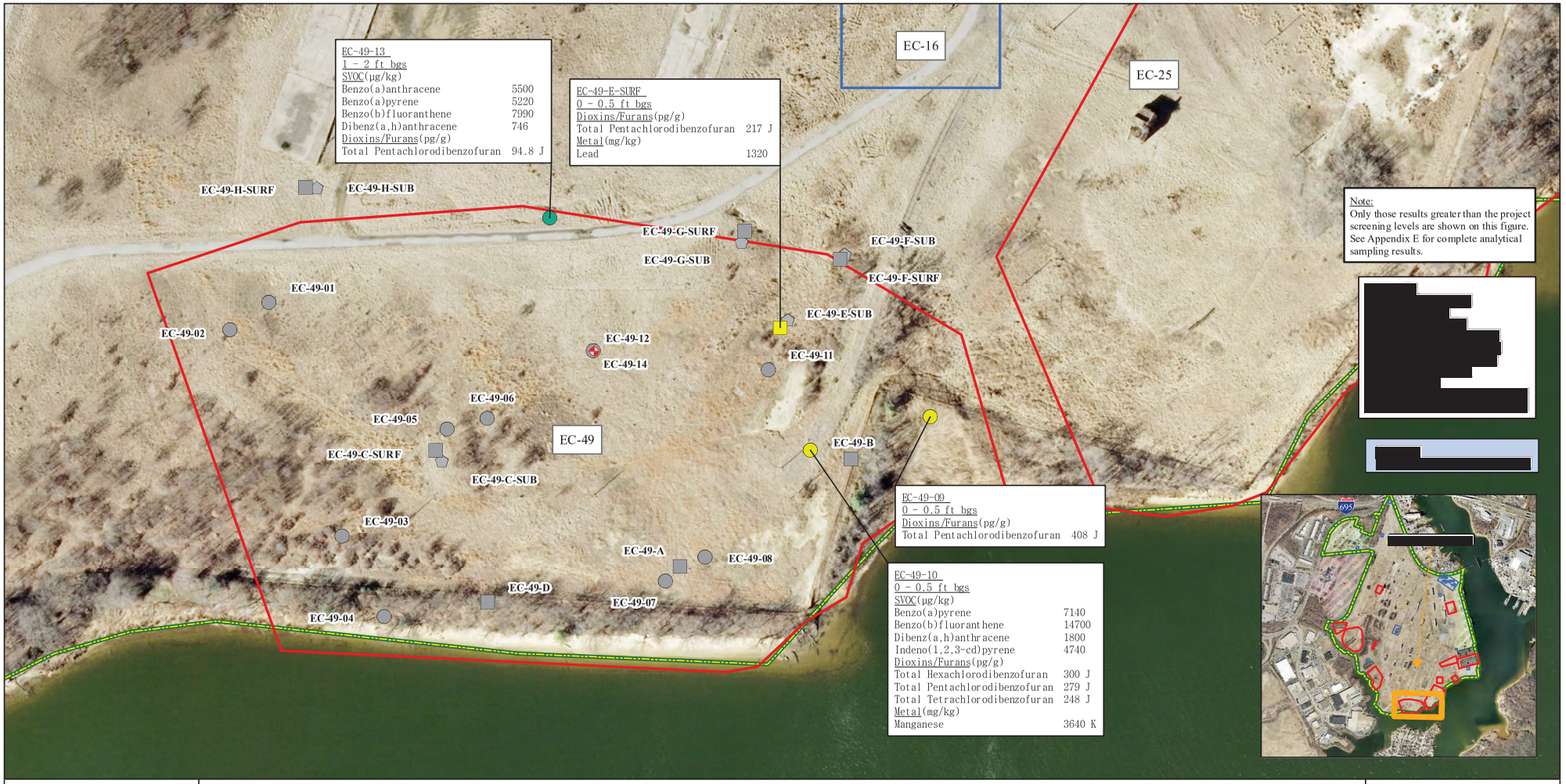

Legend

- Surface Soil Only Sampling Location - Reported Results Were Less Than PSLs
- Surface Soil Only Sampling Location - Reported Results Were Greater Than PSLs
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples and Less Than PSLs in Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Subsurface Samples and Less Than PSLs in Surface Samples
- Subsurface Soil Only Sampling Location - Reported Results Were Less Than PSLs in Subsurface Samples
- Subsurface Soil Only Sampling Location - Reported Results Were GreaterThan PSLs in Subsurface Samples
- Groundwater Sampling Location
- IRP Site Boundary
- MMRP Site Boundary
- Former Curtis Bay Ordnance Depot Boundary

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Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 22
MMRP EC-49
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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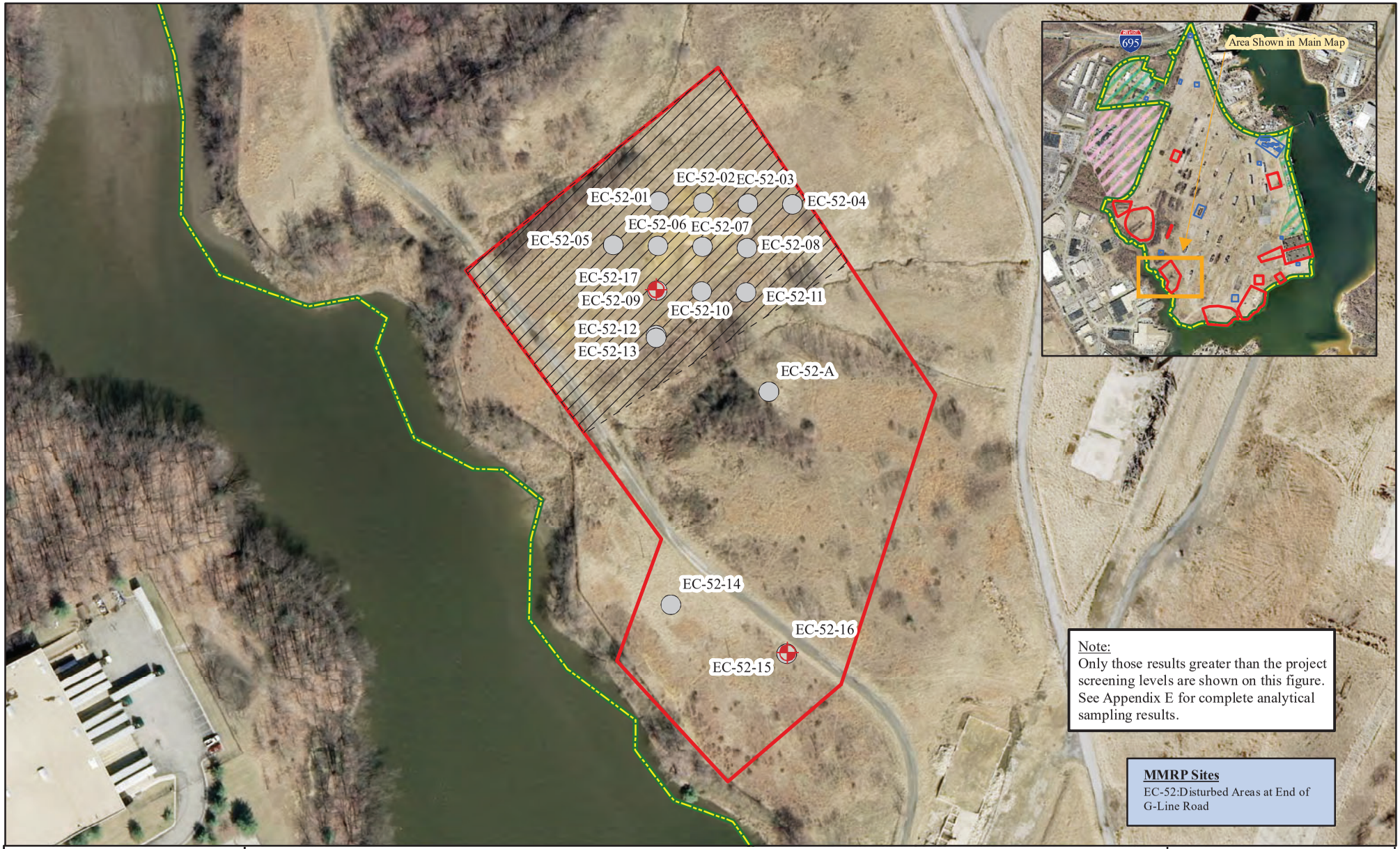

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Are Less Than PSLs
- Groundwater Sampling Location
- IRP Site Boundary
- MMRP Site Boundary
- EC-52 Propellant Grain Area
- Former Curtis Bay Ordnance Depot Boundary

0 75 150 Feet

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 23
MMRP EC 52
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 24
MMRP EC 57B
Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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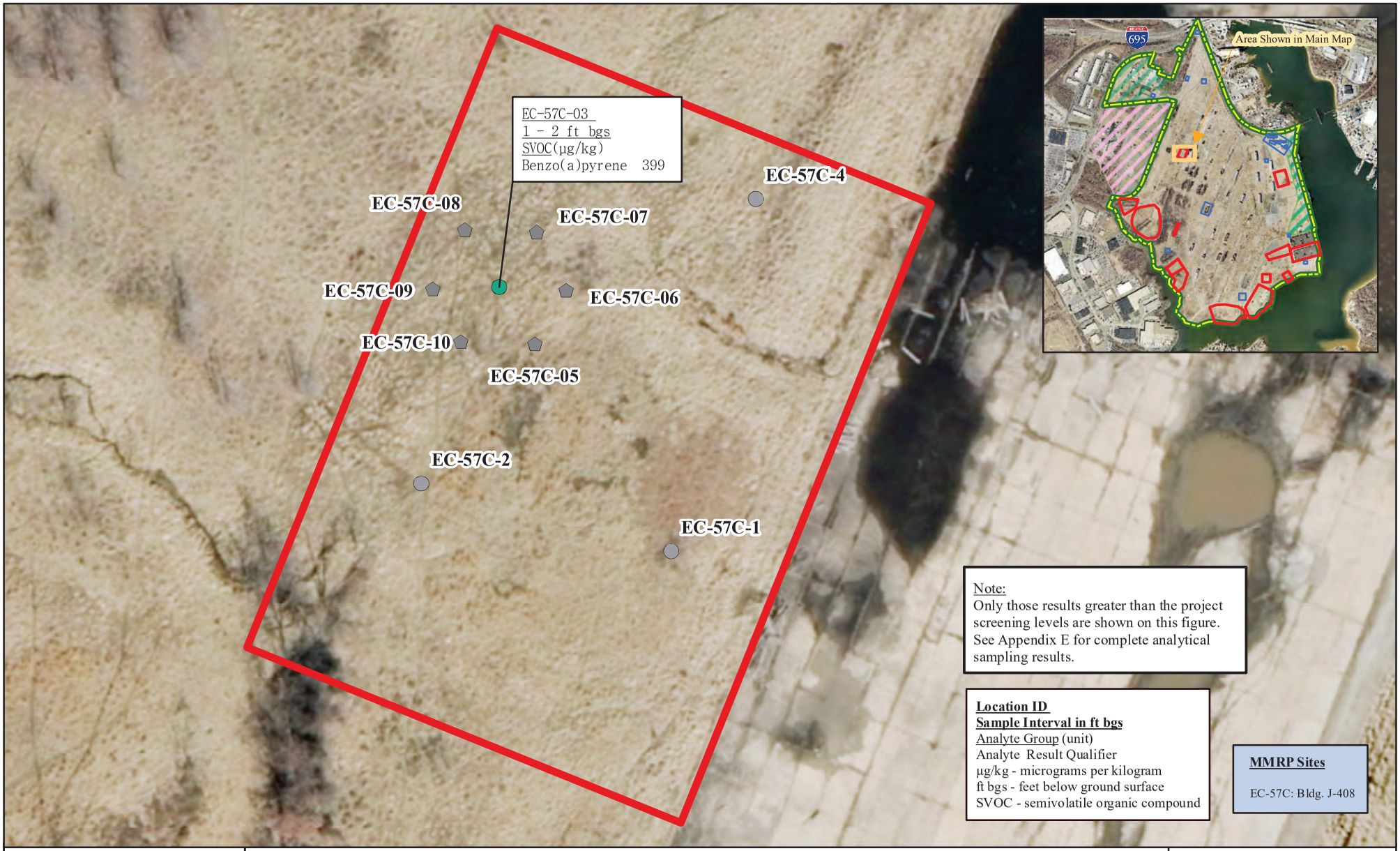

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Subsurface Samples and Less Than PSLs in Surface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Subsurface Soil Only Sampling Location- Reported Results Were LessThan PSLs in Subsurface Samples
- MMRP EC Boundary

N W E S

0 25 50 Feet

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 25
MMRP EC 57C
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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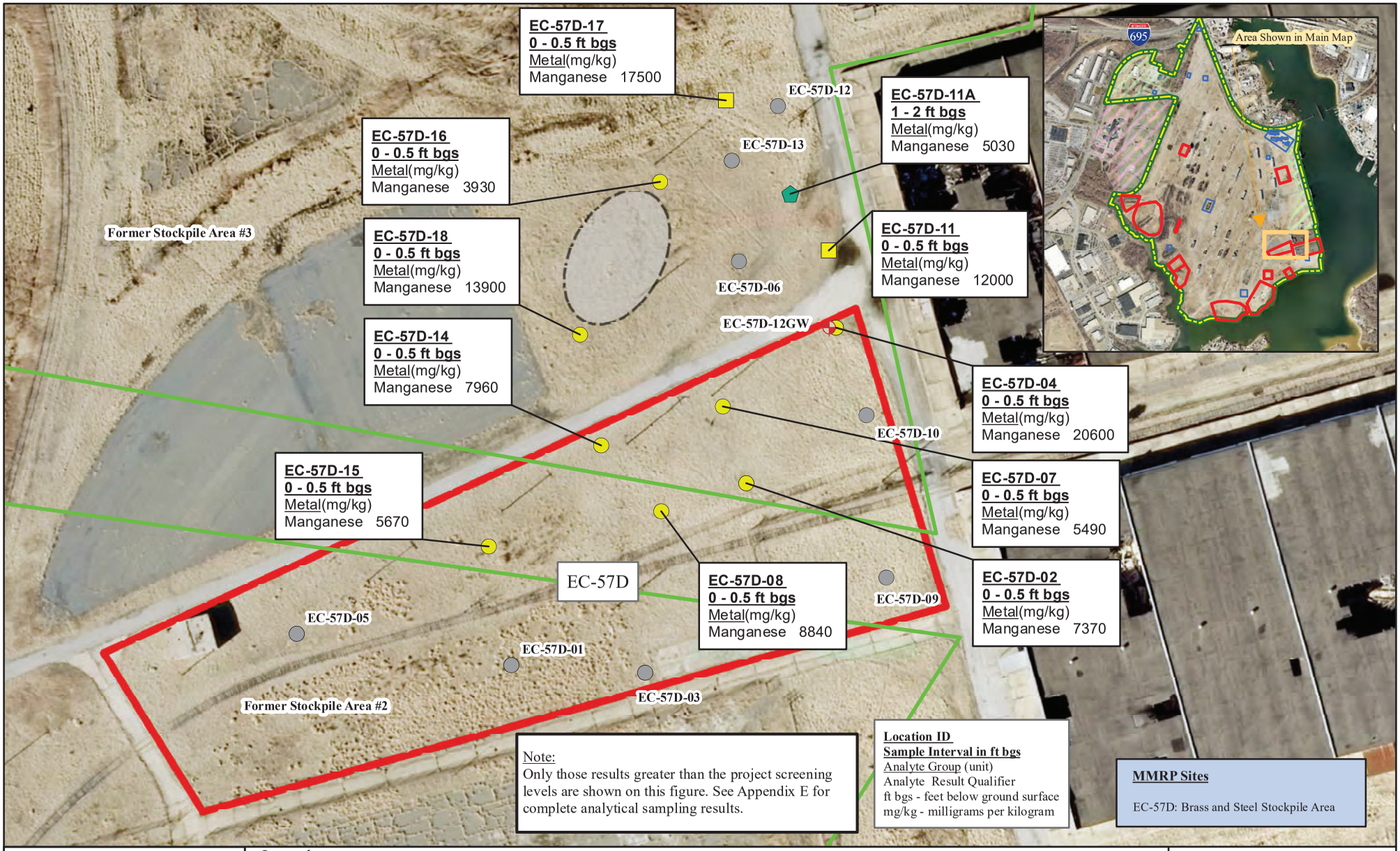

Legend

- Surface Soil Only Sampling Location - Reported Results Were Greater Than PSLs
- Subsurface Soil Only Sampling Location - Reported Results Were Greater Than PSLs in Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Surface Samples and Less Than PSLs in Subsurface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Groundwater Sampling Location
- Field Observed Mounded Area with MD
- Parsons AOC Boundary (Former Stockpile Areas)
- MMRP Site Boundary

N, W, E, S

0 50 100 Feet

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Revision Date: October 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 26
MMRP EC 57D
Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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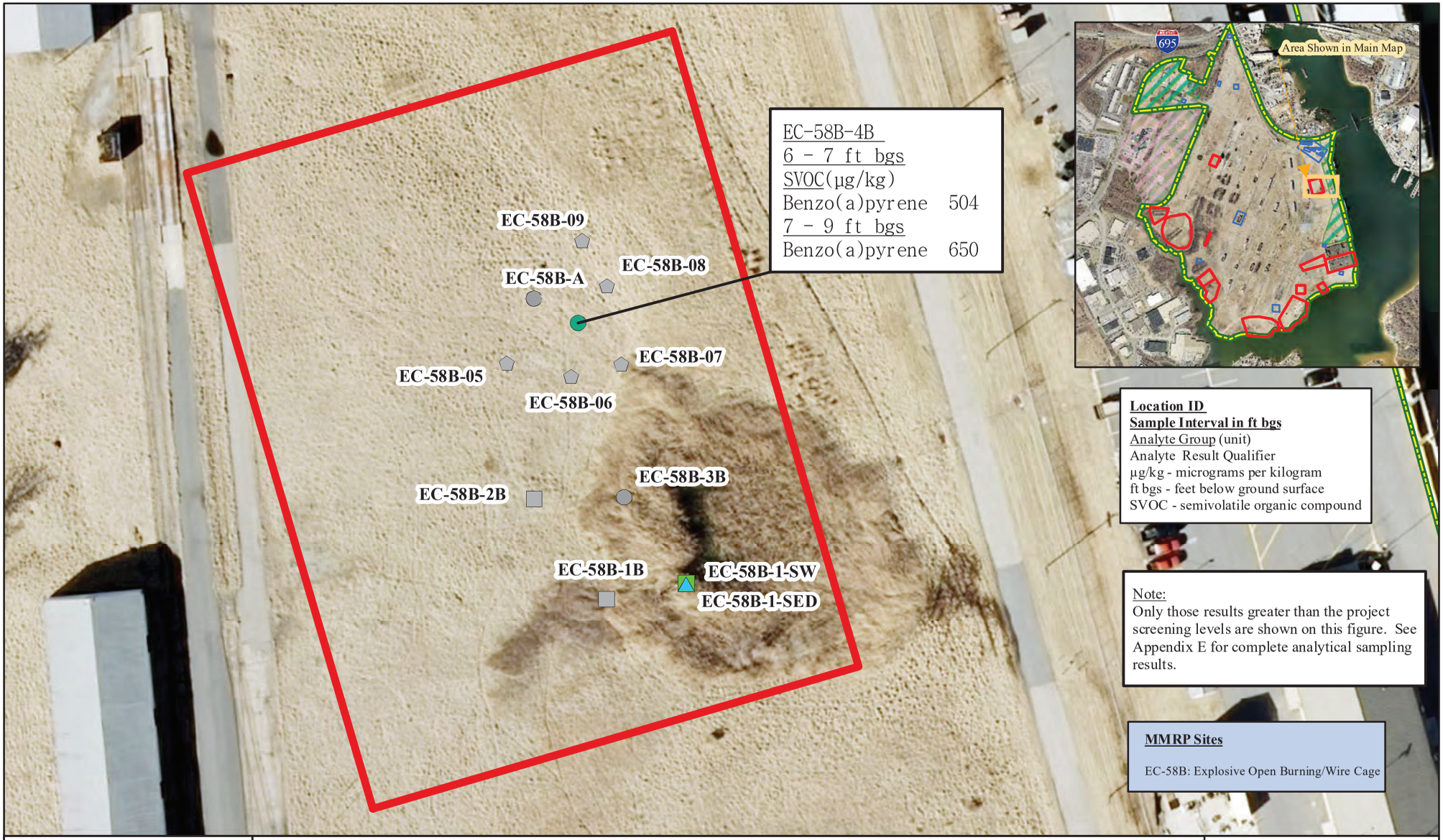

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Greater Than PSLs in Subsurface Samples and Less Than PSLs in Surface Samples
- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs in Surface and Subsurface Samples
- Surface Soil Only Sampling Location - Reported Results Were Less Than PSLs
- Subsurface Soil Only Sampling Location - Reported Results Were Less Than PSLs
- Co-located Surface Water and Sediment Sampling Location
- MMRP Site Boundary
- Former Curtis Bay Ordnance Depot Boundary

0 75 150 Feet

N W E S

Figure 27
MMRP EC 58B Sampling Locations and Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

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VICINITY MAP



Legend

- ISM Decision Unit (DU) (2019)
- MMRP EC Boundary
- Former Curtis Bay Ordnance Depot Boundary

0 40 80
Feet

N

Notes:
1) Sediment results presented are the 95% UCL that exceed the screening criteria (USEPA Region 3 BTAG / USEPA Region 4 Ecological Sediment Screening Levels).

Figure 27A
EC-58B Decision Unit Location and Sample Results
Additional Sampling Curtis Bay Depot Draft Final RI
Curtis Bay, Maryland

Map Date: 8/5/2019
Source: MD Imap 2017
Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet

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Legend

- Surface and Subsurface Soil Sampling Location - Reported Results Were Less Than PSLs
- Surface Soil Only Sampling Location - Reported Results Were Less Than PSLs
- Subsurface Soil Only Sampling Location - Reported Results Were Less Than PSLs
- Groundwater Sampling Location
- IRP Site Boundary
- Curtis Bay Ordnance Depot Boundary
- MMRP EC Boundary

N W E S

0 37.5 75 Feet

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

Figure 28
MMRP EC 58C Sampling Locations and Soil Sampling Results Greater Than PSLs
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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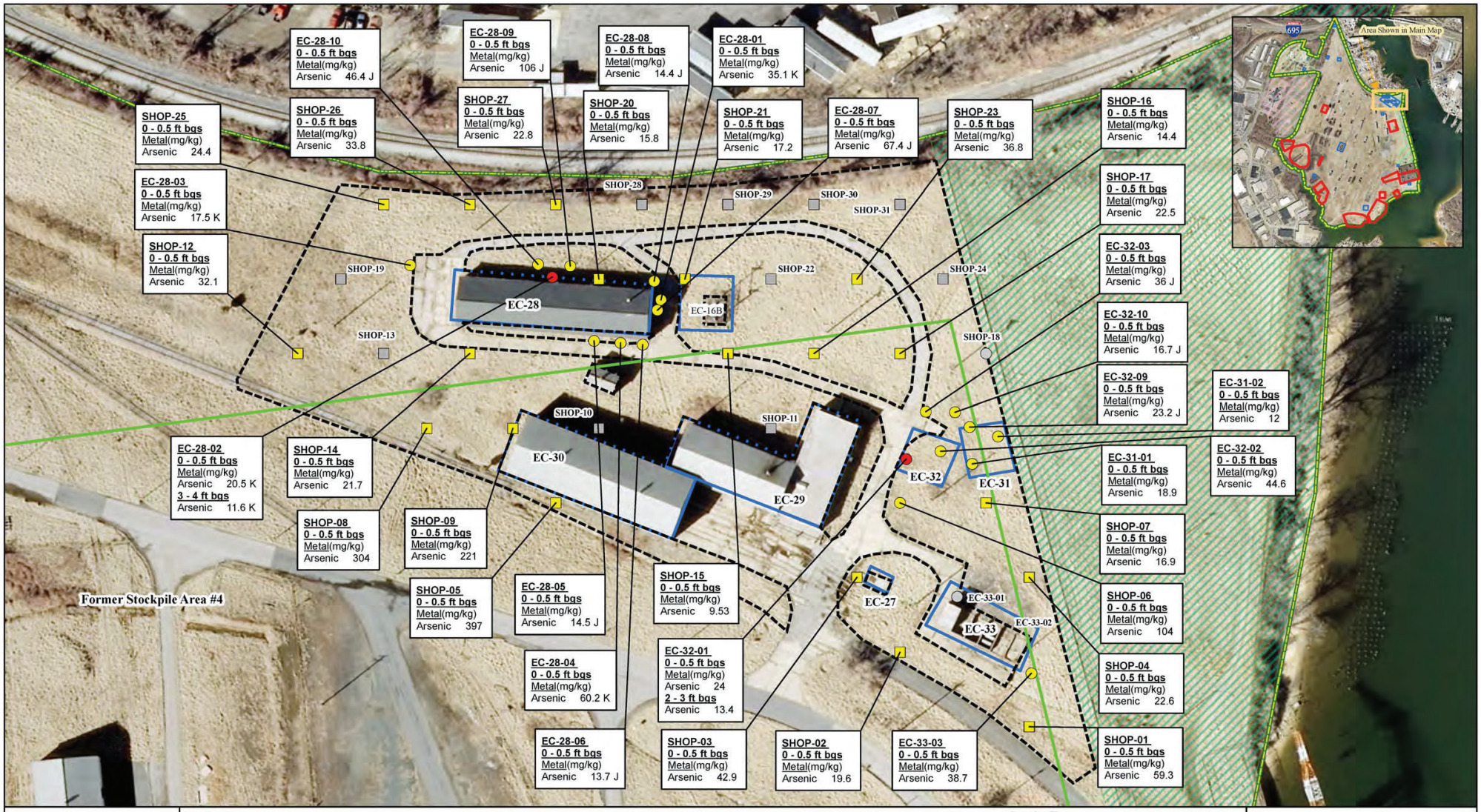

Legend

- Surface and Subsurface Soil Sampling Location - No Arsenic Results Greater Than PSLs
- Surface and Subsurface Soil Sampling Location - Arsenic Results Greater Than PSL in Surface and Less Than PSL in Subsurface
- Surface and Subsurface Soil Sampling Location - Arsenic Results Greater Than PSLs in Surface and Subsurface
- Surface Soil Only Sampling Location - Arsenic Results Less Than PSL
- Surface Soil Only Sampling Location - Arsenic Results Greater Than PSL
- IRPShop Arsenic Area
- IRP EC Boundary
- Parsons AOC Boundary (Former Stockpile Areas)
- Depot Boundary
- [redacted]

Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
Results in red exceed PSL for arsenic in surface soil (9.09 mg/kg) or subsurface soil (9.26 mg/kg).
µg/kg - micrograms per kilogram
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
K - estimated result, may be biased high

0 37.5 75 Feet

US Army Corps of Engineers - BUILDING STRONG®
EA
ERT

Revision Date: January 2018

Imagery Source: U.S. Gelogical Survey, 2011

[redacted]

Figure 29
IRP Shop Area Arsenic Soil Sampling Locations and Results Greater Than PSLs

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

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Legend

Matrix

GW *Background Groundwater Sampling Location*

Groundwater Sampling Location

IRP Site Boundary

MMRP Site Boundary

Former Curtis Bay Ordnance Depot Boundary

N W E S

0 300 600 Feet

Figure 30
Site-Wide Groundwater Sampling Locations
Former Curtis Bay Ordnance Depot Anne Arundel County, Maryland

Revision Date: June 2016

Imagery Source: U.S. Gelogical Survey, 2011

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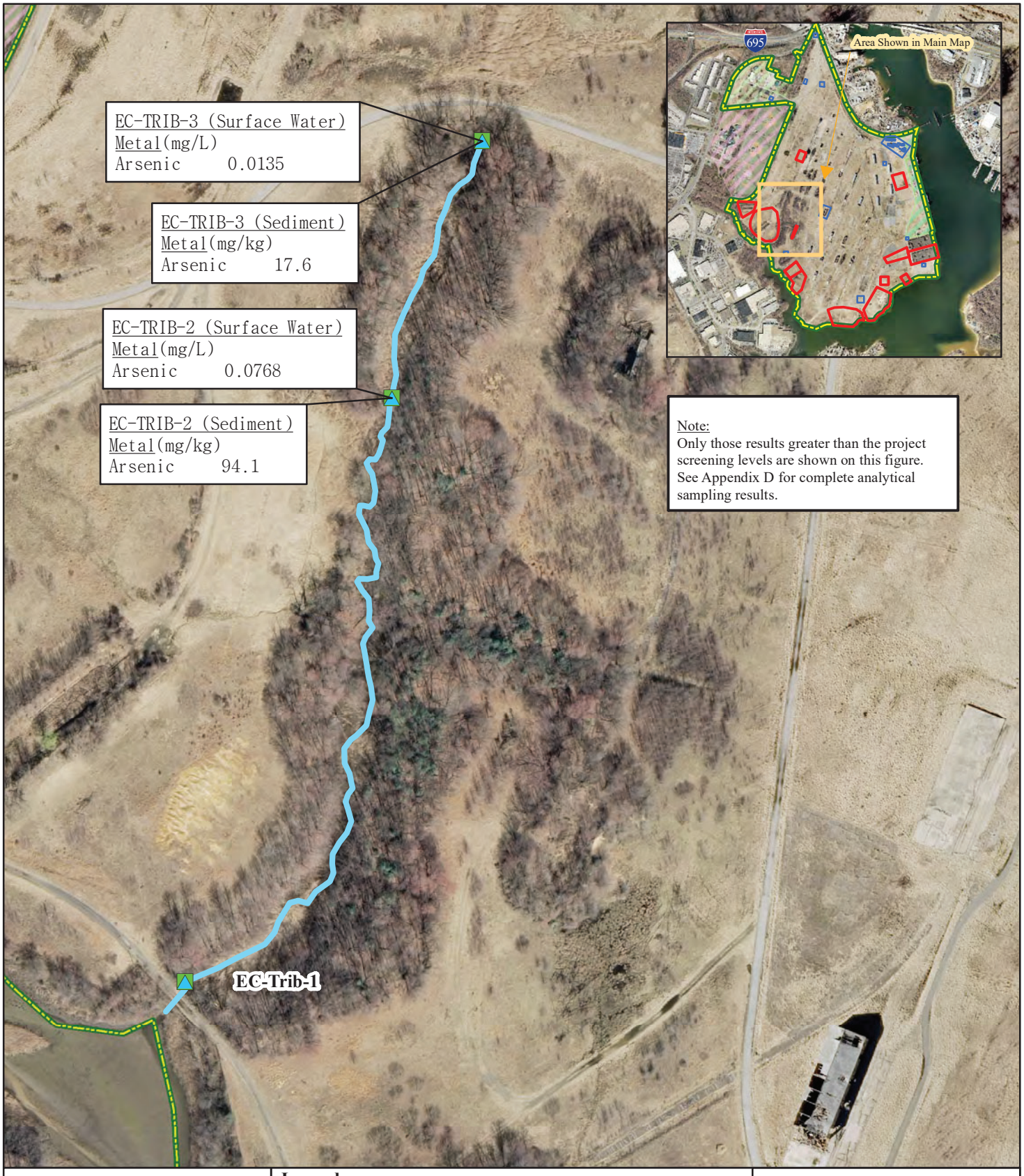

Legend

- Tributary Sampling Location
- Approximate Tributary Location
- Former Curtis Bay Ordnance Depot Boundary
- [redacted]y

Location ID (Matrix)
Analyte Group (unit)
Analyte Result Qualifier
mg/L - milligrams per liter
mg/kg - milligrams per kilogram

0 200 400 Feet

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Figure 31
Tributary Sampling Results

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: September 2016

Imagery Source: U.S. Gelogical Survey, 2011

[redacted]

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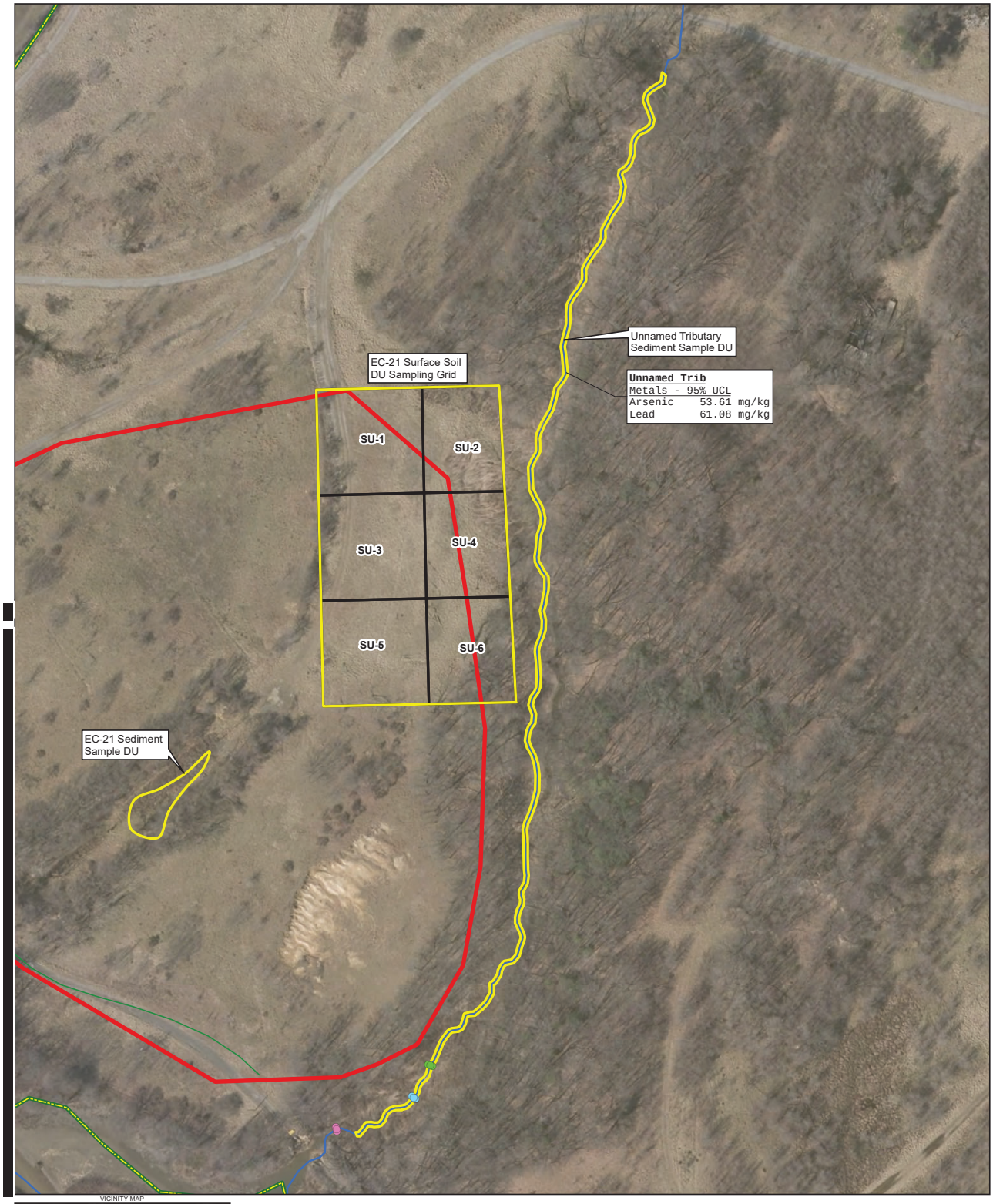

VICINITY MAP



Legend

- Primary Sediment Sample Start (2019)
- Duplicate Sediment Sample Start (2019)
- Triplicate Sediment Sample Start (2019)
- ISM Decision Unit (DU) (2019)
- ISM Sampling Unit (SU) (2019)
- Stream
- MMRP EC Boundary
- Former Curtis Bay Ordnance Depot Boundary

0 100 200
Feet

N

Notes:
1) Sediment results presented are the 95% UCL that exceed the screening criteria (USEPA Region 3 BTAG / USEPA Region 4 Ecological Sediment Screening Levels).
2) Results for EC-21 surface soil and sediment are presented on Figure 19A.

Figure 31A
Unnamed Tributary Decision Unit
Location and Sample Results
Additional Sampling Curtis
Bay Depot Draft Final RI
Curtis Bay, Maryland

Map Date: 8/5/2019
Source: MD Imap 2017
Projection: NAD 1983 State Plane
Maryland FIPS 1900 Feet

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VICINITY MAP



Legend

- Decision Unit (DU)
- Sampling Unit
- Stream
- MMRP EC Boundary
- Former Curtis Bay Ordnance Depot Boundary

0 50 100
Feet

N

Notes:
1) Sediment results presented are the 95% UCL that exceed the screening criteria (USEPA Region 3 BTAG / USEPA Region 4 Ecological Sediment Screening Levels).

Figure 32
Background Sediment Decision Unit Location and Sample Results
Additional Sampling Curtis Bay Depot Draft Final RI
Curtis Bay, Maryland

Map Date: 9/25/2019
Source: MD Imap 2017
Projection: NAD 1983 State Plane Maryland FIPS 1900 Feet

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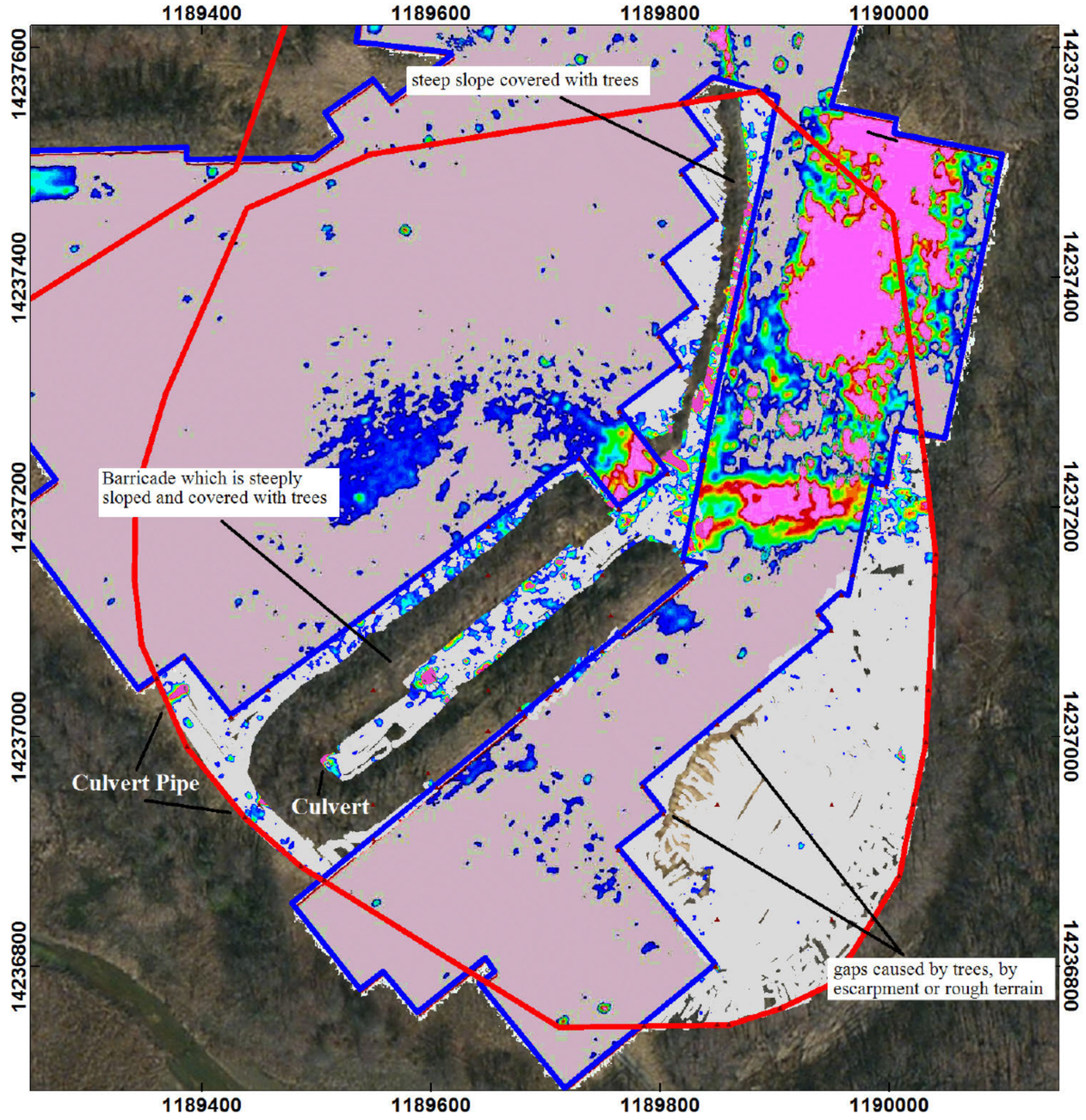


Figure B-1
EM61MK2 Survey
Channel 3

EC-21 Area
Curtis Bay, MD

Legends:
- EC Boundary
- MKM Survey Boundary

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:1500
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: [redacted] | Verified By: [redacted] | Approved By: [redacted]

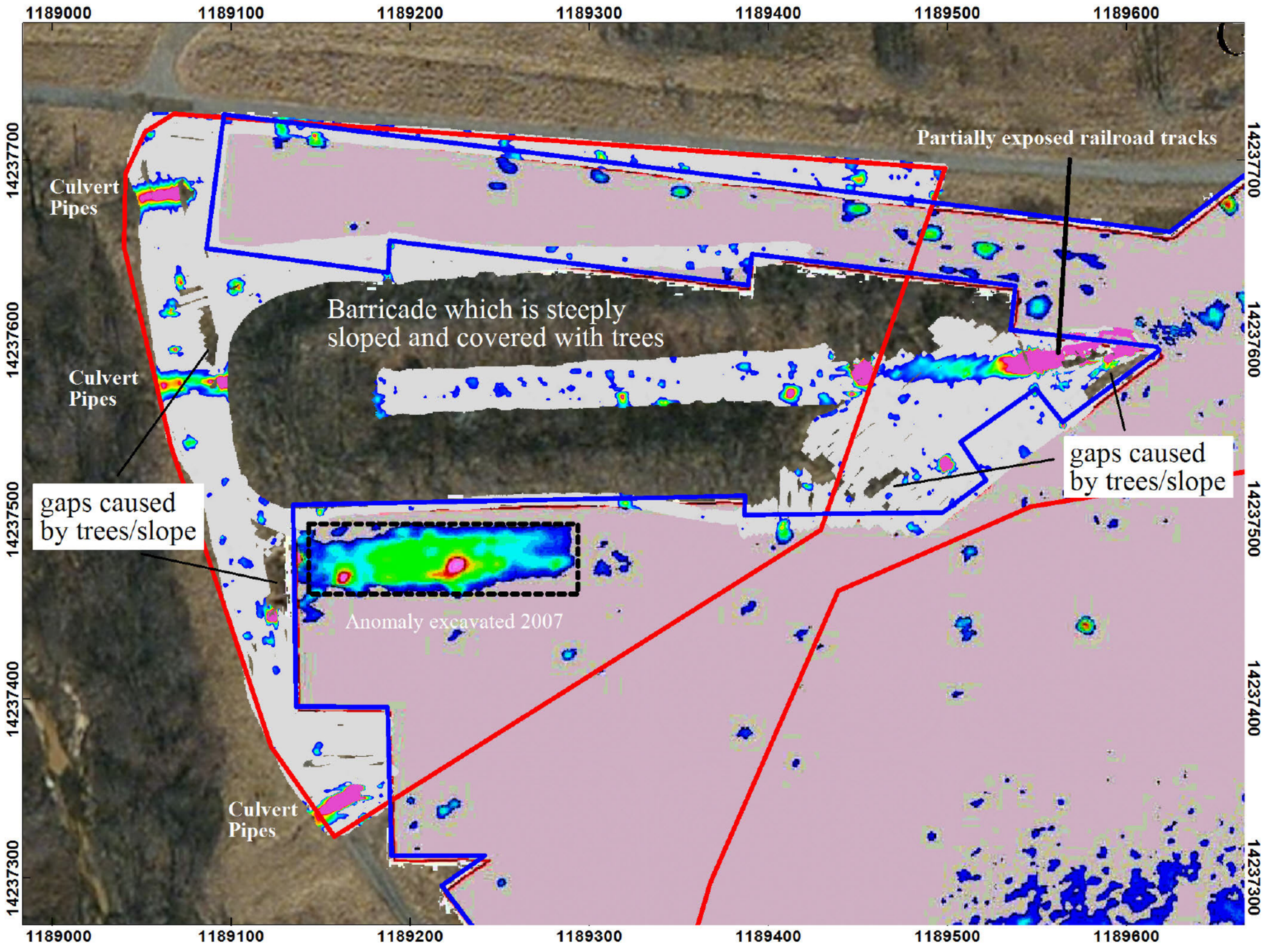


Figure B-2
EM61MK2 Survey
Channel 3

EC-22 Area
Curtis Bay, MD

Legends:
- EC Boundary
- MKM Survey Boundary

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:800
50 0 50
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: [redacted] | Verified By: [redacted] | Approved By: [redacted]

ERT

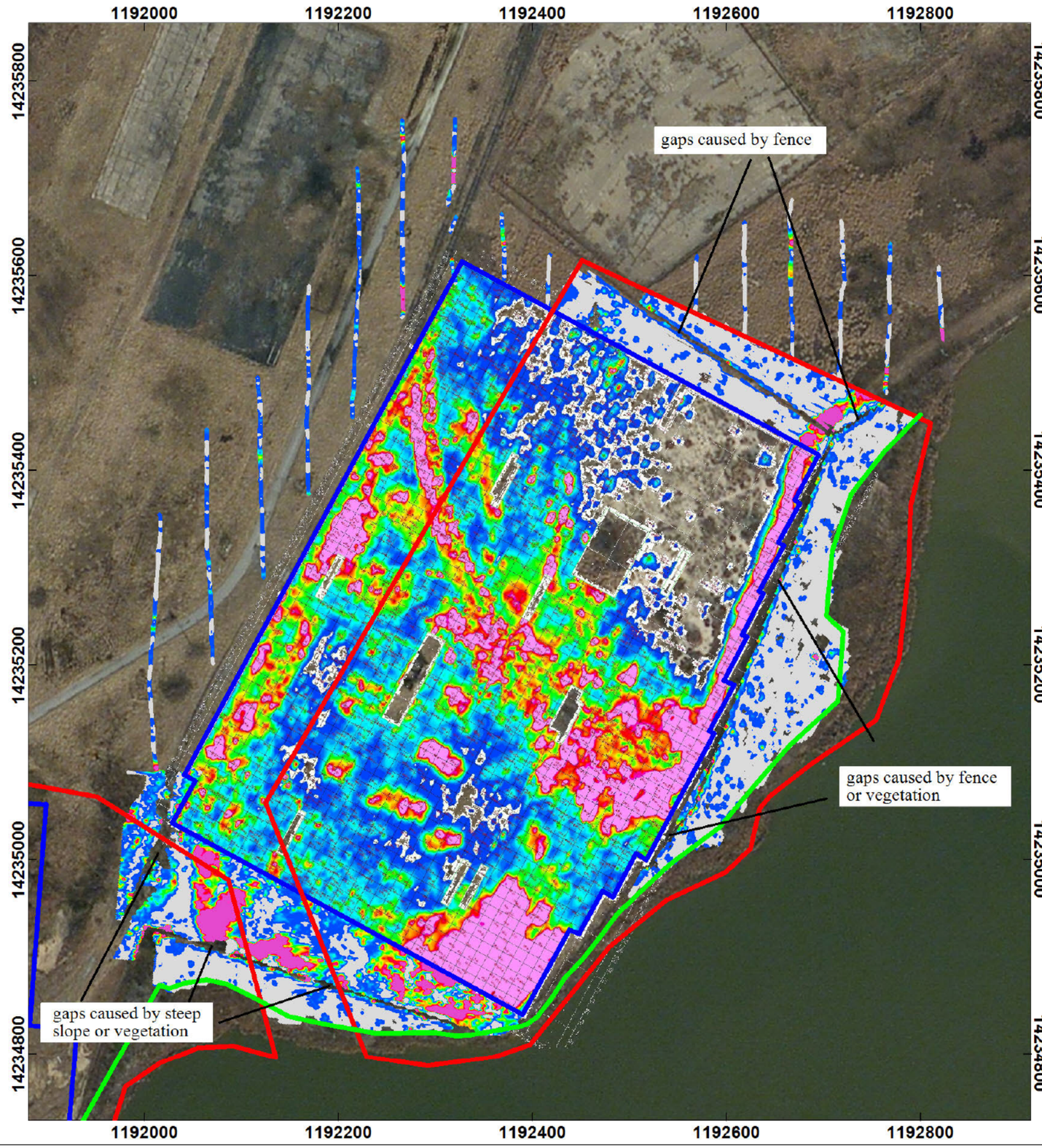


Figure B-3
EM61MK2 Survey
Channel 3

EC-25 Area
Curtis Bay, MD

Legends:
- EC boundary
- Shoreline
- MKM Survey Boundary

mV

0 80 180 260 330 400 470 540 610 680 780 920

Scale 1:1500

50 0 50 100 150

US survey foot

WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: | Verified By: | Approved By:

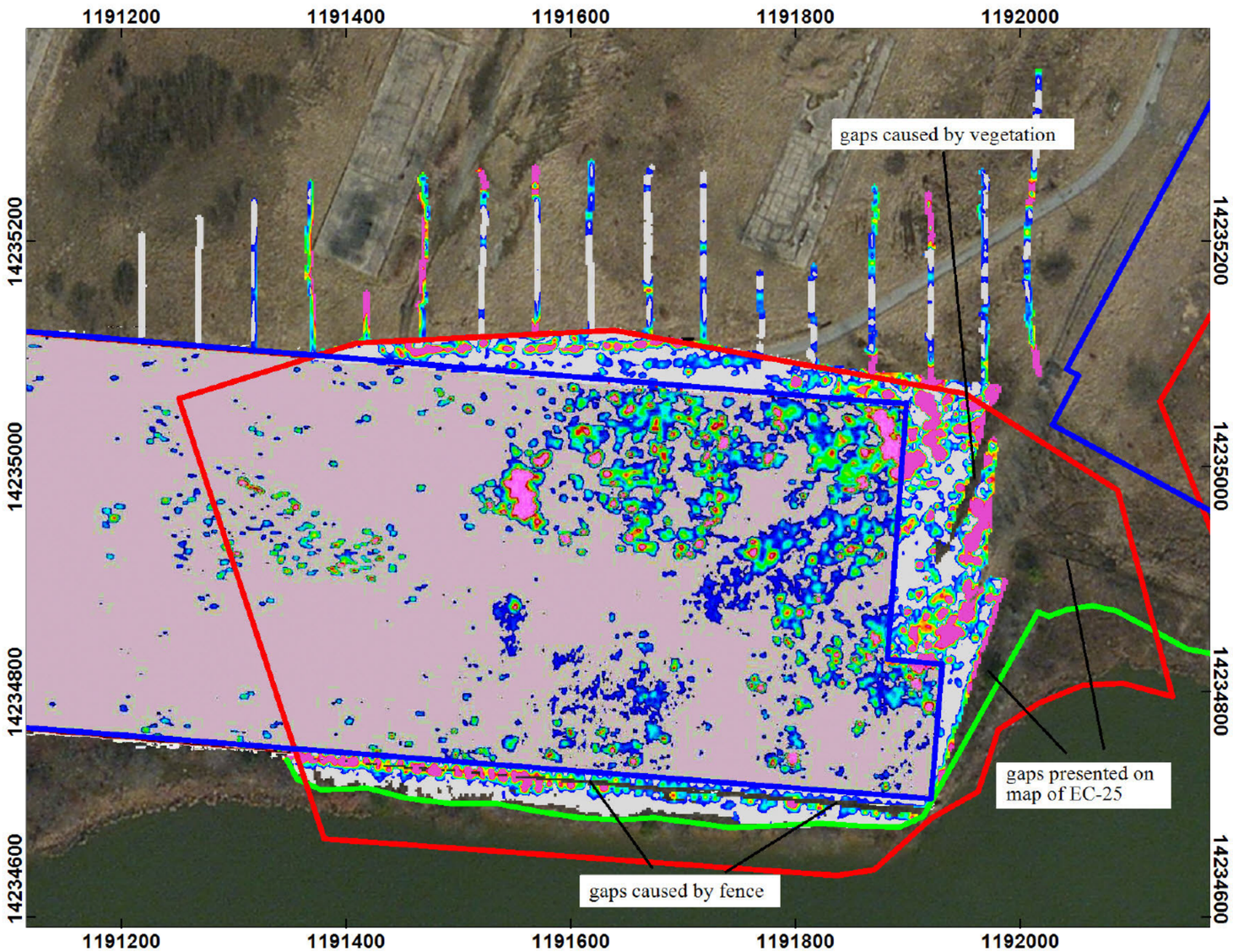


Figure B-4
EM61MK2 Survey
Channel 3

EC-49 Area
Curtis Bay, MD

Legends:
- EC boundary
- Shoreline
- MKM Survey Boundary

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:1500
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: [redacted] | Verified By: [redacted] | Approved By: [redacted]

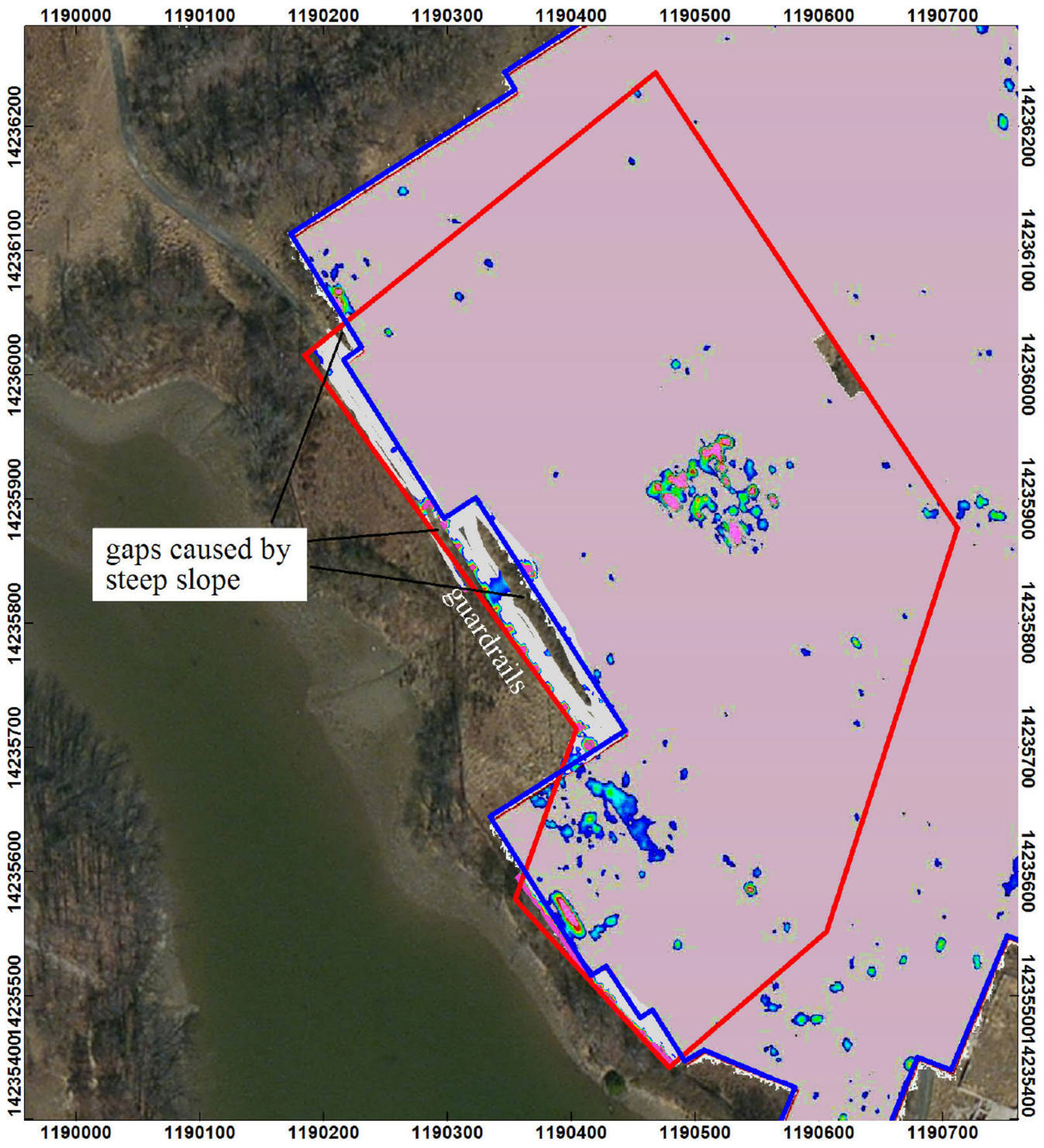


Figure B-5
EM61MK2 Survey
Channel 3

EC-52 Area
Curtis Bay, MD

Legends:
- EC Boundary
- MKM Survey Boundary

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:1250
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: [redacted] | Verified By: [redacted] | Approved By: [redacted]

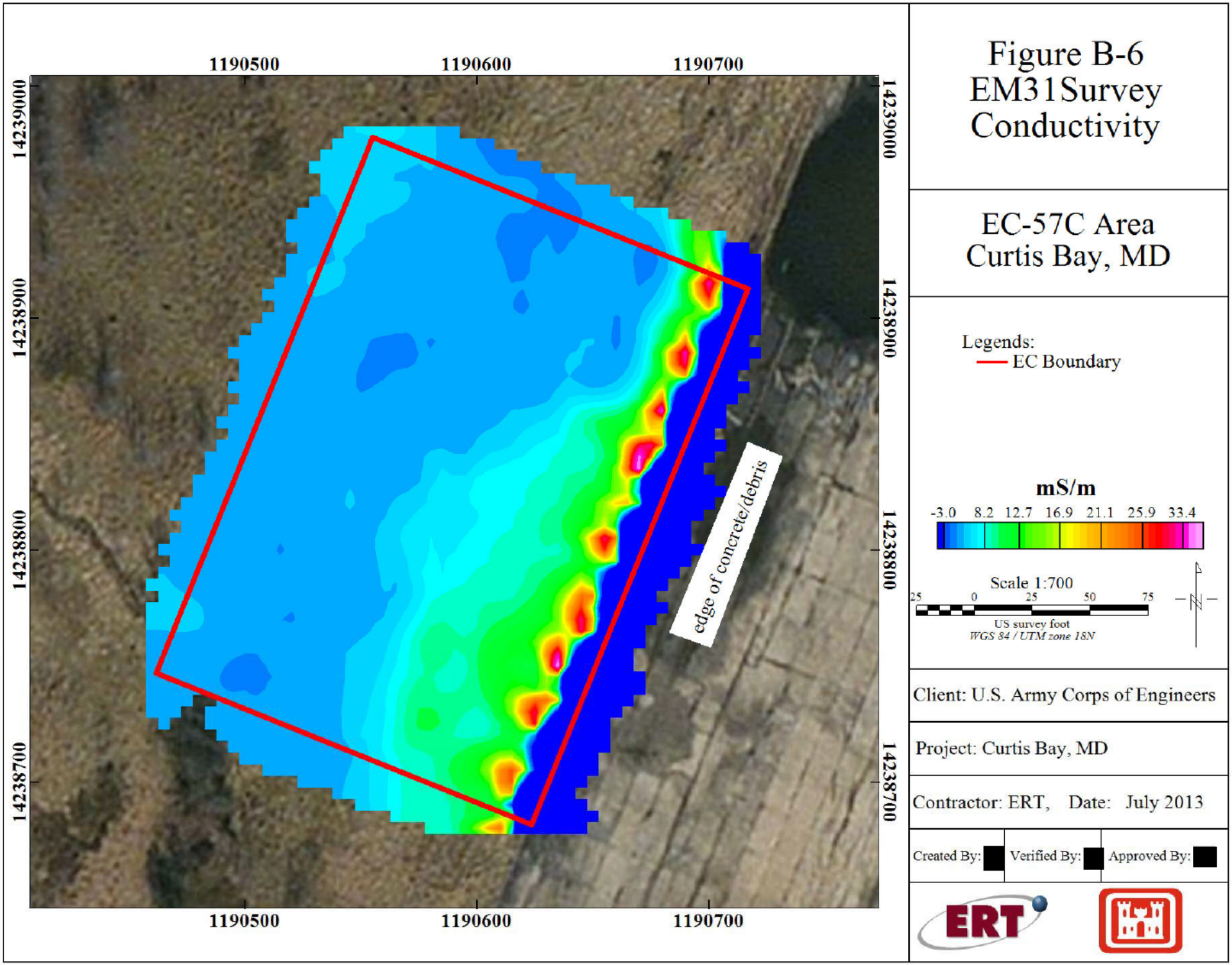


Figure B-6
EM31Survey
Conductivity

EC-57C Area
Curtis Bay, MD

Legends:
EC Boundary

mS/m

-3.0 8.2 12.7 16.9 21.1 25.9 33.4

Scale 1:700

25 0 25 50 75

US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Date: July 2013

Created By: Verified By: Approved By:

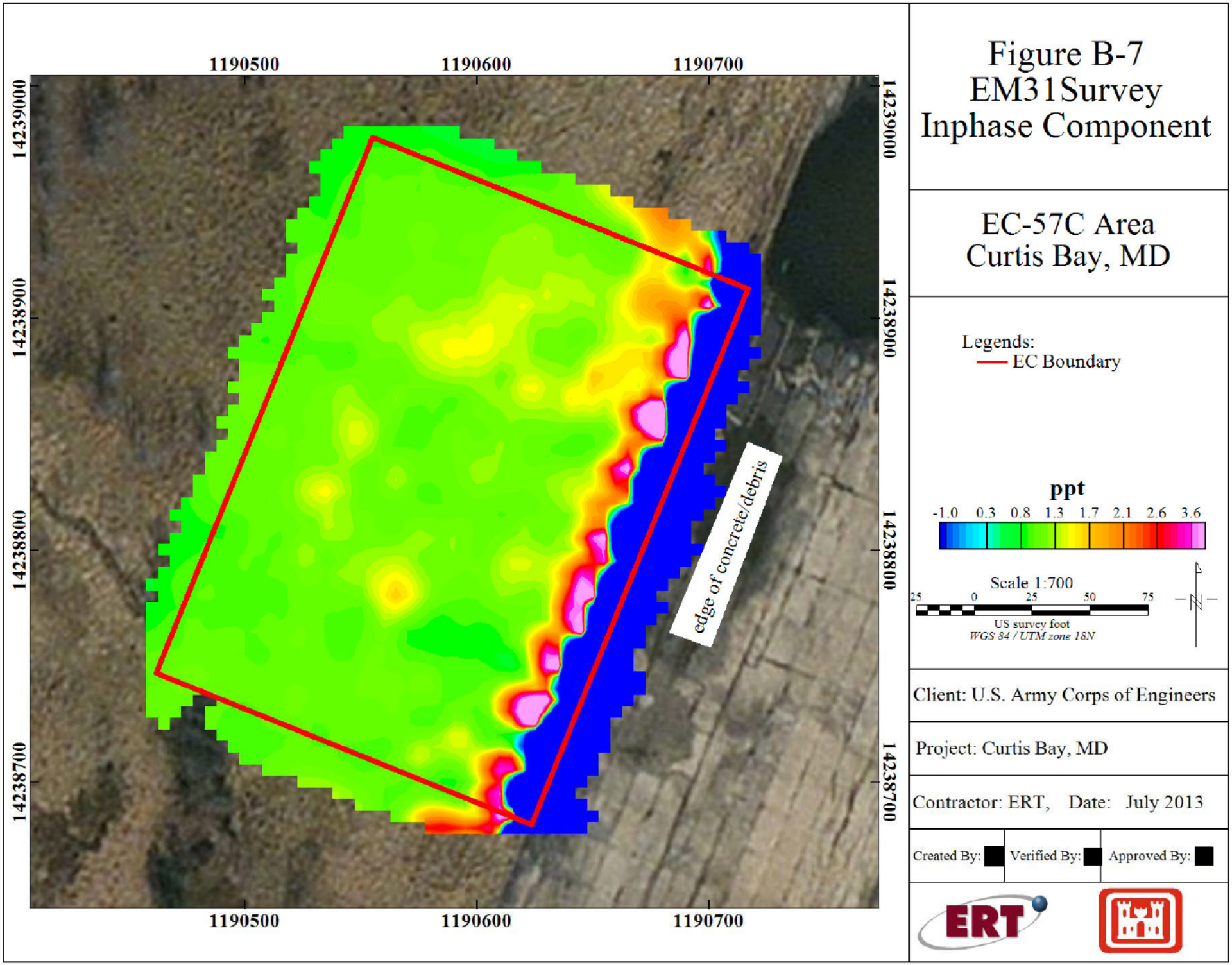


Figure B-7
EM31Survey
Inphase Component

EC-57C Area
Curtis Bay, MD

Legends:
EC Boundary

ppt

-1.0 0.3 0.8 1.3 1.7 2.1 2.6 3.6

Scale 1:700

25 0 25 50 75

US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Date: July 2013

Created By: Verified By: Approved By:

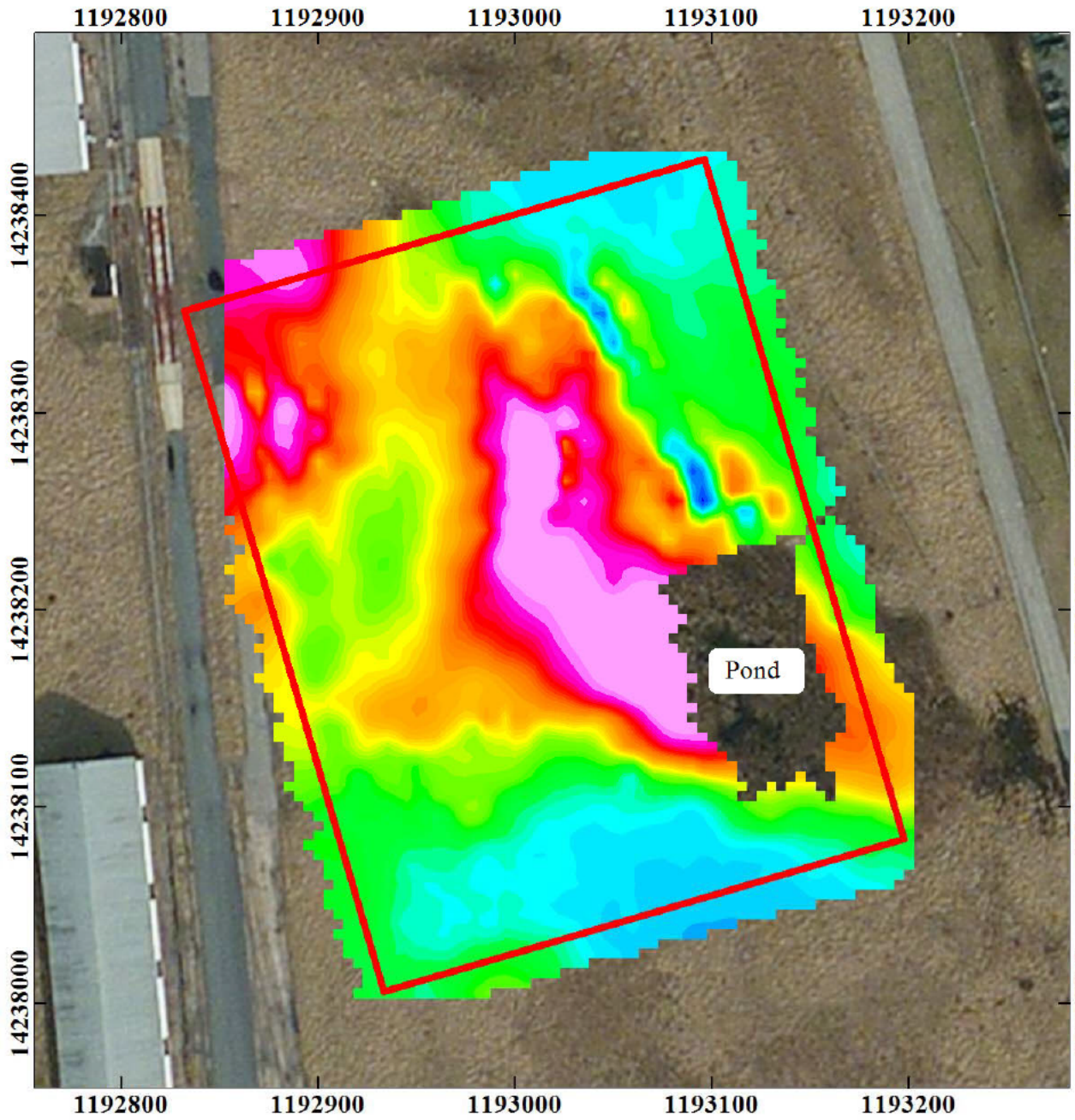


Figure B-8
EM31 Survey
Conductivity

EC-58B Area
Curtis Bay, MD

Legends:
EC Boundary

mS/m

-3.0 8.2 12.7 16.9 21.1 25.9 33.4

Scale 1:1100

50 0 50 100

US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Date: July 2013

Created By:	Verified By:	Approved By:

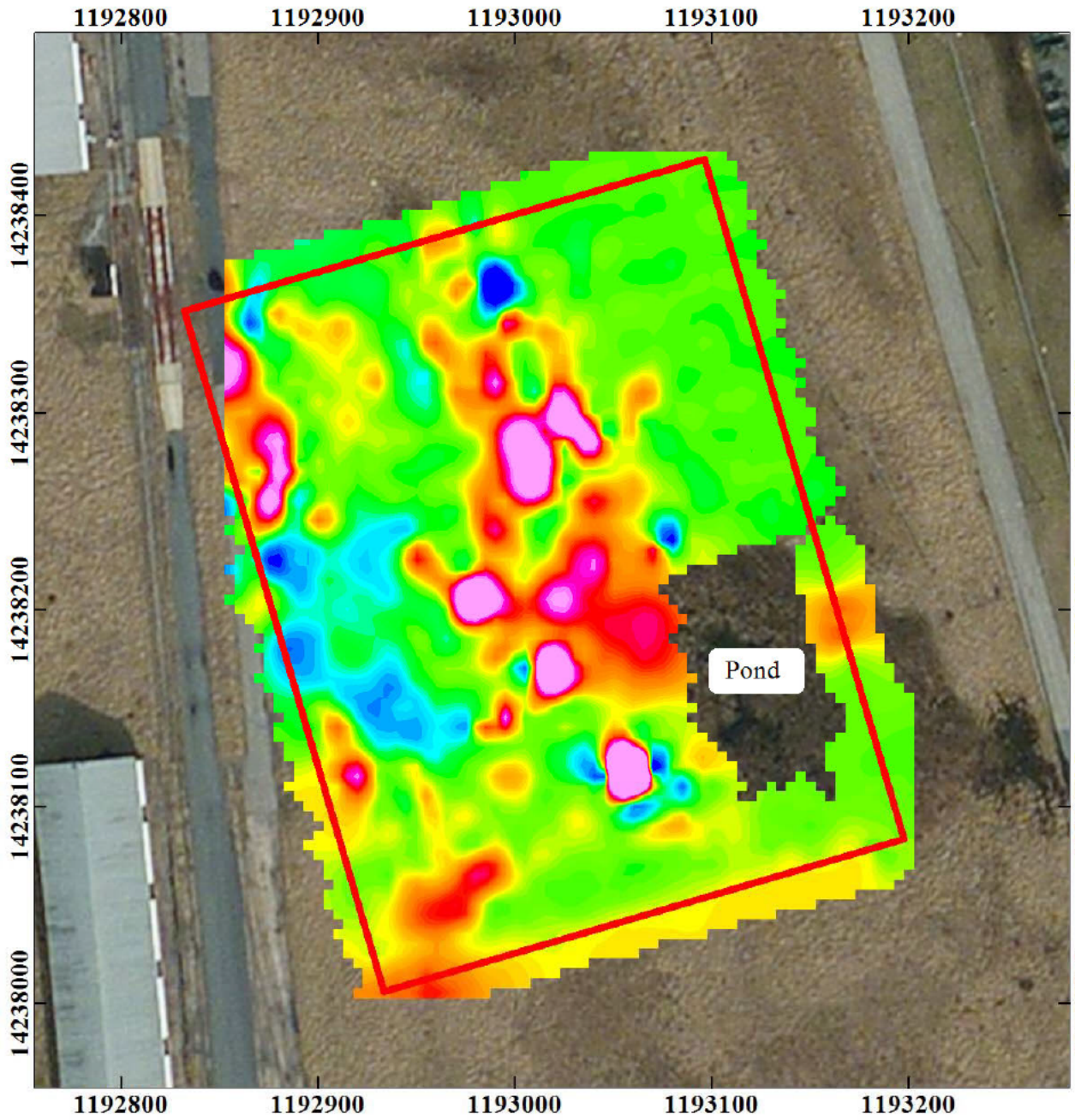


Figure B-9
EM31Survey
Inphase Component

EC-58B Area
Curtis Bay, MD

Legends:
EC Boundary

ppt

-1.0 0.3 0.8 1.3 1.7 2.1 2.6 3.6

Scale 1:1100

50 0 50 100

US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Date: July 2013

Created By: Verified By: Approved By:

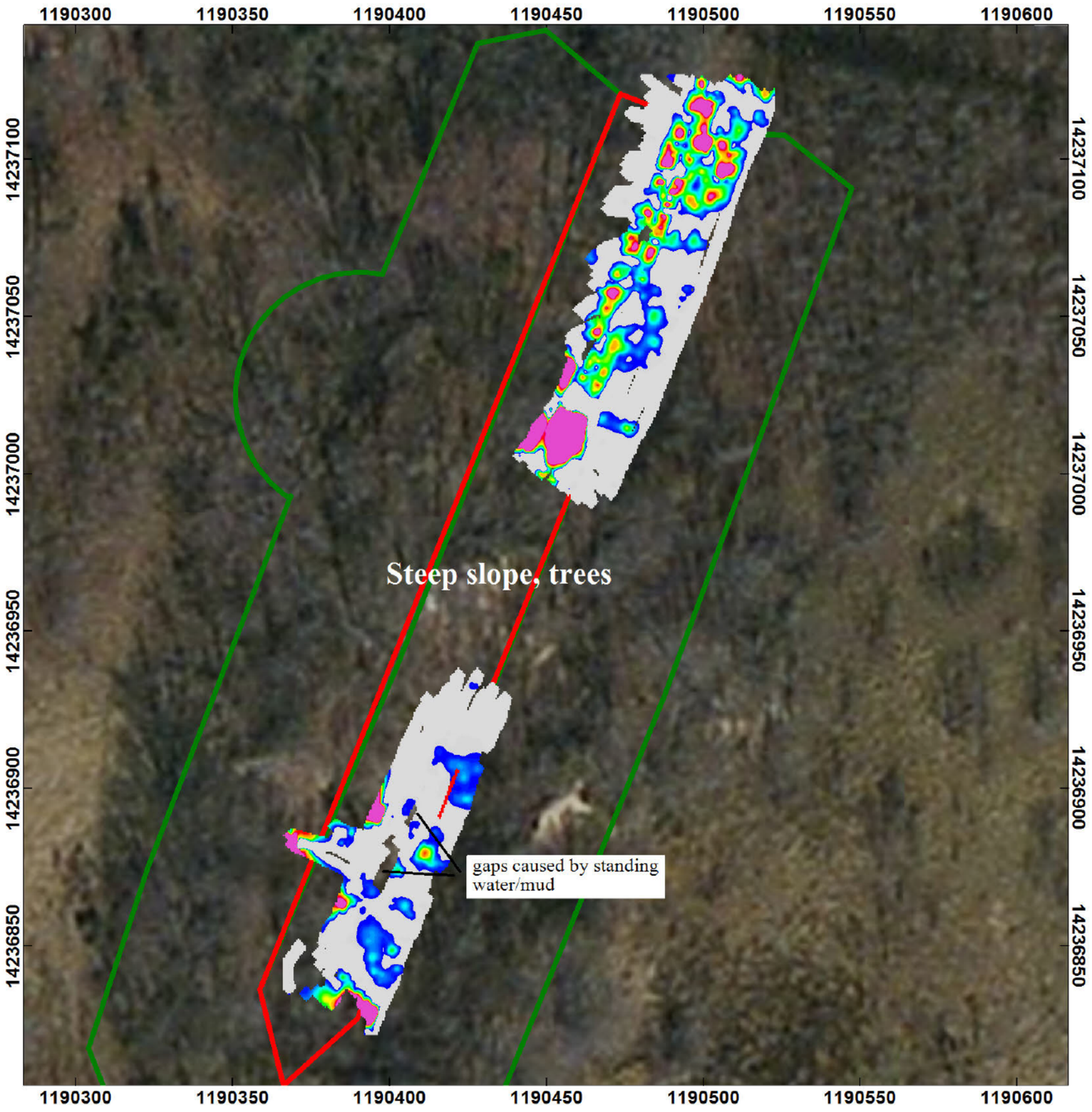


Figure B-10
EM61MK2 Survey
Channel 3

EC-58C Area
Curtis Bay, MD

Legends:
- EC boundary
- Barricade 644-XI

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:500
25 0 25 50
US survey foot
WGS 84 / UTM zone 18N

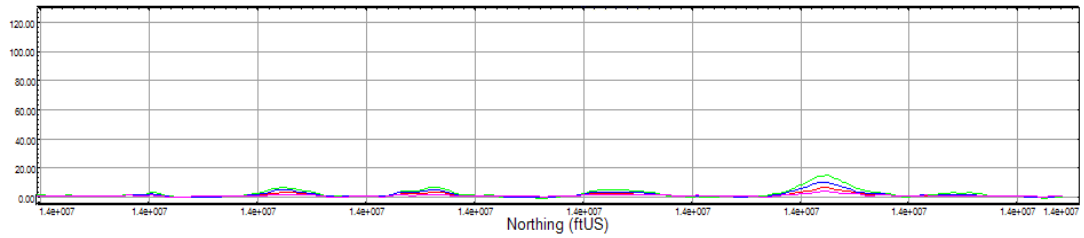
Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

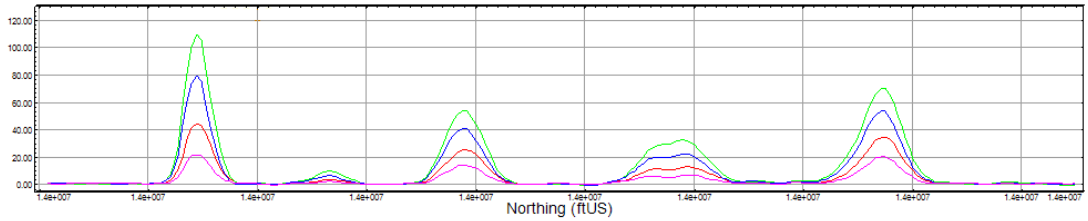
Contractor: ERT, Inc. | Date: July 2013

Created By: [redacted] | Verified By: [redacted] | Approved By: [redacted]

EM61MK2 Response (4 Channels), Background Line – 06/21/13 AM



EM61MK2 Response (4 Channels), Seed Line – 06/21/13 AM

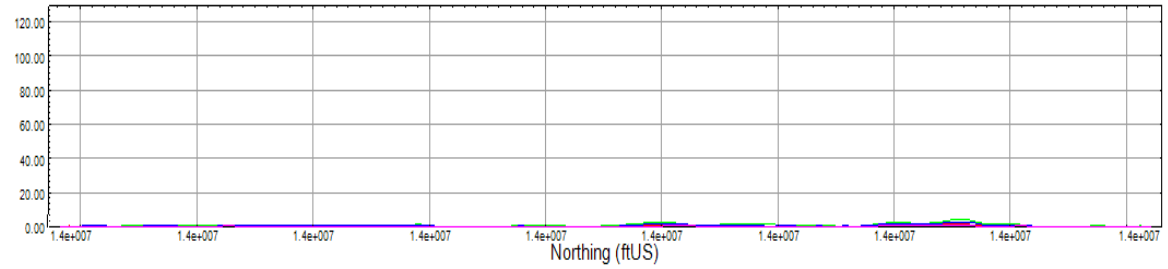


EM61MK2 Response (4 Channels), Background Line – 06/21/13 PM

Dur to Thunder Storm, no PM IVS data.

EM61MK2 Response (4 Channels), Seed Line – 06/21/13 PM

EM61MK2 Response (4 Channels), Background Line – 06/24/13 AM



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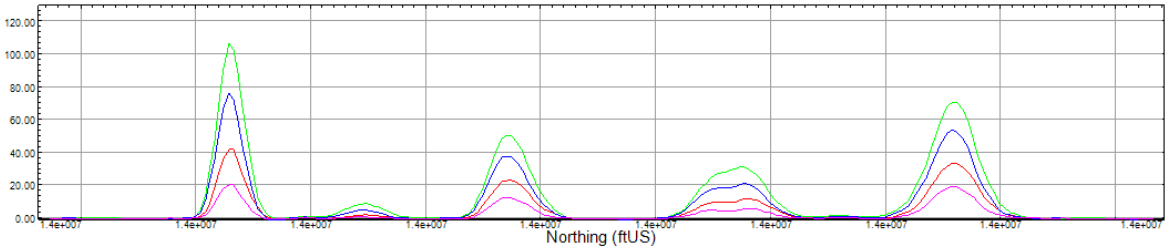
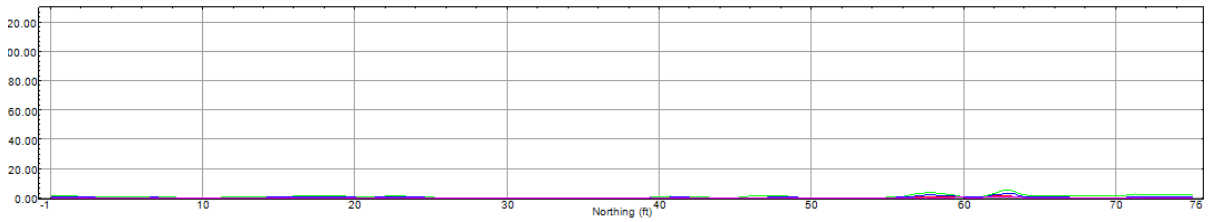


EM61MK2 Response (4 Channels), Background Line – 06/24/13 PM

Due to battery problem, no PM IVS data.

EM61MK2 Response (4 Channels), Seed Line – 06/24/13 PM

EM61MK2 Response (4 Channels), Background Line – 06/25/13 AM



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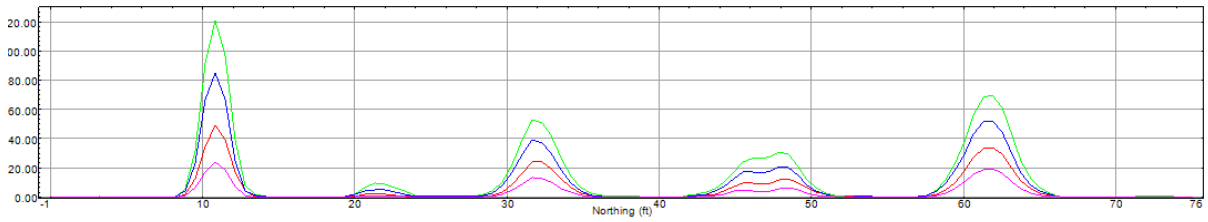

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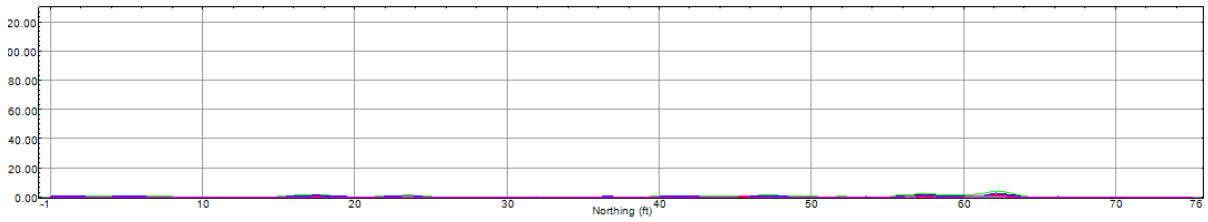

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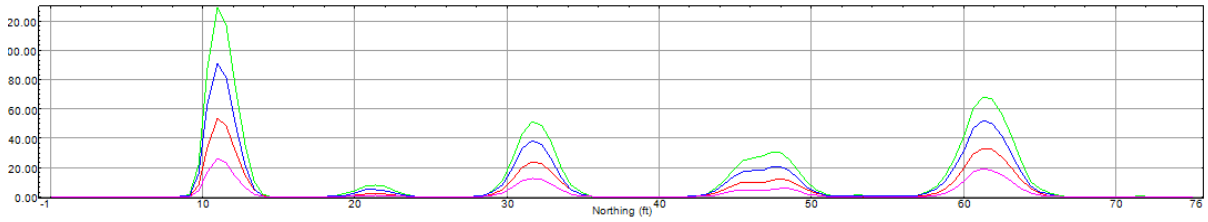
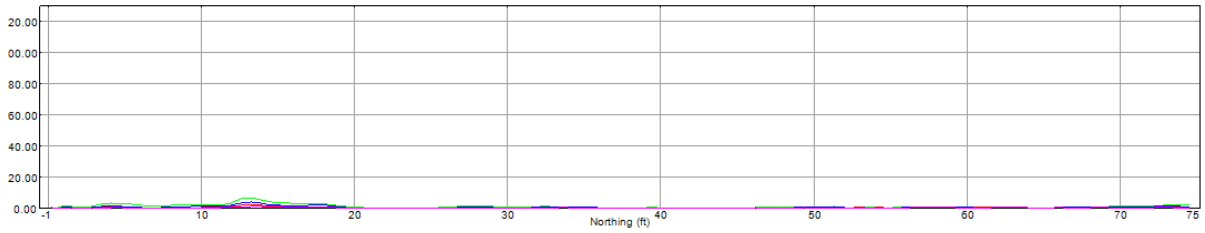


EM61MK2 Response (4 Channels), Background Line – 07/01/13 AM



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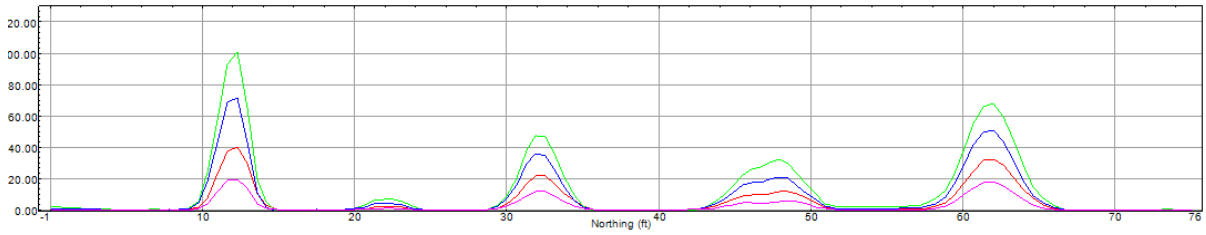

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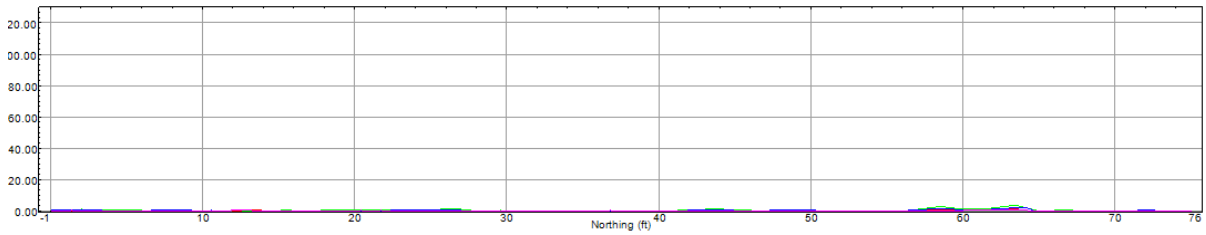

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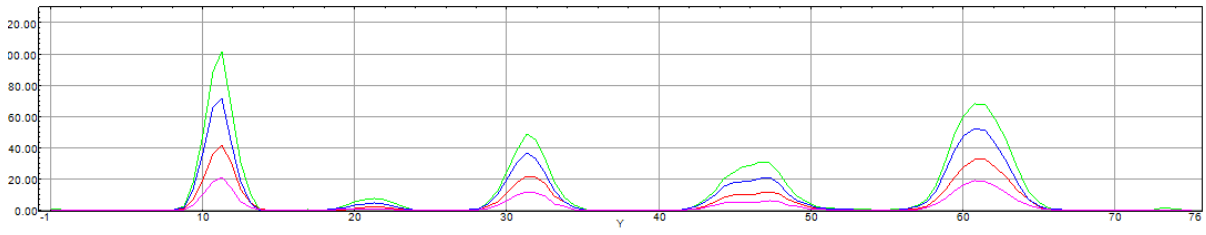
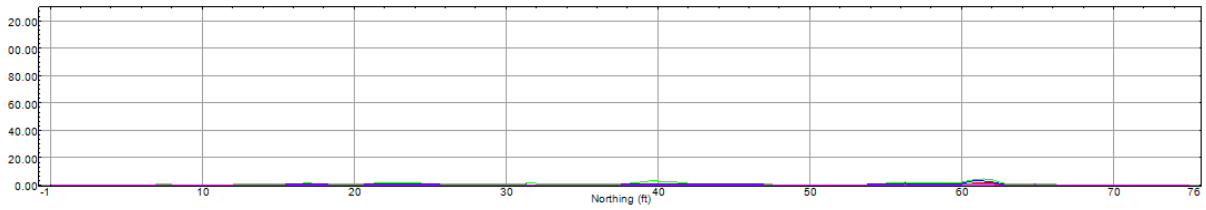


EM61MK2 Response (4 Channels), Background Line – 07/02/13 AM



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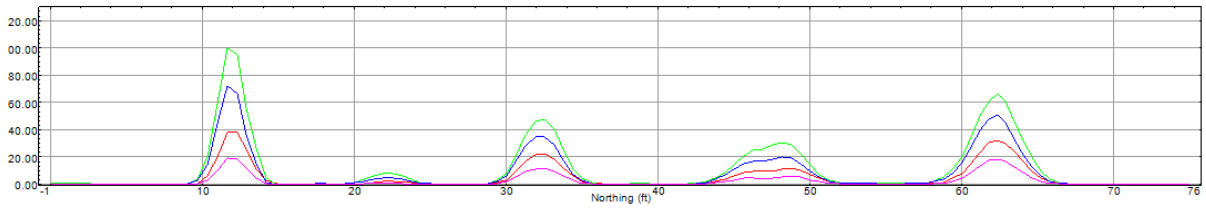

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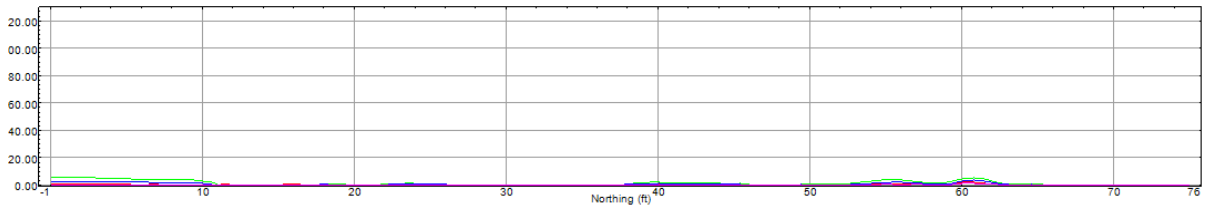

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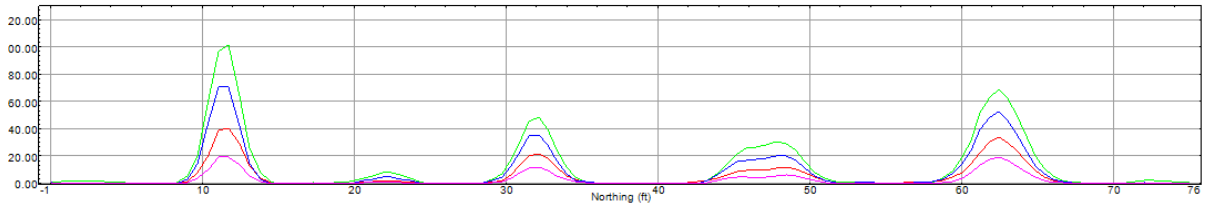
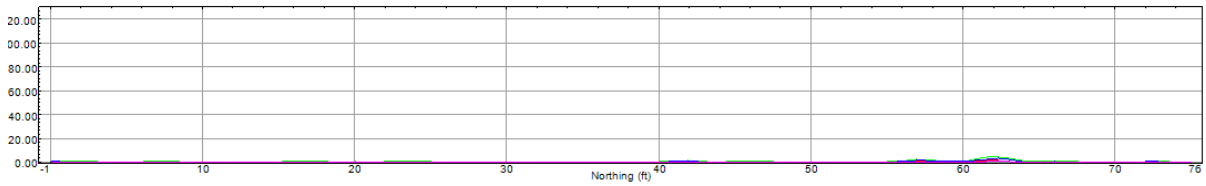
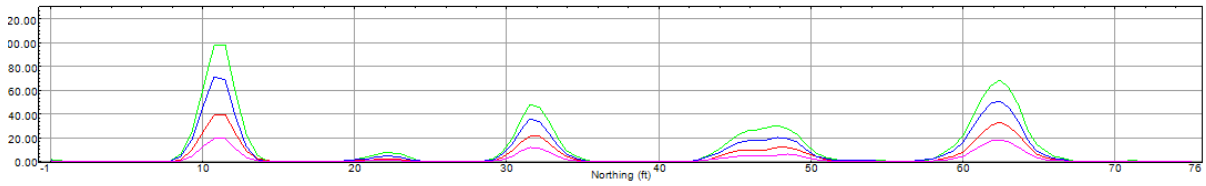


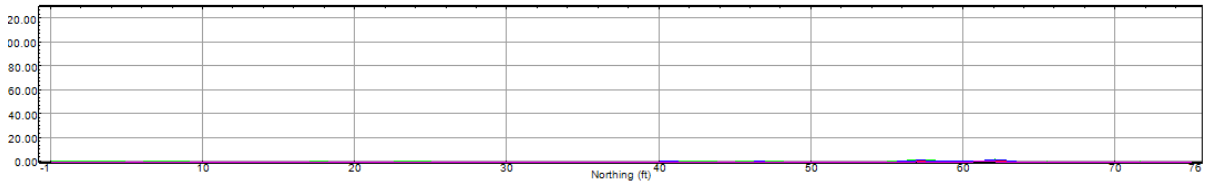
EM61MK2 Response (4 Channels), Background Line – 07/03/13 AM



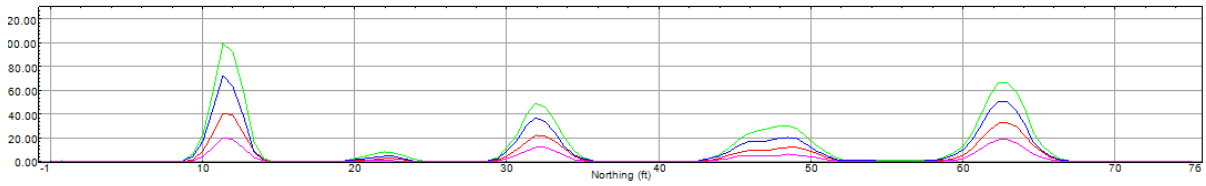
EM61MK2 Response (4 Channels), Seed Line – 07/03/13 AM



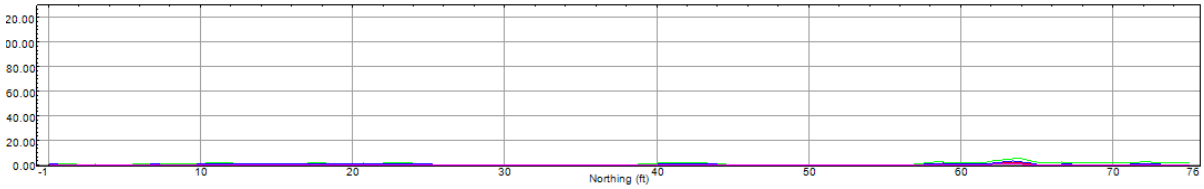
EM61MK2 Response (4 Channels), Background Line – 07/03/13 PM



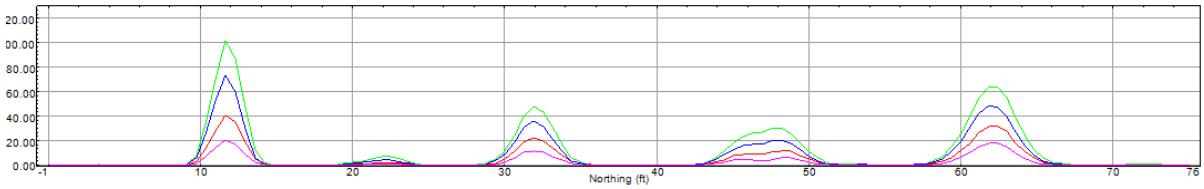
EM61MK2 Response (4 Channels), Seed Line – 07/03/13 PM



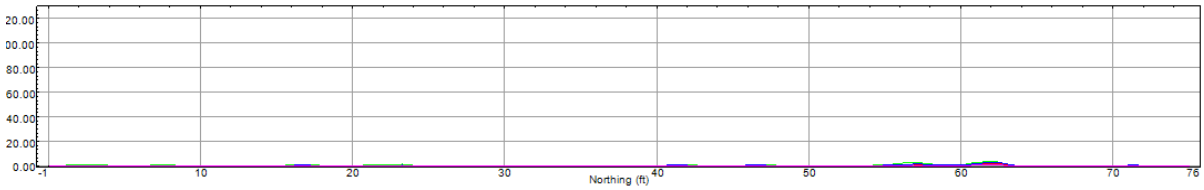
EM61MK2 Response (4 Channels), Background Line – 07/08/13 AM



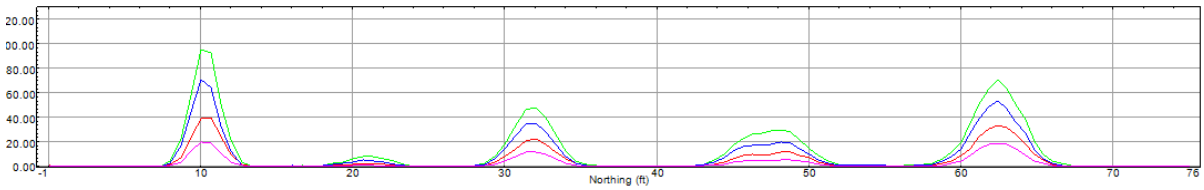
EM61MK2 Response (4 Channels), Seed Line – 07/08/13 AM



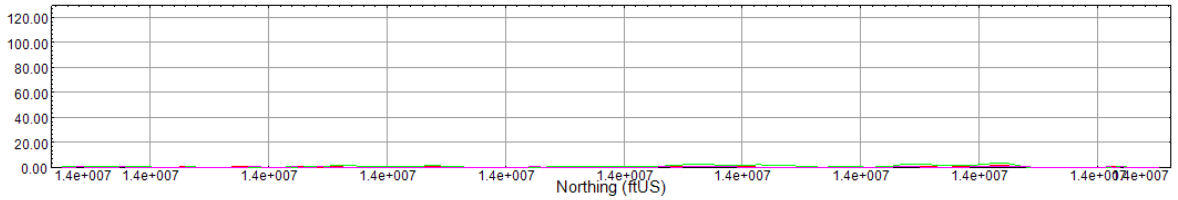
EM61MK2 Response (4 Channels), Background Line – 07/08/13 PM



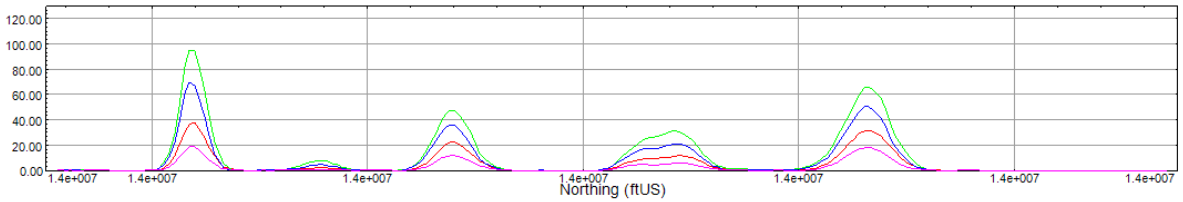
EM61MK2 Response (4 Channels), Seed Line – 07/08/13 PM



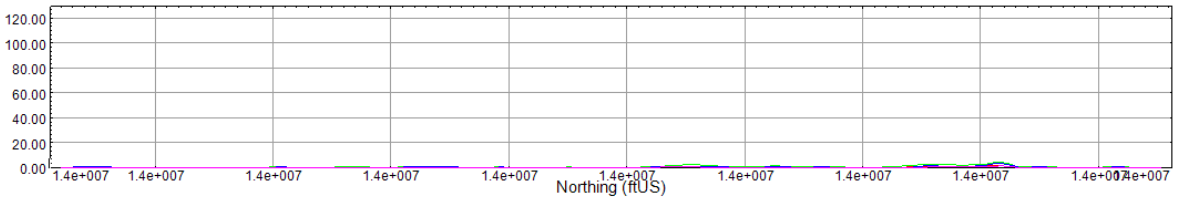
EM61MK2 Response (4 Channels), Background Line – 07/09/13 AM



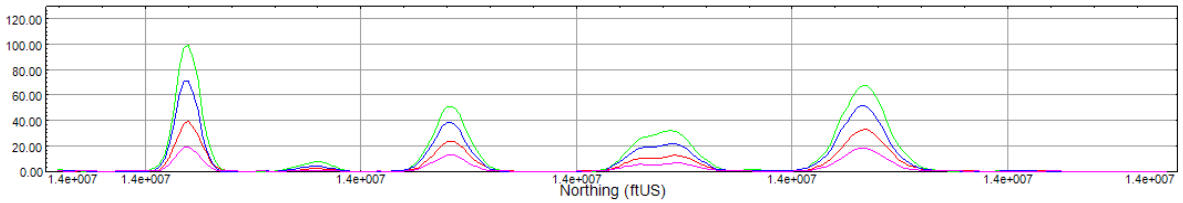
EM61MK2 Response (4 Channels), Seed Line – 07/09/13 AM



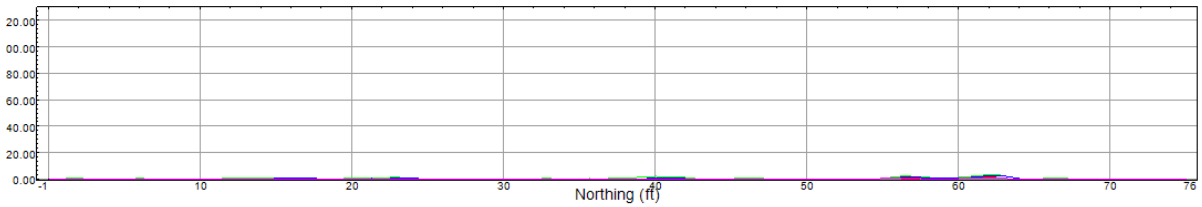
EM61MK2 Response (4 Channels), Background Line – 07/09/13 PM



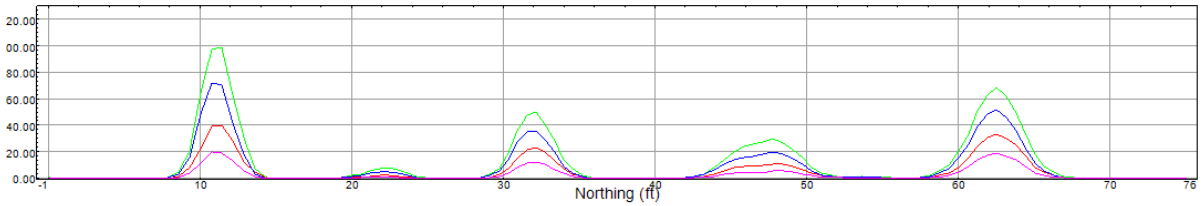
EM61MK2 Response (4 Channels), Seed Line – 07/09/13 PM



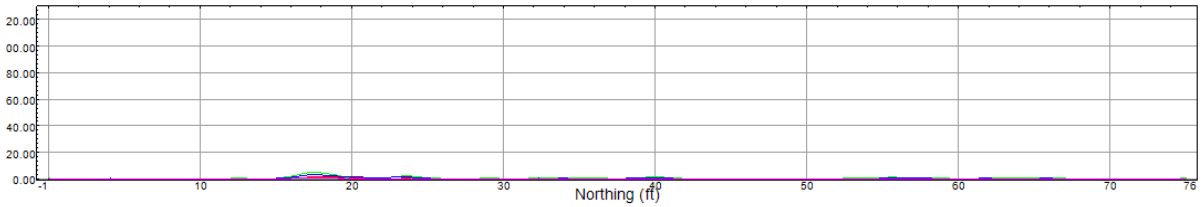
EM61MK2 Response (4 Channels), Background Line – 07/10/13 AM



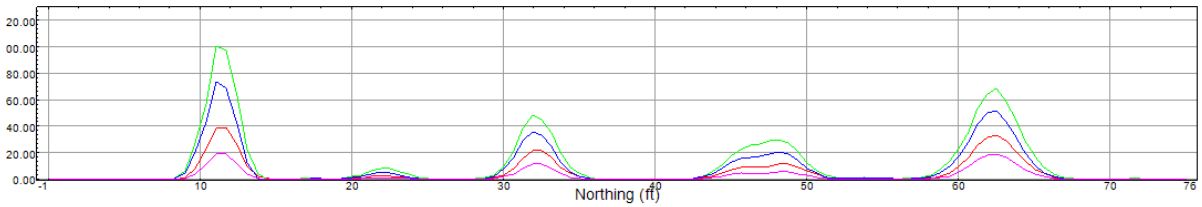
EM61MK2 Response (4 Channels), Seed Line – 07/10/13 AM



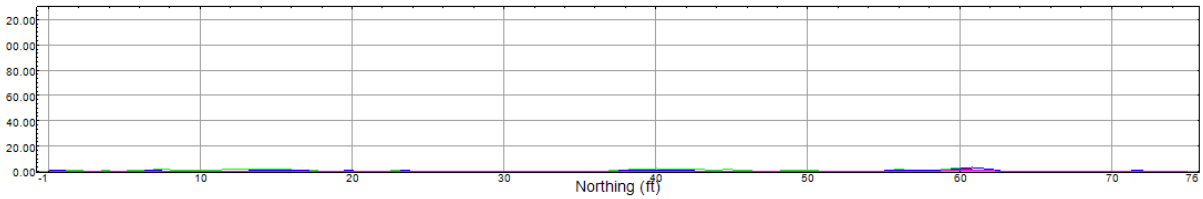
EM61MK2 Response (4 Channels), Background Line – 07/10/13 PM



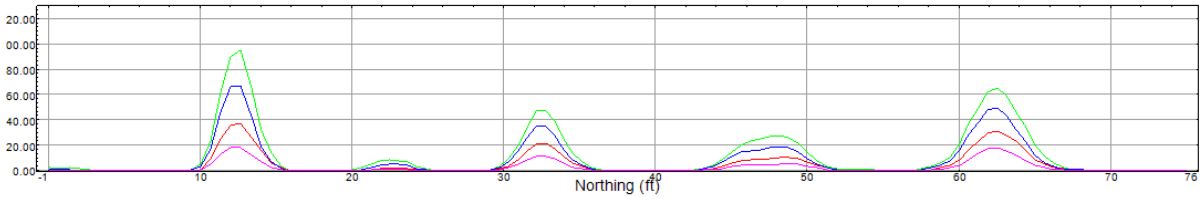
EM61MK2 Response (4 Channels), Seed Line – 07/10/13 PM



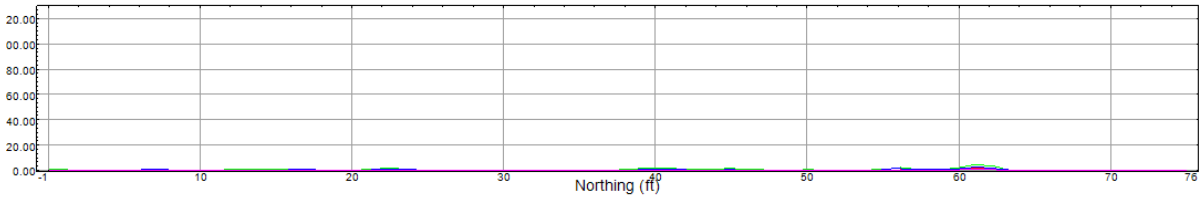
EM61MK2 Response (4 Channels), Background Line – 07/11/13 AM



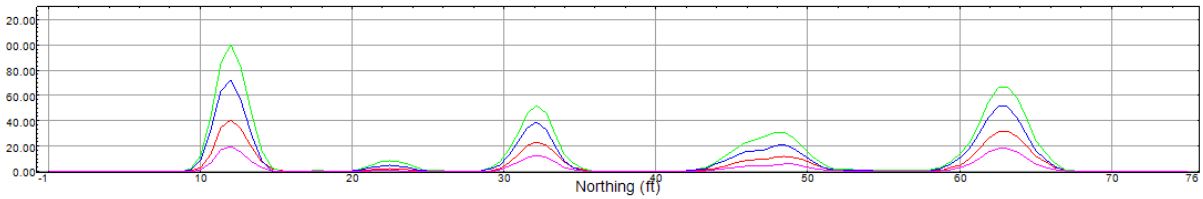
EM61MK2 Response (4 Channels), Seed Line – 07/11/13 AM



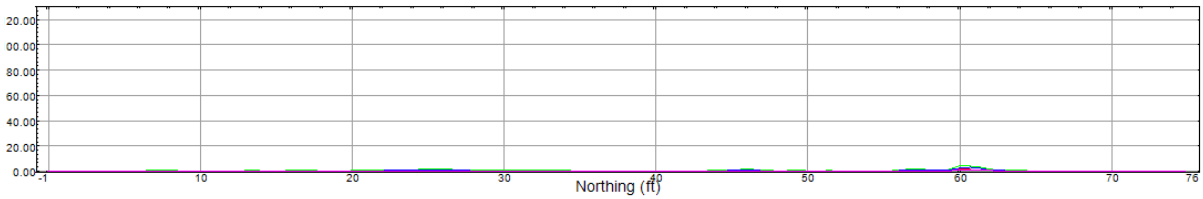
EM61MK2 Response (4 Channels), Background Line – 07/11/13 PM



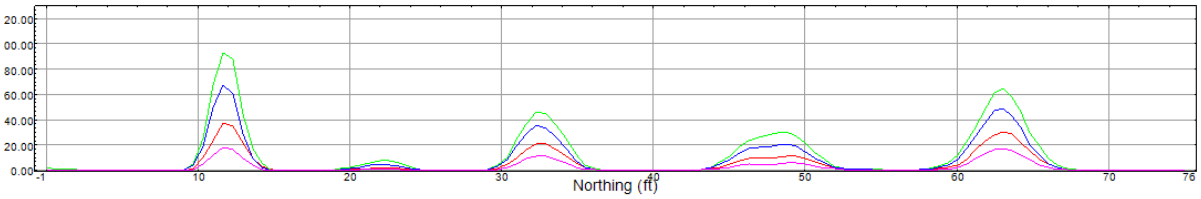
EM61MK2 Response (4 Channels), Seed Line – 07/11/13 PM



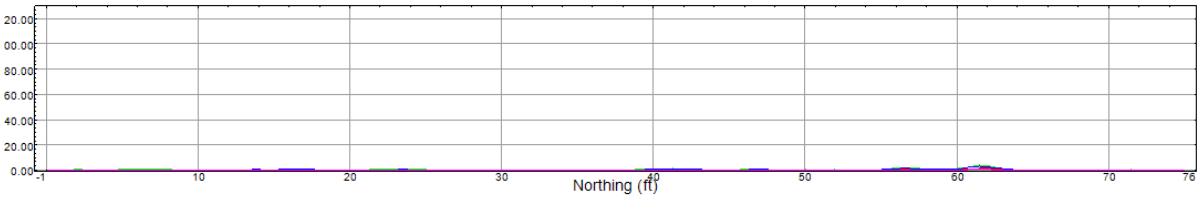
EM61MK2 Response (4 Channels), Background Line – 07/15/13 AM



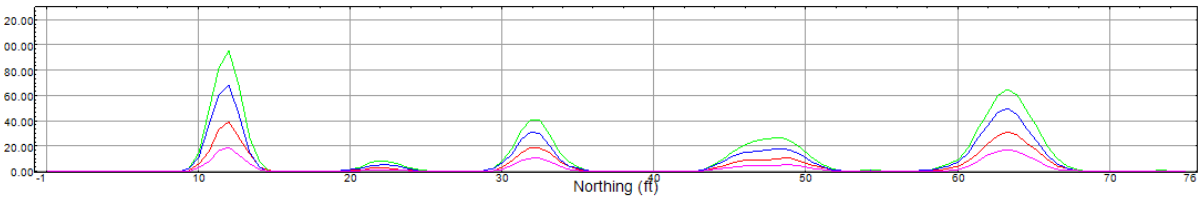
EM61MK2 Response (4 Channels), Seed Line – 07/15/13 AM



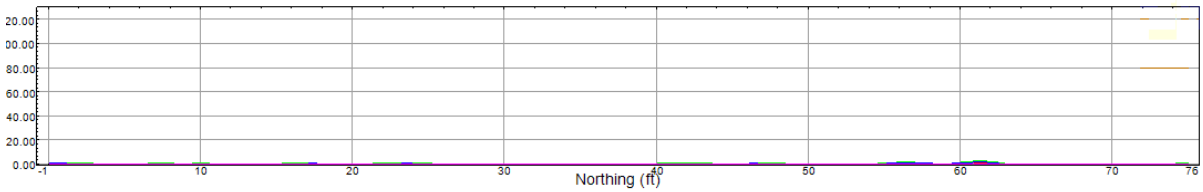
EM61MK2 Response (4 Channels), Background Line – 07/15/13 PM



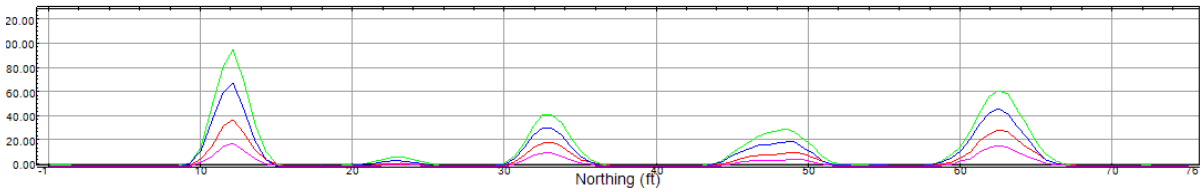
EM61MK2 Response (4 Channels), Seed Line – 07/15/13 PM



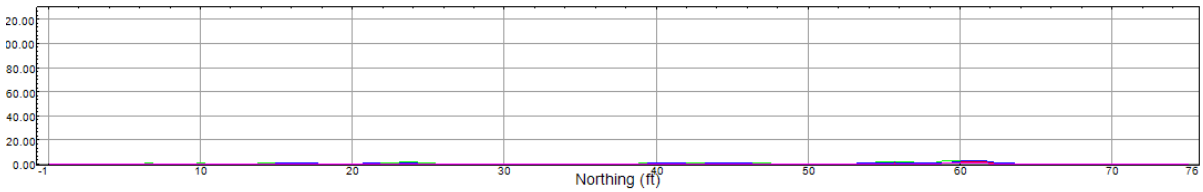
EM61MK2 Response (4 Channels), Background Line – 07/16/13 AM



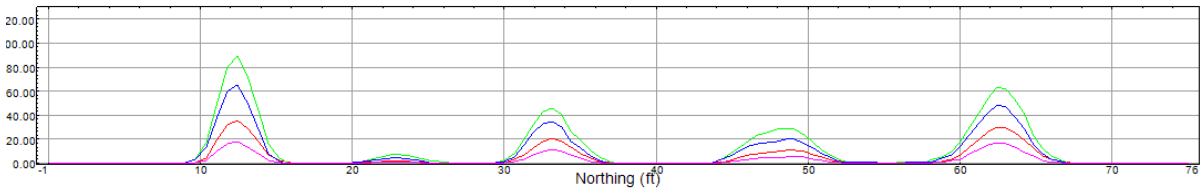
EM61MK2 Response (4 Channels), Seed Line – 07/16/13 AM



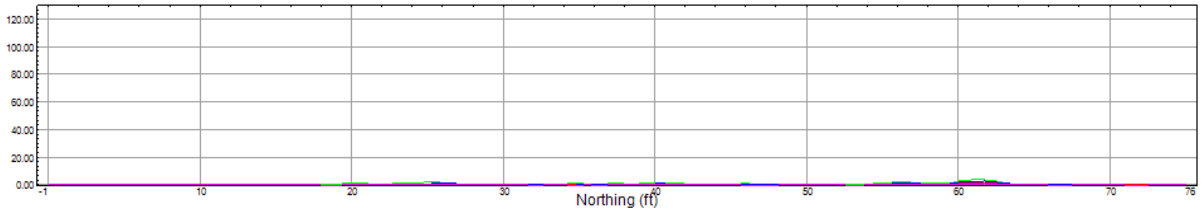
EM61MK2 Response (4 Channels), Background Line – 07/16/13 PM



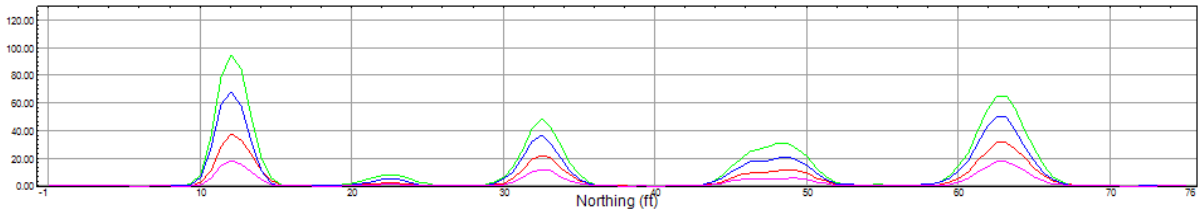
EM61MK2 Response (4 Channels), Seed Line – 07/16/13 PM



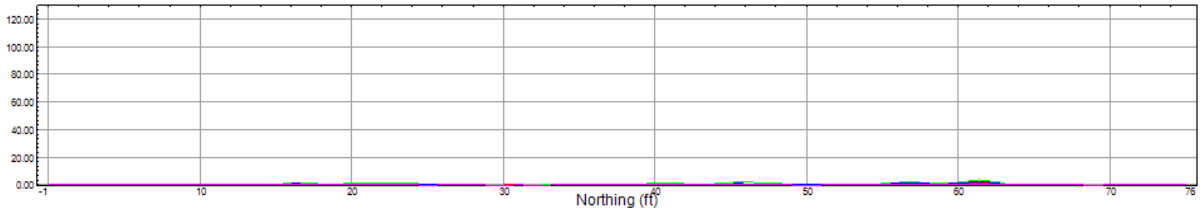
EM61MK2 Response (4 Channels), Background Line – 07/17/13 AM



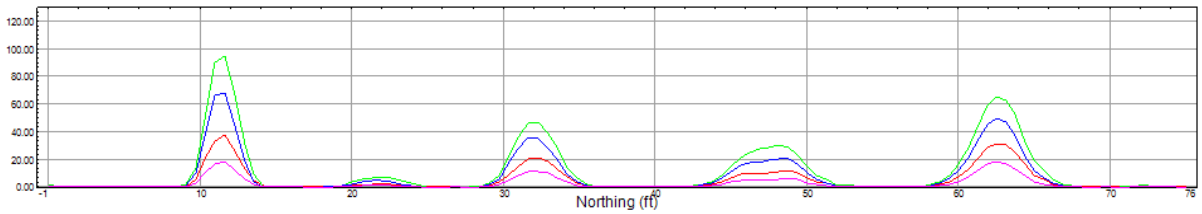
EM61MK2 Response (4 Channels), Seed Line – 07/17/13 AM



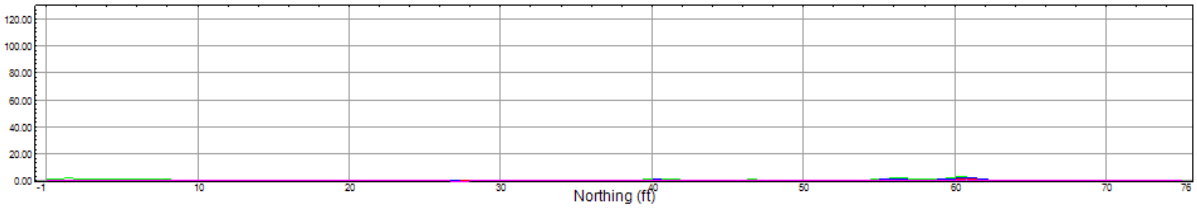
EM61MK2 Response (4 Channels), Background Line – 07/17/13 PM



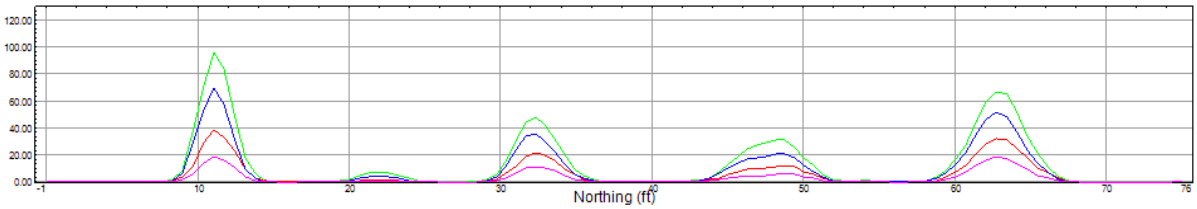
EM61MK2 Response (4 Channels), Seed Line – 07/17/13 PM



EM61MK2 Response (4 Channels), Background Line – 07/18/13 AM



EM61MK2 Response (4 Channels), Seed Line – 07/18/13 AM

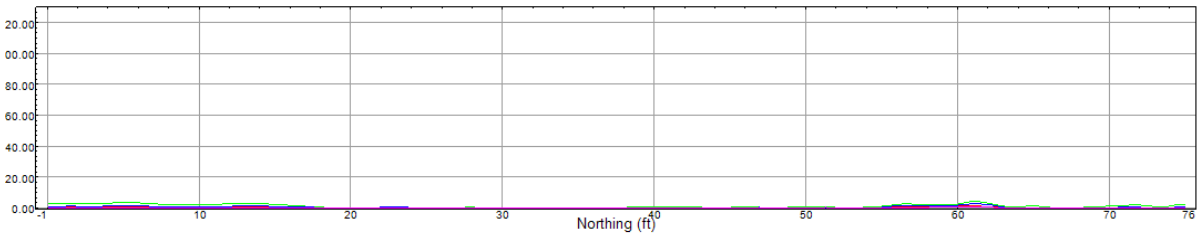


EM61MK2 Response (4 Channels), Background Line – 07/18/13 PM

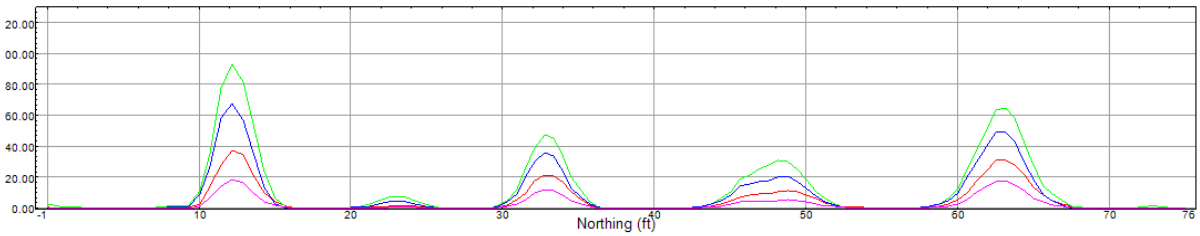
There is no PM IVS test due to Thunder Storm

EM61MK2 Response (4 Channels), Seed Line – 07/18/13 PM

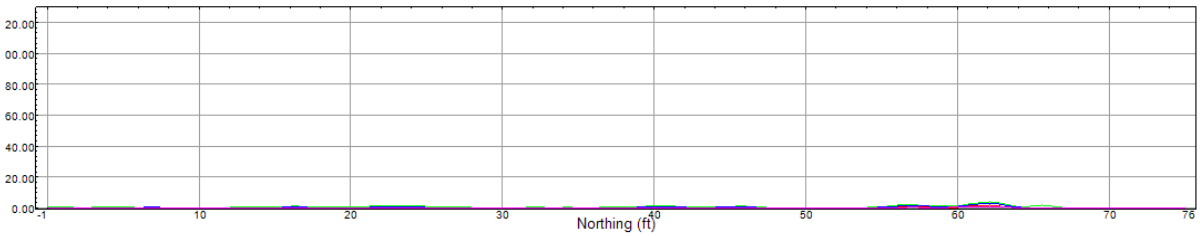
EM61MK2 Response (4 Channels), Background Line – 07/22/13 AM



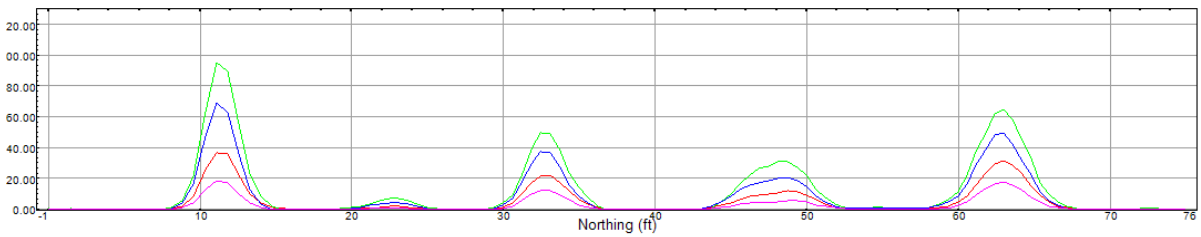
EM61MK2 Response (4 Channels), Seed Line – 07/22/13 AM



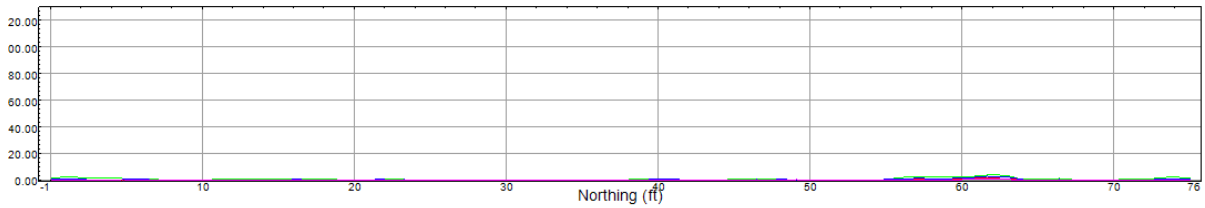
EM61MK2 Response (4 Channels), Background Line – 07/22/13 PM



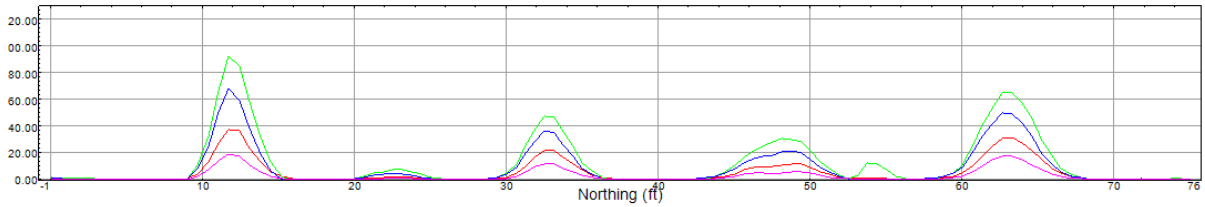
EM61MK2 Response (4 Channels), Seed Line – 07/22/13 PM



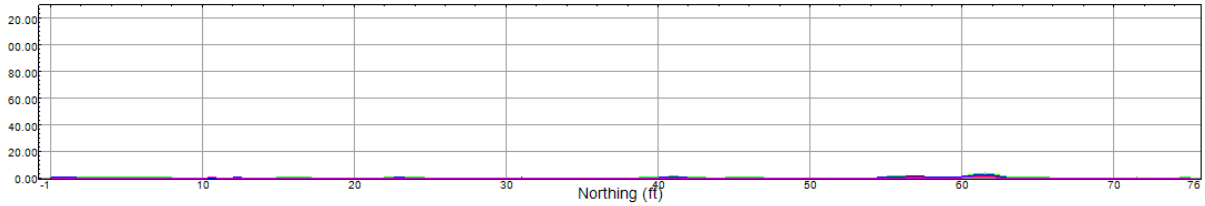
EM61MK2 Response (4 Channels), Background Line – 07/23/13 AM



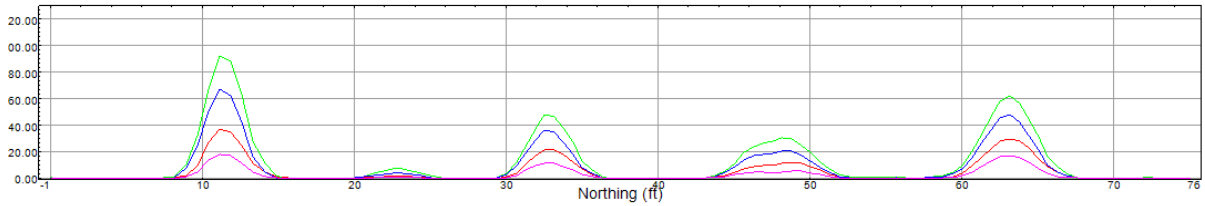
EM61MK2 Response (4 Channels), Seed Line – 07/23/13 AM



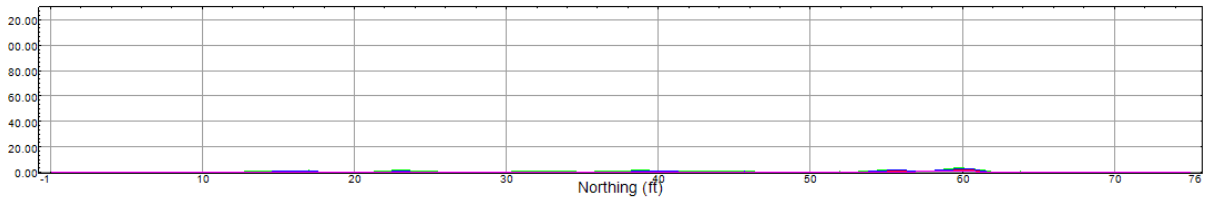
EM61MK2 Response (4 Channels), Background Line – 07/23/13 PM



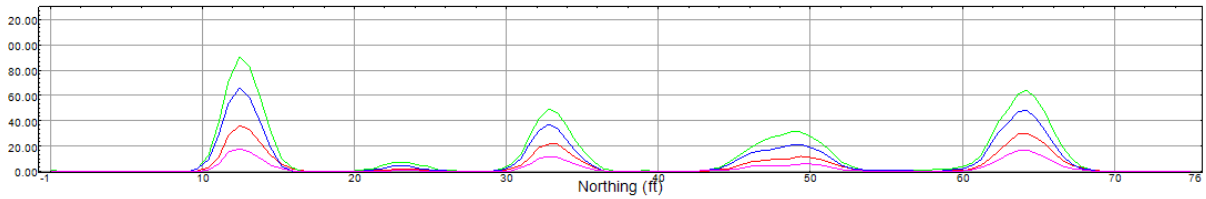
EM61MK2 Response (4 Channels), Seed Line – 07/23/13 PM



EM61MK2 Response (4 Channels), Background Line – 07/24/13 AM



EM61MK2 Response (4 Channels), Seed Line – 07/24/13 AM

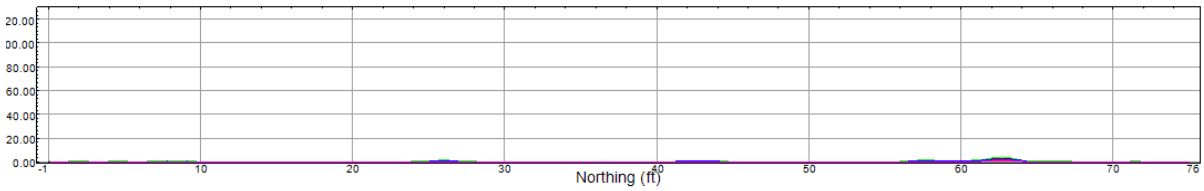


EM61MK2 Response (4 Channels), Background Line – 07/24/13 PM

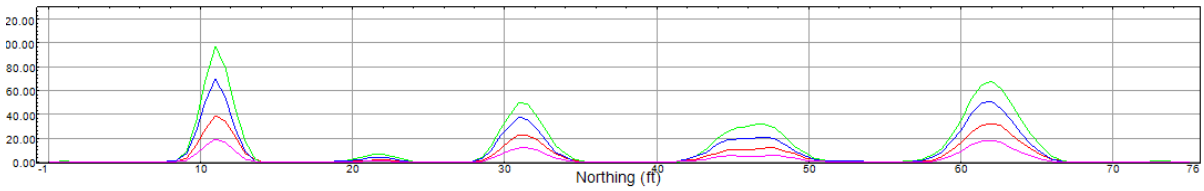
There is no PM IVS test due to cable broken

EM61MK2 Response (4 Channels), Seed Line – 07/24/13 PM

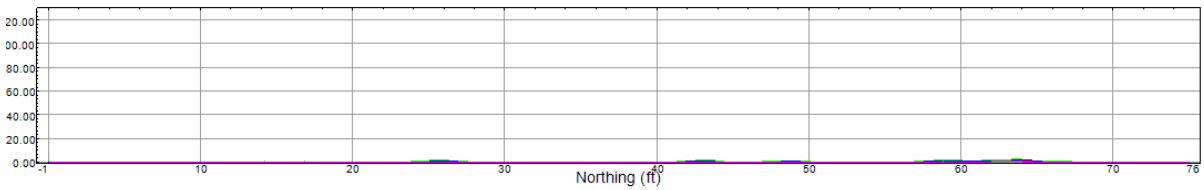
EM61MK2 Response (4 Channels), Background Line – 07/25/13 AM



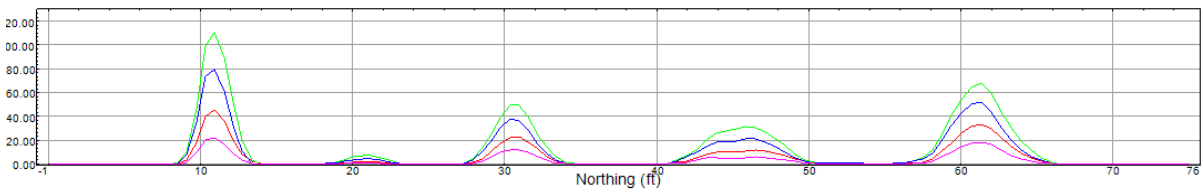
EM61MK2 Response (4 Channels), Seed Line – 07/25/13 AM



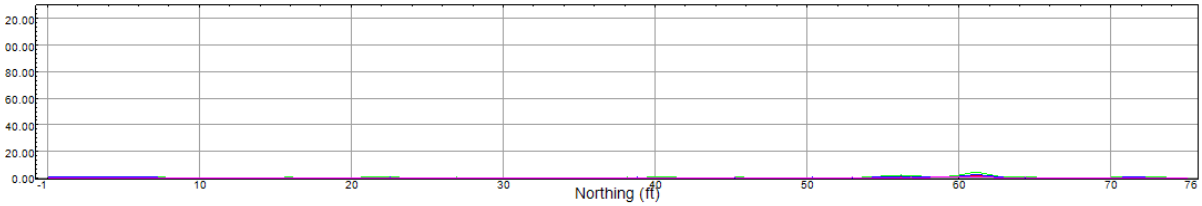
EM61MK2 Response (4 Channels), Background Line – 07/25/13 PM



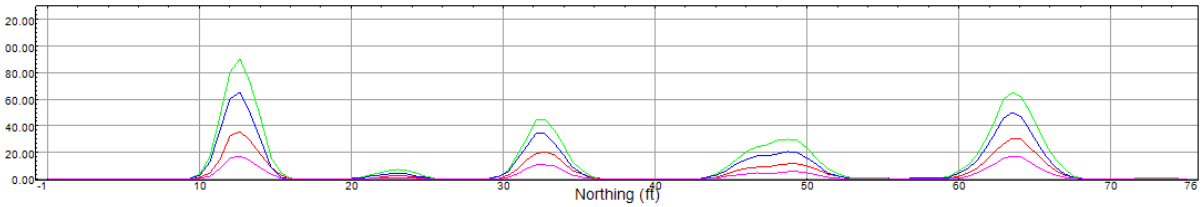
EM61MK2 Response (4 Channels), Seed Line – 07/25/13 PM



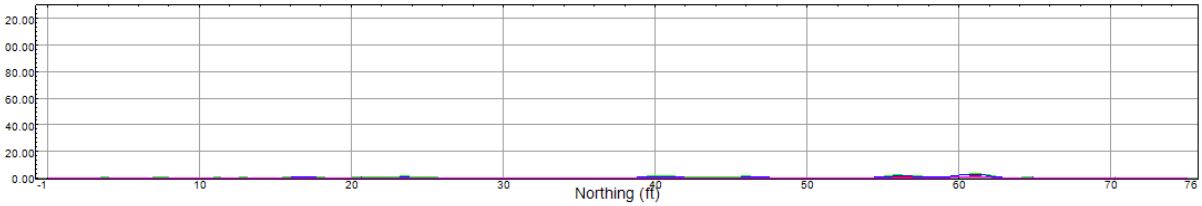
EM61MK2 Response (4 Channels), Background Line – 07/29/13 AM



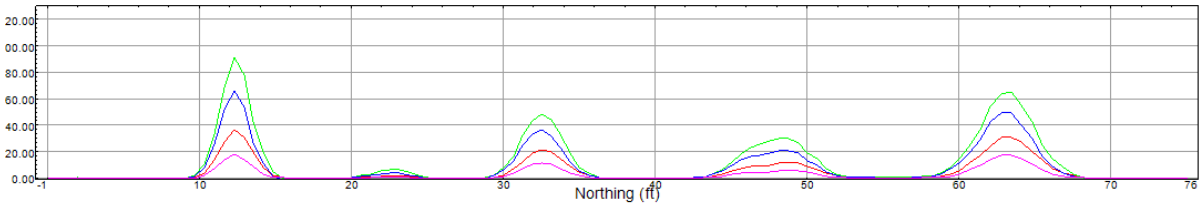
EM61MK2 Response (4 Channels), Seed Line – 07/29/13 AM



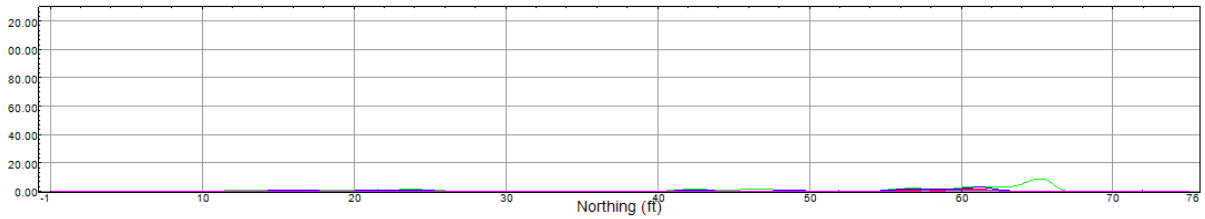
EM61MK2 Response (4 Channels), Background Line – 07/29/13 PM



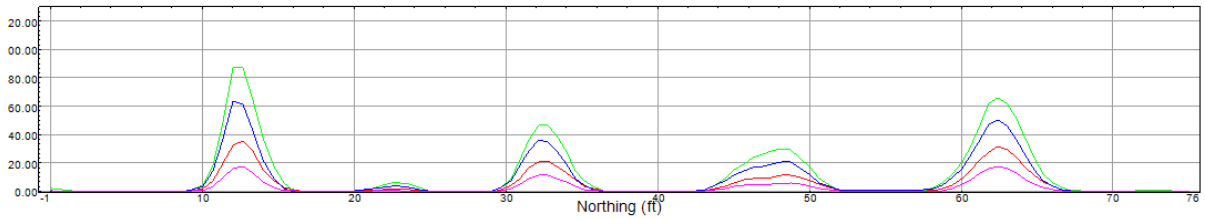
EM61MK2 Response (4 Channels), Seed Line – 07/29/13 PM



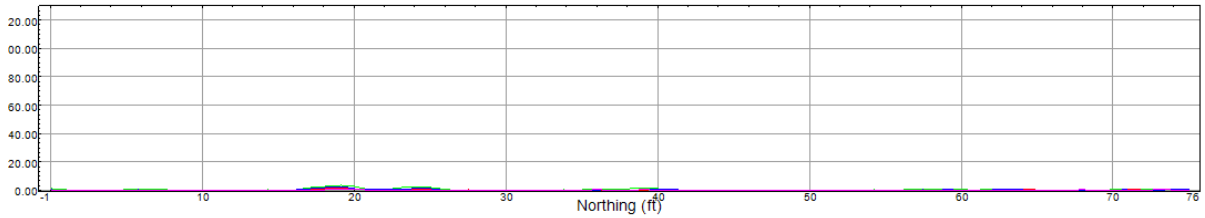
EM61MK2 Response (4 Channels), Background Line – 07/30/13 AM



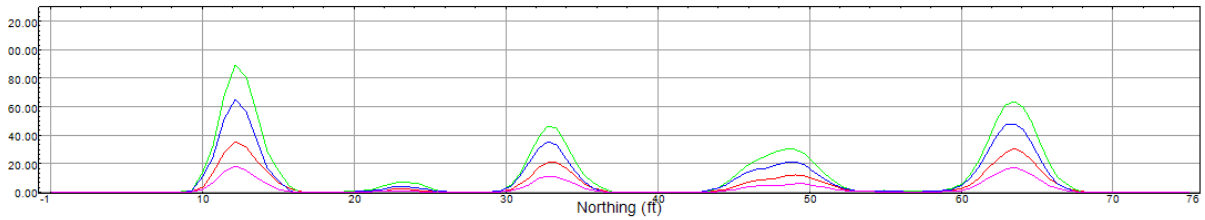
EM61MK2 Response (4 Channels), Seed Line – 07/30/13 AM



EM61MK2 Response (4 Channels), Background Line – 07/30/13 PM



EM61MK2 Response (4 Channels), Seed Line – 07/30/13 PM



EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0620_em_QC **Survey Date:** 06/20/13 **Date:** 07/29/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062013A					062013Z					
Line #:	1.0					201.0					
Min:	-8.45	-3.47	-0.91	-0.57		-3.83	-1.49	-0.49	-0.22		
Max:	-5.73	-2.04	-0.17	-0.02		-1.7	-0.46	-0.01	0.15		
Mean:	-6.85	-2.62	-0.51	-0.31		-2.84	-0.92	-0.22	-0.02		2.5mV p-p
Std:	0.55	0.24	0.1	0.08		0.44	0.16	0.08	0.06		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062013A					062013Z					
Line #:	2.0					202.0					
Min:	-9.41	-3.37	-0.7	-0.4		-5.2	-1.75	-0.57	-0.22		
Max:	-6.72	-2.25	-0.06	0.06		-1.85	-0.28	0.18	0.23		
Mean:	-8.48	-2.95	-0.42	-0.15		-4.36	-1.43	-0.32	0		no spikes
Std:	0.62	0.26	0.13	0.1		0.51	0.26	0.14	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062013A					062013Z					
Line #:	3.0					203.0					
Min:	519.6	340.58	190.82	91.55		474.66	306.6	169.08	80.84		
Max:	523.26	342.74	191.97	92.25		477.52	308.18	169.83	81.35		
Mean:	521.29	341.54	191.35	91.92		476.09	307.35	169.45	81.12		+/- 20%
Std:	0.74	0.41	0.21	0.12		0.62	0.3	0.13	0.08		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0621_em_QC **Survey Date:** 06/21/13 **Date:** 07/29/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062113A					062113Z					
Line #:	1.0					201.0					
Min:	-2.88	-1.27	-0.24	-0.22							
Max:	0.03	-0.04	0.25	0.24							
Mean:	-1.83	-0.7	-0.01	0.01							2.5mV p-p
Std:	0.51	0.18	0.08	0.07							

No PM data, due to the thunder storm.

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062113A					062113Z					
Line #:	2.0					202.0					
Min:	-3.8	-1.6	-0.42	-0.3							
Max:	-2.6	-0.95	0.03	0.07							
Mean:	-3.18	-1.3	-0.18	-0.08							no spikes
Std:	0.21	0.1	0.07	0.06							2 mV p-p

No PM data, due to the thunder storm.

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062113A					062113Z					
Line #:	3.0					203.0					
Min:	487.91	314.35	173.16	82.56							
Max:	494.6	317.25	174.48	83.33							
Mean:	490.56	315.36	173.54	82.84							+/- 20%
Std:	0.71	0.34	0.16	0.09							& 2.5 mV p-p

No PM data, due to the thunder storm.

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0624_em_QC **Survey Date:** 06/24/13 **Date:** 07/29/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062413A					062413Z					
Line #:	1.0					201.0					
Min:	-3.37	-1.25	-0.32	-0.21							
Max:	1.54	0.86	0.58	0.33							
Mean:	-0.98	-0.2	0.13	0.04							2.5mV p-p
Std:	0.96	0.44	0.18	0.08							

No PM data, the battery died.

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062413A					062413Z					
Line #:	2.0					202.0					
Min:	-0.92	-0.22	0.04	-0.31							
Max:	1.45	0.87	0.49	0.07							
Mean:	0.33	0.34	0.23	-0.09							no spikes
Std:	0.49	0.24	0.09	0.07							2 mV p-p

No PM data, the battery died.

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062413A					062413Z					
Line #:	3.0					203.0					
Min:	520.2	334.96	184.1	87.39							
Max:	525.7	337.58	185.17	87.91							
Mean:	523.2	336.34	184.63	87.67							+/- 20%
Std:	1.12	0.5	0.18	0.08							& 2.5 mV p-p

No PM data, the battery died.

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0625_em_QC **Survey Date:** 06/25/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062513A					062513Z					
Line #:	1.0					201.0					
Min:	-3.11	-0.81	-0.07	-0.16		-7	-2.69	-0.59	-0.35		
Max:	5.03	2.44	0.92	0.28		0.62	0.38	0.16	0.21		
Mean:	1.1	0.82	0.31	0.07		-3.61	-0.97	-0.21	-0.09		2.5mV p-p
Std:	1.29	0.55	0.17	0.06		1.59	0.44	0.12	0.1		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062513A					062513Z					
Line #:	2.0					202.0					
Min:	1.27	0.89	0.31	-0.04		-8.27	-2.27	-0.58	-0.39		
Max:	6.17	3.59	1.28	0.46		-4.85	-0.98	-0.02	0.01		
Mean:	3.87	2.28	0.86	0.22		-6.92	-1.77	-0.33	-0.18		no spikes
Std:	1.46	0.73	0.26	0.11		0.7	0.27	0.12	0.08		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	062513A					062513Z					
Line #:	3.0					203.0					
Min:	516.63	333.71	184.07	87.74		491.95	322.01	179.38	85.96		
Max:	522.21	336.22	185.26	88.56		499.41	325.67	181.22	86.93		
Mean:	519.83	334.88	184.69	88.21		494.14	323.08	179.98	86.31		+/- 20%
Std:	0.95	0.48	0.19	0.12		1.53	0.74	0.34	0.18		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0701_em_QC **Survey Date:** 07/01/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070113A					070113Z					
Line #:	1.0					201.0					
Min:	-3.57	-1.11	-0.67	-0.48		-0.95	-0.47	-0.1	-0.12		
Max:	3.05	1.93	1.03	0.42		2.25	0.43	0.36	0.27		
Mean:	0.33	0.32	0.2	0.02		-0.08	0	0.11	0.04		2.5mV p-p
Std:	1.55	0.63	0.24	0.14		0.44	0.15	0.08	0.06		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070113A					070113Z					
Line #:	2.0					202.0					
Min:	-0.13	0.13	0.23	-0.15		-0.93	-0.29	-0.01	-0.2		
Max:	3.61	1.93	0.76	0.24		1.22	0.49	0.36	0.25		
Mean:	1.98	1.08	0.47	0.05		0.09	0.06	0.19	0.03		no spikes
Std:	1.07	0.45	0.14	0.07		0.41	0.14	0.07	0.06		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070113A					070113Z					
Line #:	3.0					203.0					
Min:	532.63	345.51	192.33	92.4		509.52	328.69	180.9	86.06		
Max:	540.51	349.24	193.83	93.12		515.87	331.58	182.24	86.81		
Mean:	536.48	347.17	192.97	92.74		511.77	329.83	181.44	86.34		+/- 20%
Std:	1.6	0.72	0.26	0.1		1.29	0.51	0.24	0.12		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0702_em_QC **Survey Date:** 07/02/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070213A					070213Z					
Line #:	1.0					201.0					
Min:	-1.82	-0.41	-0.07	-0.17		-5.35	-1.08	-1.06	-0.36		
Max:	2.07	0.85	0.54	0.18		1.37	2.79	1.17	0.27		
Mean:	-0.28	0.23	0.26	0.03		-2.07	-0.08	0.23	0.02		2.5mV p-p
Std:	0.82	0.25	0.09	0.06		1.28	0.37	0.14	0.13		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070213A					070213Z					
Line #:	2.0					202.0					
Min:	-2.12	-0.23	0.18	-0.23		-7.38	-1.54	-0.25	-0.34		
Max:	3.22	1.62	0.64	0.09		-0.8	2.46	0.99	0.19		
Mean:	-0.01	0.49	0.4	-0.04		-3.89	-0.34	0.33	0		no spikes
Std:	1.04	0.31	0.08	0.06		0.86	0.4	0.17	0.09		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070213A					070213Z					
Line #:	3.0					203.0					
Min:	514.36	333.02	184.47	88.11		511.19	304.38	179.92	84.35		
Max:	523.55	337.07	186.03	88.86		651.87	332.14	181.57	85.44		
Mean:	518.19	334.43	184.92	88.35		513.74	330.1	180.34	84.96		+/- 20%
Std:	1.67	0.66	0.24	0.11		5.9	1.17	0.21	0.1		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0703_em_QC **Survey Date:** 07/03/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070313A					070313Z					
Line #:	1.0					201.0					
Min:	-3.86	-1.51	-0.77	-0.27		-5.02	-1.18	-0.43	-0.4		
Max:	0.95	1.33	1	0.36		-0.27	-0.07	0.22	0.26		
Mean:	-0.71	-0.25	0.07	0.01		-3.19	-0.7	-0.08	-0.1		2.5mV p-p
Std:	0.84	0.36	0.2	0.08		0.93	0.21	0.1	0.1		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070313A					070313Z					
Line #:	2.0					202.0					
Min:	-3.07	-2.06	-0.94	-0.39		-5.95	-1.37	-0.25	-0.32		
Max:	0.47	1.28	0.74	0.34		-3.1	-0.36	0.31	0.06		
Mean:	-1.21	-0.37	0	-0.01		-5.11	-0.98	0	-0.14		no spikes
Std:	0.42	0.37	0.24	0.09		0.52	0.18	0.08	0.06		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070313A					070313Z					
Line #:	3.0					203.0					
Min:	553.46	356.88	196.57	93.46		498.02	326.33	181.76	86.75		
Max:	558.88	359.36	197.58	94.23		504.98	329.05	183.08	87.78		
Mean:	555.67	357.81	196.96	93.9		500.55	327.09	182.18	87.32		+/- 20%
Std:	0.87	0.35	0.15	0.12		1.01	0.39	0.17	0.1		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0708_em_QC **Survey Date:** 07/08/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070813A					070813Z					
Line #:	1.0					201.0					
Min:	-3.2	-1.36	-0.85	-0.33		-5.38	-1.66	-1.67	-1.09		
Max:	0.98	1.43	0.75	0.29		-0.28	0.53	0.36	0.86		
Mean:	-0.97	-0.22	0.34	-0.05		-3.44	-0.64	-0.02	0.11		2.5mV p-p
Std:	0.9	0.42	0.22	0.07		1.11	0.26	0.13	0.12		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070813A					070813Z					
Line #:	2.0					202.0					
Min:	-1.47	-0.38	0.3	-0.25		-5.39	-1.29	-0.28	-0.17		
Max:	3.41	1.52	0.78	0.04		-3.73	-0.19	0.36	0.2		
Mean:	0.15	0.27	0.5	-0.1		-4.57	-0.72	0.01	0.02		no spikes
Std:	1.17	0.41	0.1	0.06		0.3	0.13	0.08	0.06		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070813A					070813Z					
Line #:	3.0					203.0					
Min:	509.55	326.79	179.31	84.62		506.65	331.19	183.88	87.82		
Max:	516.45	330.09	180.62	85.28		513.59	334.62	185.66	88.78		
Mean:	512.1	327.96	179.75	84.91		509.08	332.3	184.57	88.26		+/- 20%
Std:	1.47	0.61	0.22	0.1		1.09	0.48	0.21	0.12		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0709_em_QC **Survey Date:** 07/09/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070913A					070913Z					
Line #:	1.0					201.0					
Min:	-2.92	-0.99	-0.24	-0.24		-5.92	-1.71	-0.73	-0.57		
Max:	0.64	0.11	0.27	0.42		0	0.06	0.09	0.08		
Mean:	-1.52	-0.41	0.07	0.11		-3.43	-0.95	-0.24	-0.21		2.5mV p-p
Std:	0.6	0.17	0.08	0.09		1.21	0.34	0.13	0.12		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070913A					070913Z					
Line #:	2.0					202.0					
Min:	-3.26	-0.93	-0.1	-0.04		-7.65	-2	-0.53	-0.5		
Max:	-1.57	-0.27	0.35	0.32		-4.28	-0.98	-0.07	-0.03		
Mean:	-2.36	-0.6	0.11	0.12		-5.97	-1.59	-0.3	-0.3		no spikes
Std:	0.31	0.14	0.07	0.06		0.6	0.19	0.08	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	070913A					070913Z					
Line #:	3.0					203.0					
Min:	519.7	336,79	186.54	89.05		517.78	335.9	185.17	87.94		
Max:	526,58	340.34	188.24	89.91		527.49	341.26	188.1	89.74		
Mean:	521.87	337.76	186.98	89.35		519.65	336.81	185.65	88.27		+/- 20%
Std:	1.09	0.55	0.25	0.12		1.51	0.72	0.33	0.17		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0710_em_QC **Survey Date:** 07/10/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071013A					071013Z					
Line #:	1.0					201.0					
Min:	-3.16	-4.4	-0.52	-0.5		-3.83	-4.03	-0.47	-0.3		
Max:	7.78	0.43	0.54	0.34		9.68	0.68	0.83	0.34		
Mean:	-1.76	-0.39	0.02	-0.07		-0.24	0.02	-0.03	0.05		2.5mV p-p
Std:	0.72	0.25	0.13	0.1		0.74	0.28	0.12	0.08		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071013A					071013Z					
Line #:	2.0					202.0					
Min:	-3.61	-0.87	-0.08	-0.32		-3.72	-0.2	-0.19	-0.15		
Max:	-1.08	0.14	0.72	0.15		2.99	1.07	0.56	0.43		
Mean:	-2.39	-0.39	0.18	-0.06		0.7	0.37	0.12	0.06		no spikes
Std:	0.61	0.21	0.09	0.06		0.48	0.19	0.11	0.08		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071013A					071013Z					
Line #:	3.0					203.0					
Min:	524.74	340.24	188.41	89.66		537.66	350.43	194.7	93.68		
Max:	531.56	343.92	190	90.54		543.22	353.84	196.13	94.84		
Mean:	526.64	341.2	188.84	90		540.06	351.55	195.42	94.02		+/- 20%
Std:	1.26	0.65	0.27	0.14		0.77	0.37	0.19	0.1		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0711_em_QC **Survey Date:** 07/11/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071113A					071113Z					
Line #:	1.0					201.0					
Min:	-3.06	-1.09	-0.25	-0.19		-1.35	-0.49	-0.18	-0.32		
Max:	0.73	0.31	0.28	0.19		0.59	0.54	0.63	0.33		
Mean:	-1.38	-0.35	0.04	0		-0.35	0.01	0.12	0.12		2.5mV p-p
Std:	0.54	0.19	0.07	0.06		0.34	0.16	0.09	0.07		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071113A					071113Z					
Line #:	2.0					202.0					
Min:	-3.97	-1.24	-0.17	-0.27		-3.31	-0.29	-0.1	-0.06		
Max:	-1.53	-0.34	0.27	0.1		1.17	1.28	0.45	0.41		
Mean:	-2.85	-0.72	0.06	-0.05		0.28	0.24	0.15	0.13		no spikes
Std:	0.39	0.16	0.08	0.07		0.39	0.16	0.08	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071113A					071113Z					
Line #:	3.0					203.0					
Min:	503.05	322.67	176.9	84.02		534.49	348.25	194.26	93.47		
Max:	506.82	324.36	177.7	84.62		538.5	350.42	195.27	94.09		
Mean:	505.04	323.51	177.34	84.26		536,81	349.33	194.79	93.85		+/- 20%
Std:	0.88	0.38	0.15	0.08		0.62	0.33	0.17	0.09		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0715_em_QC **Survey Date:** 07/15/13 **Date:** 07/30/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071513A					071513Z					
Line #:	1.0					201.0					
Min:	-5.15	-1.62	-0.28	-0.27		-3.34	-1.29	-0.61	-0.57		
Max:	-1.59	-0.34	0.26	0.27		-1.49	-0.45	-0.07	-0.11		
Mean:	-3.26	-0.96	-0.05	0		-2.67	-0.87	-0.37	-0.36		2.5mV p-p
Std:	0.61	0.22	0.1	0.09		0.32	0.13	0.08	0.07		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071513A					071513Z					
Line #:	2.0					202.0					
Min:	-5.58	-2	-0.37	-0.46		-5.12	-1.79	-0.61	-0.66		
Max:	-2.81	-0.52	0.08	-0.01		-1.66	-0.3	0.03	-0.11		
Mean:	-4.55	-1.41	-0.21	-0.22		-3.69	-0.99	-0.3	-0.45		no spikes
Std:	0.65	0.3	0.08	0.08		0.78	0.23	0.08	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071513A					071513Z					
Line #:	3.0					203.0					
Min:	547.22	356.77	198.77	95.24		489.98	317.54	174.61	82.48		
Max:	552.1	359.22	199.88	95.95		498.98	321.52	176.2	83.28		
Mean:	548.89	357.58	199.14	95.48		493.37	318.91	175.11	82.76		+/- 20%
Std:	0.92	0.43	0.18	0.1		1.75	0.67	0.23	0.1		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0716_em_QC **Survey Date:** 07/16/13 **Date:** 07/31/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071613A					071613Z					
Line #:	1.0					201.0					
Min:	-4.06	-1.23	-0.16	-0.17		-3.89	-2.73	-0.45	-0.58		
Max:	0.04	0.23	0.39	0.29		5.38	0.35	0.57	0.28		
Mean:	-2.51	-0.68	0.1	0.09		-2.37	-0.6	-0.03	-0.08		2.5mV p-p
Std:	0.9	0.29	0.08	0.07		0.83	0.22	0.11	0.1		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071613A					071613Z					
Line #:	2.0					202.0					
Min:	-4.53	-1.4	-0.07	-0.1		-5.09	-1.2	-0.17	-0.3		
Max:	-2.98	-0.68	0.38	0.27		-2.64	-0.29	0.3	0.17		
Mean:	-3.81	-1.06	0.12	0.08		-3.63	-0.73	0.06	-0.1		no spikes
Std:	0.33	0.14	0.07	0.06		0.32	0.13	0.07	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071613A					071613Z					
Line #:	3.0					203.0					
Min:	540.32	353.04	197.66	95.09		502.39	328.89	183.35	87.52		
Max:	546.27	356.19	199.14	96.01		507.65	331.66	184.46	88.12		
Mean:	542.51	354.27	198.16	95.44		504.72	330	183.91	87.82		+/- 20%
Std:	0.87	0.48	0.22	0.13		1	0.4	0.18	0.09		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0717_em_QC **Survey Date:** 07/17/13 **Date:** 07/31/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071713A					071713Z					
Line #:	1.0					201.0					
Min:	-6.02	-1.84	-0.33	-0.53		-6	-3.97	-0.53	-0.34		
Max:	1.41	0.32	1.1	0.29		-0.06	0.38	1.79	0.61		
Mean:	-0.76	-0.71	0.43	-0.09		-3.33	-0.88	-0.09	-0.02		2.5mV p-p
Std:	1.07	0.33	0.12	0.14		1.38	0.42	0.16	0.13		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071713A					071713Z					
Line #:	2.0					202.0					
Min:	-4.76	-2.17	0.03	-0.29		-7.21	-2.44	-0.62	-0.53		
Max:	-1.29	-0.73	0.57	0.02		-4.57	-0.94	0.04	0.11		
Mean:	-3.12	-1.49	0.33	-0.12		-6.12	-1.62	-0.26	-0.22		no spikes
Std:	0.99	0.35	0.11	0.06		0.63	0.23	0.1	0.09		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071713A					071713Z					
Line #:	3.0					203.0					
Min:	500.47	322.05	177.98	84.2		495.41	323.5	179.01	85.39		
Max:	507.34	325.45	179.36	85.05		500.92	325.18	180.09	86.52		
Mean:	502.89	323.14	178.42	84.53		498.24	324.28	179.61	85.8		+/- 20%
Std:	1.06	0.52	0.23	0.13		0.86	0.32	0.16	0.12		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0718_em_QC **Survey Date:** 07/18/13 **Date:** 07/31/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071813A					071813Z					
Line #:	1.0					201.0					
Min:	-2.69	-0.81	-0.25	-0.42							
Max:	0.89	0.66	0.56	0.4							
Mean:	-0.89	-0.01	0.16	0.02							2.5mV p-p
Std:	0.57	0.28	0.16	0.13							

No PM data, due to the thunder storm.

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071813A					071813Z					
Line #:	2.0					202.0					
Min:	-2.23	-0.41	0.02	-0.15							
Max:	-0.62	0.42	0.56	0.22							
Mean:	-1.32	-0.01	0.32	0.05							no spikes
Std:	0.32	0.16	0.07	0.06							2 mV p-p

No PM data, due to the thunder storm.

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	071813A					071813Z					
Line #:	3.0					203.0					
Min:	417.18	265.16	143.66	66.59							
Max:	422.91	268.06	144.85	67.5							
Mean:	419.15	266.16	144.01	66.85							+/- 20%
Std:	0.92	0.43	0.17	0.1							& 2.5 mV p-p

No PM data, due to the thunder storm.

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0722_em_QC **Survey Date:** 07/22/13 **Date:** 07/31/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072213A					072213Z					
Line #:	1.0					201.0					
Min:	-8.49	-4.26	-1.88	-0.69		-4.96	-1.26	-0.56	-0.48		
Max:	0.58	2.66	1.8	0.82		0.29	0.35	0.17	0.09		
Mean:	-3.67	-0.94	-0.05	0.01		-2.78	-0.65	-0.24	-0.2		2.5mV p-p
Std:	1.39	1.11	0.72	0.21		1.19	0.31	0.12	0.1		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072213A					072213Z					
Line #:	2.0					202.0					
Min:	-5.39	-1.82	-0.44	-0.44		-6.1	-1.74	-0.47	-0.49		
Max:	-3.34	-0.56	0.19	0.2		-4.28	-0.76	-0.01	-0.11		
Mean:	-4.34	-1.14	-0.04	-0.02		-5.4	-1.25	-0.31	-0.29		no spikes
Std:	0.45	0.26	0.13	0.12		0.26	0.12	0.08	0.06		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072213A					072213Z					
Line #:	3.0					203.0					
Min:	523.91	339.36	187.3	89.17		525.65	345.08	192.82	92.94		
Max:	530.08	342.4	188.78	89.87		532.04	348.2	194.35	93.76		
Mean:	525.95	340.25	187.69	89.43		527.74	346.05	193.32	93.27		+/- 20%
Std:	1.16	0.55	0.25	0.11		1.24	0.58	0.27	0.14		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0723_em_QC **Survey Date:** 07/23/13 **Date:** 08/01/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072313A					072313Z					
Line #:	1.0					201.0					
Min:	-6.86	-2.77	-4.36	-0.48		-6.26	-1.58	-0.69	-0.32		
Max:	2.76	7.07	2.15	0.68		-1.02	-0.22	0.15	0.17		
Mean:	-1.32	-0.02	0.05	0.02		-4	-1	-0.13	-0.09		2.5mV p-p
Std:	1.56	0.97	0.64	0.18		1.04	0.22	0.08	0.08		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072313A					072313Z					
Line #:	2.0					202.0					
Min:	-4.48	-1.31	-0.26	-0.22		-6.77	-1.58	-0.4	-0.25		
Max:	-2.07	-0.02	0.36	0.15		-3.92	-0.84	0.34	0.24		
Mean:	-3.25	-0.55	0.1	-0.03		-5.65	-1.18	0	0.03		no spikes
Std:	0.55	0.26	0.11	0.06		0.45	0.12	0.11	0.11		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072313A					072313Z					
Line #:	3.0					203.0					
Min:	525.17	339.76	187.86	89.24		476.48	309.99	170.95	81.46		
Max:	533.31	344.2	189.57	90.26		485.25	313.11	172.53	82.42		
Mean:	527.46	341.31	188.34	89.68		479.7	311	171.49	81.81		+/- 20%
Std:	1.4	0.62	0.24	0.14		1.21	0.53	0.25	0.16		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** **QC Check by:** [redacted]
Dataset: 0724_em_QC **Survey Date:** 07/24/13 **Date:** 08/01/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072413A					072413Z					
Line #:	1.0					201.0					
Min:	-4.53	-1.17	-0.83	-0.3							
Max:	0.96	0.51	0.35	0.61							
Mean:	-2	-0.37	0	-0.07							2.5mV p-p
Std:	1.04	0.26	0.09	0.09							

No PM data, due to the cable broken.

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072413A					072413Z					
Line #:	2.0					202.0					
Min:	-5.44	-1.4	-0.29	-0.37							
Max:	-3.48	-0.58	0.16	-0.01							
Mean:	-4.49	-0.94	-0.06	-0.17							no spikes
Std:	0.38	0.16	0.08	0.06							2 mV p-p

No PM data, due to the cable broken.

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072413A					072413Z					
Line #:	3.0					203.0					
Min:	505.09	324.67	177.2	83.42							
Max:	513.65	328.77	178.82	84.17							
Mean:	508.2	326.11	177.77	83.67							+/- 20%
Std:	1.71	0.68	0.24	0.11							& 2.5 mV p-p

No PM data, due to the cable broken.

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0725_em_QC **Survey Date:** 07/25/13 **Date:** 08/01/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072513A					072513Z					
Line #:	1.0					201.0					
Min:	-4.59	-1.84	-0.55	-0.57		-5.63	-1.6	-0.66	-0.3		
Max:	0.17	-0.1	-0.01	-0.02		-0.42	-0.02	0.19	0.26		
Mean:	-2.71	-1.09	-0.25	-0.23		-3.62	-0.94	-0.14	-0.01		2.5mV p-p
Std:	1	0.3	0.08	0.09		1.06	0.28	0.1	0.08		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072513A					072513Z					
Line #:	2.0					202.0					
Min:	-5.37	-2	-0.46	-0.42		-6.92	-1.71	-0.46	-0.33		
Max:	-3.35	-1.15	-0.09	-0.11		-4.15	-1.04	0.01	0.06		
Mean:	-4.55	-1.61	-0.25	-0.24		-5.27	-1.35	-0.27	-0.14		no spikes
Std:	0.48	0.16	0.07	0.06		0.35	0.12	0.09	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072513A					072513Z					
Line #:	3.0					203.0					
Min:	514.44	335.02	186.34	88.9		507.18	333.87	185.58	88.7		
Max:	521.19	338.4	187.79	89.71		514.76	335.61	186.93	89.27		
Mean:	516.79	336.12	186.91	89.27		512.7	334.6	185.97	88.97		+/- 20%
Std:	1.35	0.6	0.23	0.13		0.65	0.31	0.15	0.09		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0729_em_QC **Survey Date:** 07/29/13 **Date:** 08/01/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072913A					072913Z					
Line #:	1.0					201.0					
Min:	-5.34	-1.65	-0.41	-0.24		-1.54	-0.85	-0.58	-0.48		
Max:	-0.22	0.13	0.32	0.23		3.28	0.66	0.17	0.05		
Mean:	-3.17	-0.83	-0.02	0.02		0.22	-0.04	-0.24	-0.21		2.5mV p-p
Std:	1.11	0.36	0.09	0.07		0.57	0.25	0.15	0.1		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072913A					072913Z					
Line #:	2.0					202.0					
Min:	-6.2	-2.7	-0.5	-0.41		-1.15	-0.74	-0.76	-0.56		
Max:	0.06	-0.98	0.15	0.14		0.53	0.17	-0.21	-0.19		
Mean:	-5.43	-1.55	-0.15	-0.09		-0.29	-0.36	-0.48	-0.36		no spikes
Std:	0.63	0.19	0.09	0.07		0.26	0.15	0.08	0.07		2 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	072913A					072913Z					
Line #:	3.0					203.0					
Min:	497.05	320.32	176.09	83.4		545.27	354.98	196.01	94.47		
Max:	503.13	324.44	179.14	85.62		554.67	357.7	198.09	95.18		
Mean:	498.58	321.29	176.8	84		549.11	355.92	197.18	94.72		+/- 20%
Std:	1.1	0.6	0.41	0.38		0.83	0.41	0.2	0.09		& 2.5 mV p-p

Comments: EM values are reported in milivolts.

EM_QC_Form 6-1_Curtis Bay Project

Area: Curtis Bay **Location i.d.:** _____ **QC Check by:** [redacted]
Dataset: 0730_em_QC **Survey Date:** 07/30/13 **Date:** 08/01/13

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	073013A					073013Z					
Line #:	1.0					201.0					
Min:	-2.69	-1.22	-1.86	-0.2		-4.51	-1.39	-0.43	-0.35		
Max:	2.9	2.54	0.28	0.48		0.22	0.14	0.31	0.3		
Mean:	-1.14	-0.18	-0.24	0		-2.76	-0.84	-0.15	-0.07		2.5mV p-p
Std:	0.78	0.34	0.19	0.08		0.95	0.29	0.11	0.11		

Comments: EM values are reported in milivolts

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	073013A					073013Z					
Line #:	2.0					202.0					
Min:	-3.36	-2.36	-0.55	-0.23		-5.73	-1.81	-0.43	-0.36		
Max:	0.67	0.5	0.16	0.15		-3.17	-0.98	0.04	0.09		
Mean:	-1.76	-0.39	-0.24	-0.06		-4.94	-1.48	-0.22	-0.12		no spikes
Std:	0.93	0.33	0.13	0.07		0.46	0.15	0.07	0.06		2 mV p-p

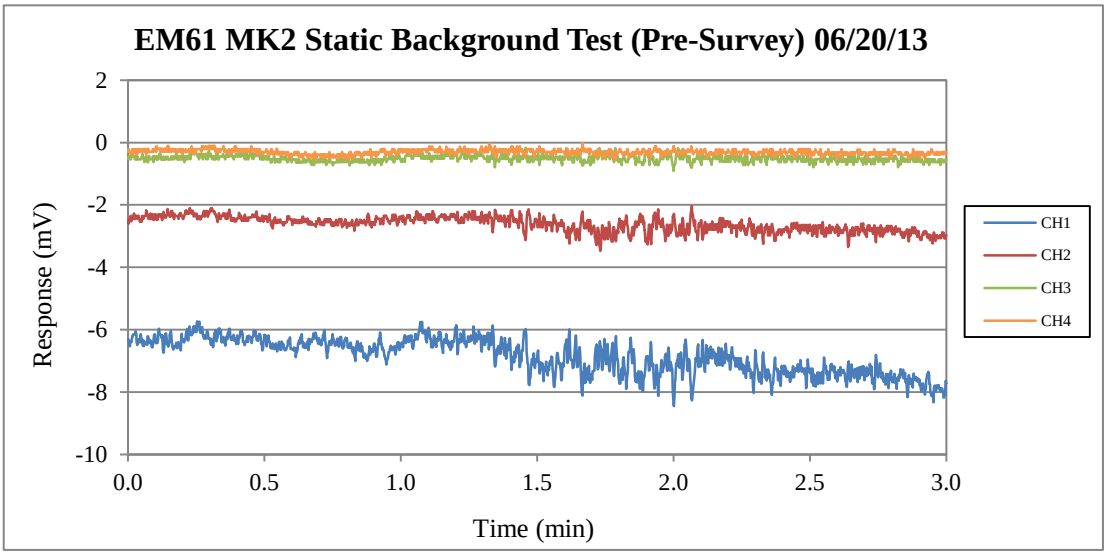
Comments: EM values are reported in milivolts. Non spike data is ignored.

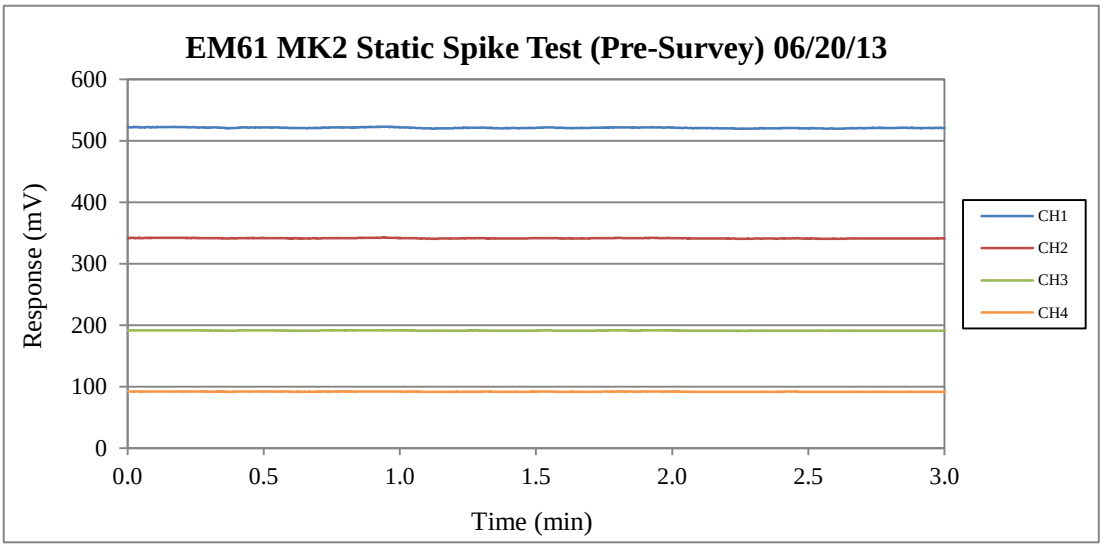
Static Spike Test

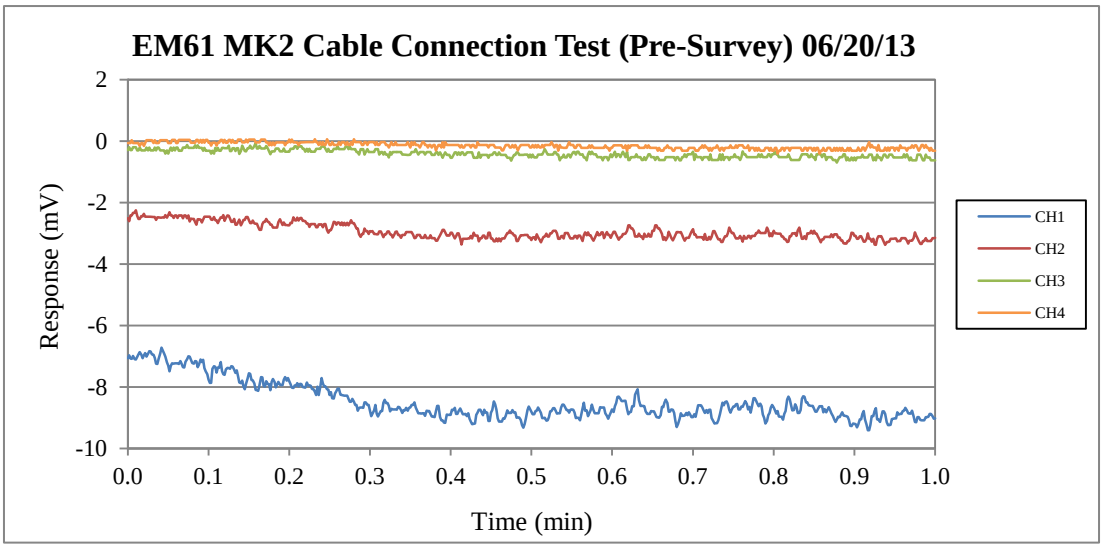
Sensor #1

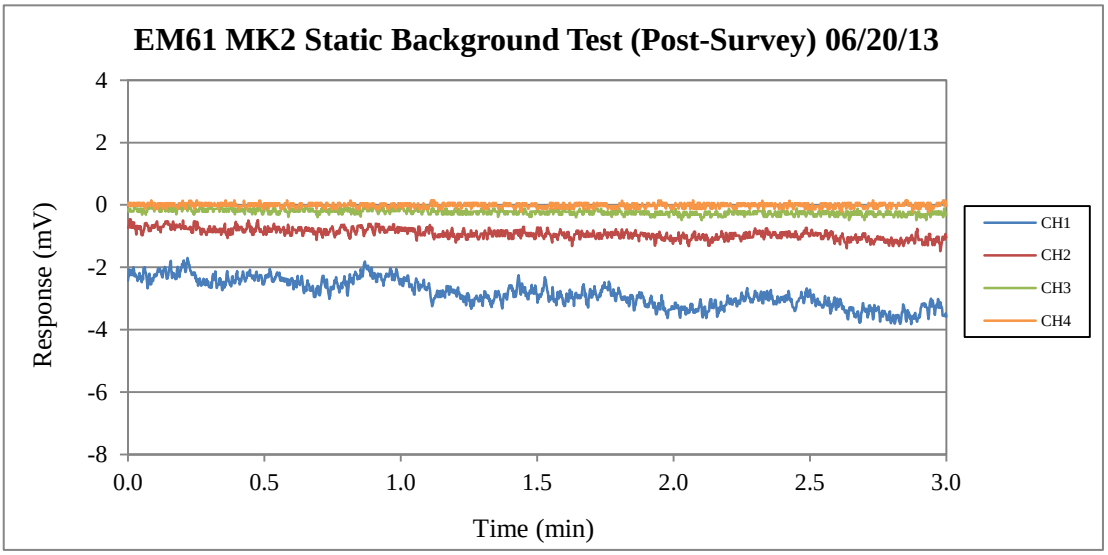
	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	073013A					073013Z					
Line #:	3.0					203.0					
Min:	560.41	361	198.54	94.62		545.53	356.4	198.38	95.22		
Max:	565.7	364.06	199.83	95.39		556.01	361.65	200.82	96.49		
Mean:	562.43	362.16	198.95	94.93		549.27	358.14	199.25	95.7		+/- 20%
Std:	0.91	0.46	0.2	0.11		1.85	0.9	0.39	0.19		& 2.5 mV p-p

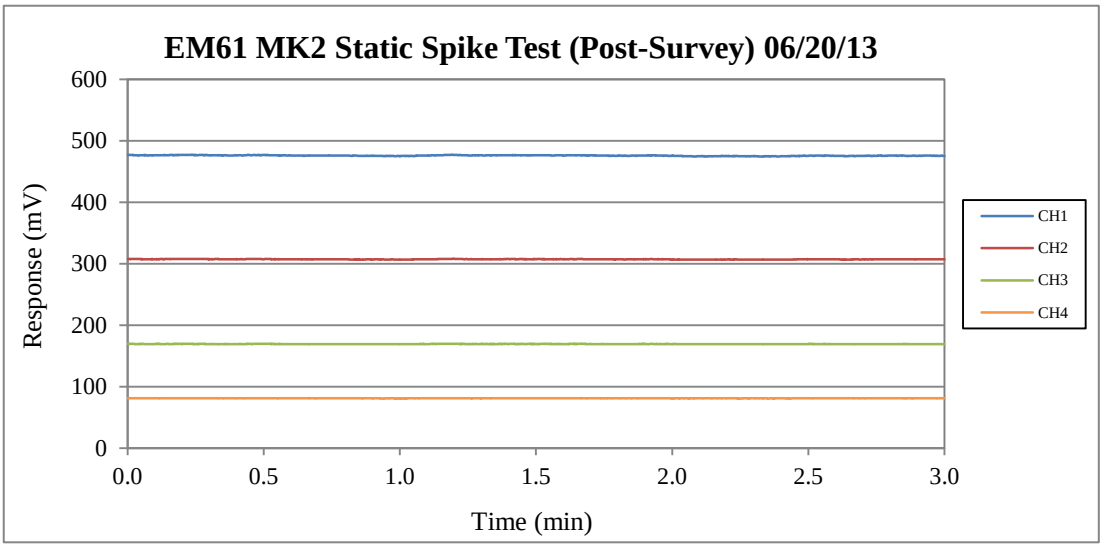
Comments: EM values are reported in milivolts.

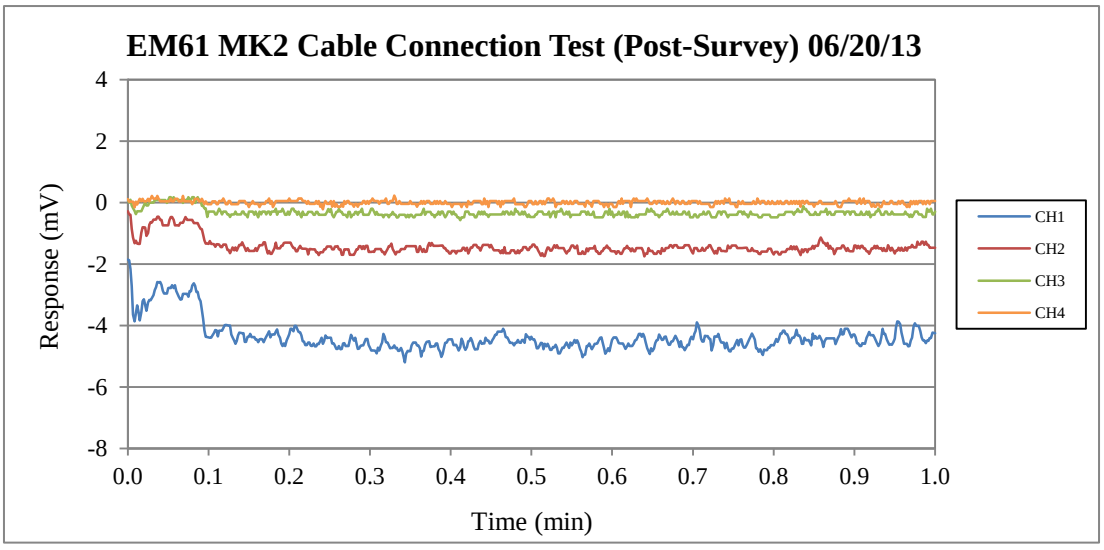

EM61 MK2 Static Background Test (Pre-Survey) 06/20/13
Response (mV)
2
0
-2
-4
-6
-8
-10
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

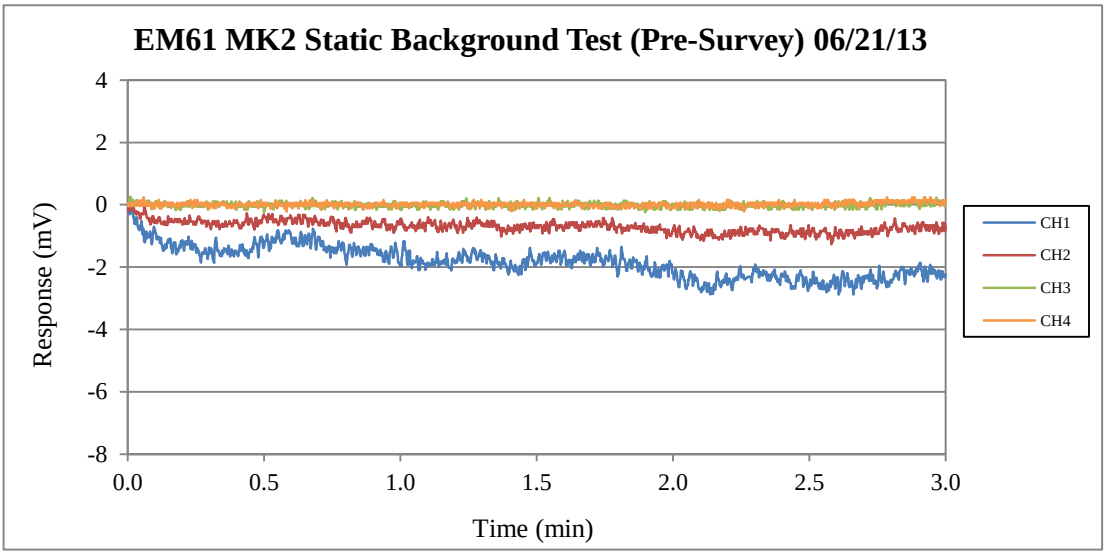

EM61 MK2 Static Spike Test (Pre-Survey) 06/20/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

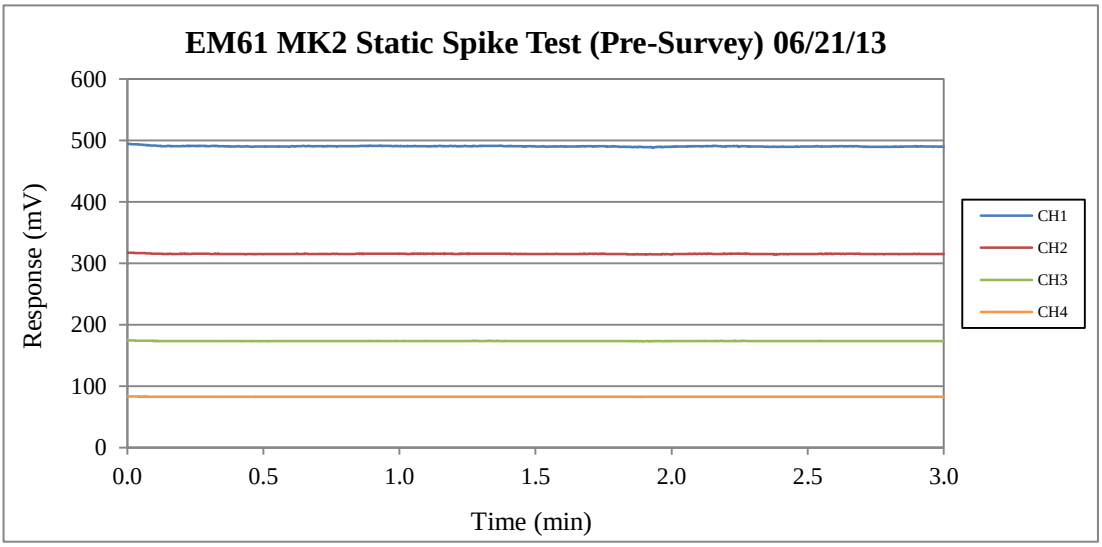

EM61 MK2 Cable Connection Test (Pre-Survey) 06/20/13
Response (mV)
2
0
-2
-4
-6
-8
-10
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

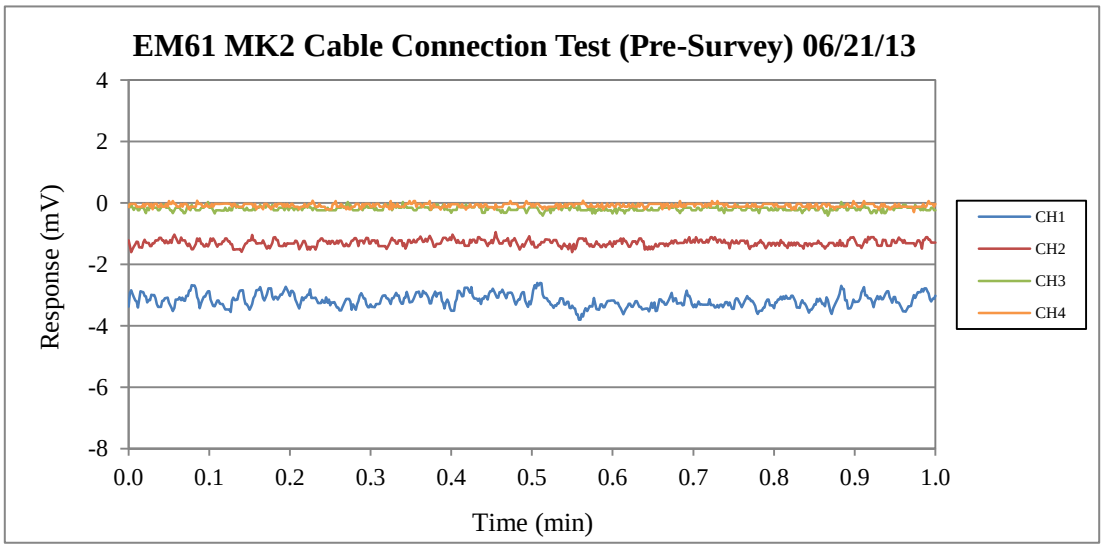

EM61 MK2 Static Background Test (Post-Survey) 06/20/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Static Spike Test (Post-Survey) 06/20/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

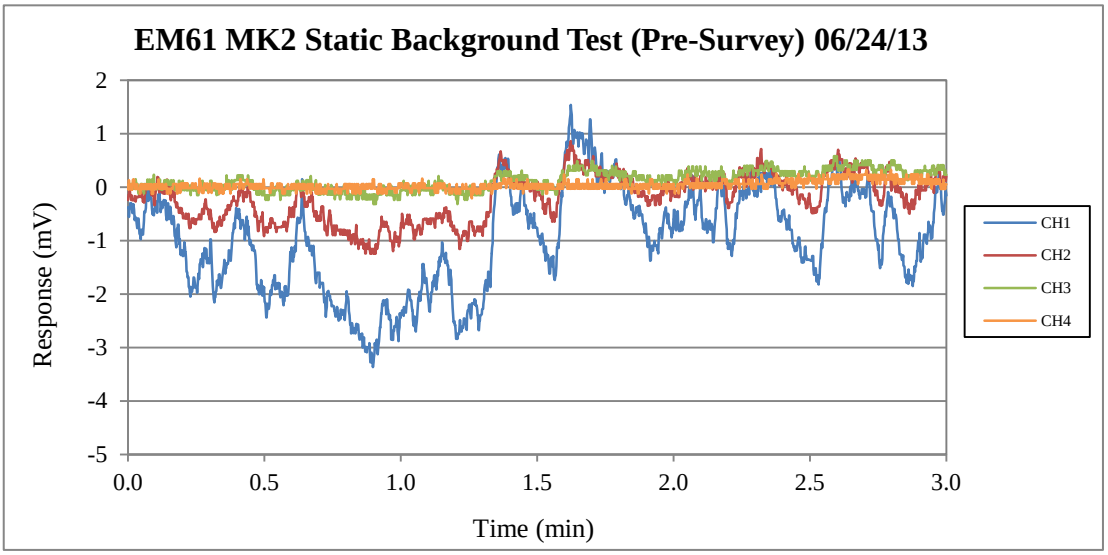

EM61 MK2 Cable Connection Test (Post-Survey) 06/20/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

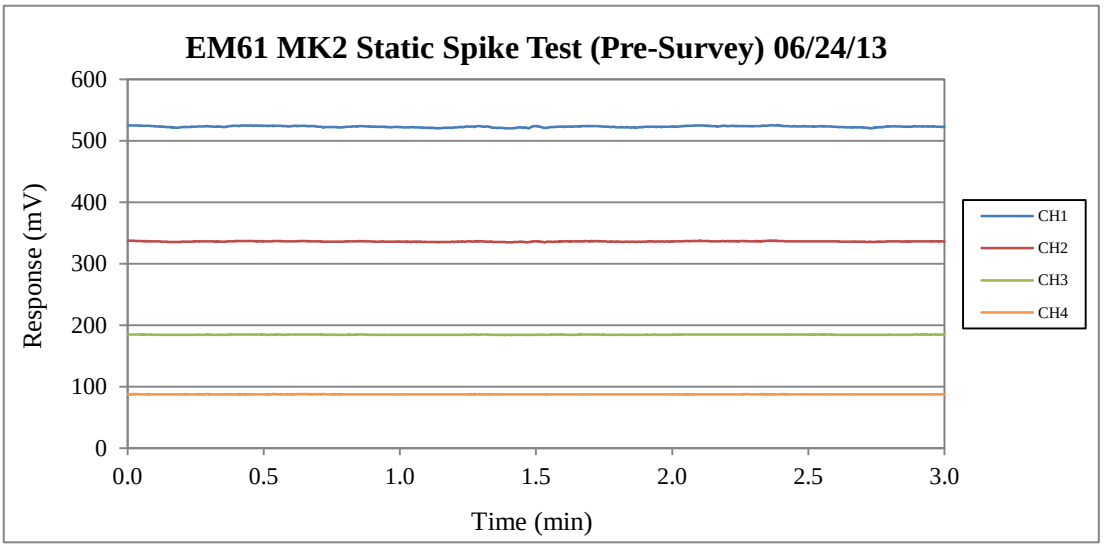


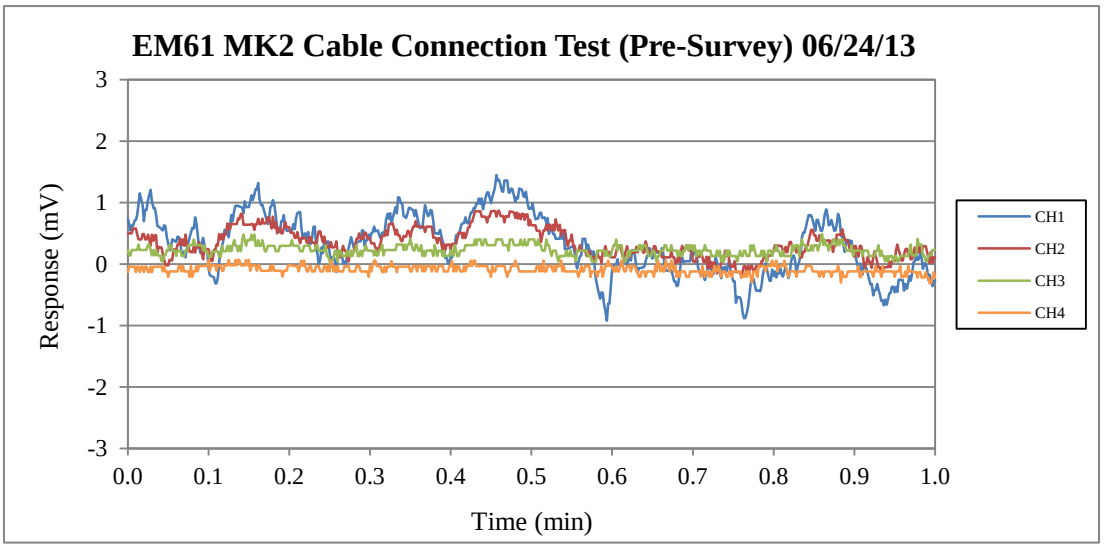




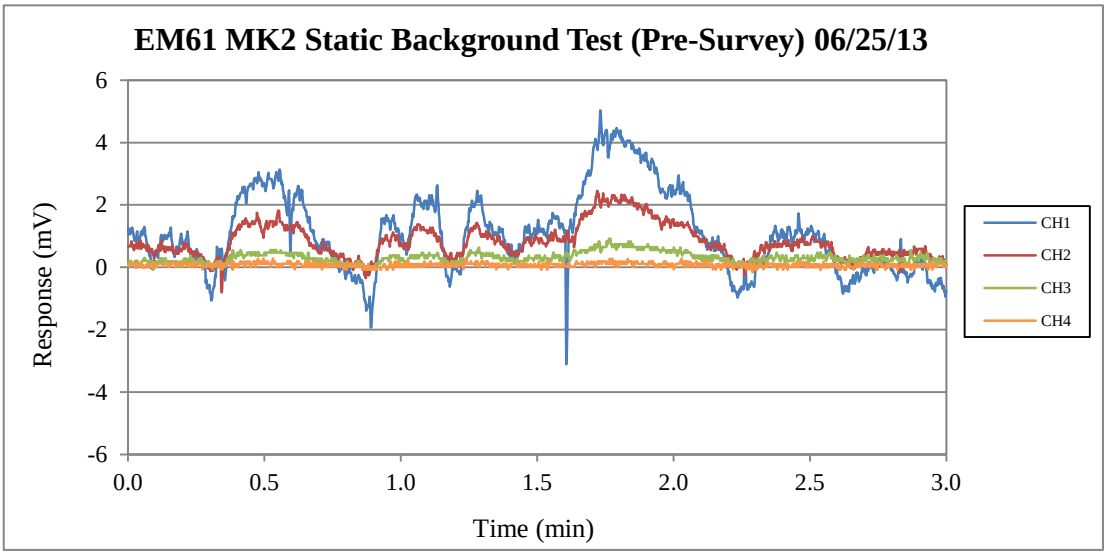
No PM data, due to the thunder storm.

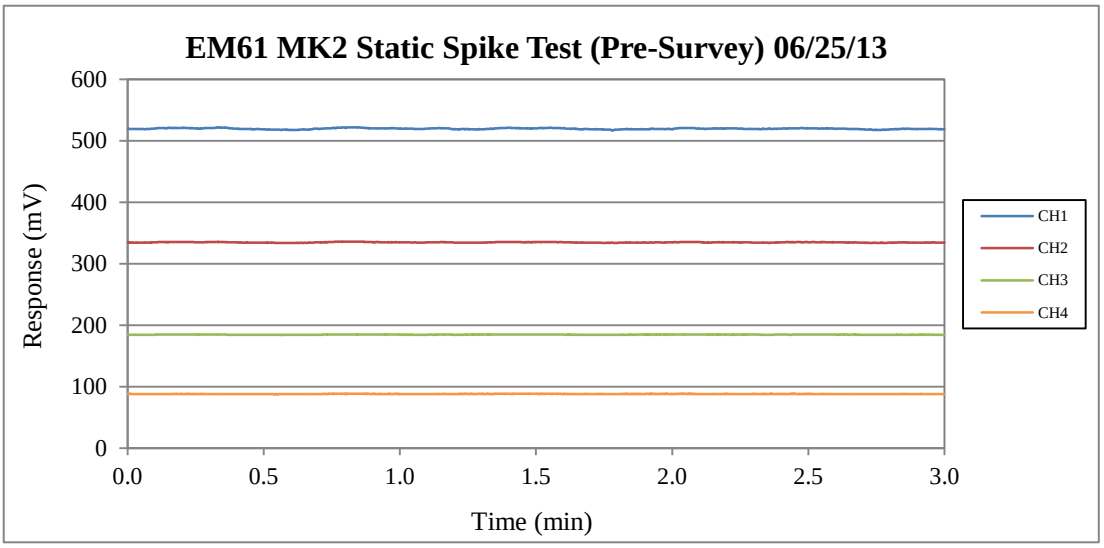


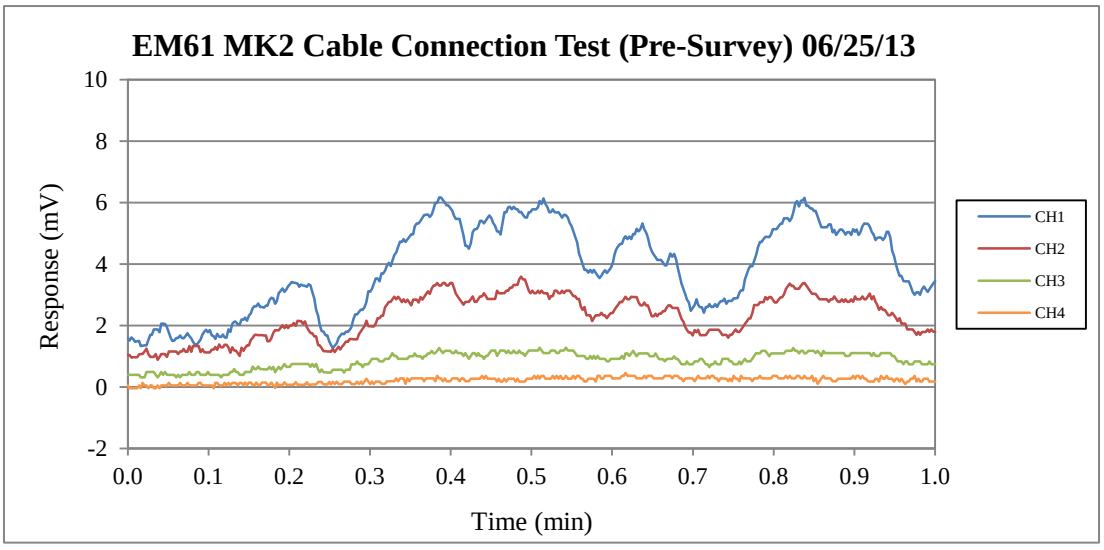


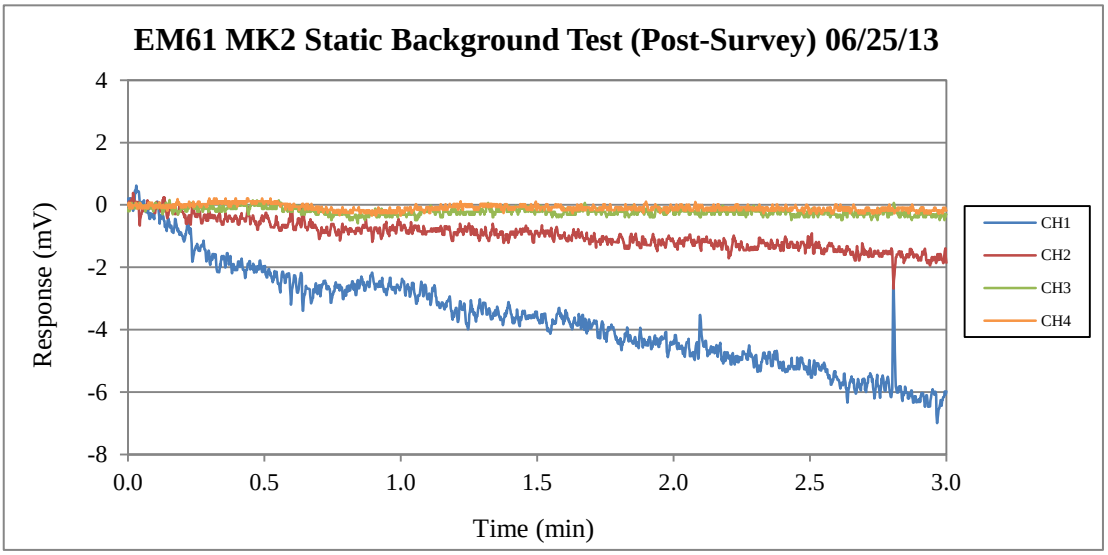


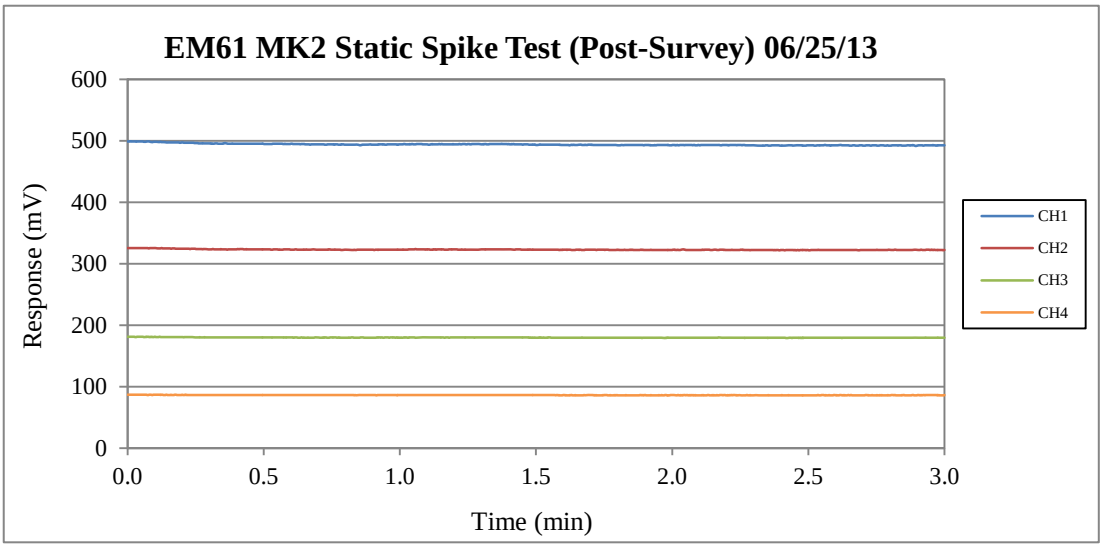
No PM data, battery died.

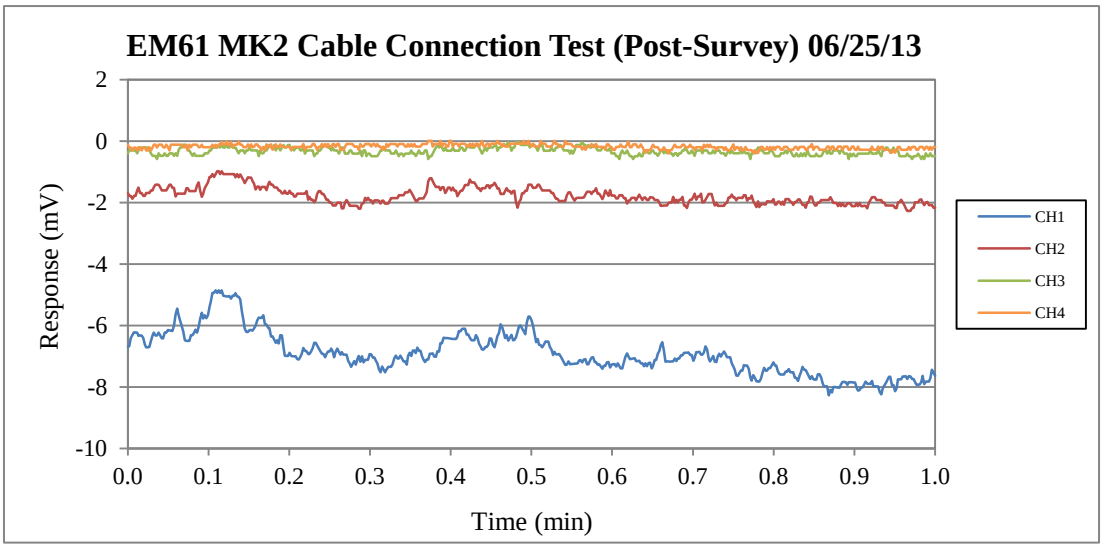

EM61 MK2 Static Background Test (Pre-Survey) 06/25/13
Response (mV)
6
4
2
0
-2
-4
-6
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

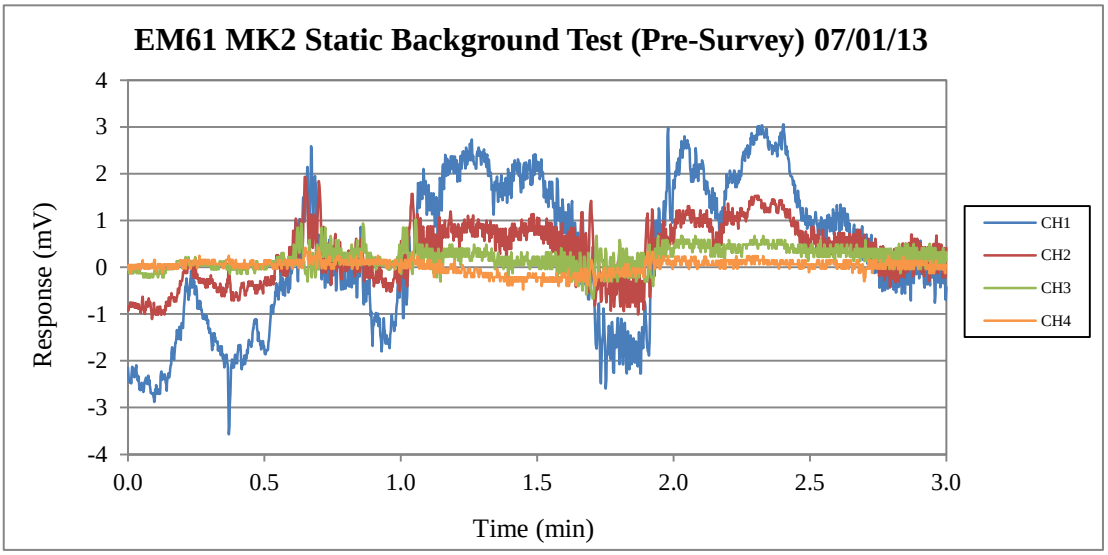

EM61 MK2 Static Spike Test (Pre-Survey) 06/25/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

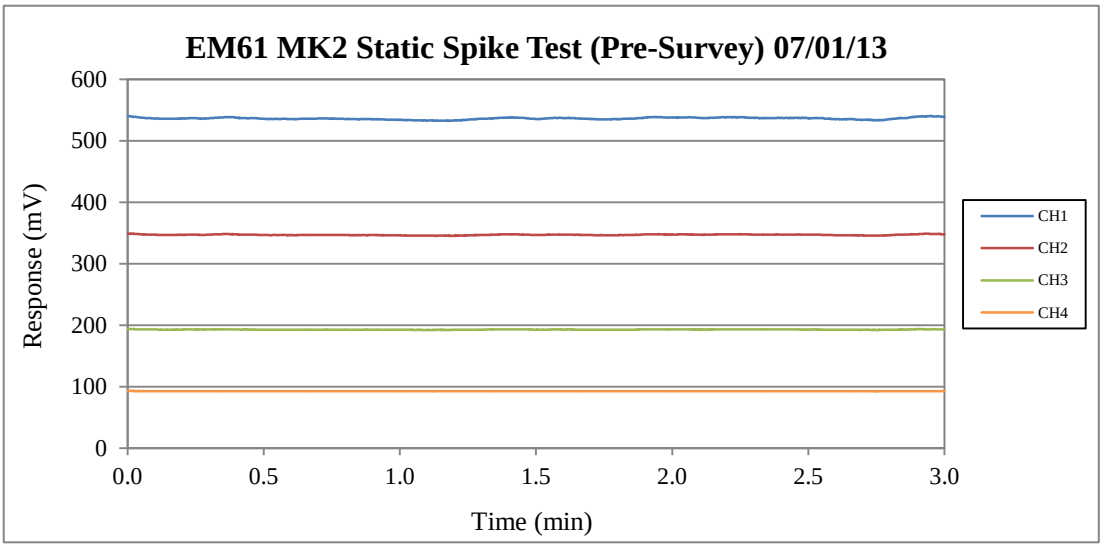

EM61 MK2 Cable Connection Test (Pre-Survey) 06/25/13
Response (mV)
10
8
6
4
2
0
-2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

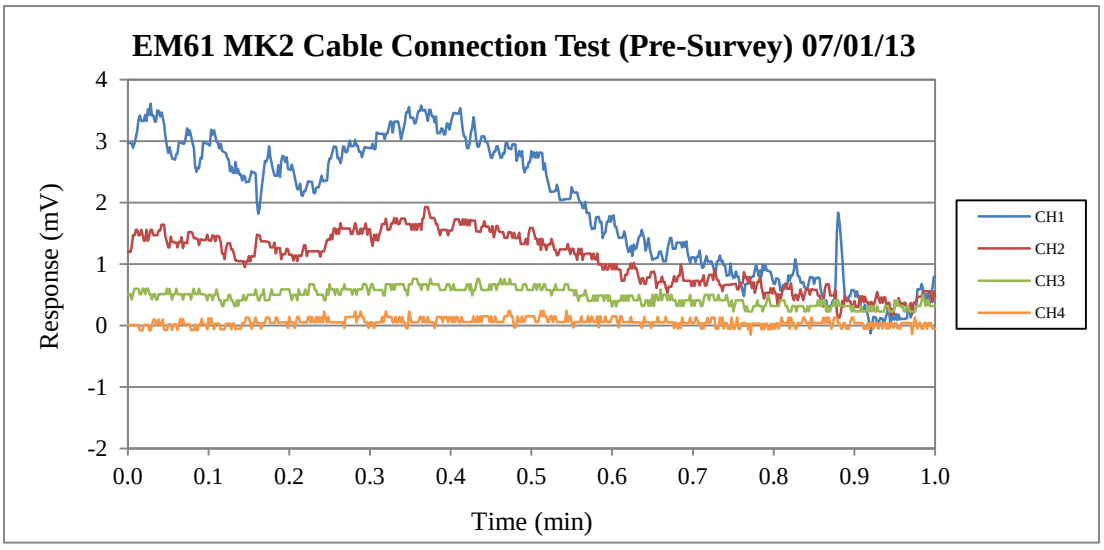

EM61 MK2 Static Background Test (Post-Survey) 06/25/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

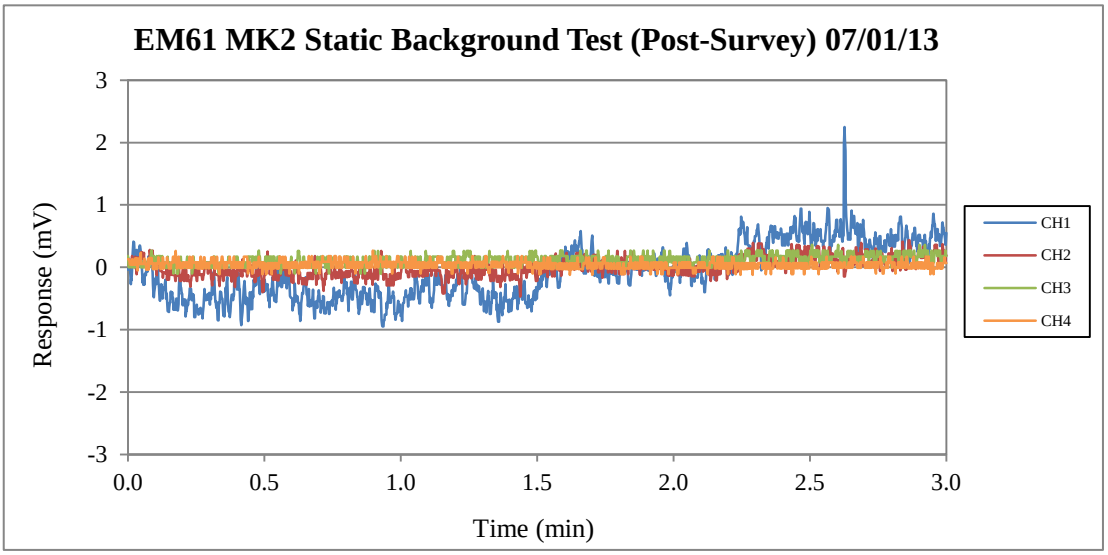

EM61 MK2 Static Spike Test (Post-Survey) 06/25/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

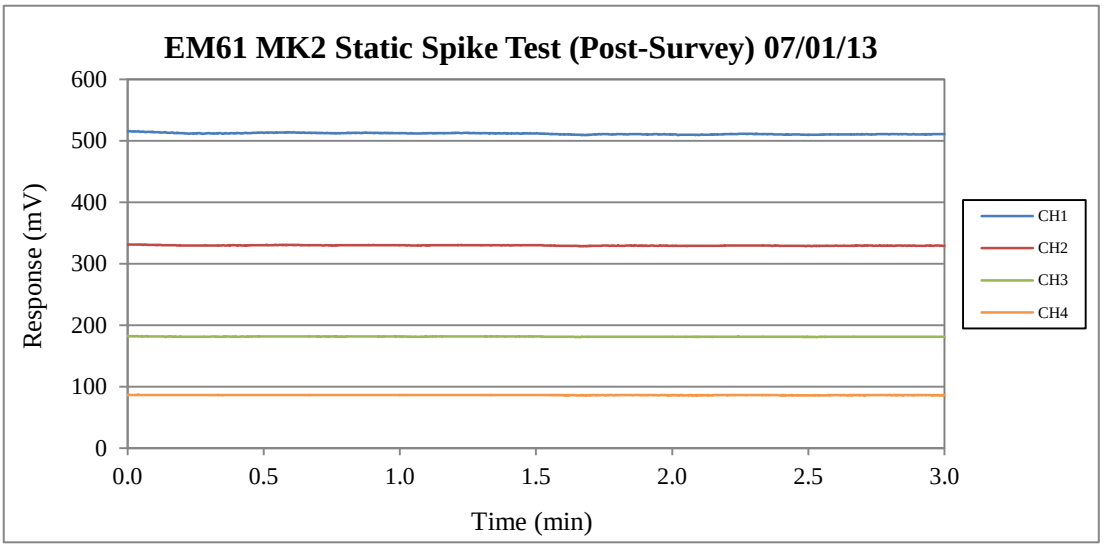

EM61 MK2 Cable Connection Test (Post-Survey) 06/25/13
Response (mV)
2
0
-2
-4
-6
-8
-10
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

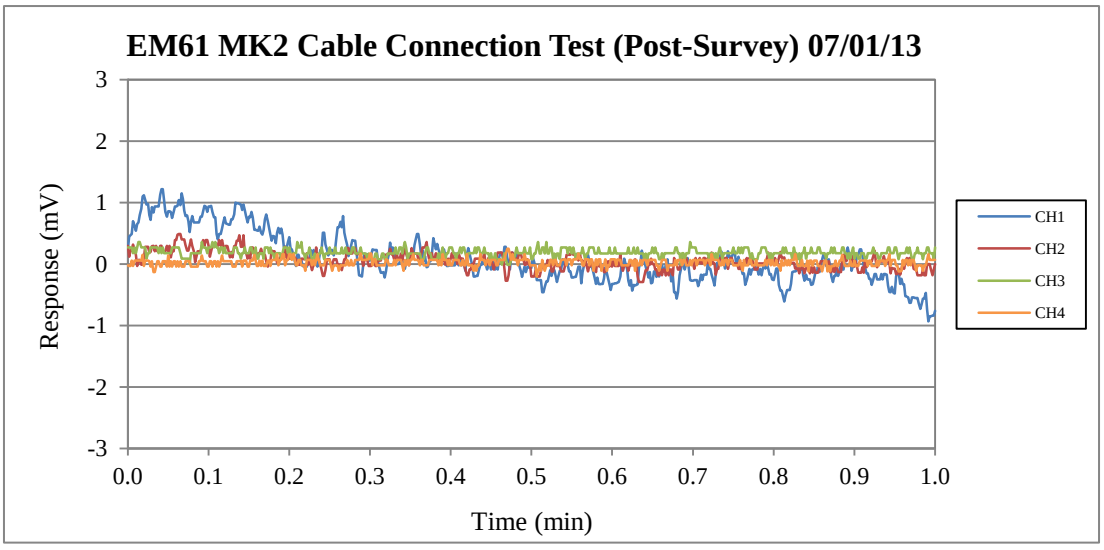

EM61 MK2 Static Background Test (Pre-Survey) 07/01/13
Response (mV)
4
3
2
1
0
-1
-2
-3
-4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

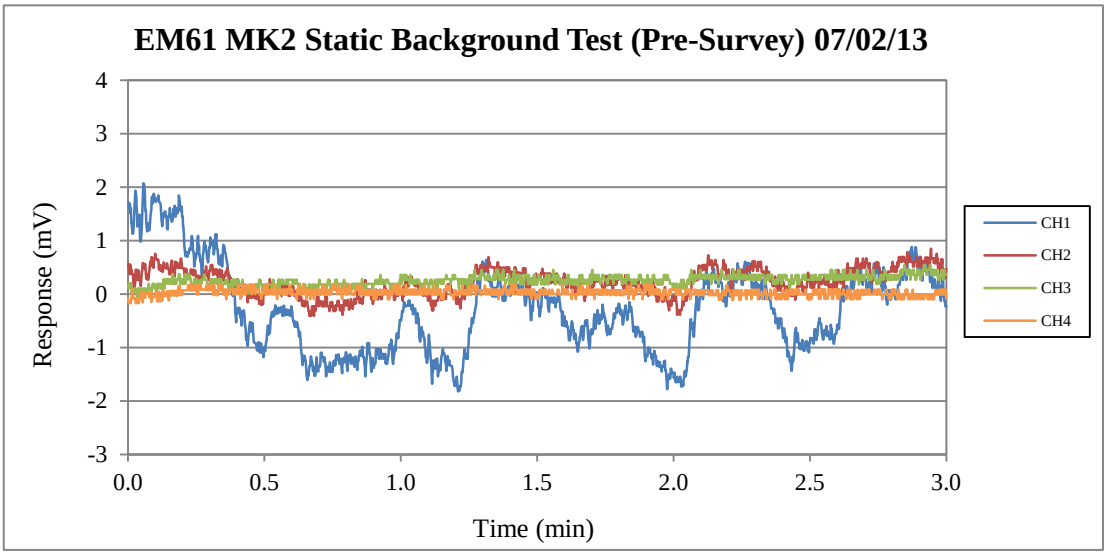

EM61 MK2 Static Spike Test (Pre-Survey) 07/01/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

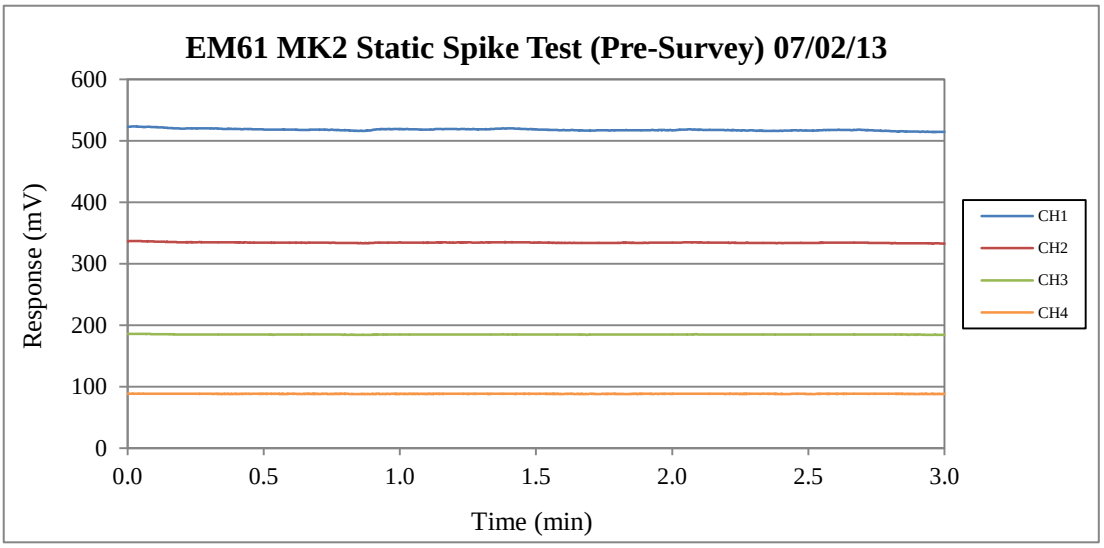

EM61 MK2 Cable Connection Test (Pre-Survey) 07/01/13
Response (mV)
4
3
2
1
0
-1
-2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

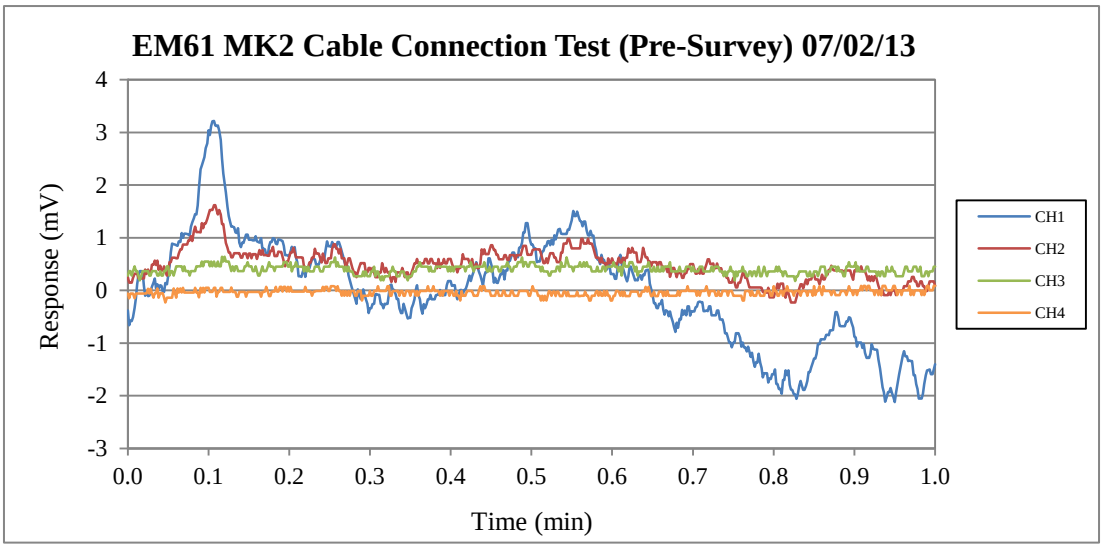

EM61 MK2 Static Background Test (Post-Survey) 07/01/13
Response (mV)
3
2
1
0
-1
-2
-3
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

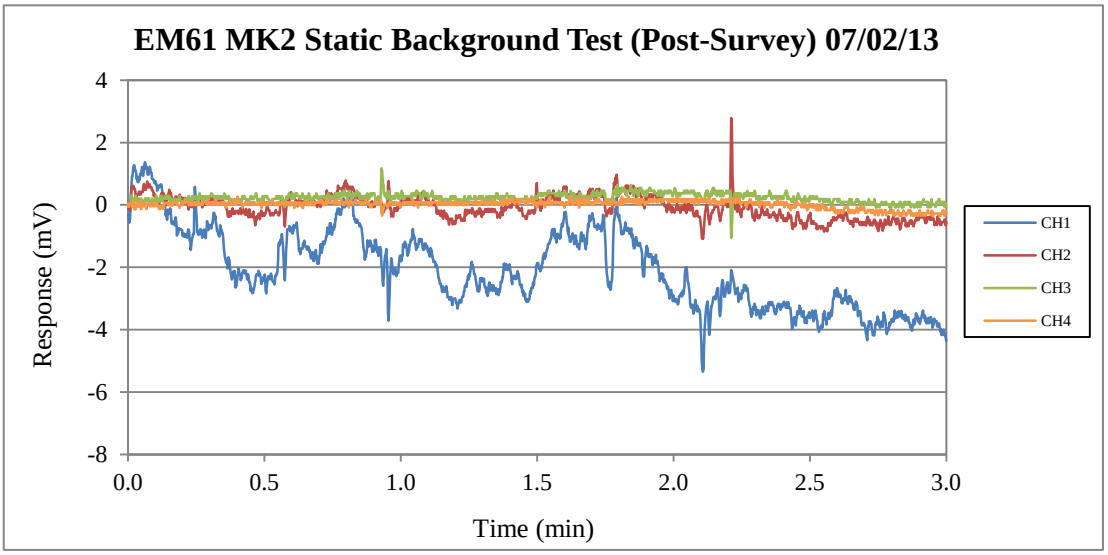

EM61 MK2 Static Spike Test (Post-Survey) 07/01/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

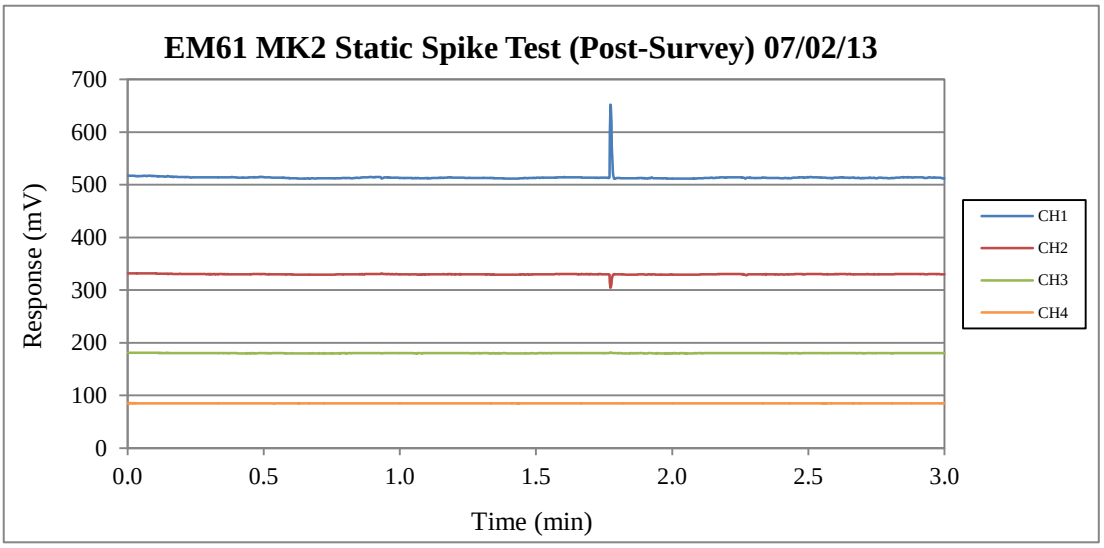

EM61 MK2 Cable Connection Test (Post-Survey) 07/01/13
Response (mV)
3
2
1
0
-1
-2
-3
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

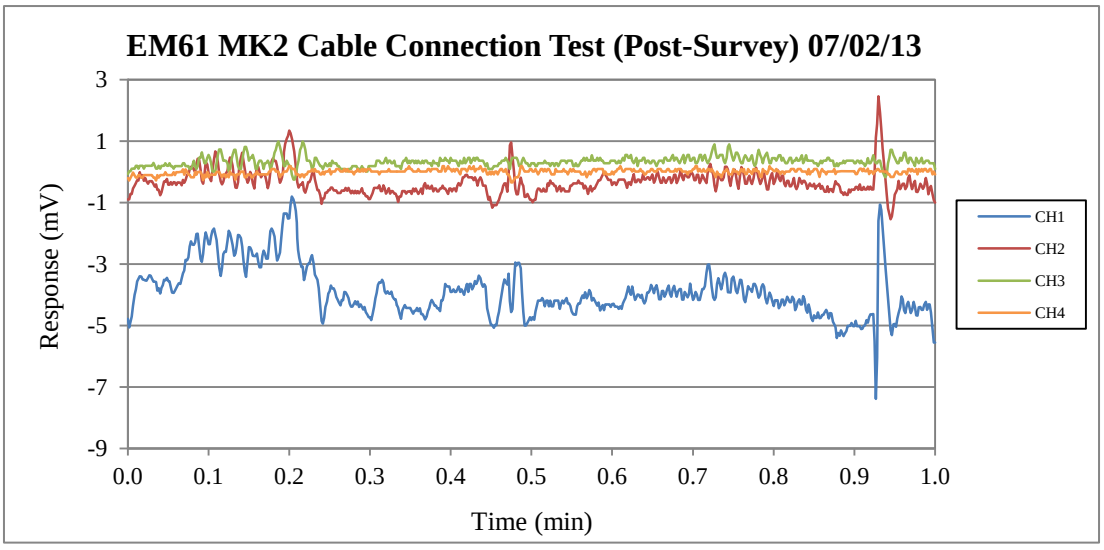

EM61 MK2 Static Background Test (Pre-Survey) 07/02/13
Response (mV)
4
3
2
1
0
-1
-2
-3
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

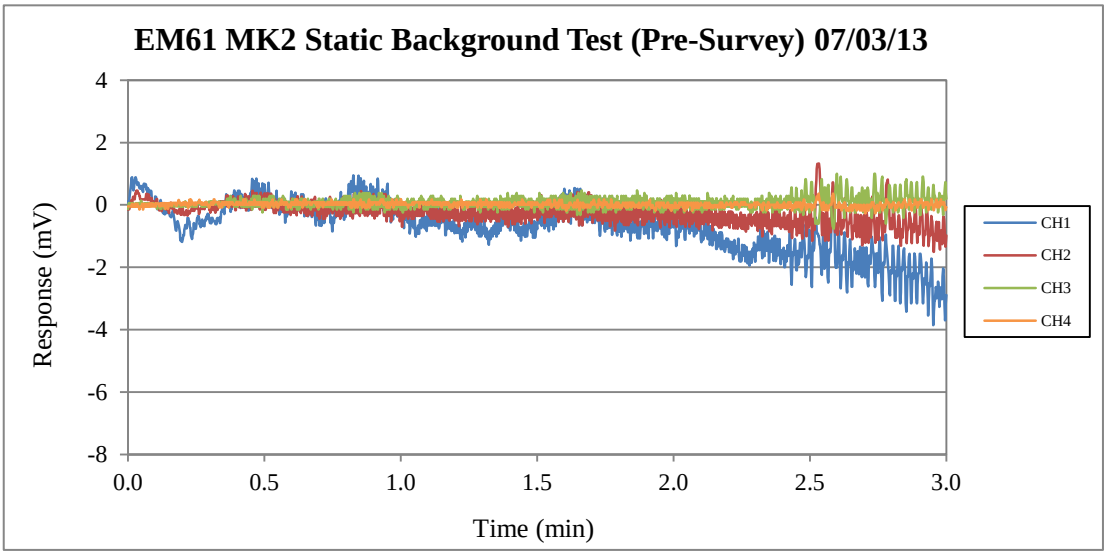

EM61 MK2 Static Spike Test (Pre-Survey) 07/02/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

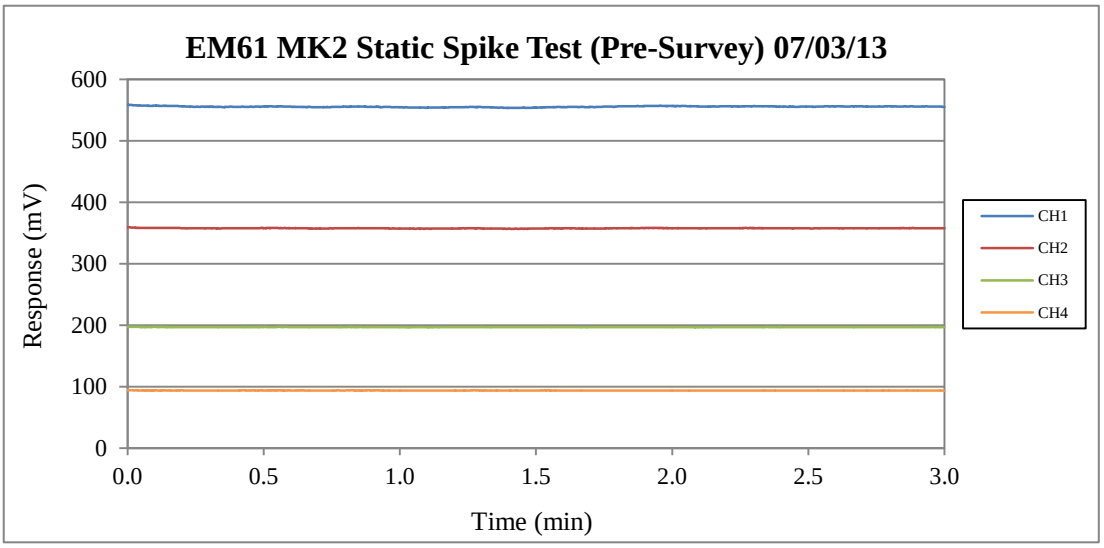

EM61 MK2 Cable Connection Test (Pre-Survey) 07/02/13
Response (mV)
4
3
2
1
0
-1
-2
-3
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

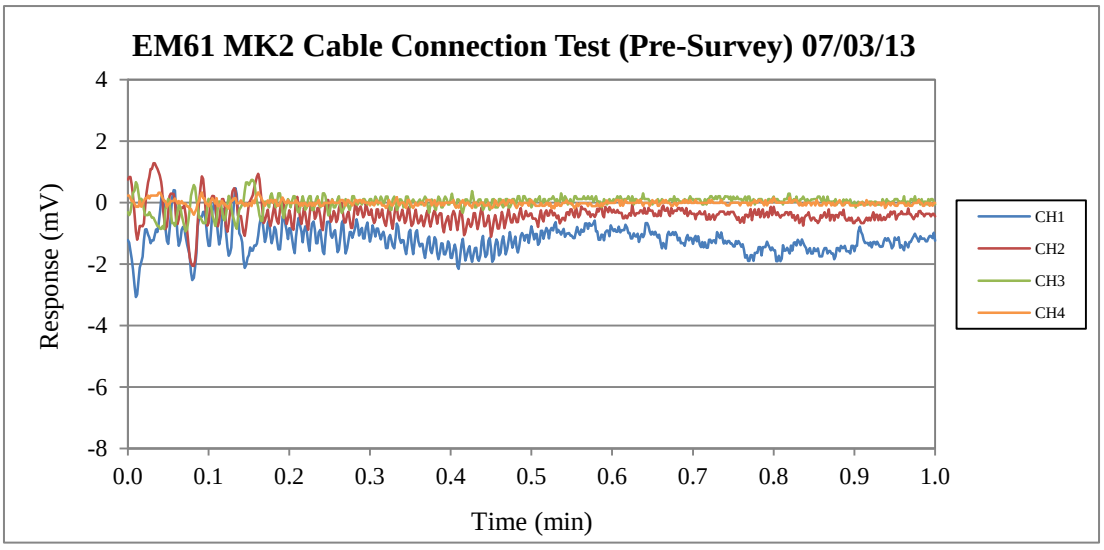

EM61 MK2 Static Background Test (Post-Survey) 07/02/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

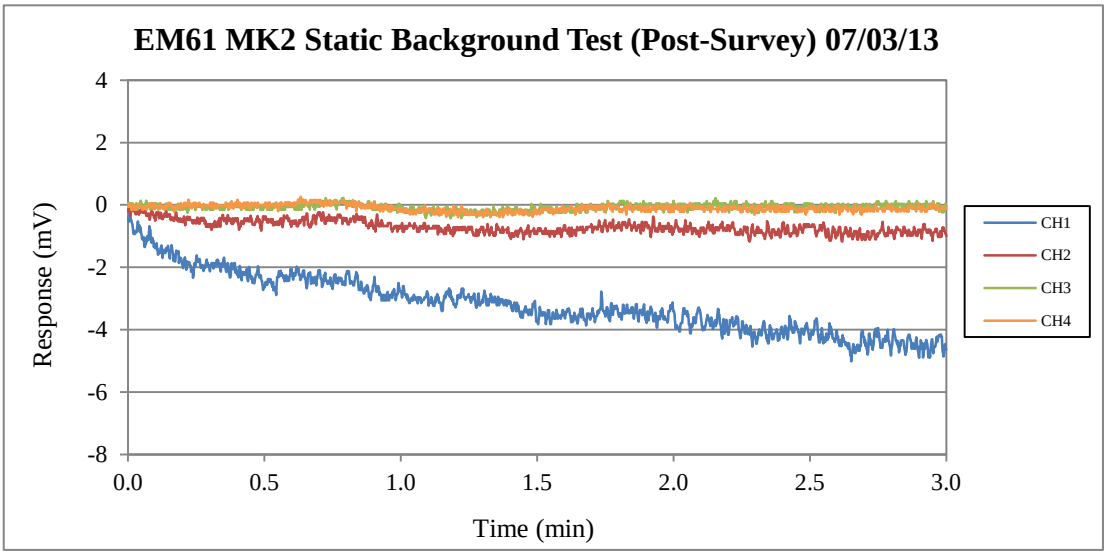

EM61 MK2 Static Spike Test (Post-Survey) 07/02/13
Response (mV)
700
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

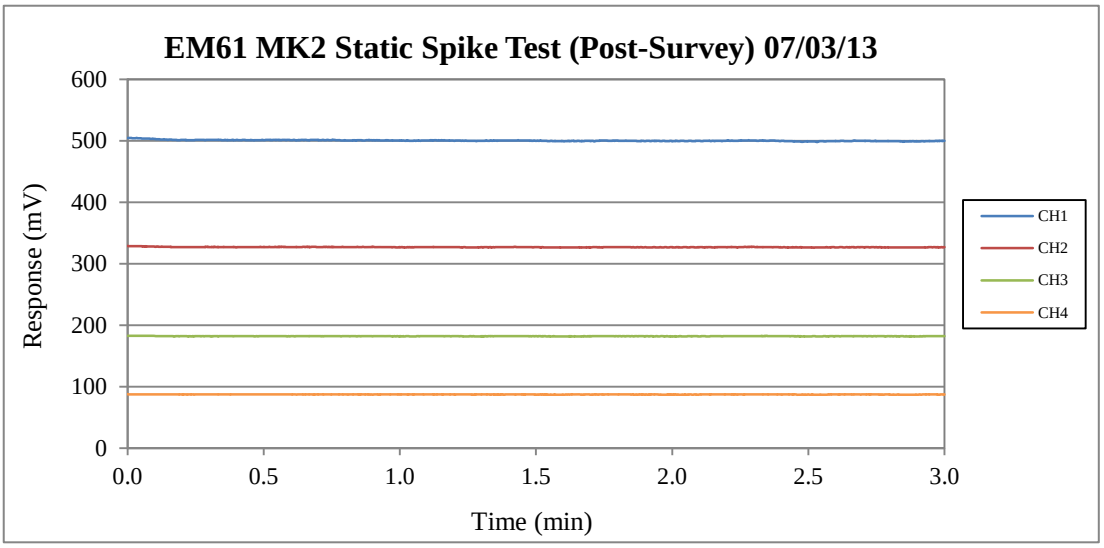

EM61 MK2 Cable Connection Test (Post-Survey) 07/02/13
Response (mV)
3
1
-1
-3
-5
-7
-9
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

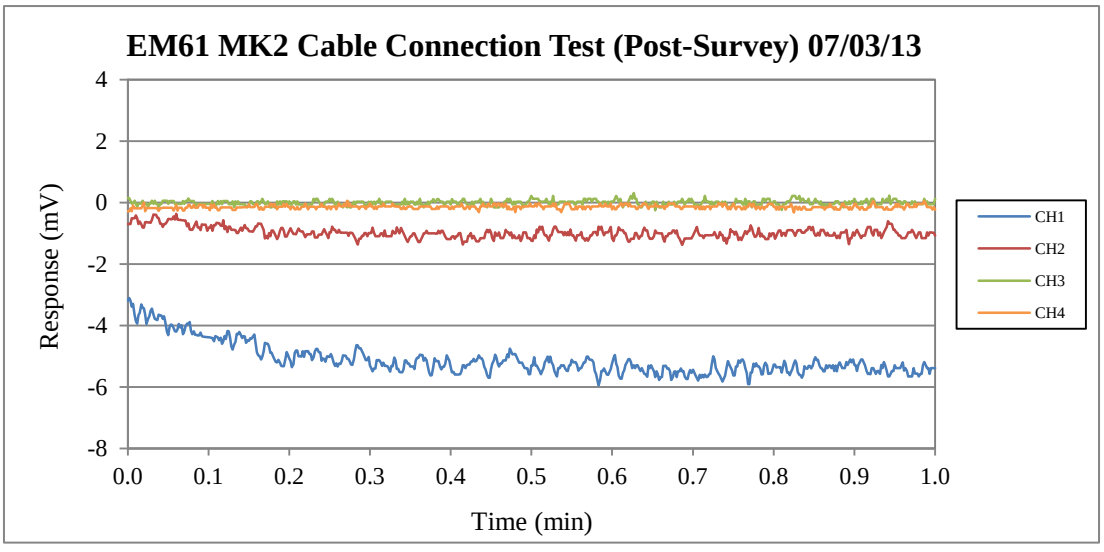

EM61 MK2 Static Background Test (Pre-Survey) 07/03/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

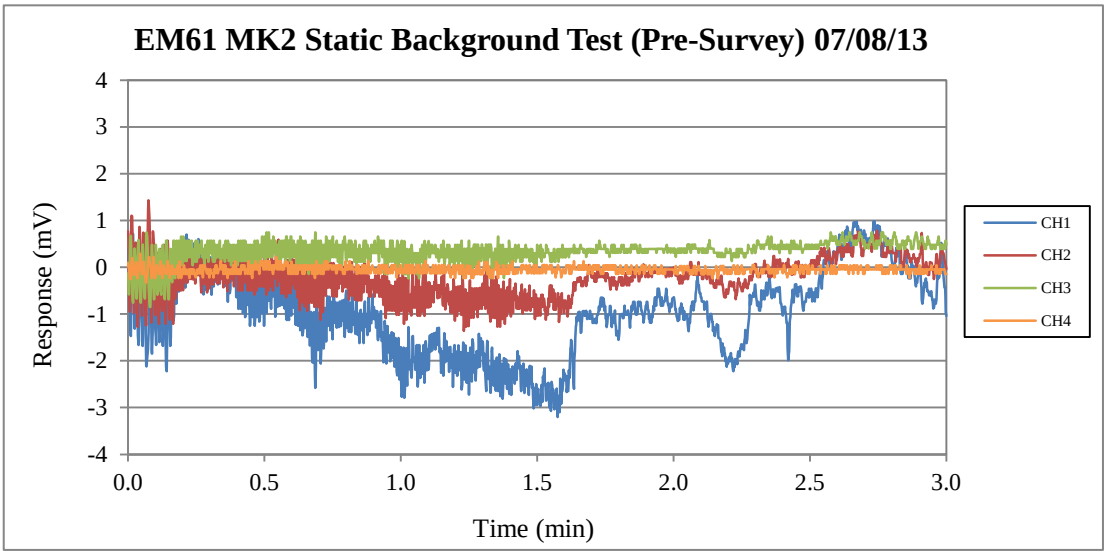

EM61 MK2 Static Spike Test (Pre-Survey) 07/03/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

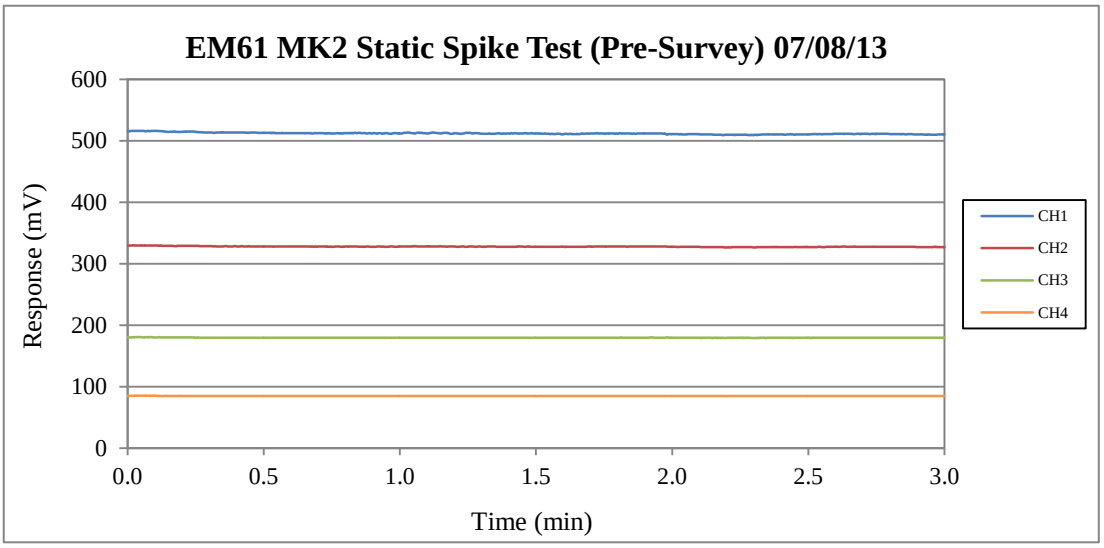

EM61 MK2 Cable Connection Test (Pre-Survey) 07/03/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

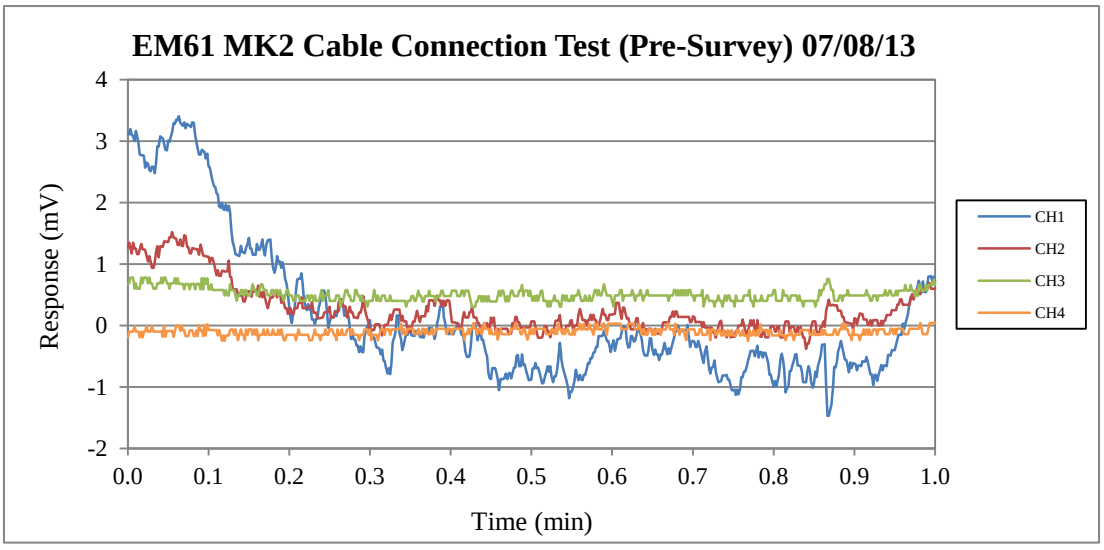

EM61 MK2 Static Background Test (Post-Survey) 07/03/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

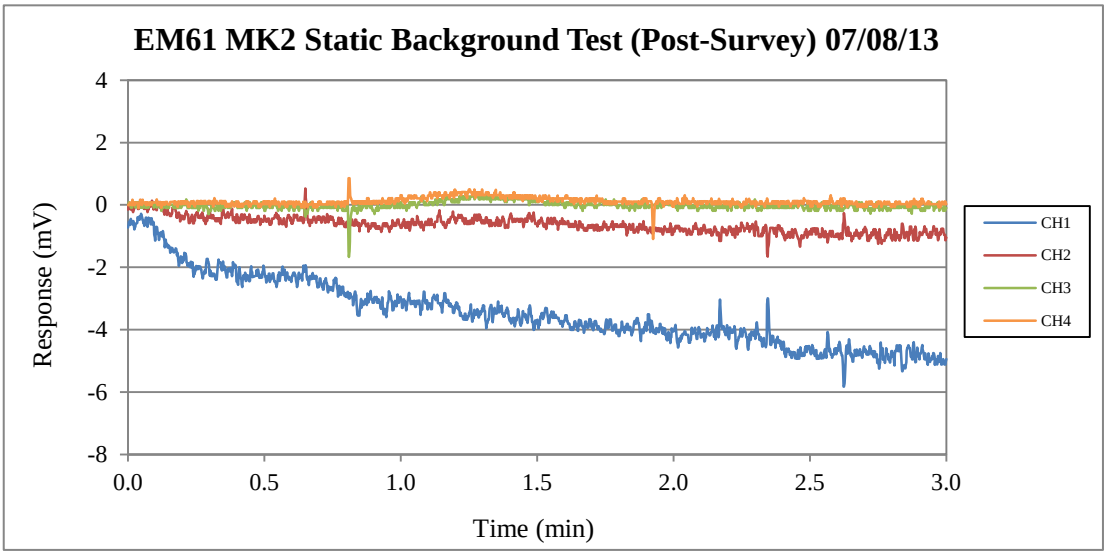

EM61 MK2 Static Spike Test (Post-Survey) 07/03/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

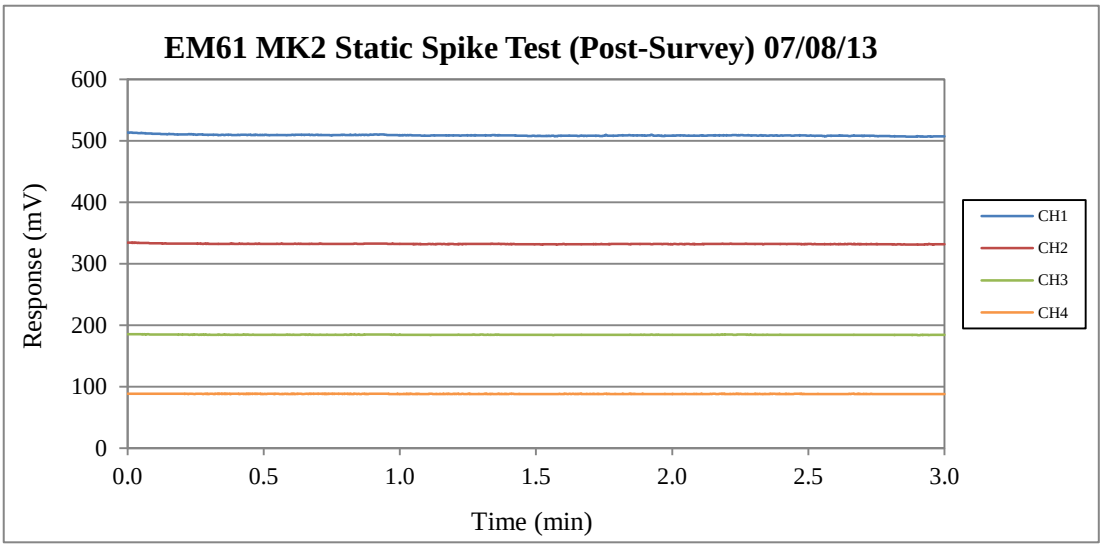

EM61 MK2 Cable Connection Test (Post-Survey) 07/03/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

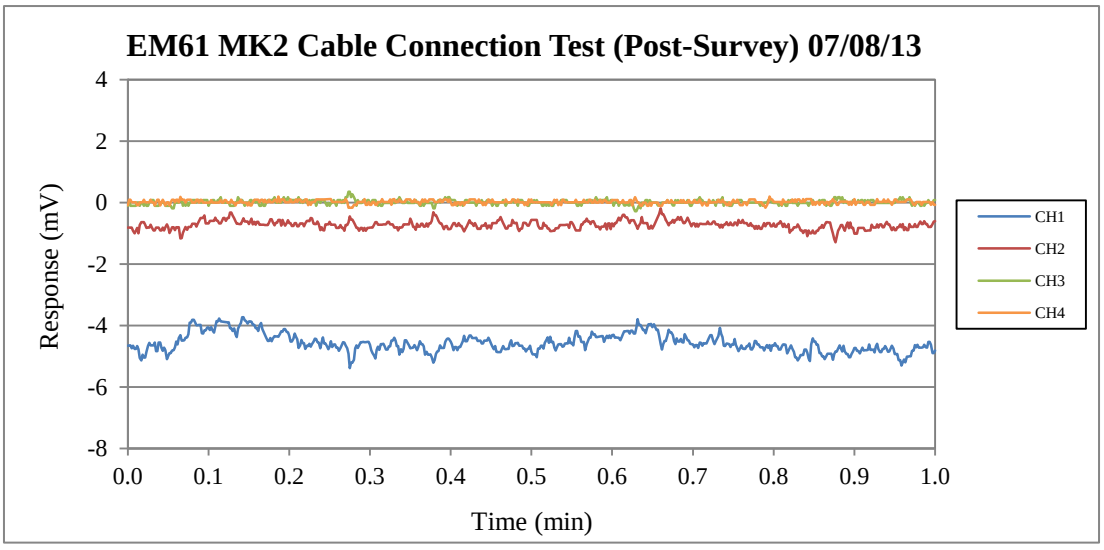

EM61 MK2 Static Background Test (Pre-Survey) 07/08/13
Response (mV)
4
3
2
1
0
-1
-2
-3
-4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

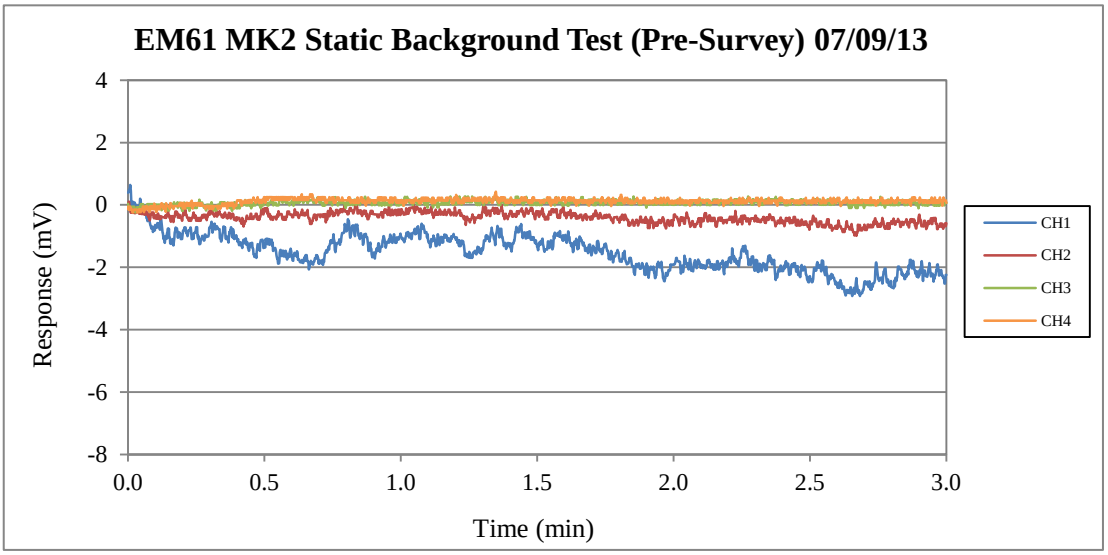

EM61 MK2 Static Spike Test (Pre-Survey) 07/08/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

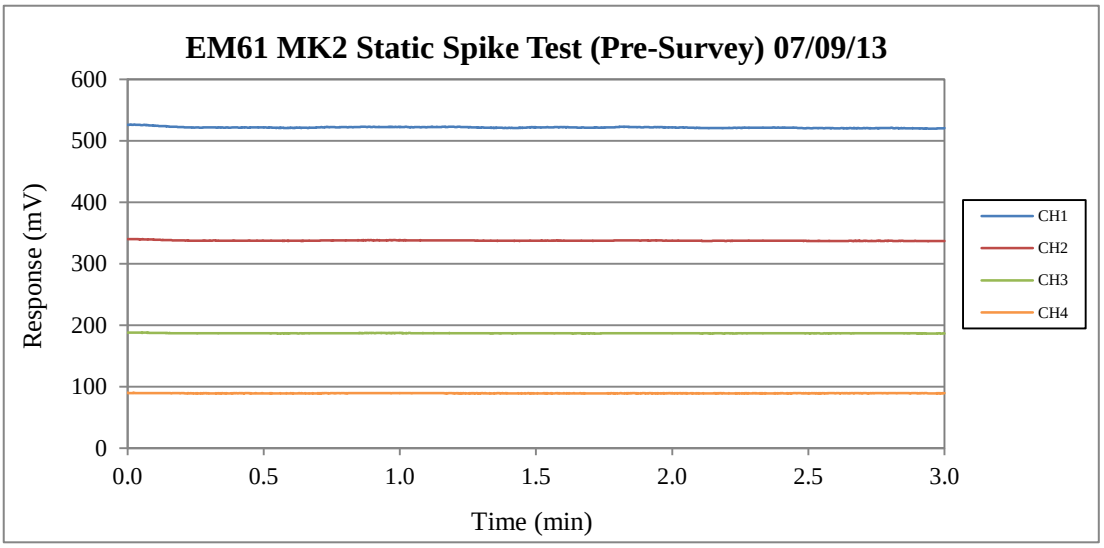

EM61 MK2 Cable Connection Test (Pre-Survey) 07/08/13
Response (mV)
4
3
2
1
0
-1
-2
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

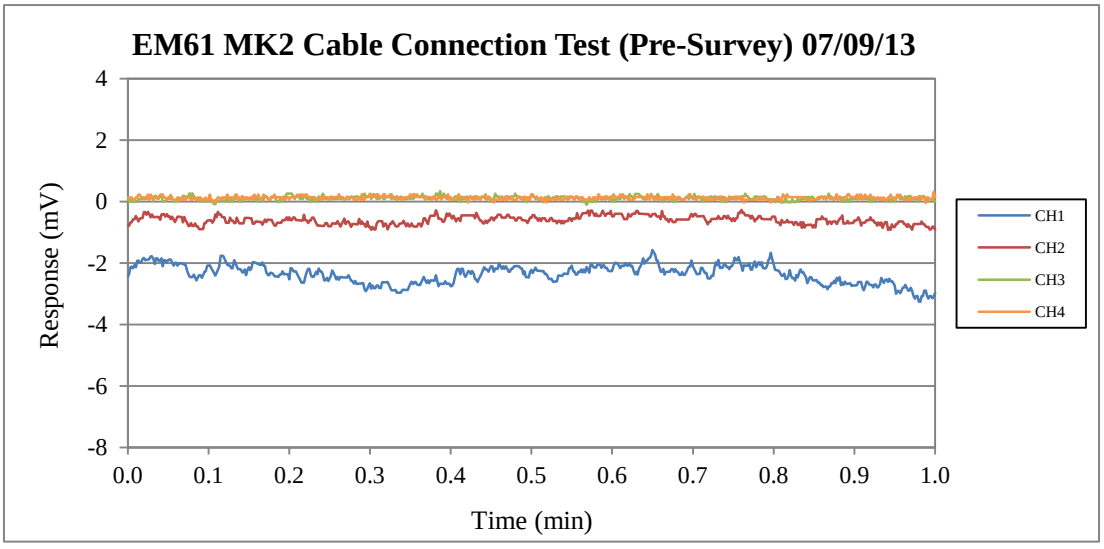

EM61 MK2 Static Background Test (Post-Survey) 07/08/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

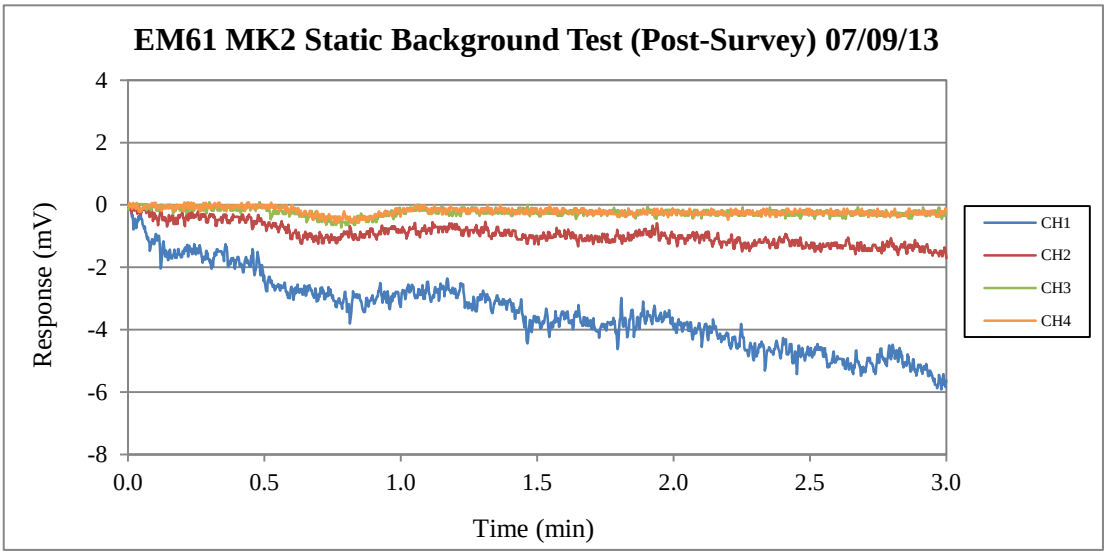

EM61 MK2 Static Spike Test (Post-Survey) 07/08/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

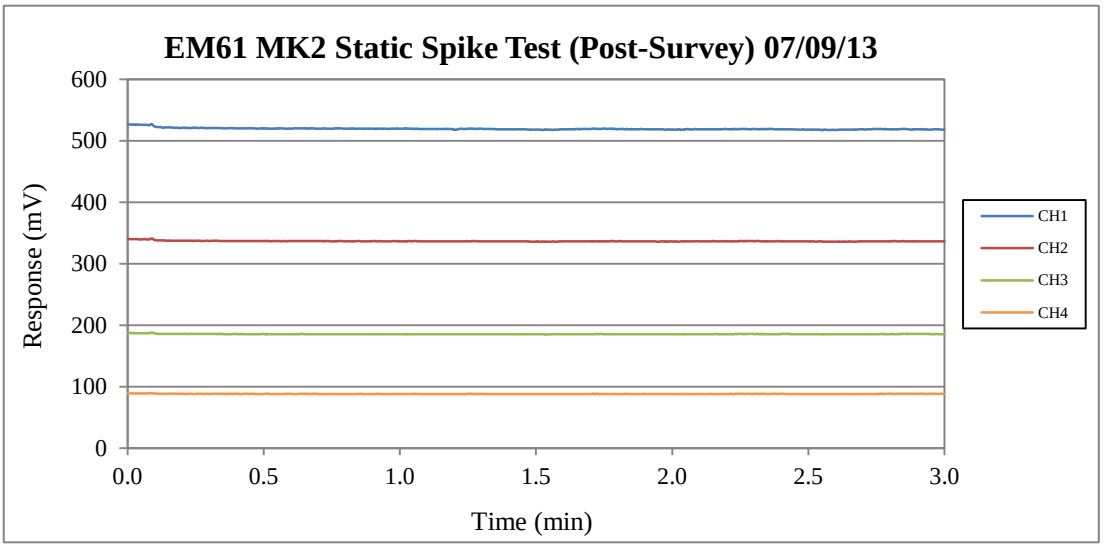

EM61 MK2 Cable Connection Test (Post-Survey) 07/08/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

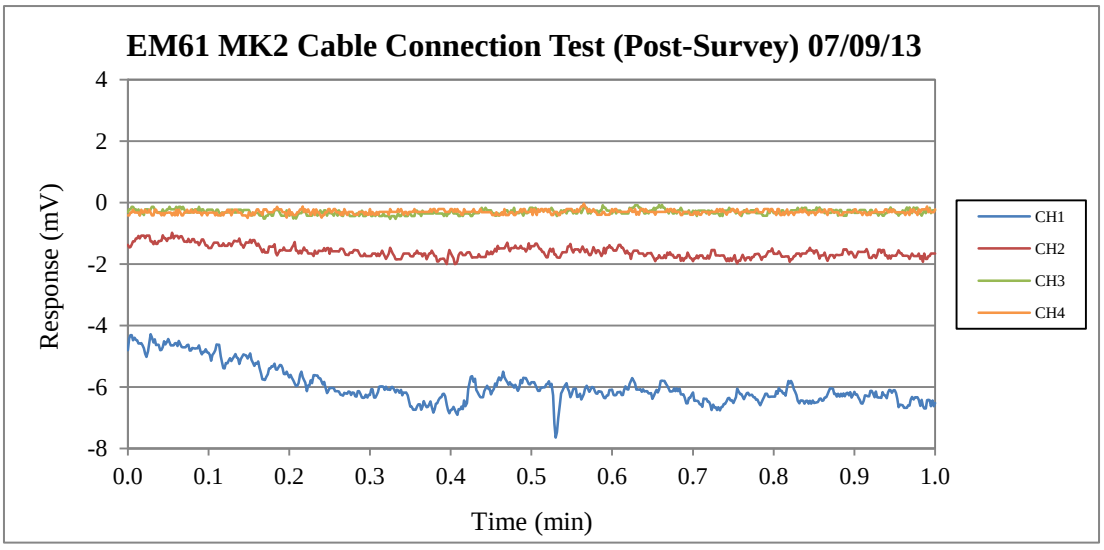

EM61 MK2 Static Background Test (Pre-Survey) 07/09/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

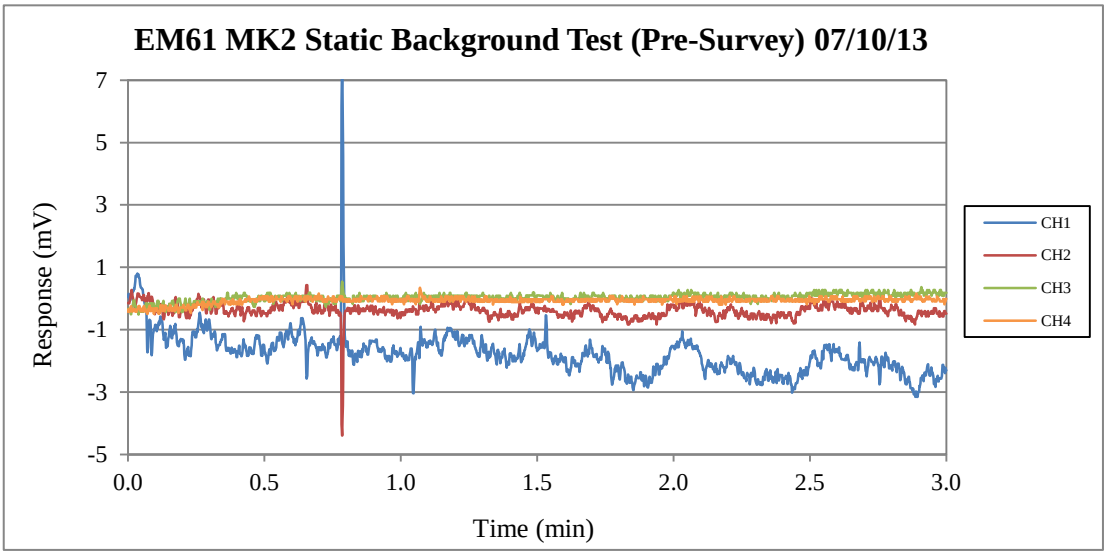

EM61 MK2 Static Spike Test (Pre-Survey) 07/09/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

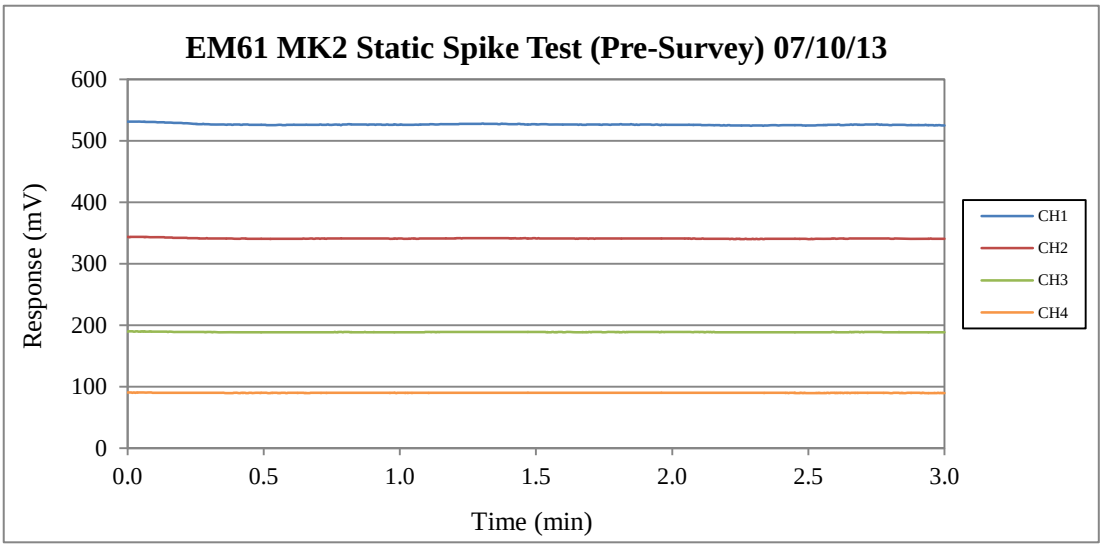

EM61 MK2 Cable Connection Test (Pre-Survey) 07/09/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

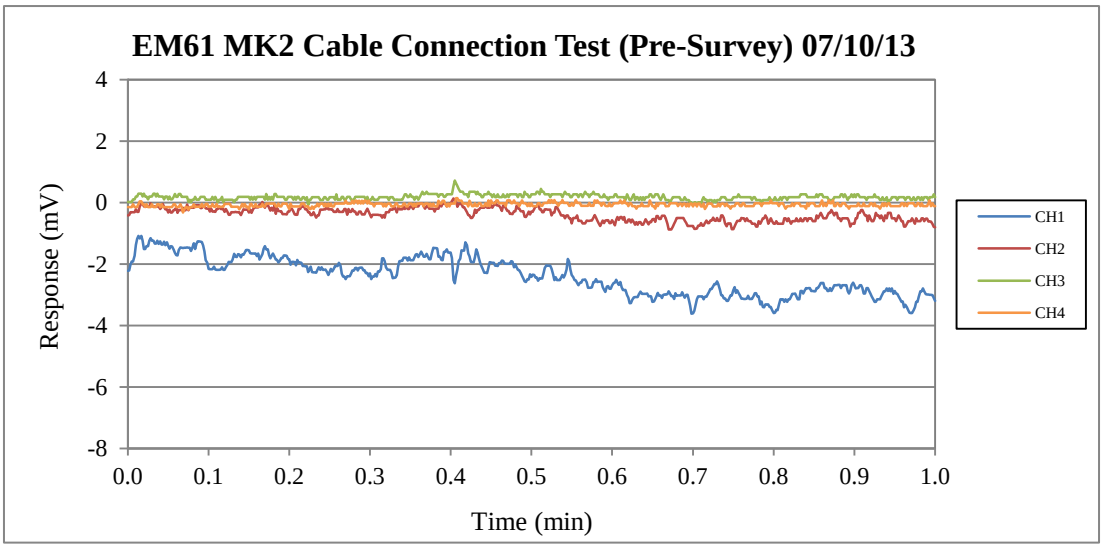

EM61 MK2 Static Background Test (Post-Survey) 07/09/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

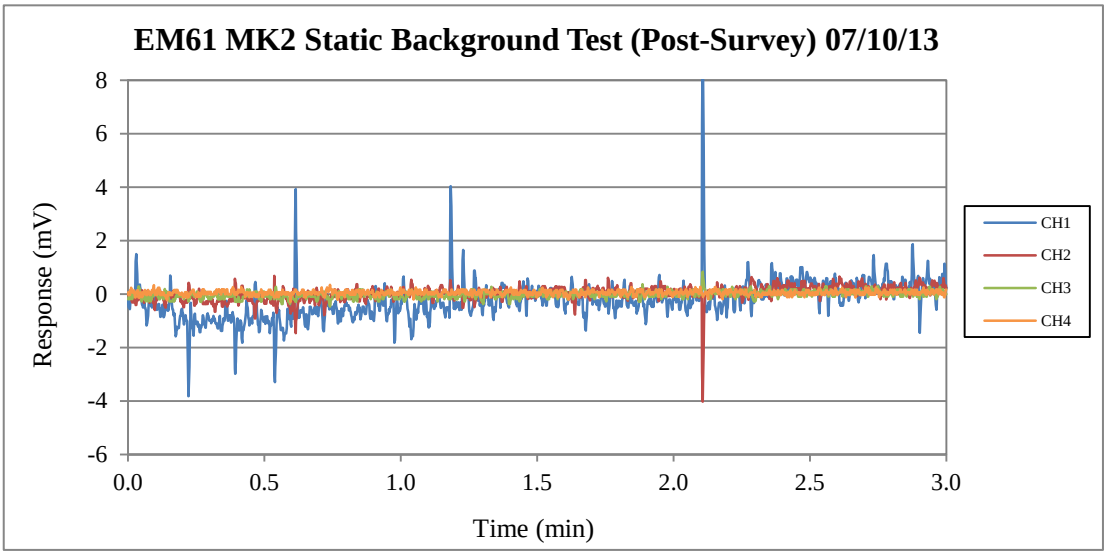

EM61 MK2 Static Spike Test (Post-Survey) 07/09/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

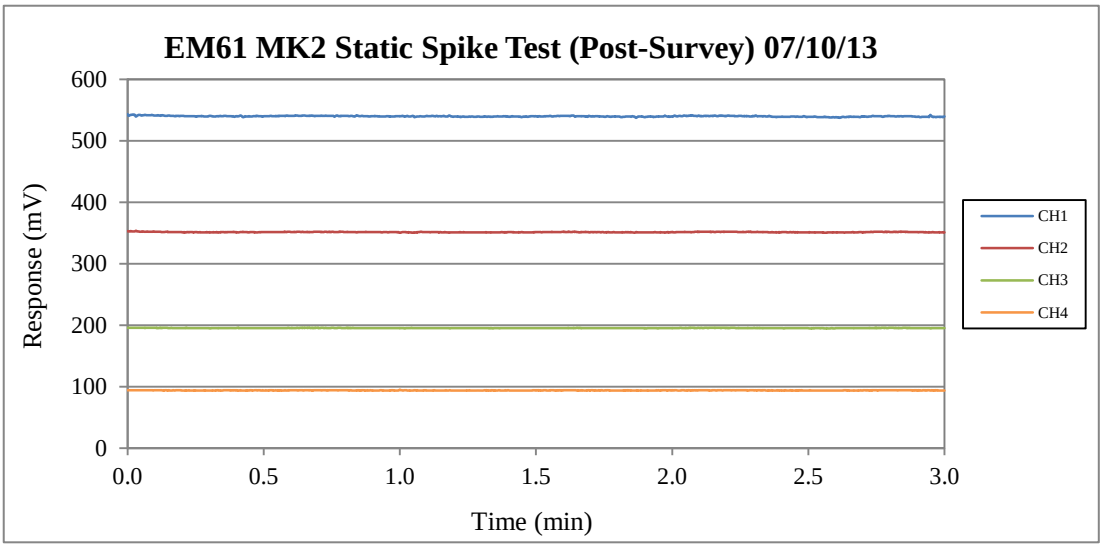

EM61 MK2 Cable Connection Test (Post-Survey) 07/09/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

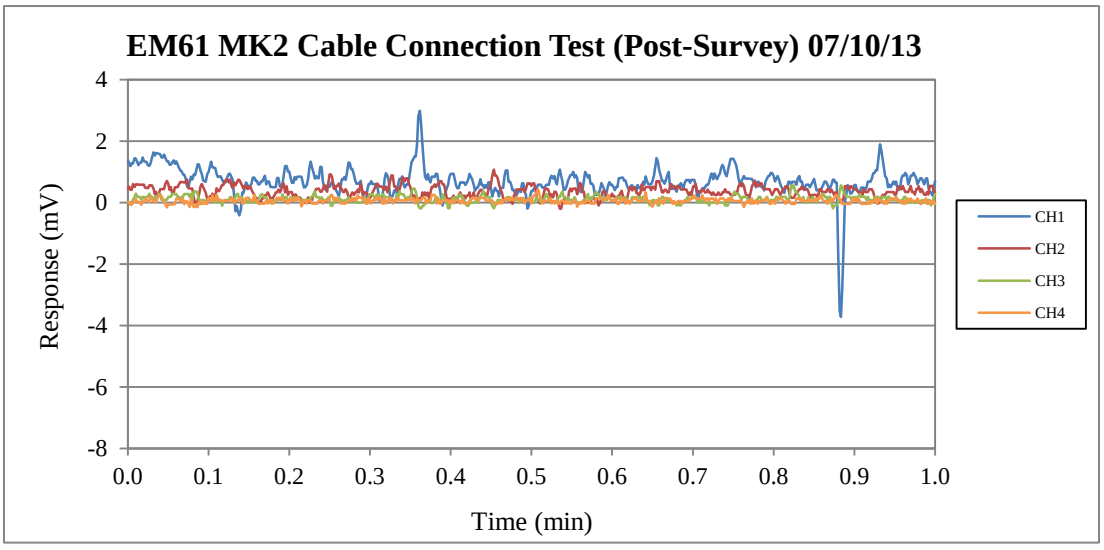

EM61 MK2 Static Background Test (Pre-Survey) 07/10/13
Response (mV)
7
5
3
1
-1
-3
-5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

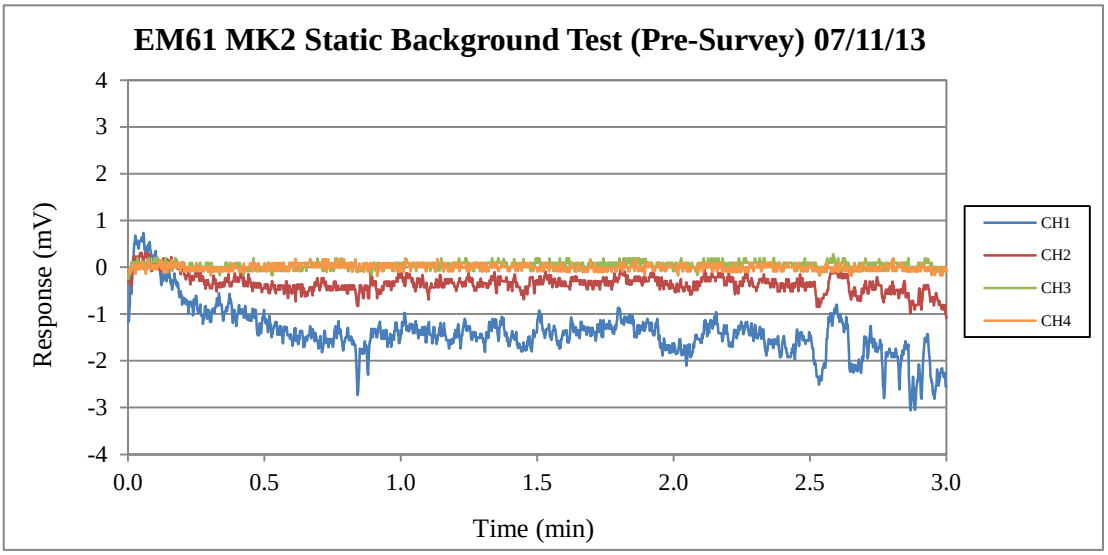

EM61 MK2 Static Spike Test (Pre-Survey) 07/10/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

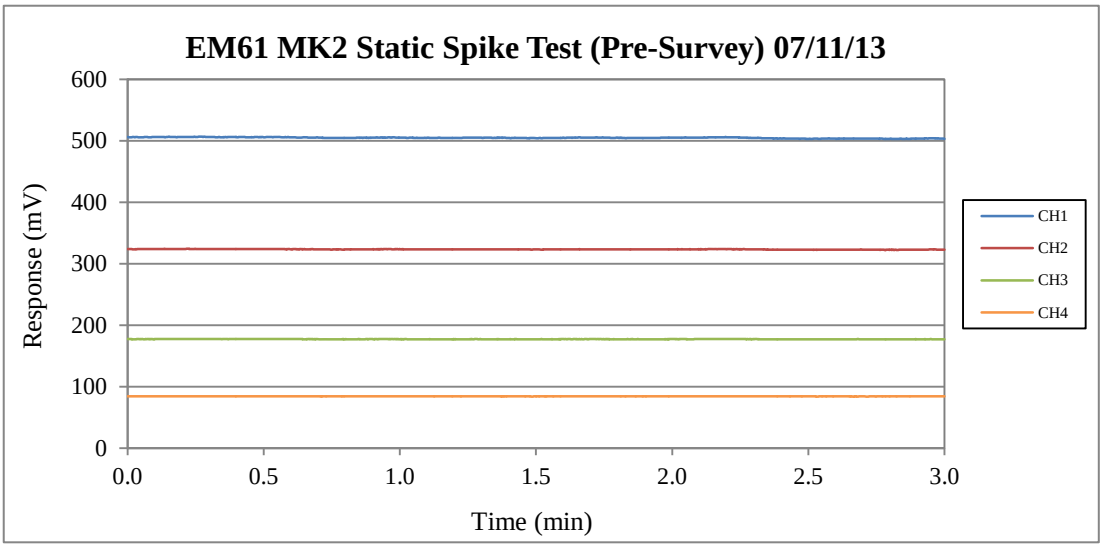

EM61 MK2 Cable Connection Test (Pre-Survey) 07/10/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

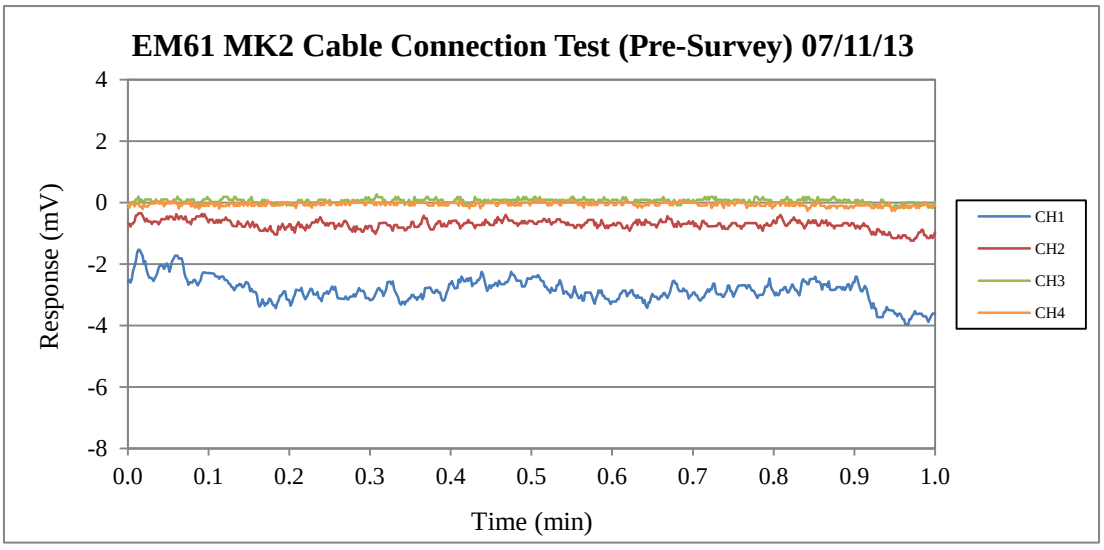

EM61 MK2 Static Background Test (Post-Survey) 07/10/13
Response (mV)
8
6
4
2
0
-2
-4
-6
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

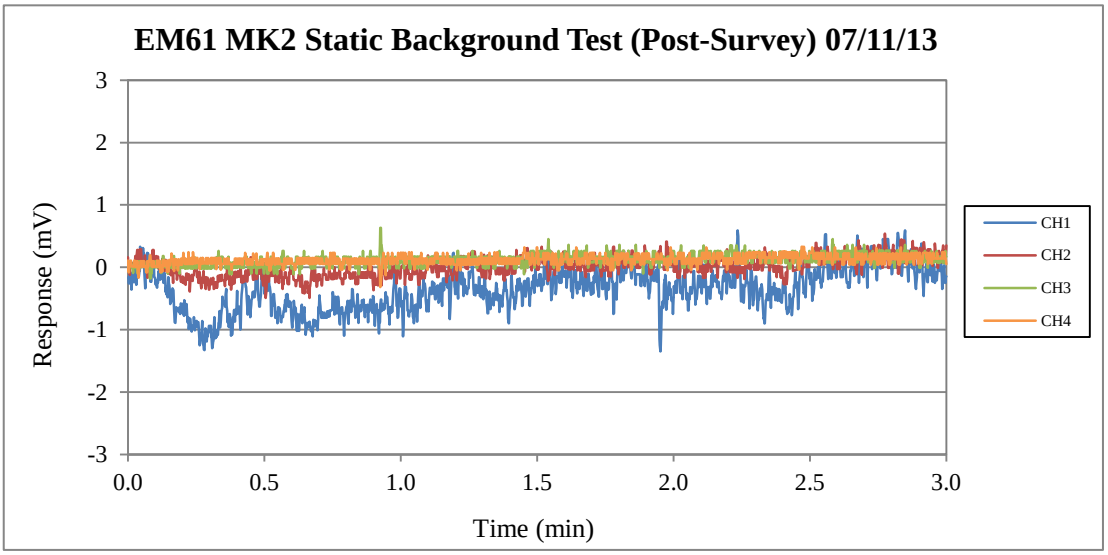

EM61 MK2 Static Spike Test (Post-Survey) 07/10/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

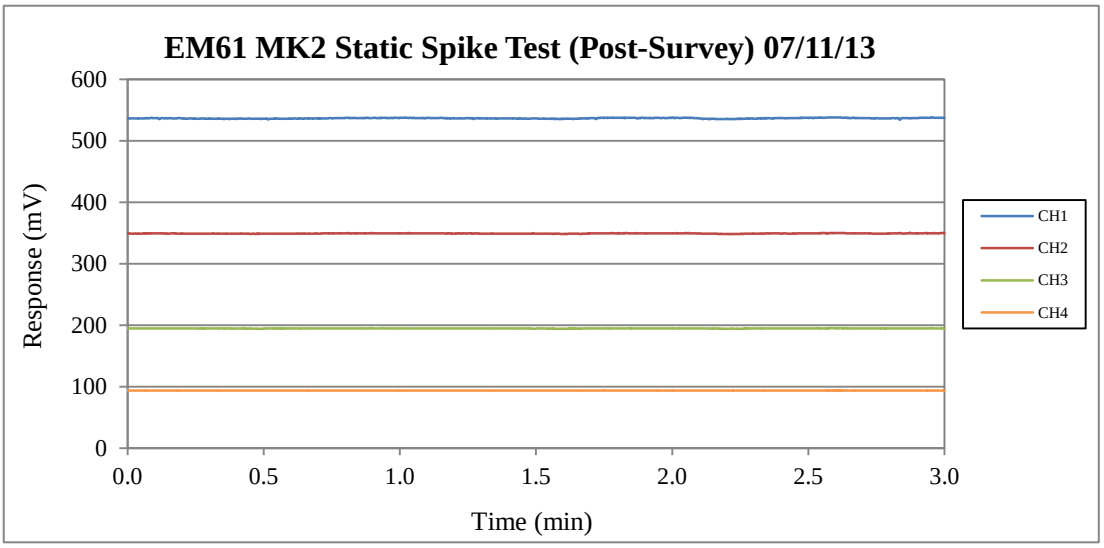

EM61 MK2 Cable Connection Test (Post-Survey) 07/10/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

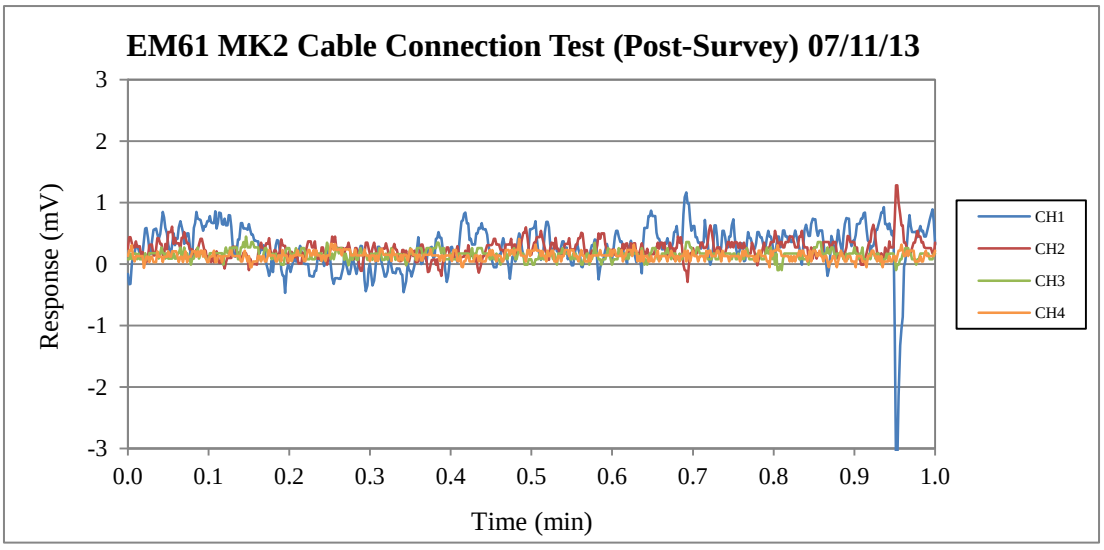

EM61 MK2 Static Background Test (Pre-Survey) 07/11/13
Response (mV)
4
3
2
1
0
-1
-2
-3
-4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

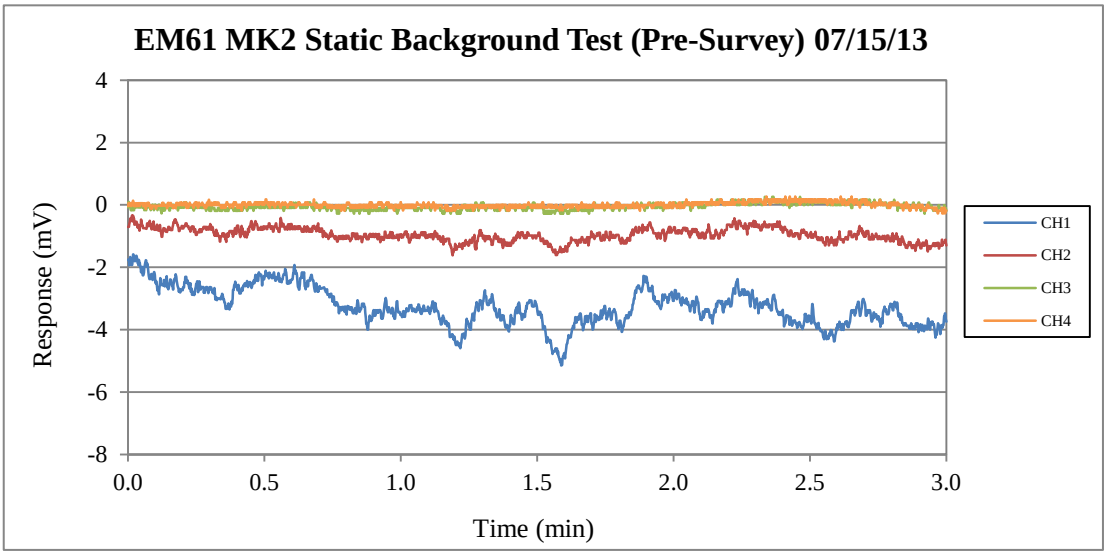

EM61 MK2 Static Spike Test (Pre-Survey) 07/11/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

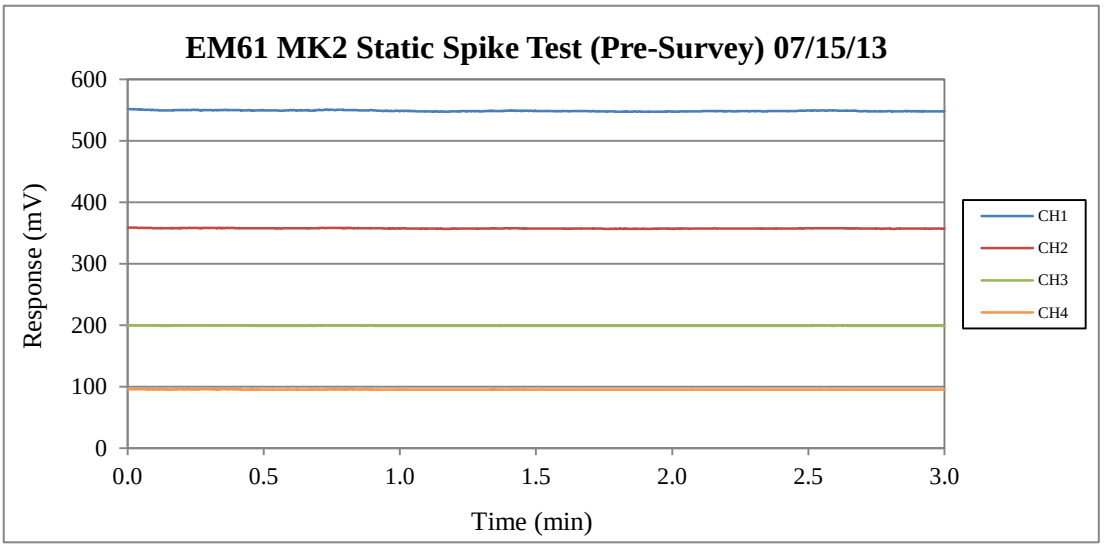

EM61 MK2 Cable Connection Test (Pre-Survey) 07/11/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

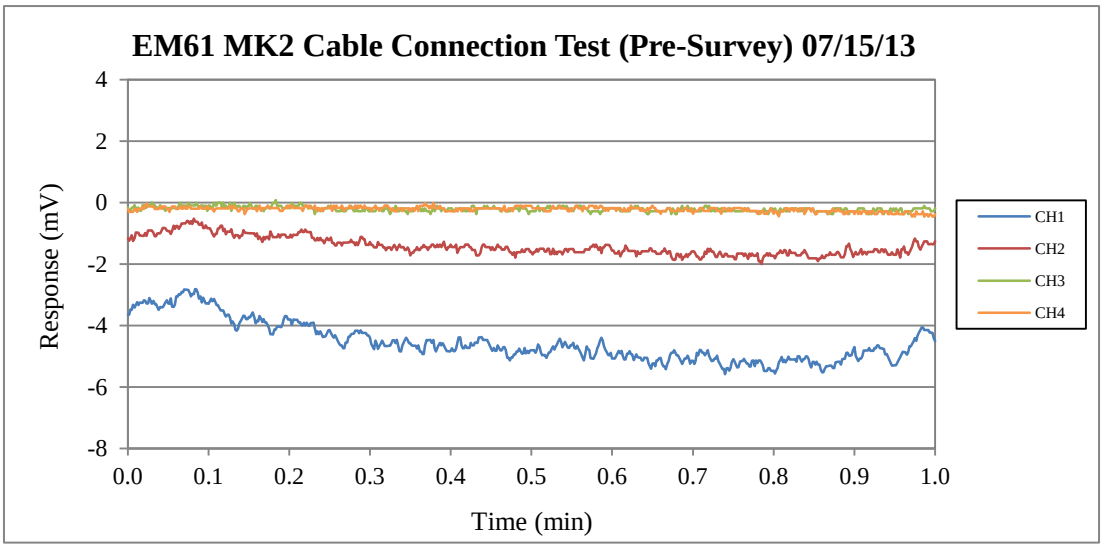

EM61 MK2 Static Background Test (Post-Survey) 07/11/13
Response (mV)
3
2
1
0
-1
-2
-3
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

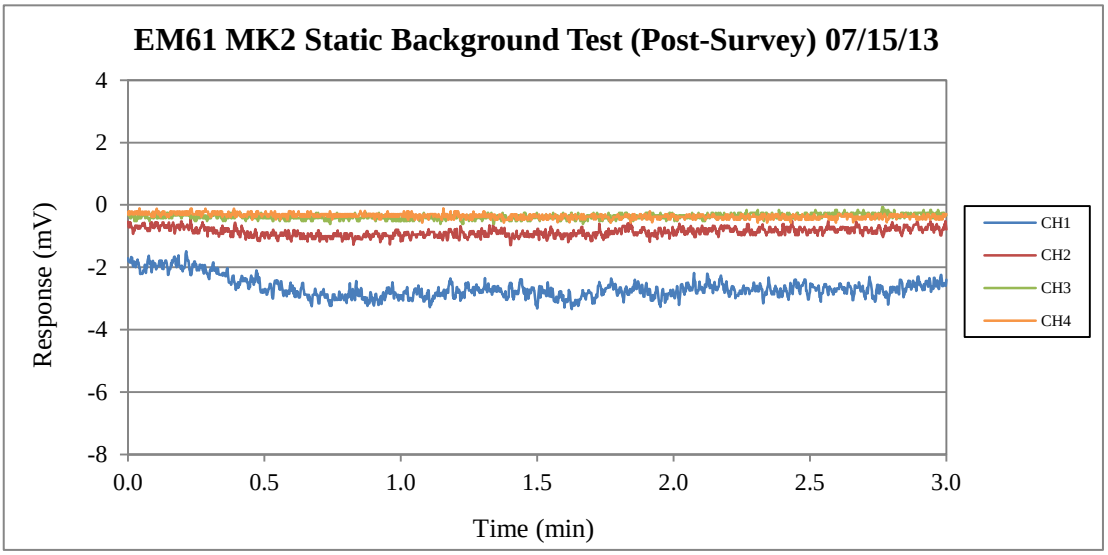

EM61 MK2 Static Spike Test (Post-Survey) 07/11/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

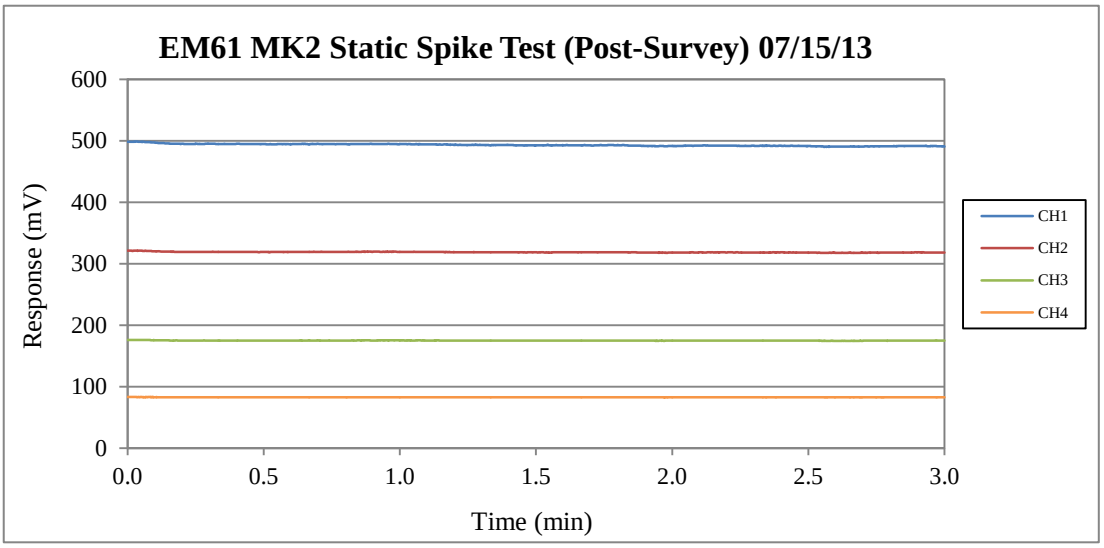

EM61 MK2 Cable Connection Test (Post-Survey) 07/11/13
Response (mV)
3
2
1
0
-1
-2
-3
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

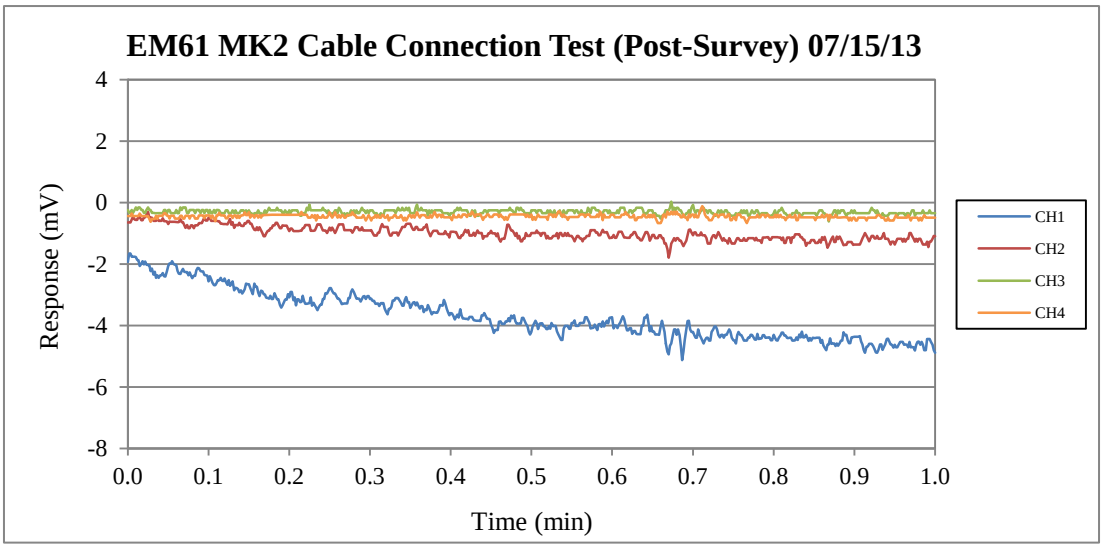

EM61 MK2 Static Background Test (Pre-Survey) 07/15/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

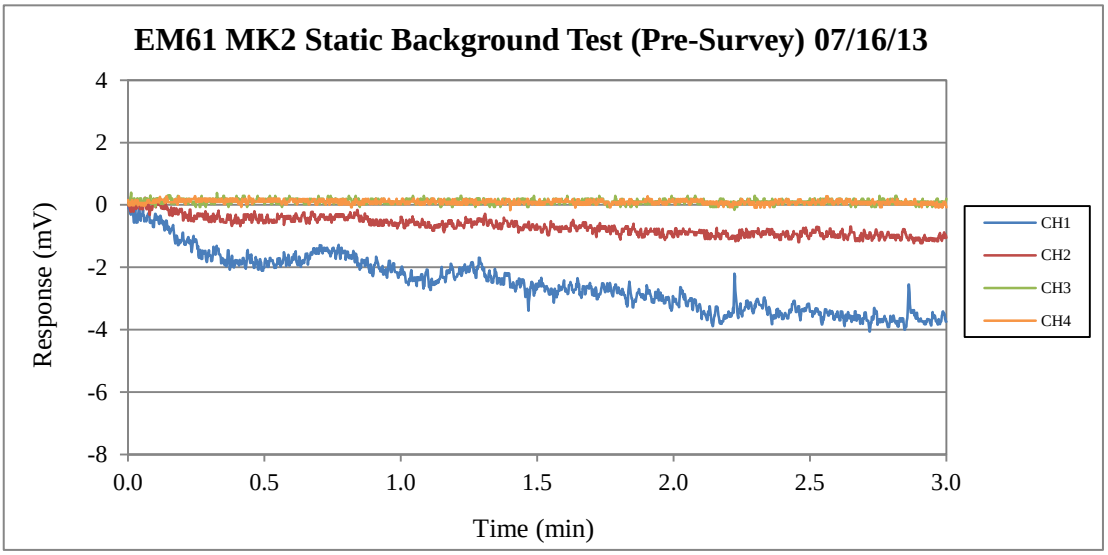

EM61 MK2 Static Spike Test (Pre-Survey) 07/15/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

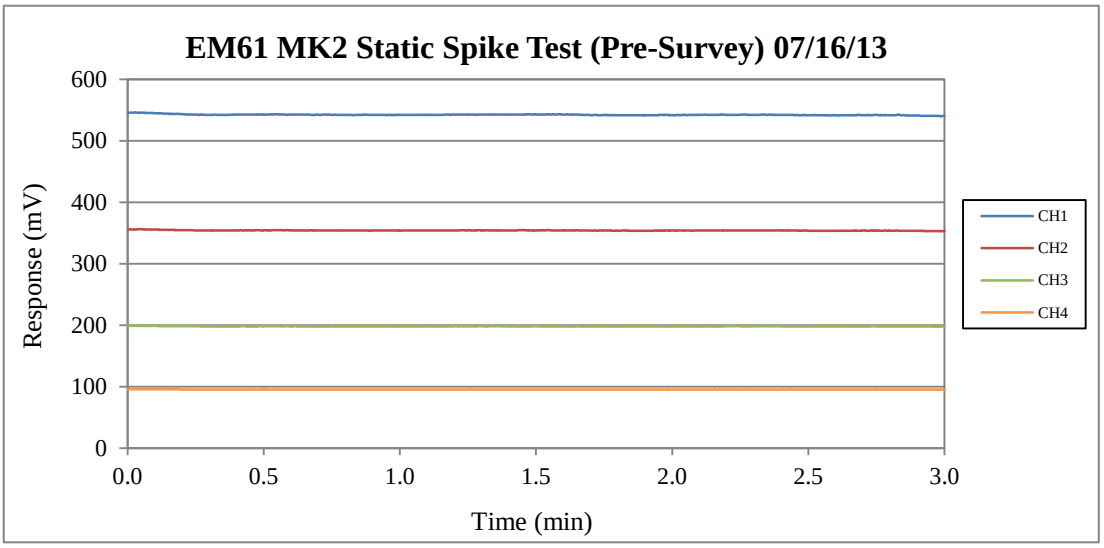

EM61 MK2 Cable Connection Test (Pre-Survey) 07/15/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

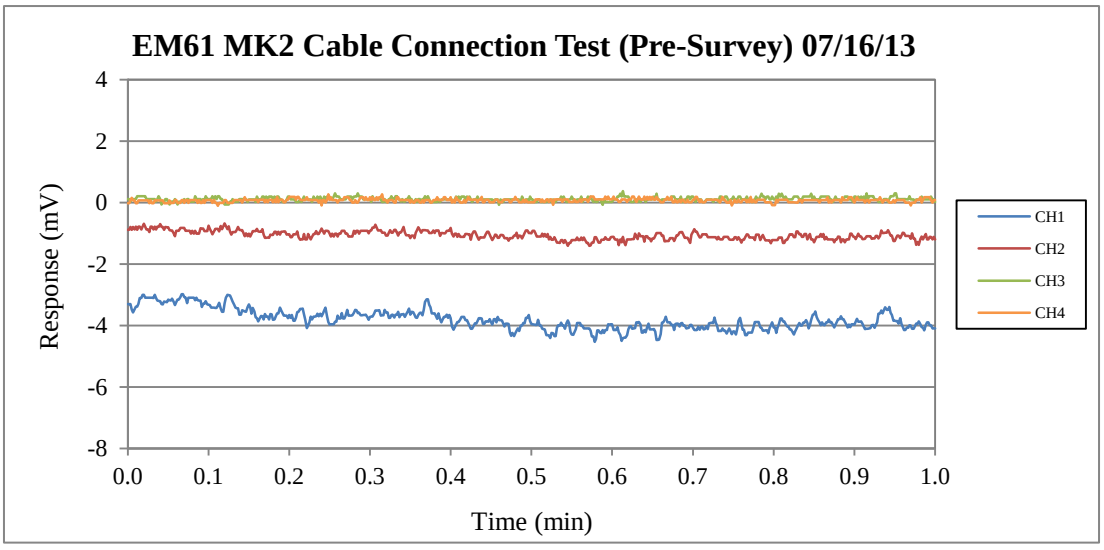

EM61 MK2 Static Background Test (Post-Survey) 07/15/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

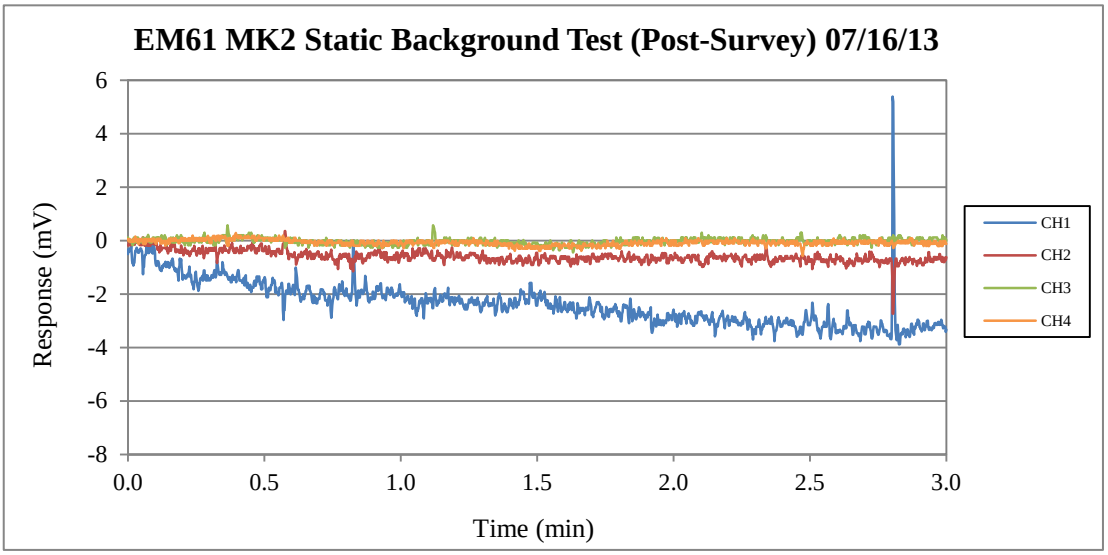

EM61 MK2 Static Spike Test (Post-Survey) 07/15/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

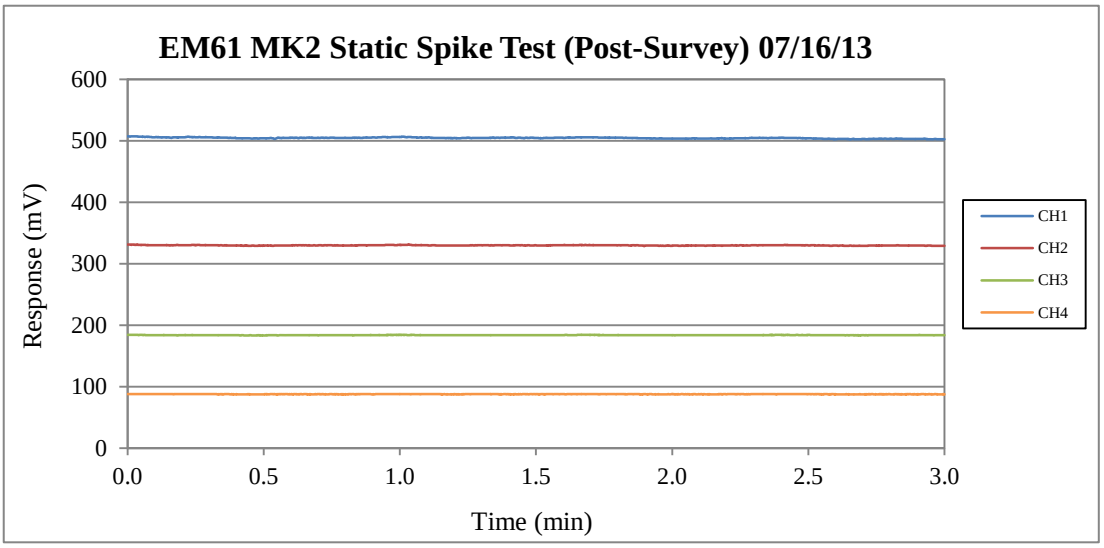

EM61 MK2 Cable Connection Test (Post-Survey) 07/15/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

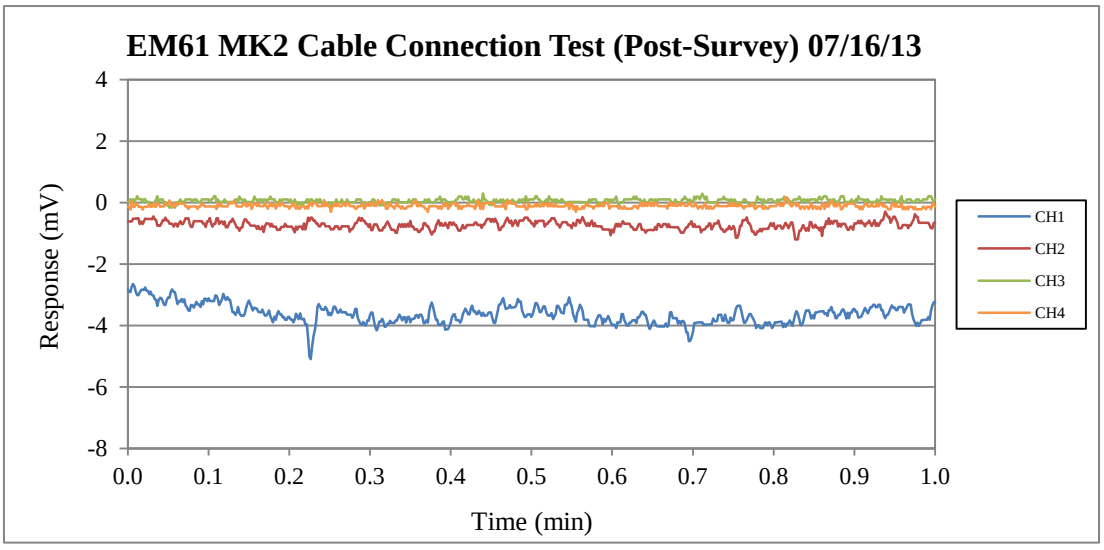

EM61 MK2 Static Background Test (Pre-Survey) 07/16/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

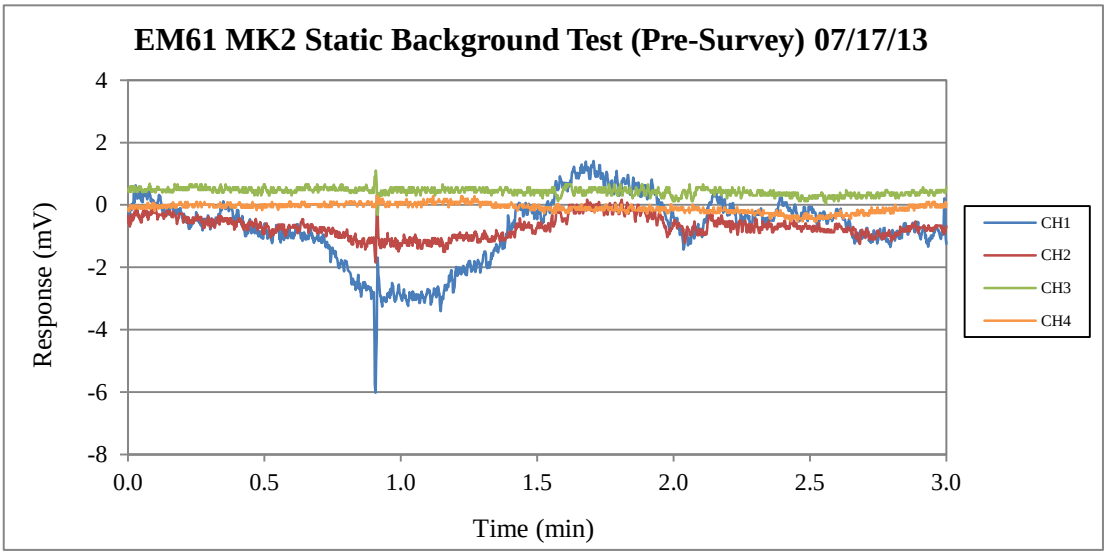

EM61 MK2 Static Spike Test (Pre-Survey) 07/16/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

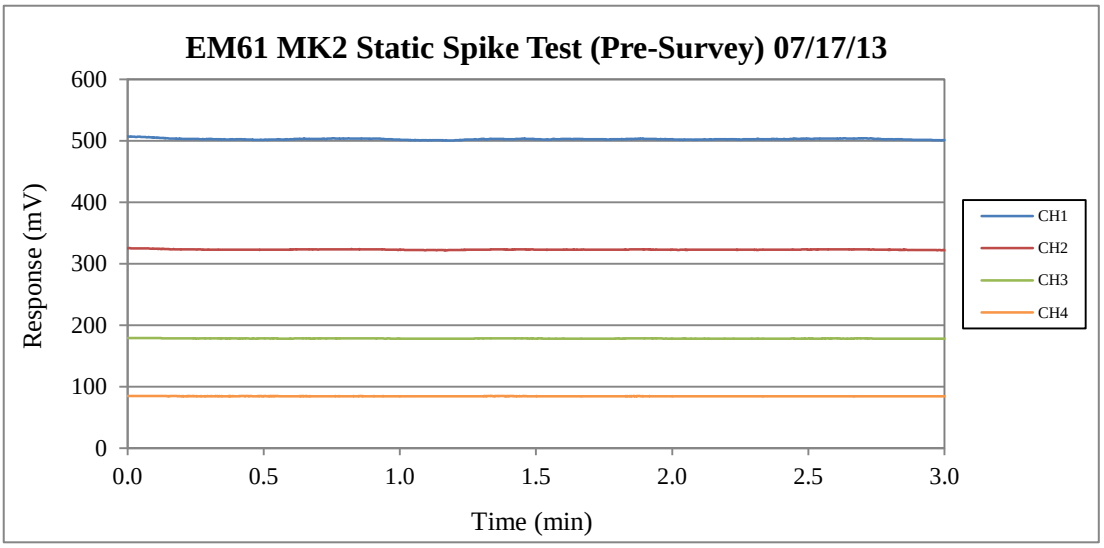

EM61 MK2 Cable Connection Test (Pre-Survey) 07/16/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

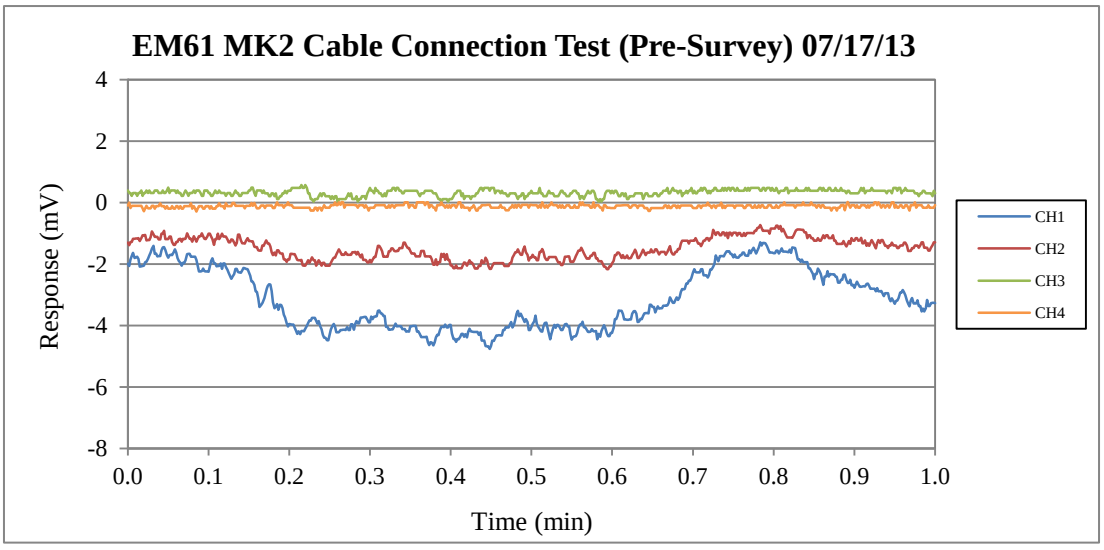

EM61 MK2 Static Background Test (Post-Survey) 07/16/13
Response (mV)
6
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

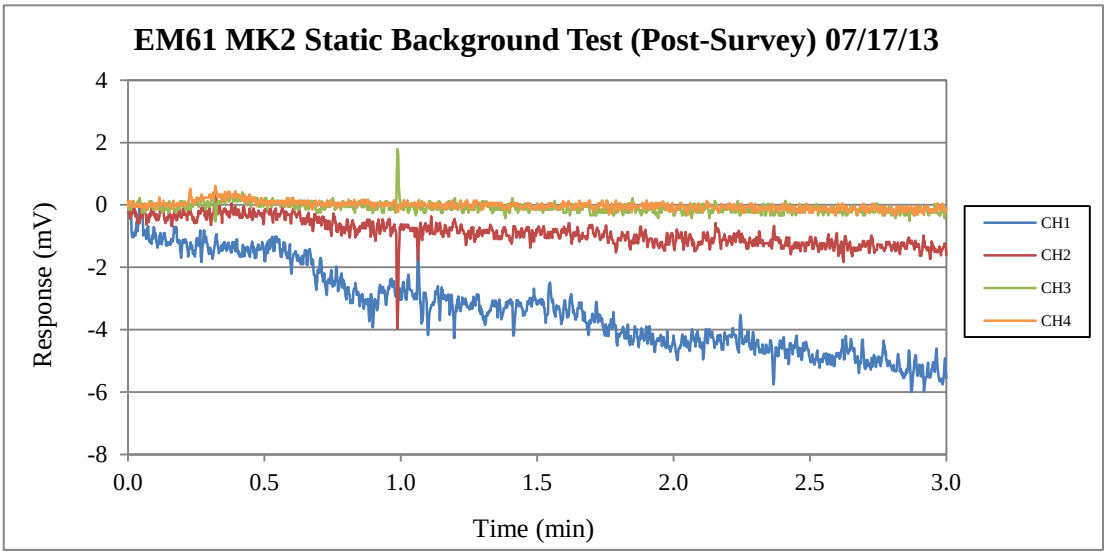

EM61 MK2 Static Spike Test (Post-Survey) 07/16/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

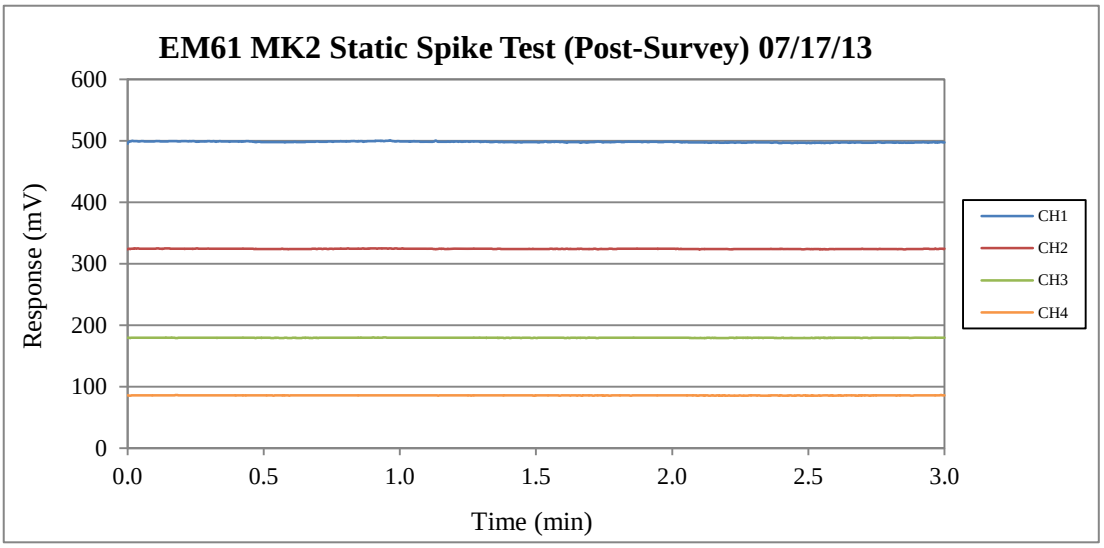

EM61 MK2 Cable Connection Test (Post-Survey) 07/16/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

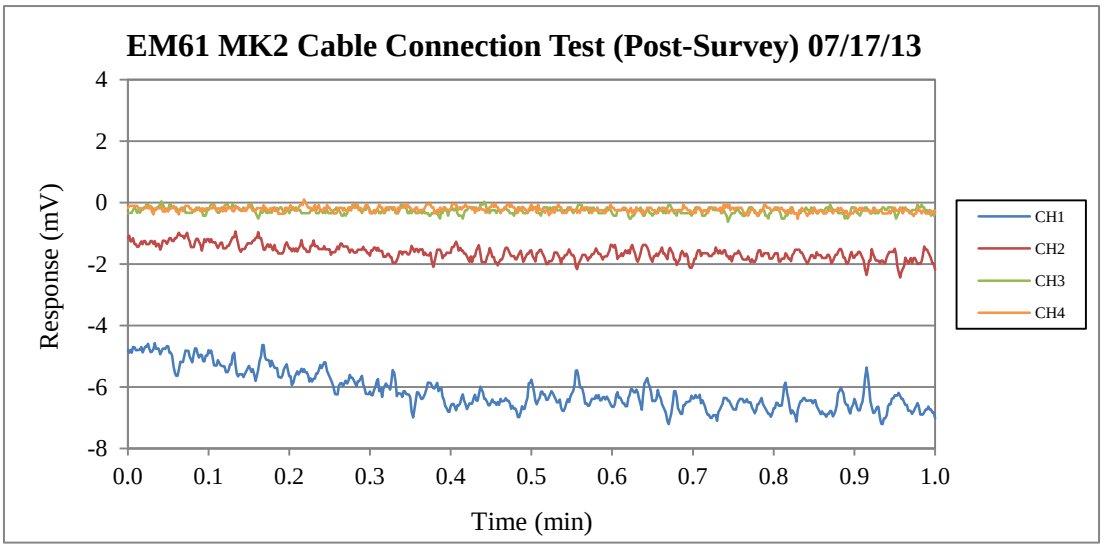

EM61 MK2 Static Background Test (Pre-Survey) 07/17/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

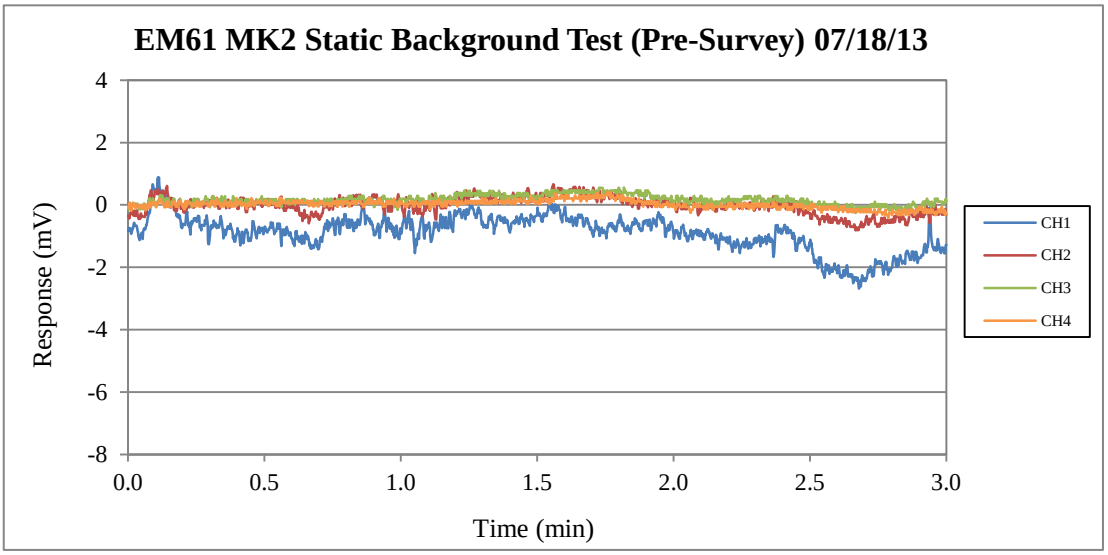

EM61 MK2 Static Spike Test (Pre-Survey) 07/17/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

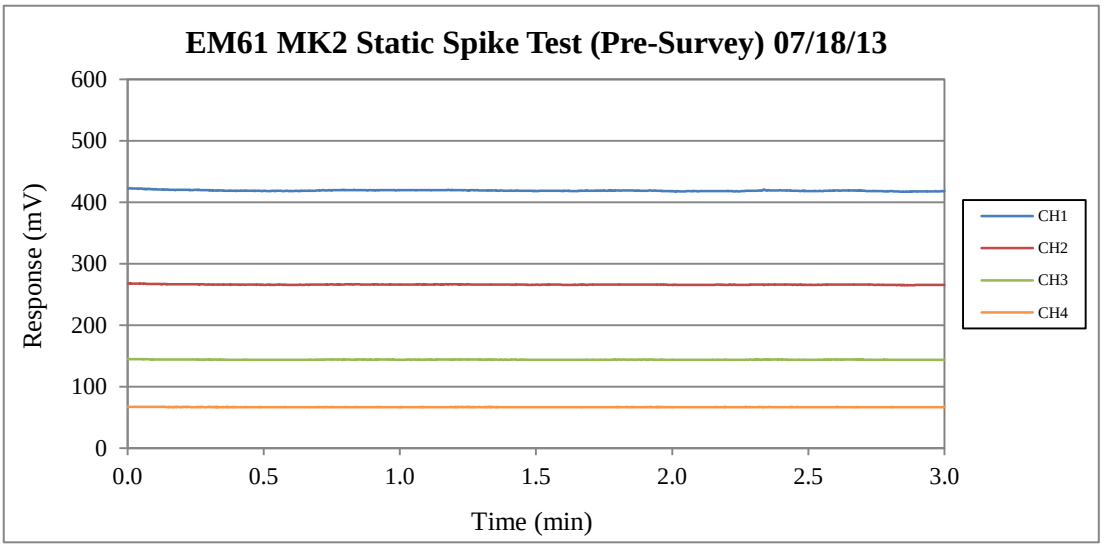

EM61 MK2 Cable Connection Test (Pre-Survey) 07/17/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

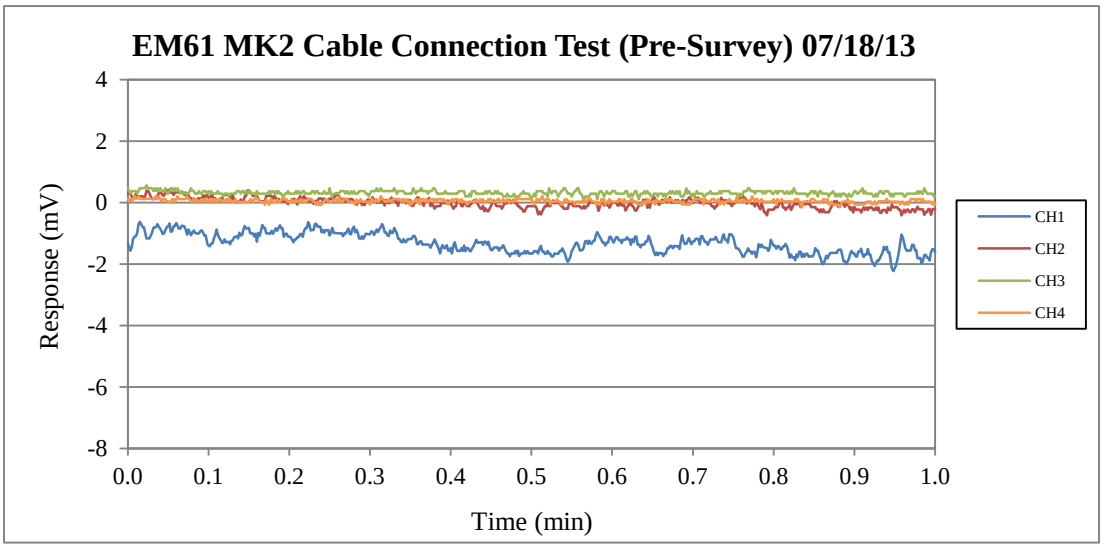

EM61 MK2 Static Background Test (Post-Survey) 07/17/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Static Spike Test (Post-Survey) 07/17/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

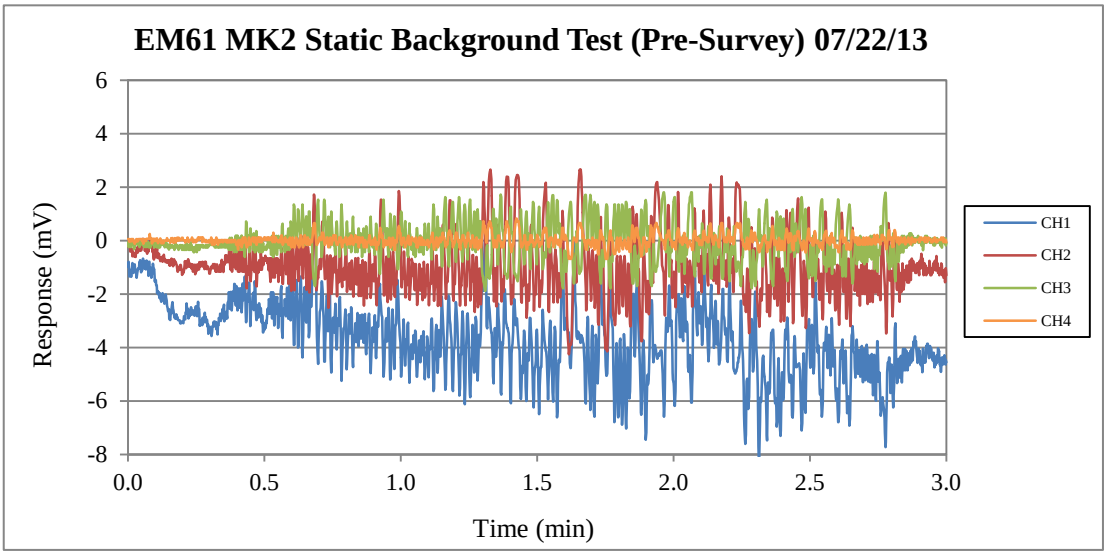

EM61 MK2 Cable Connection Test (Post-Survey) 07/17/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

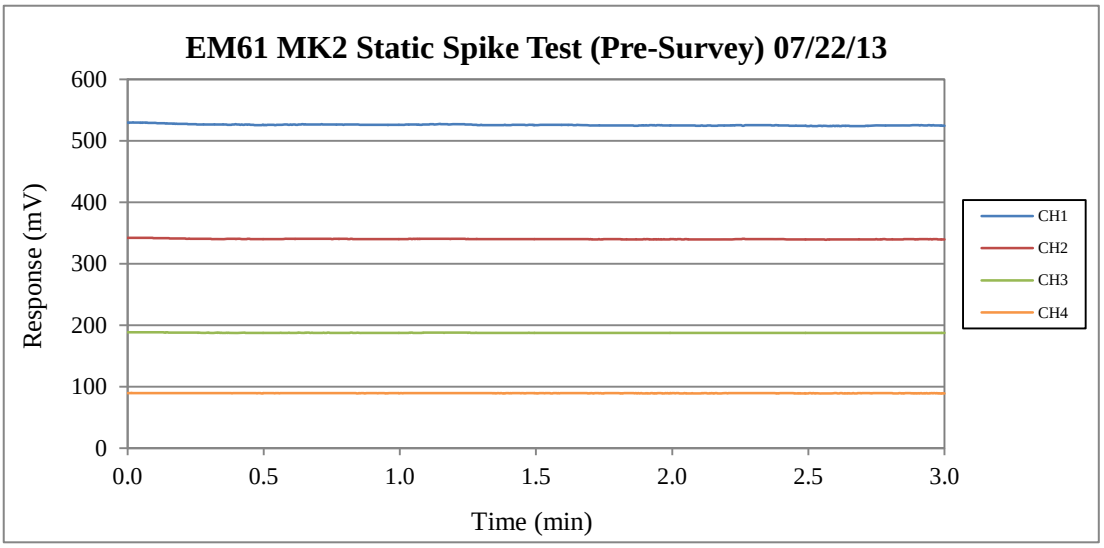


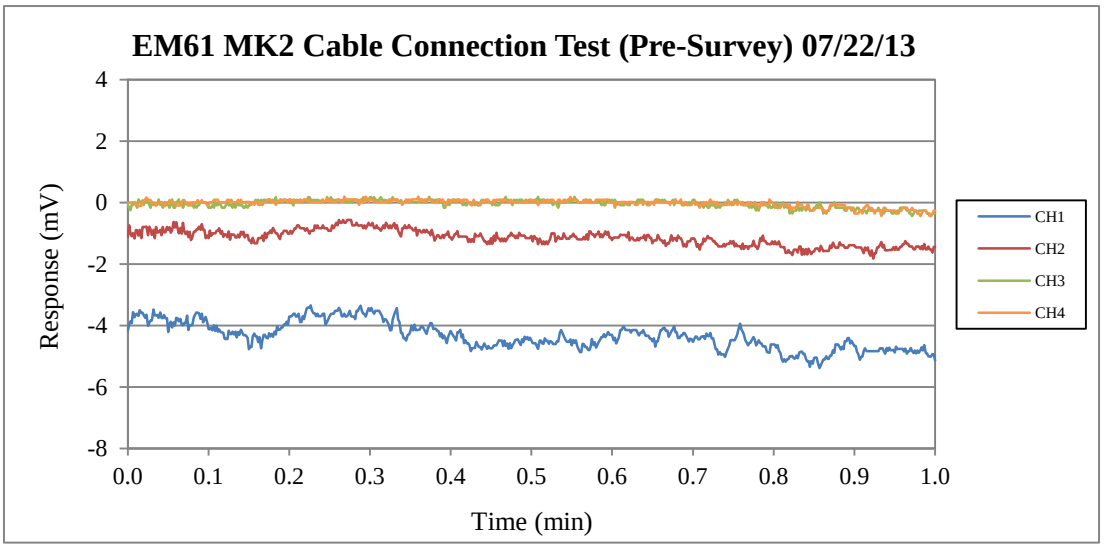


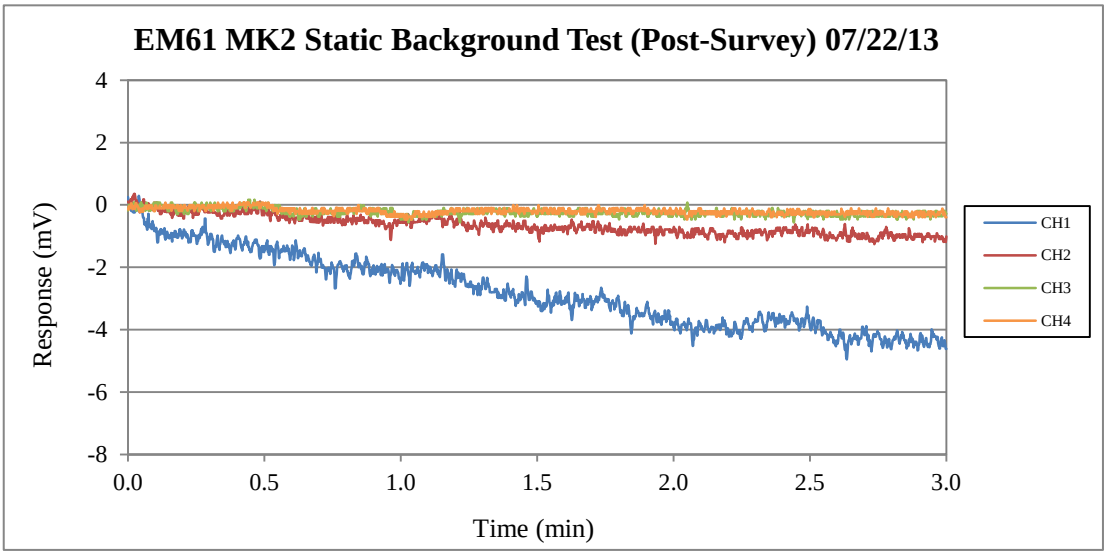


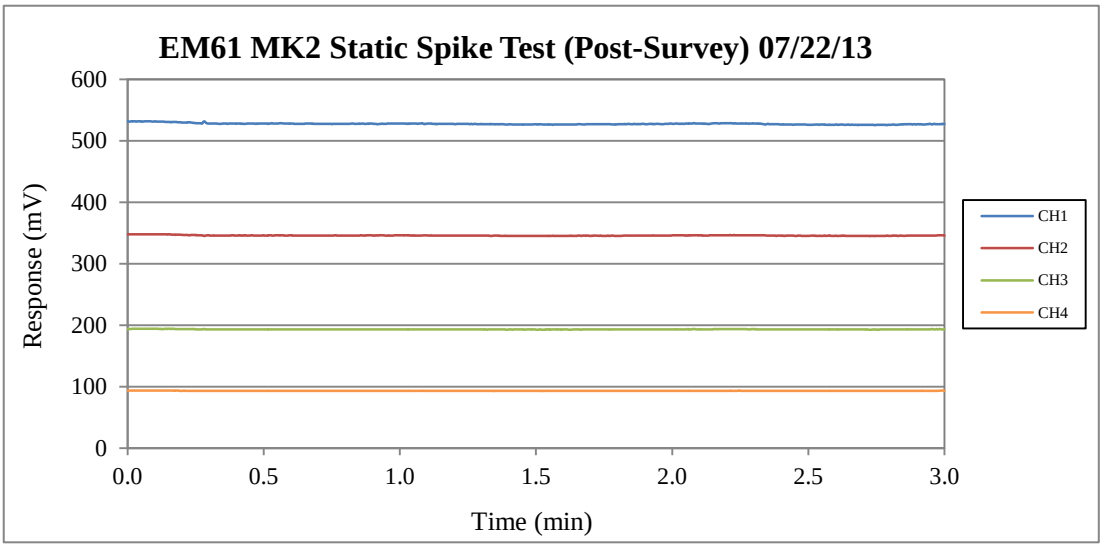
No PM data, due to the thunder storm.

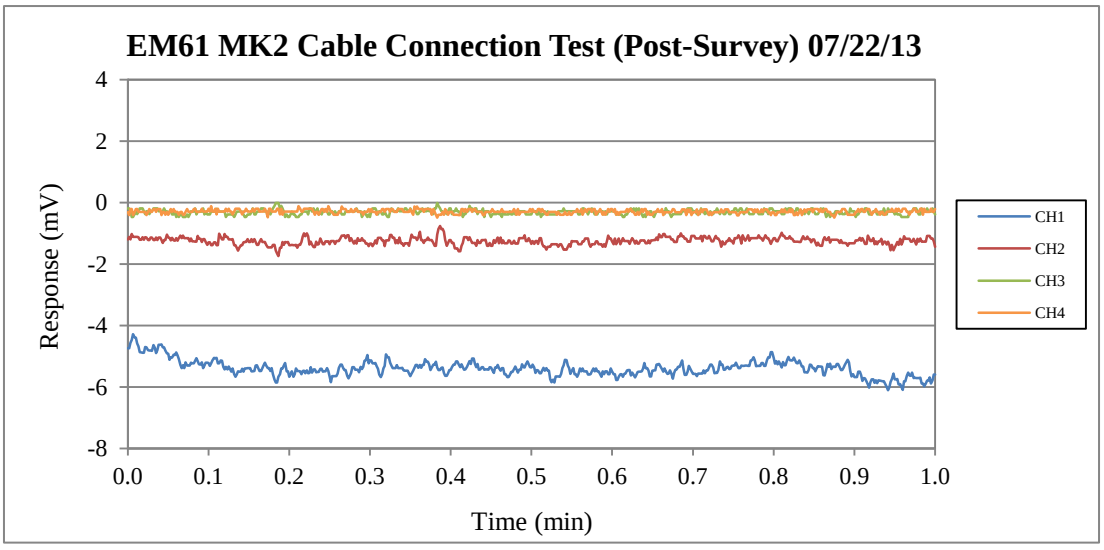

EM61 MK2 Static Background Test (Pre-Survey) 07/22/13
Response (mV)
6
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

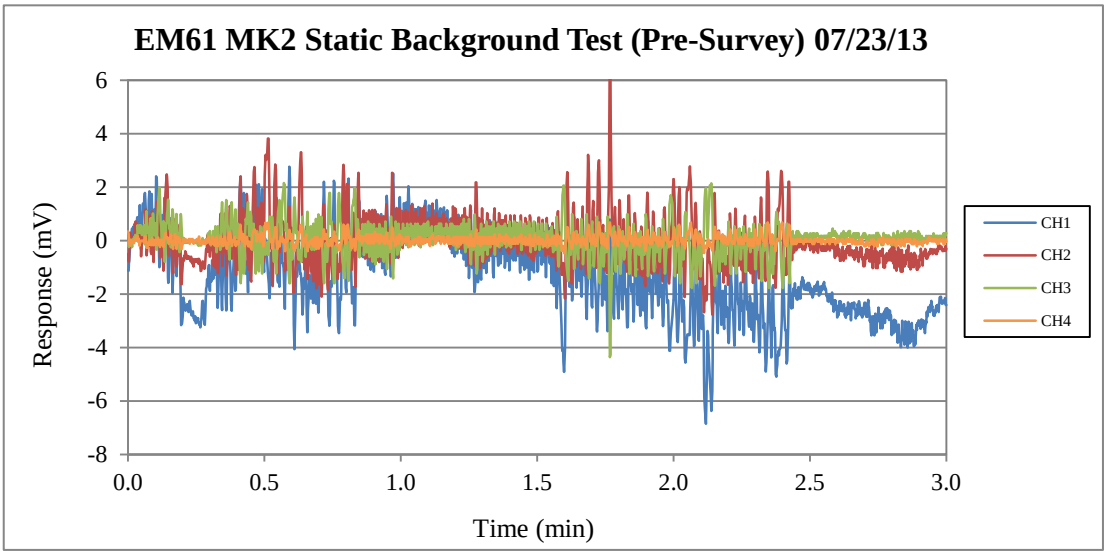

EM61 MK2 Static Spike Test (Pre-Survey) 07/22/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

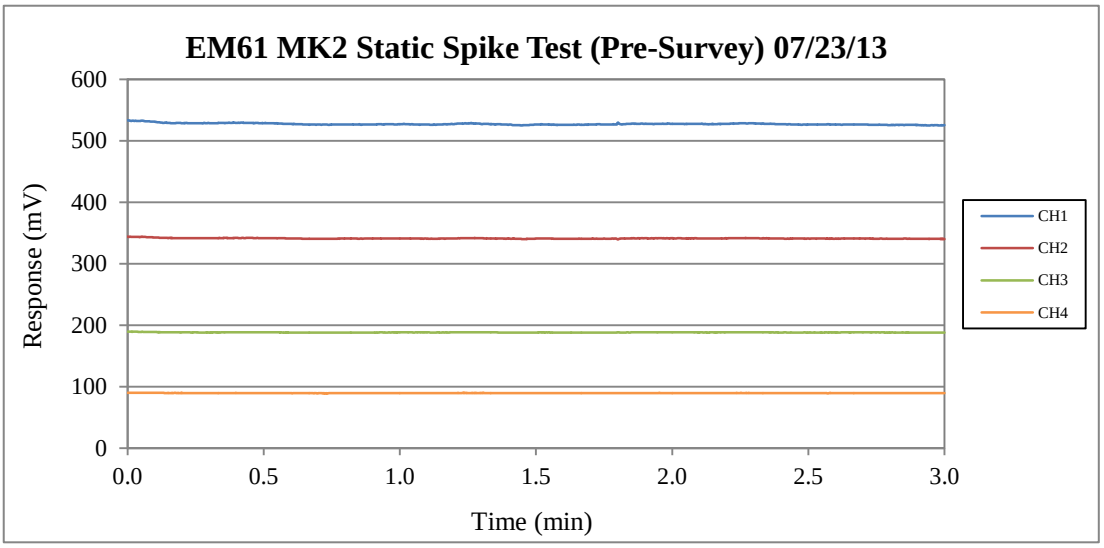

EM61 MK2 Cable Connection Test (Pre-Survey) 07/22/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

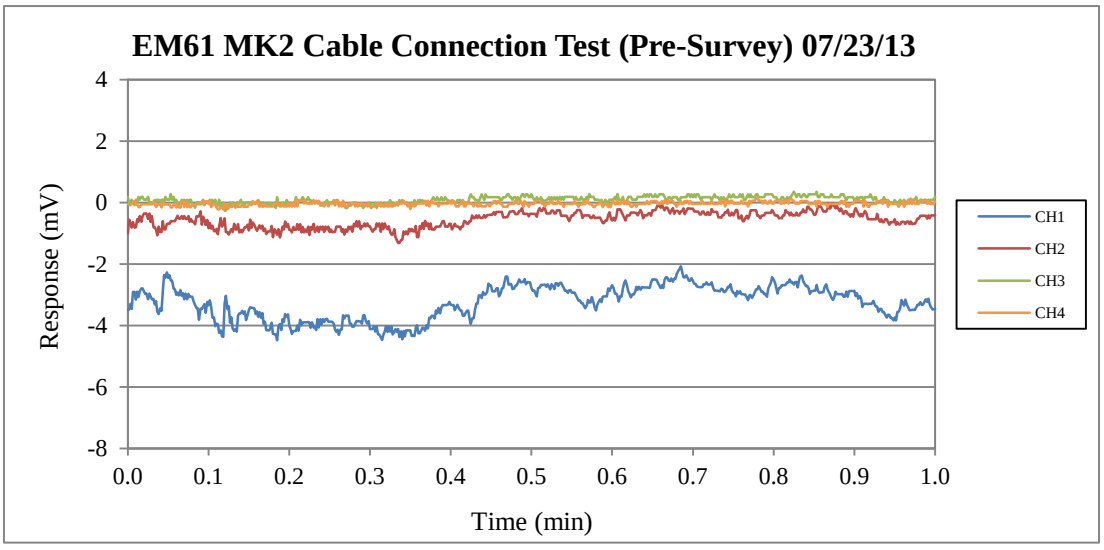

EM61 MK2 Static Background Test (Post-Survey) 07/22/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

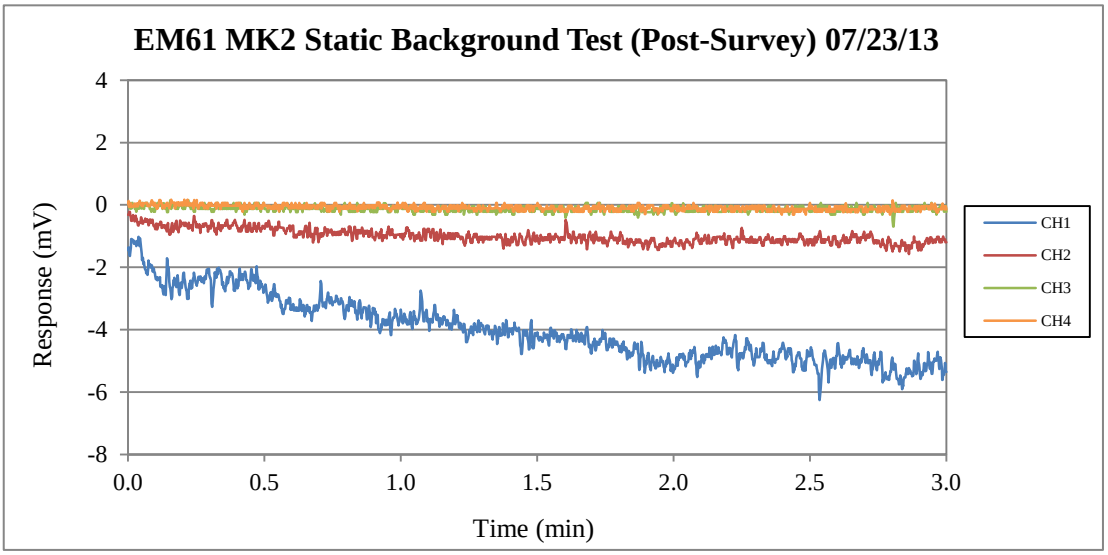

EM61 MK2 Static Spike Test (Post-Survey) 07/22/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

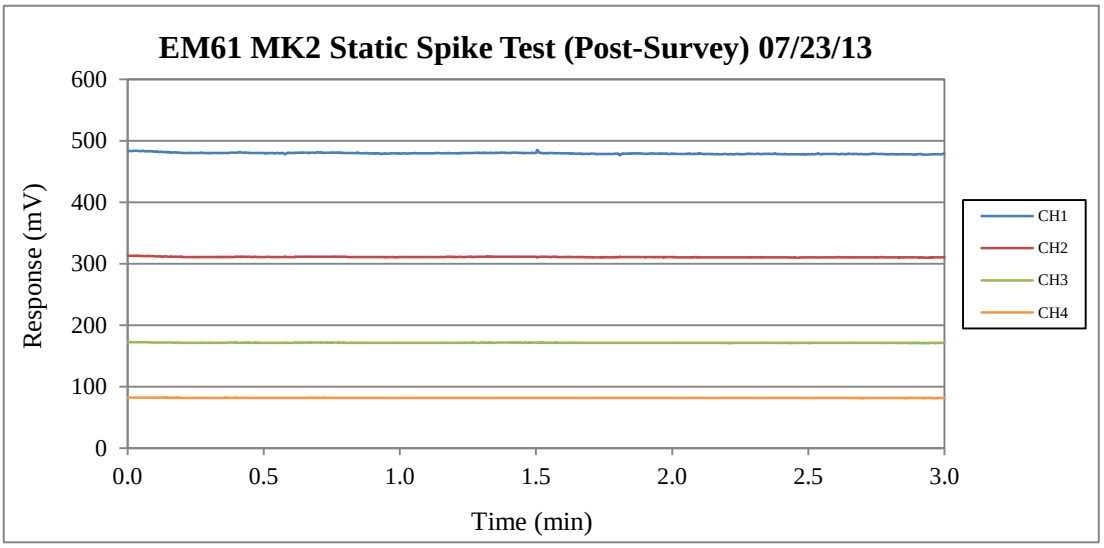

EM61 MK2 Cable Connection Test (Post-Survey) 07/22/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

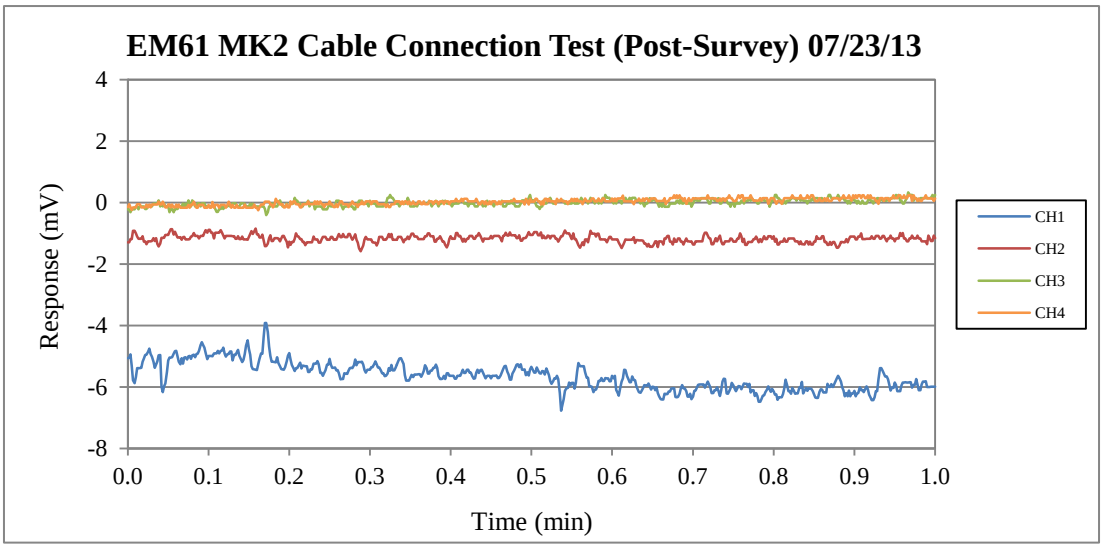

EM61 MK2 Static Background Test (Pre-Survey) 07/23/13
Response (mV)
6
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

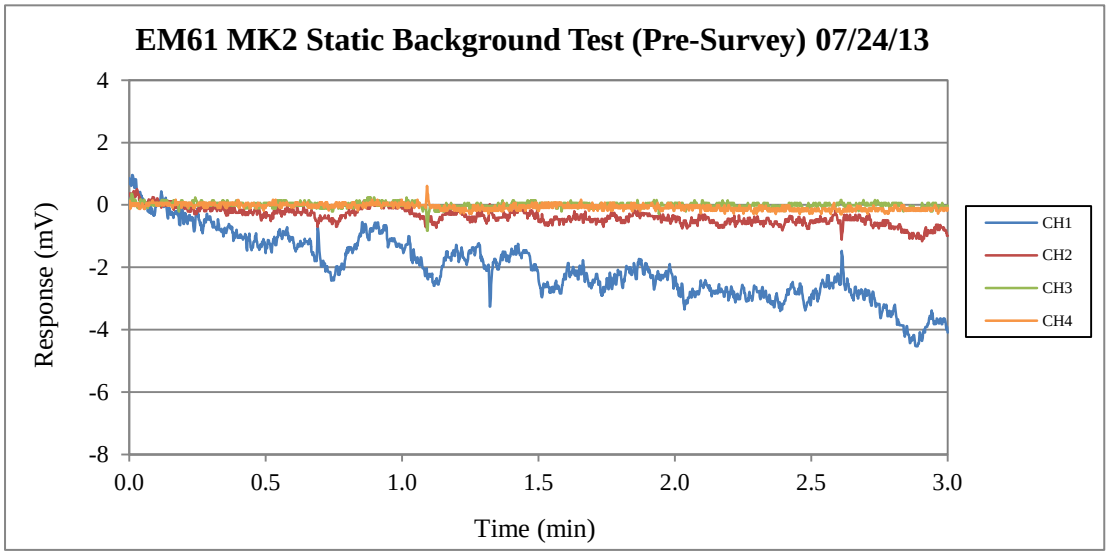

EM61 MK2 Static Spike Test (Pre-Survey) 07/23/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

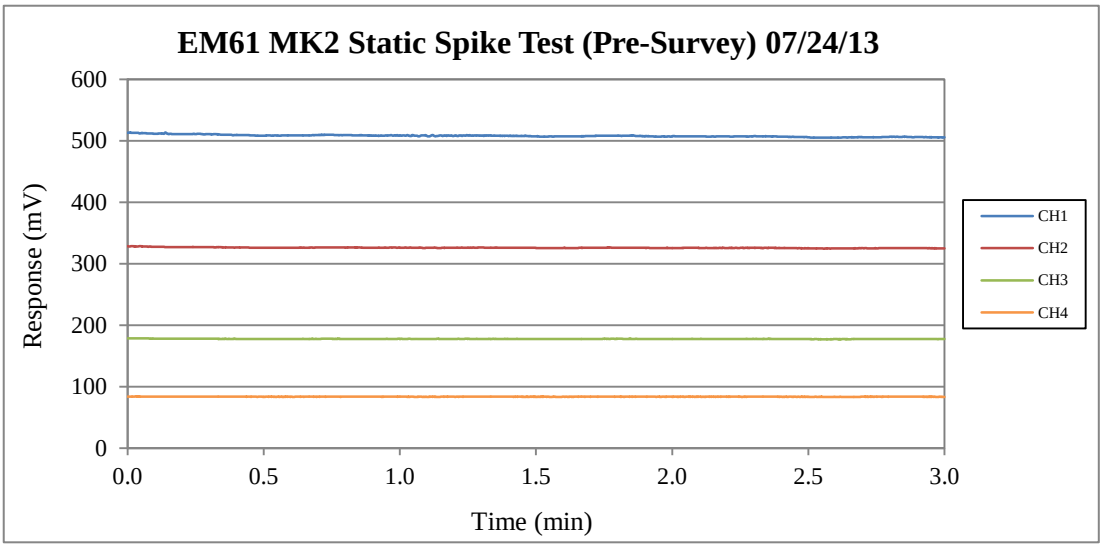

EM61 MK2 Cable Connection Test (Pre-Survey) 07/23/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

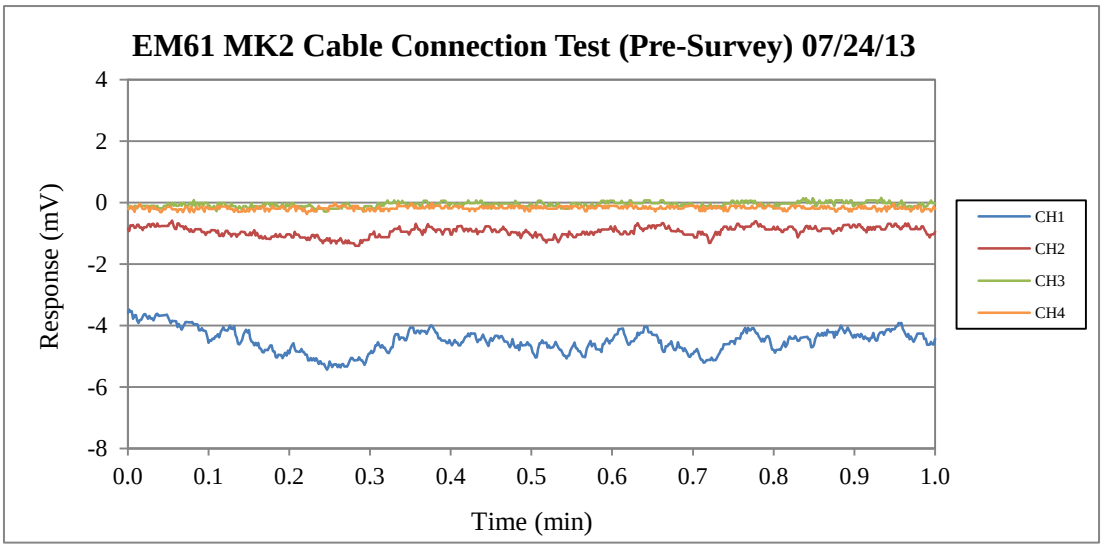

EM61 MK2 Static Background Test (Post-Survey) 07/23/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Static Spike Test (Post-Survey) 07/23/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

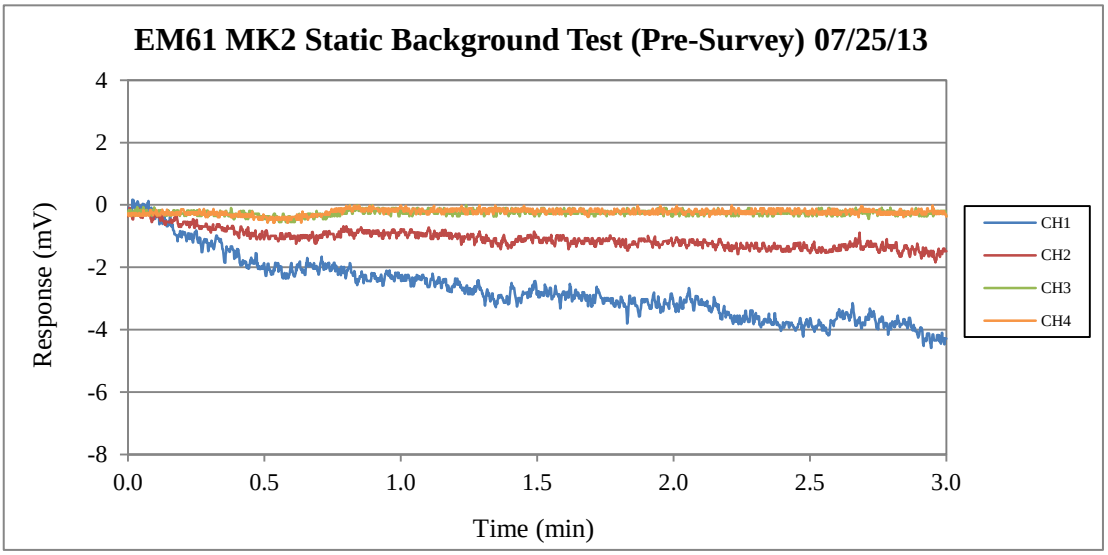

EM61 MK2 Cable Connection Test (Post-Survey) 07/23/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

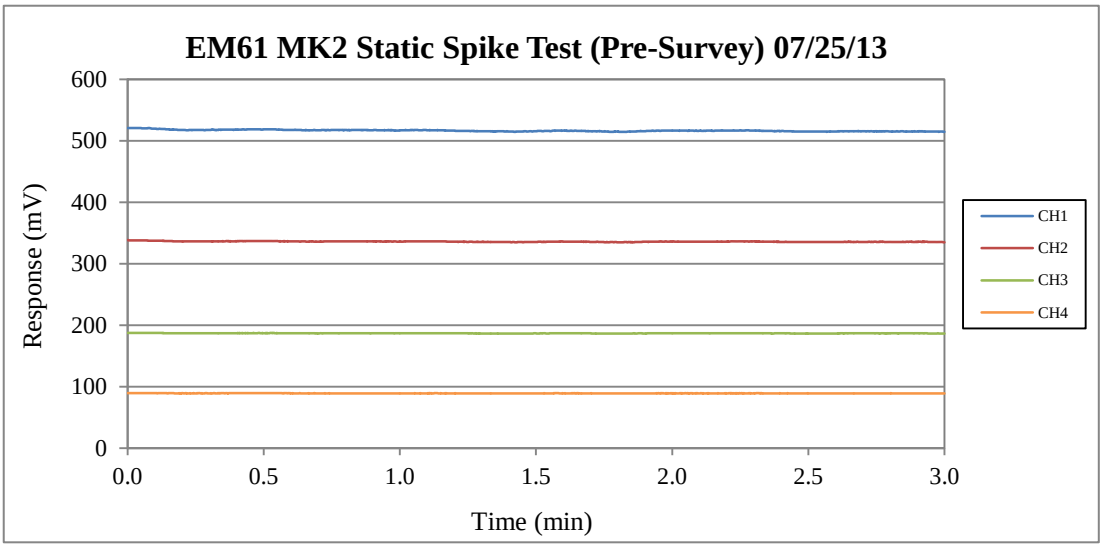


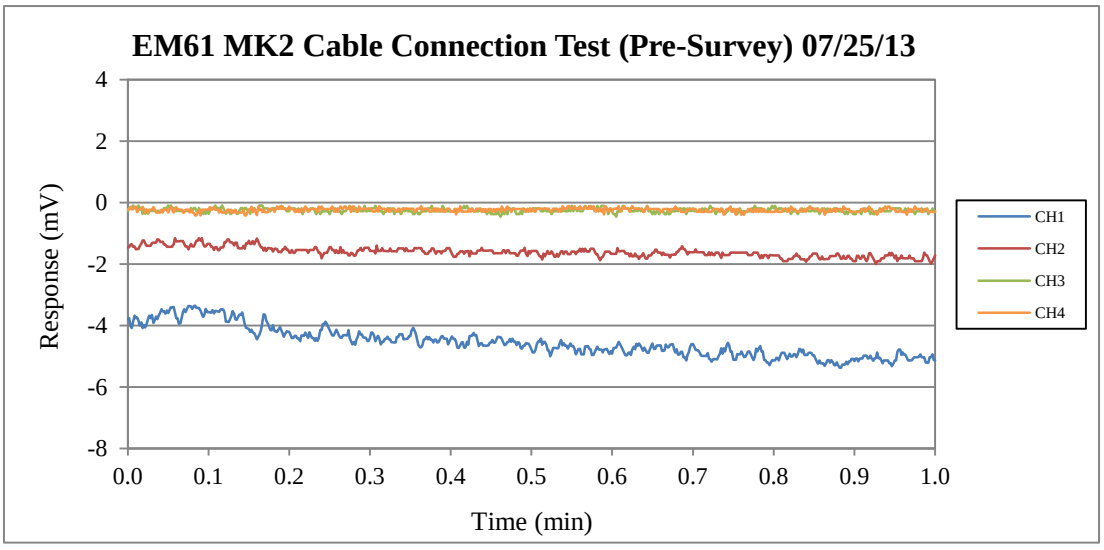


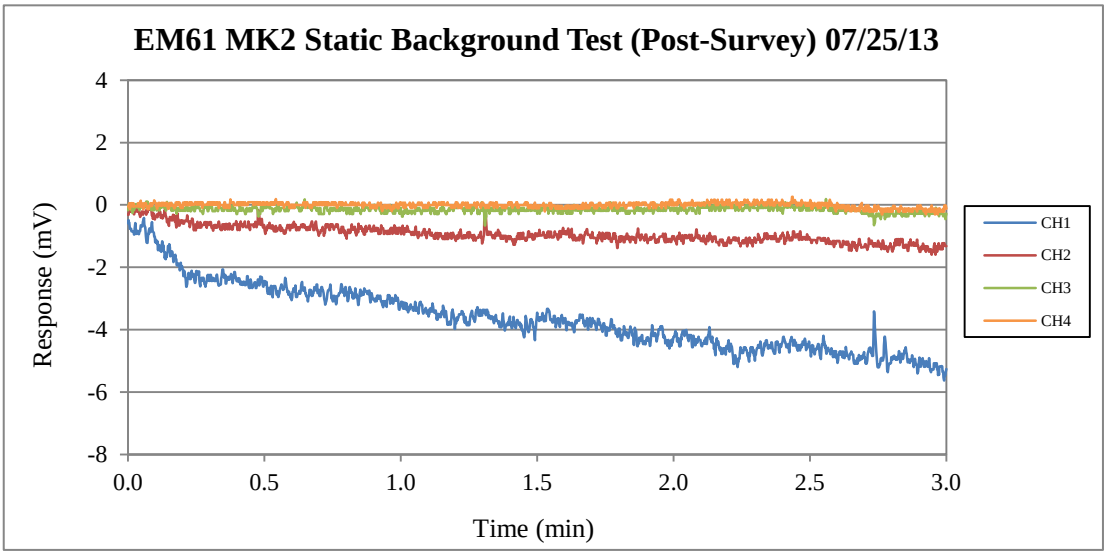


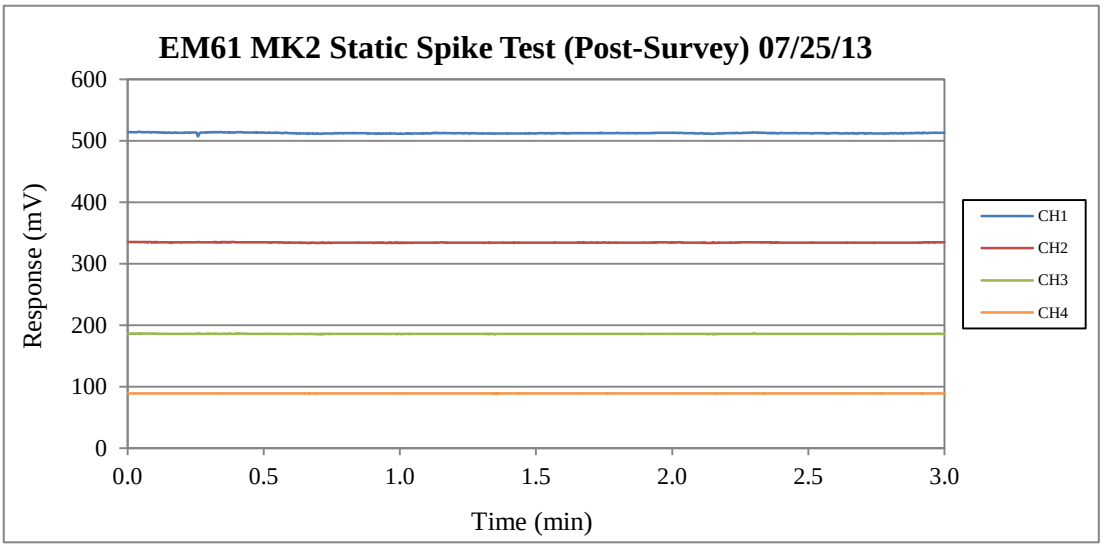
No PM data, due to the cable broken.

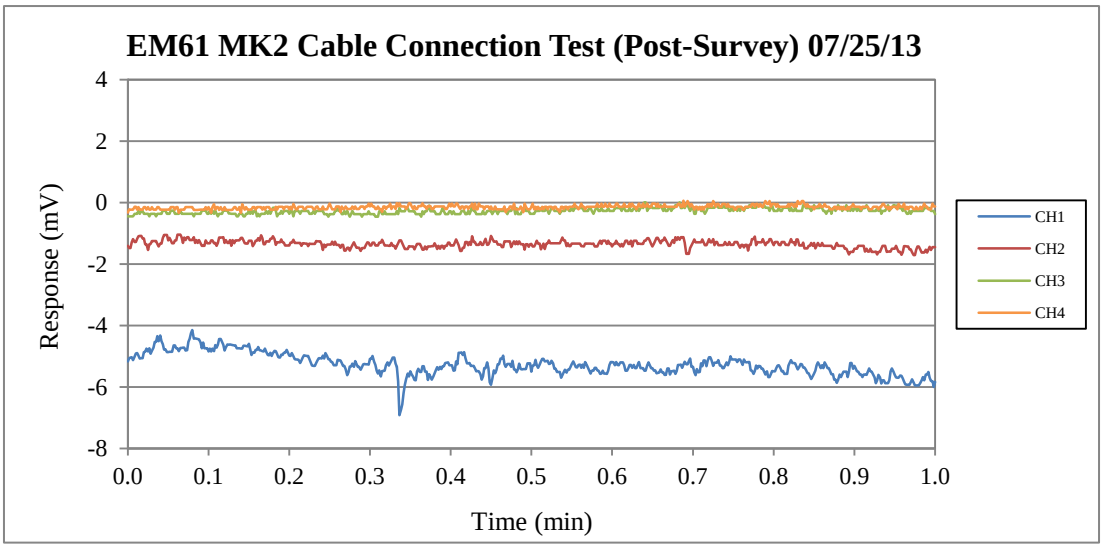

EM61 MK2 Static Background Test (Pre-Survey) 07/25/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

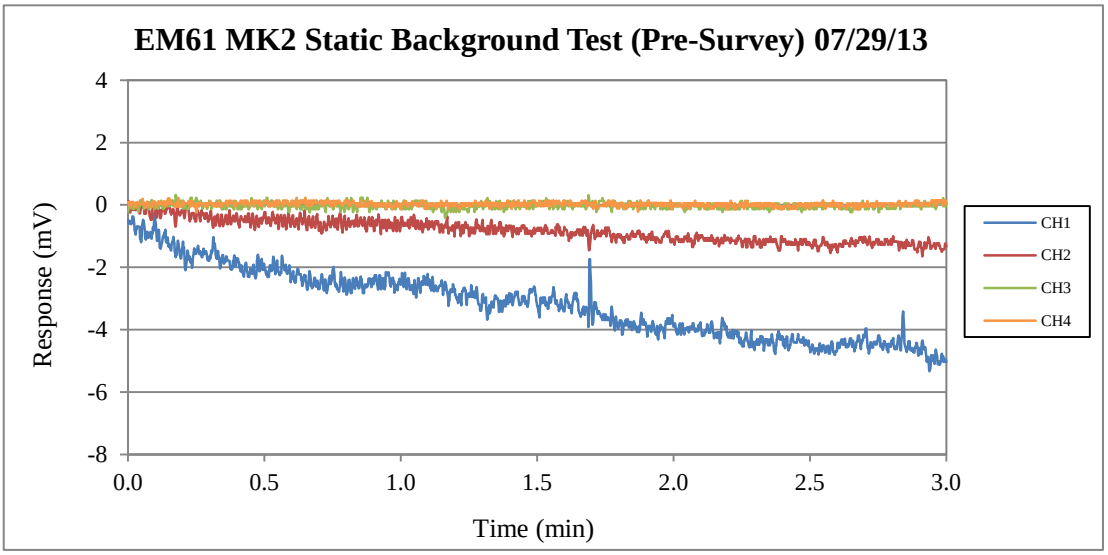

EM61 MK2 Static Spike Test (Pre-Survey) 07/25/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

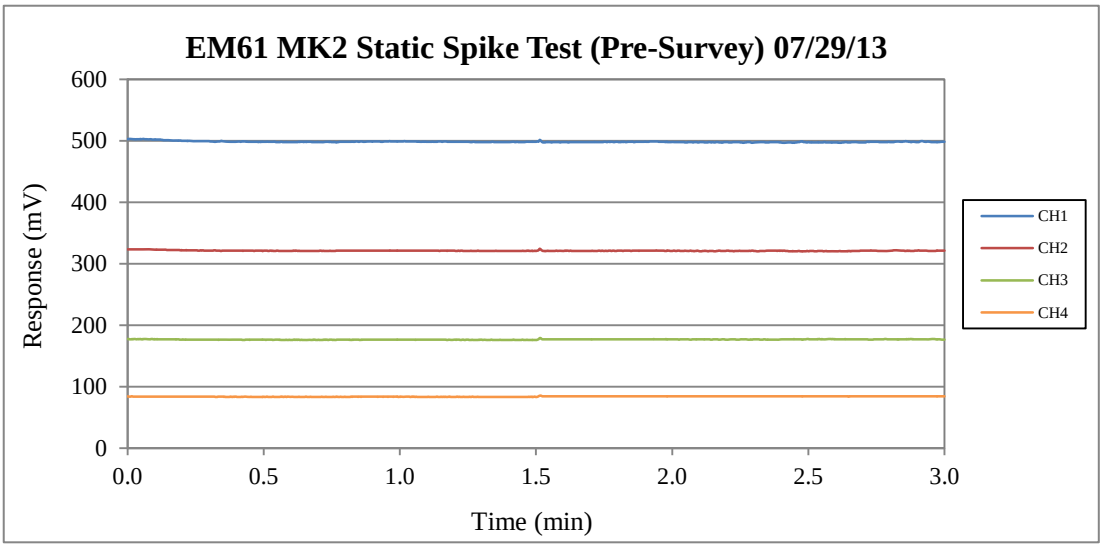

EM61 MK2 Cable Connection Test (Pre-Survey) 07/25/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

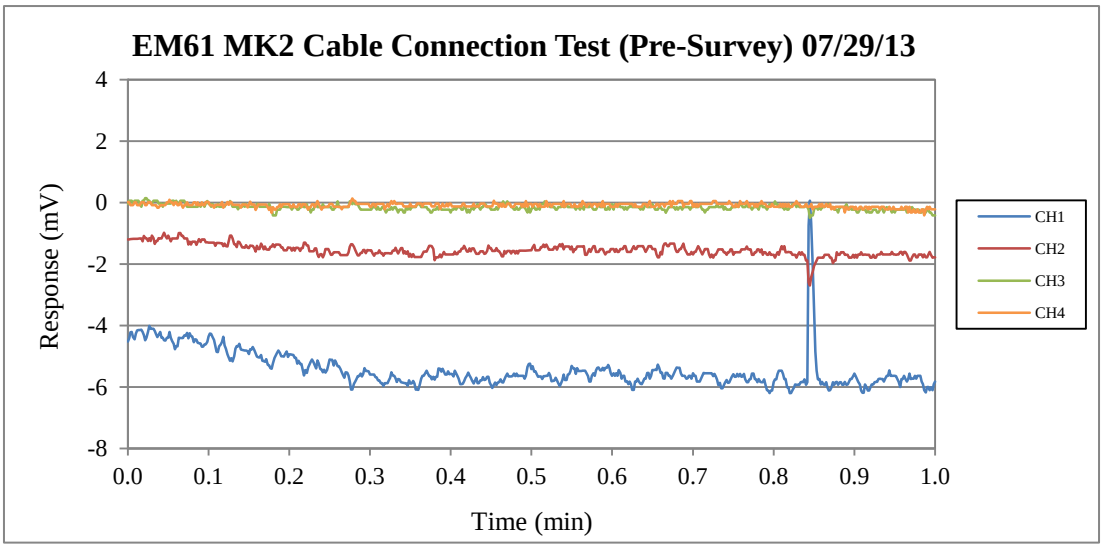

EM61 MK2 Static Background Test (Post-Survey) 07/25/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

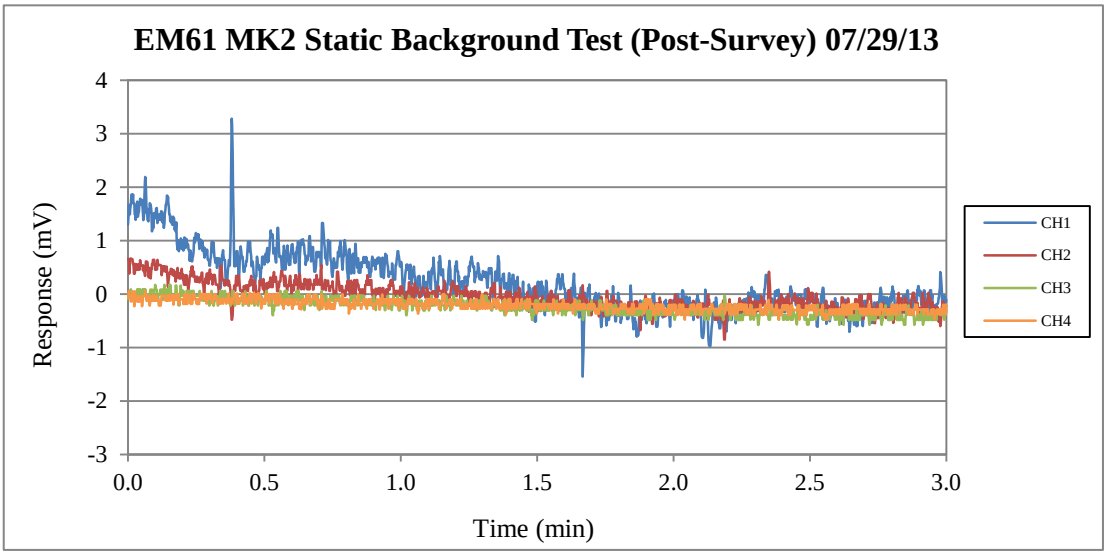

EM61 MK2 Static Spike Test (Post-Survey) 07/25/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

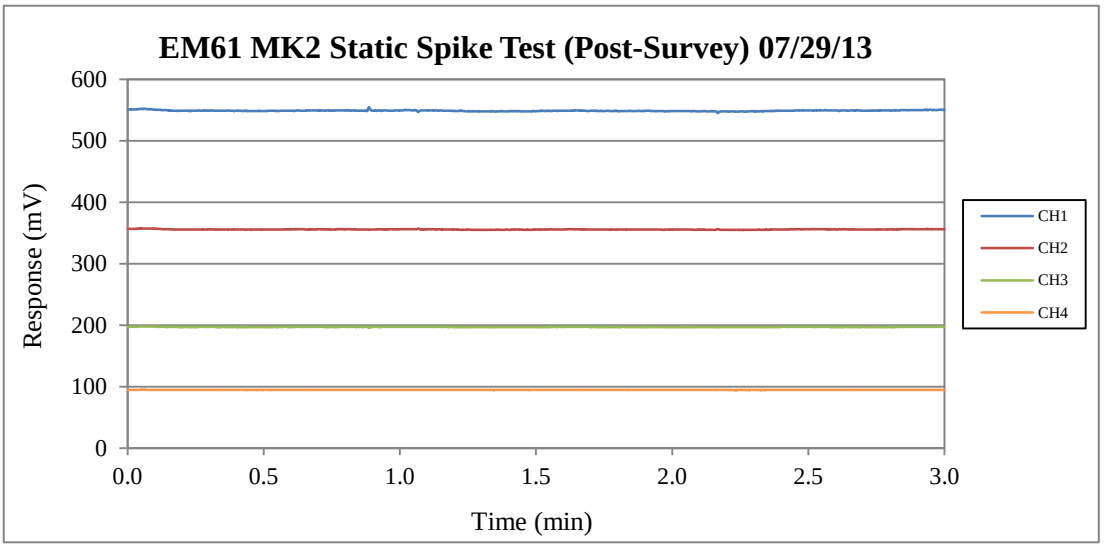

EM61 MK2 Cable Connection Test (Post-Survey) 07/25/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

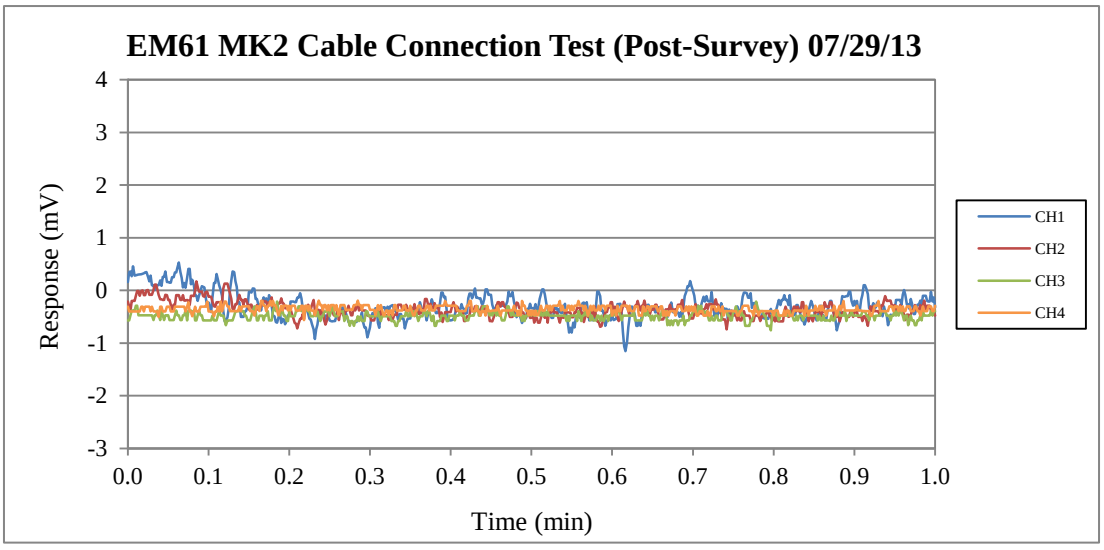

EM61 MK2 Static Background Test (Pre-Survey) 07/29/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

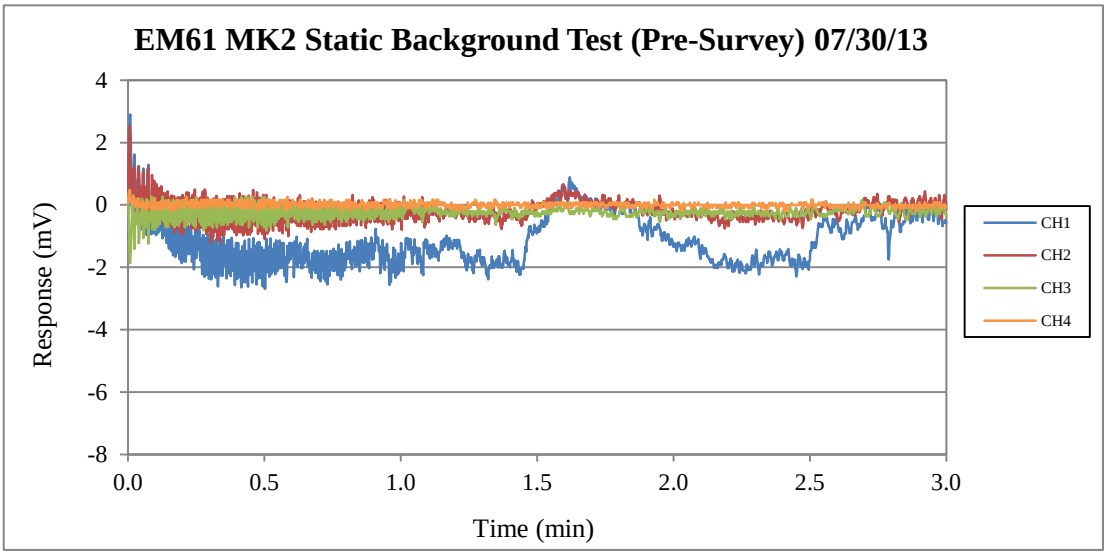

EM61 MK2 Static Spike Test (Pre-Survey) 07/29/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

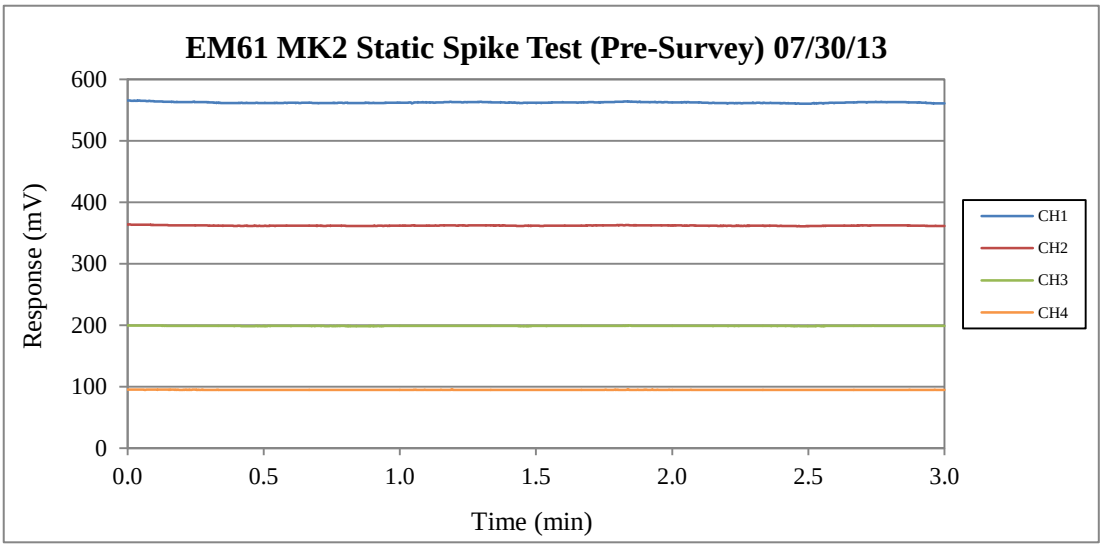

EM61 MK2 Cable Connection Test (Pre-Survey) 07/29/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

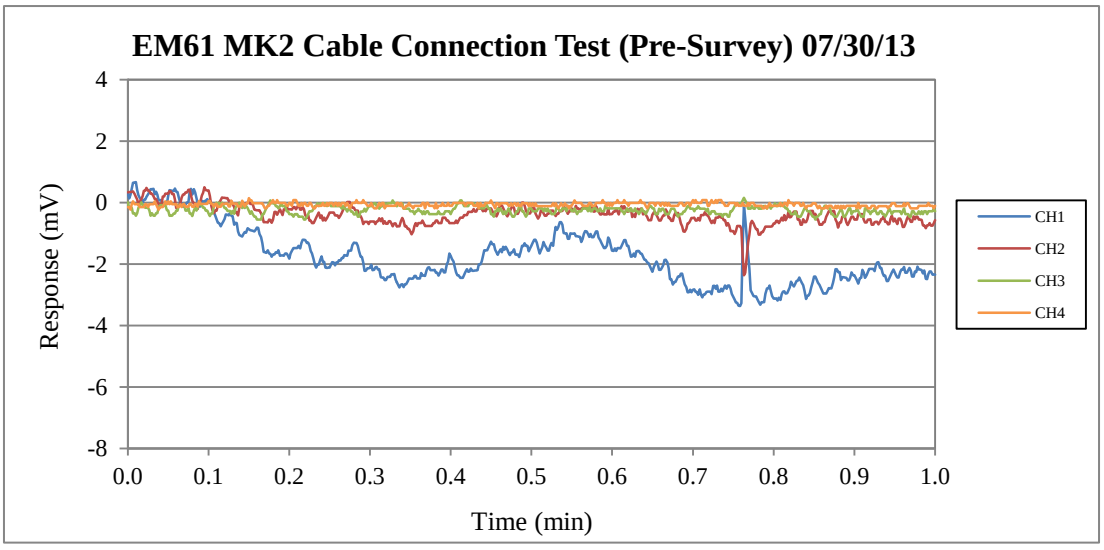

EM61 MK2 Static Background Test (Post-Survey) 07/29/13
Response (mV)
4
3
2
1
0
-1
-2
-3
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

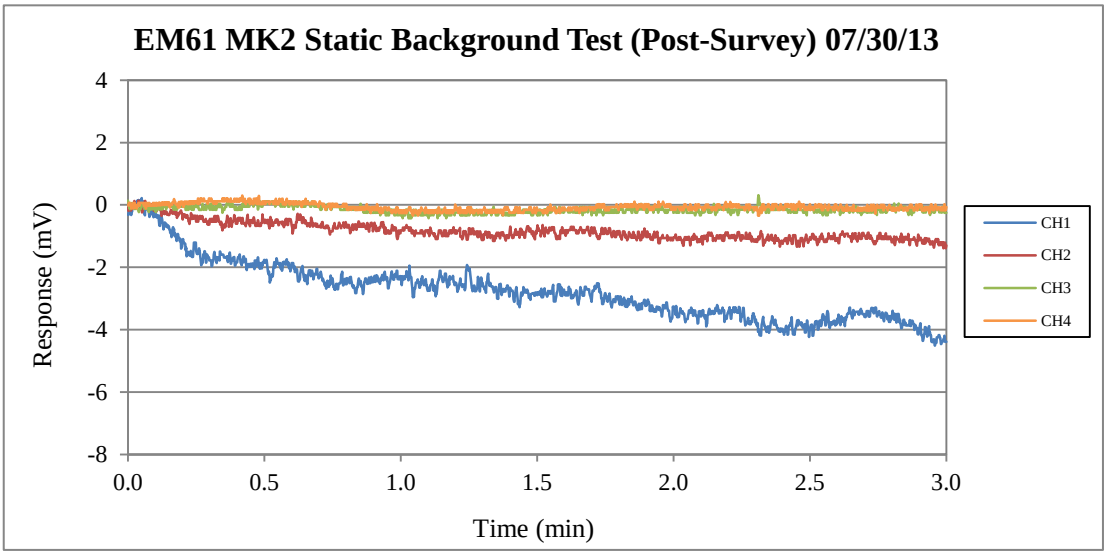

EM61 MK2 Static Spike Test (Post-Survey) 07/29/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

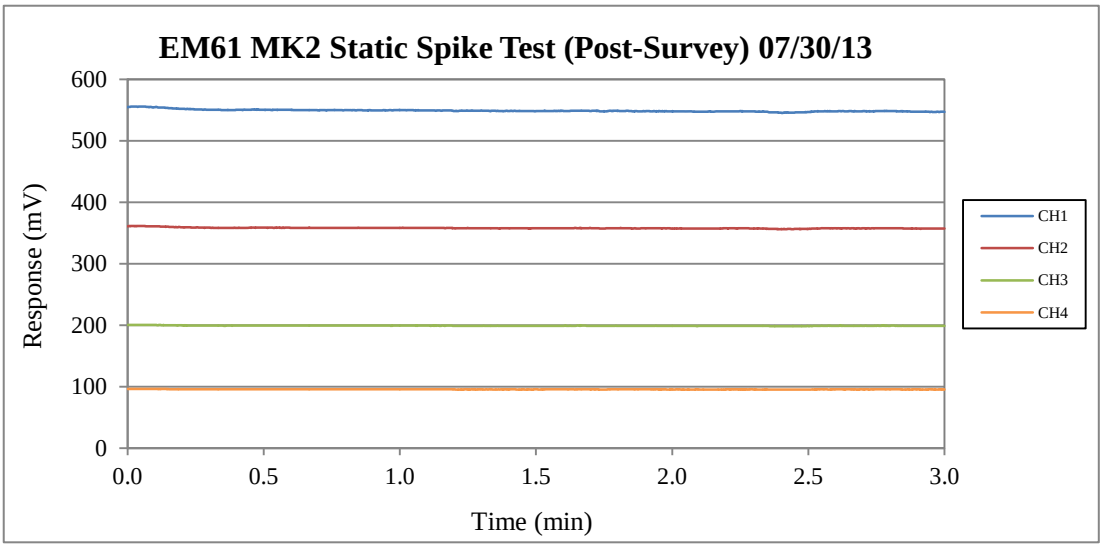

EM61 MK2 Cable Connection Test (Post-Survey) 07/29/13
Response (mV)
4
3
2
1
0
-1
-2
-3
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

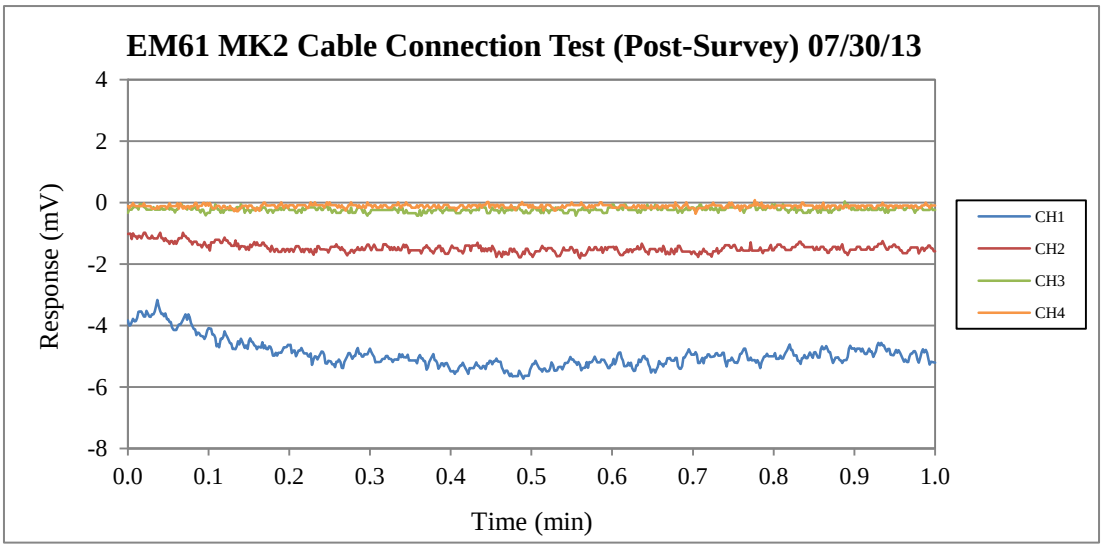

EM61 MK2 Static Background Test (Pre-Survey) 07/30/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Static Spike Test (Pre-Survey) 07/30/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

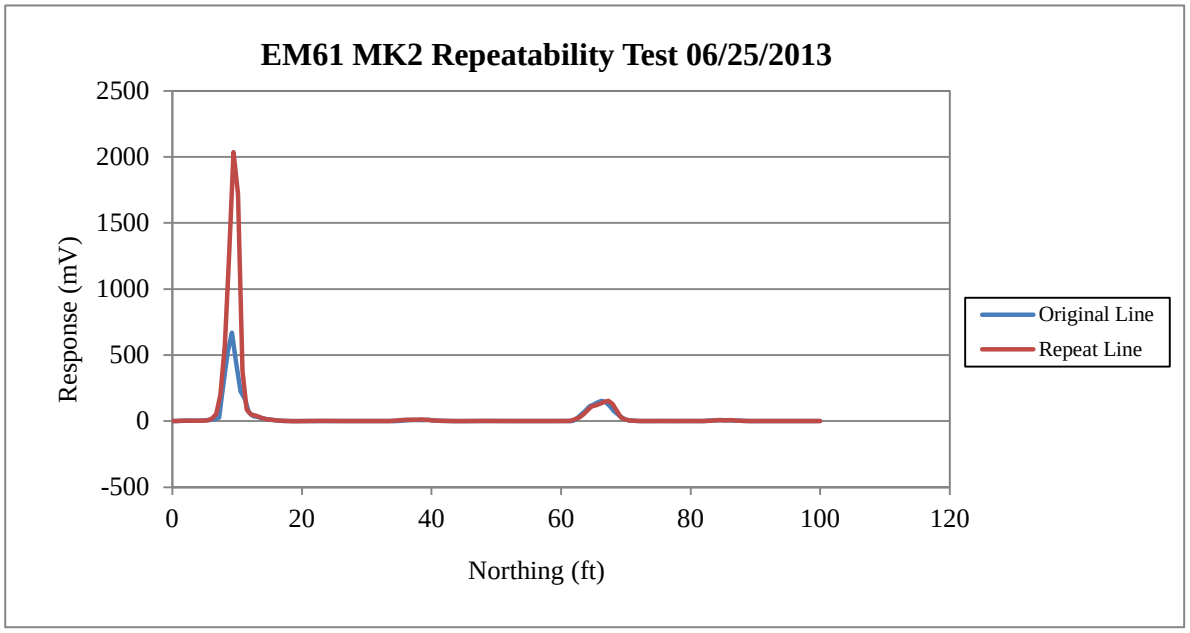

EM61 MK2 Cable Connection Test (Pre-Survey) 07/30/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Static Background Test (Post-Survey) 07/30/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

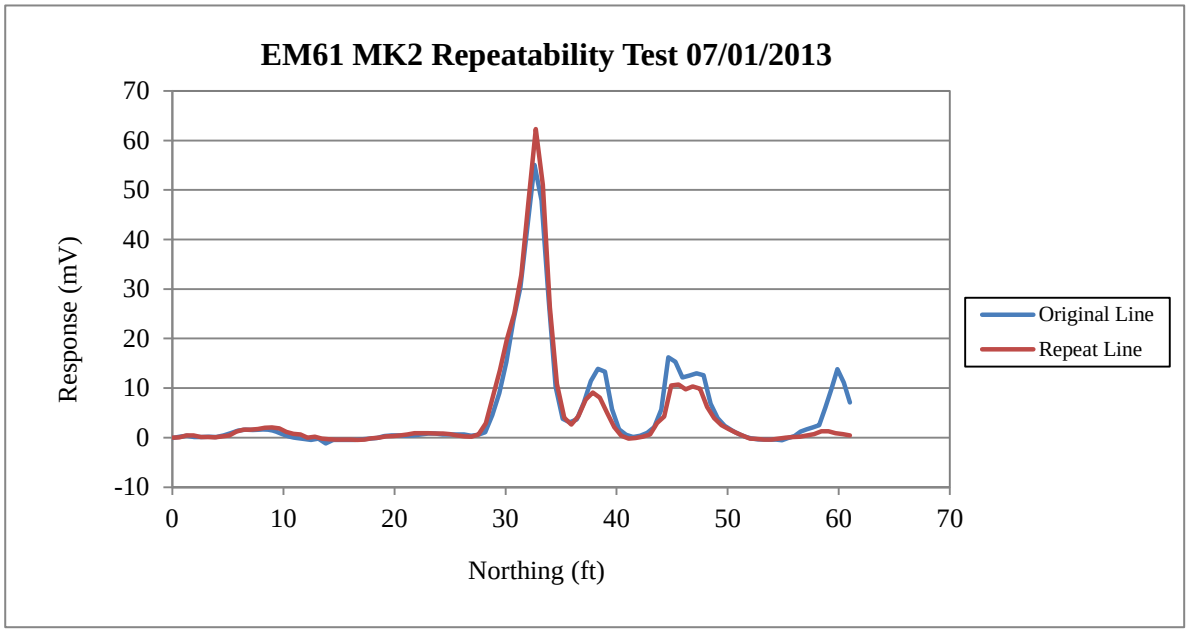

EM61 MK2 Static Spike Test (Post-Survey) 07/30/13
Response (mV)
600
500
400
300
200
100
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Cable Connection Test (Post-Survey) 07/30/13
Response (mV)
4
2
0
-2
-4
-6
-8
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4

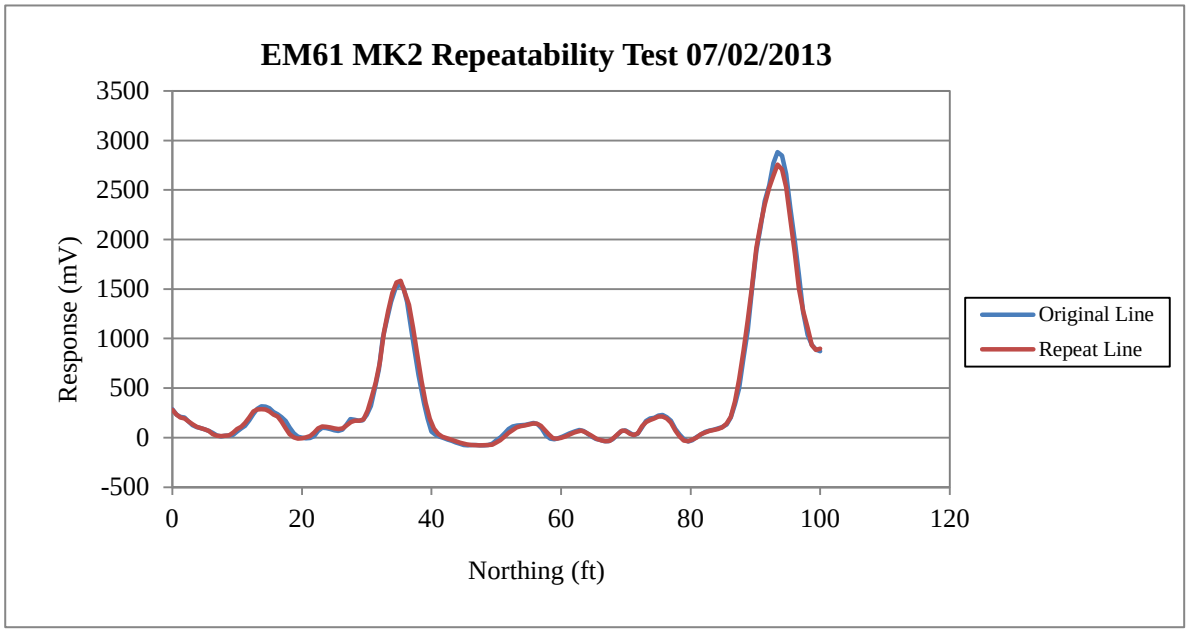
Curtis Bay, June - July 2013



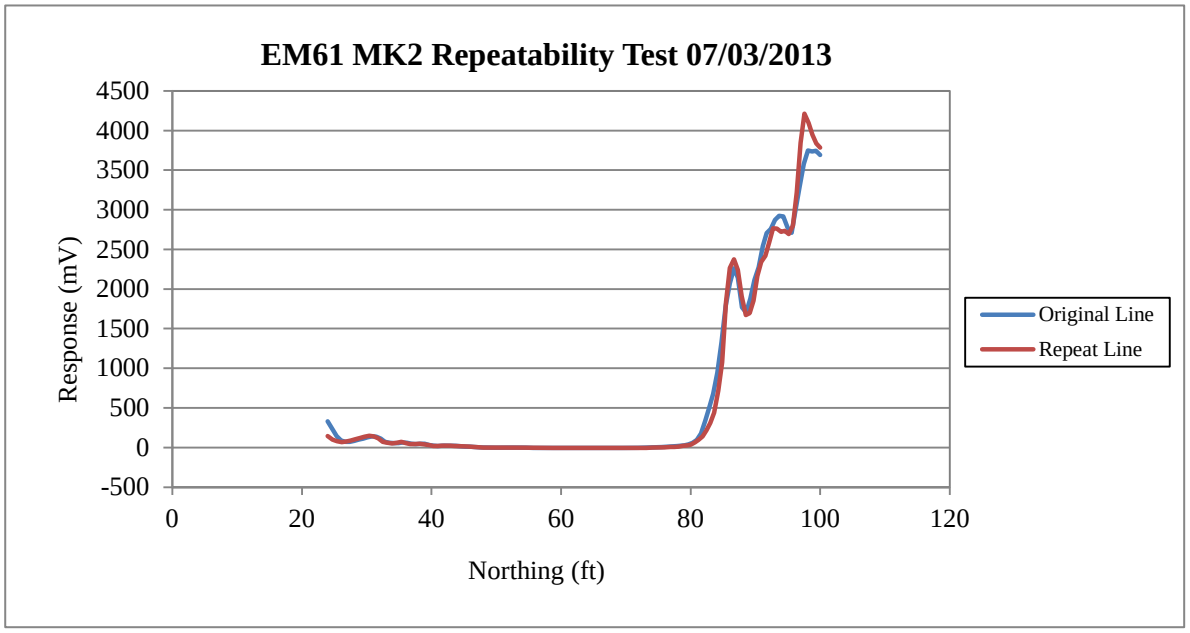
Curtis Bay, June - July 2013



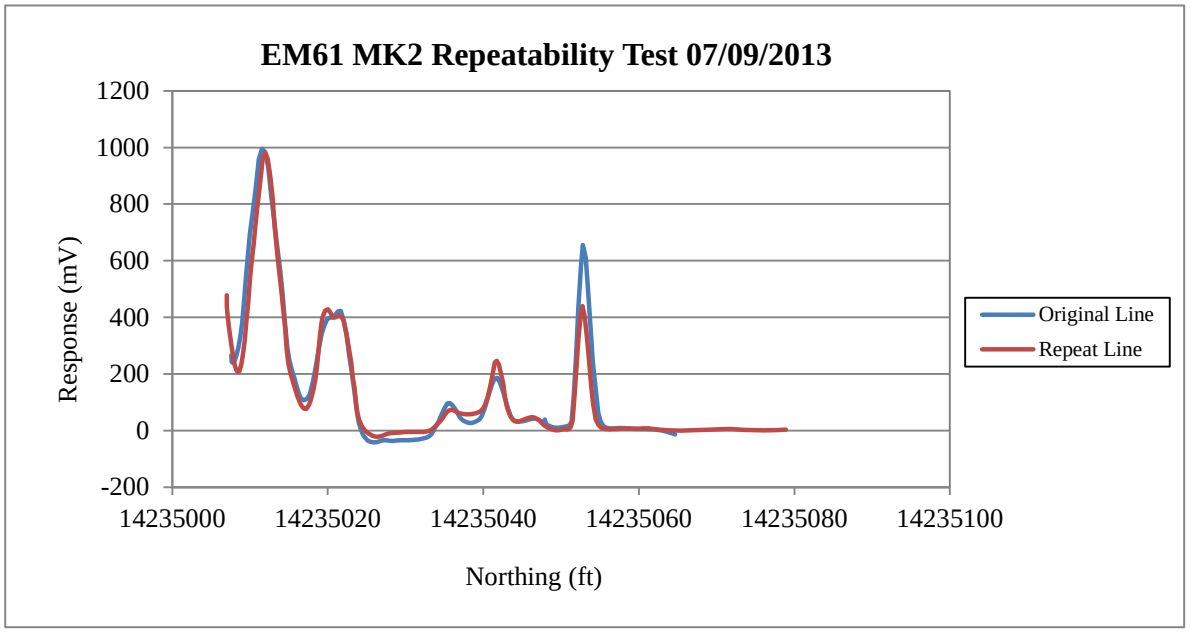
Curtis Bay, June - July 2013



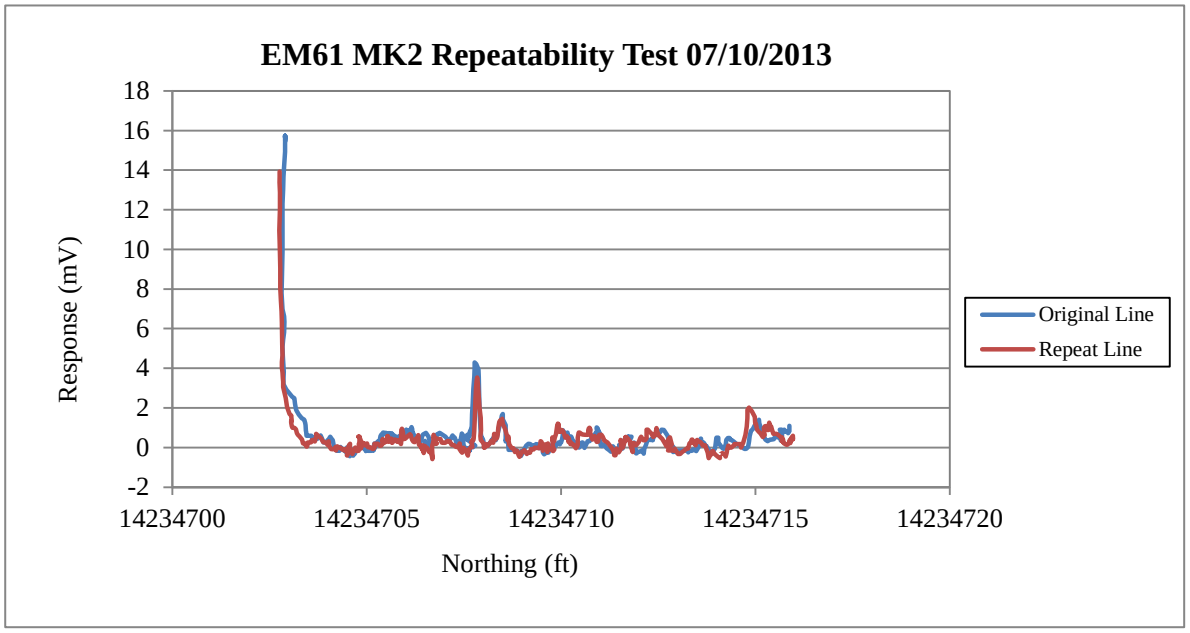
Curtis Bay, June - July 2013

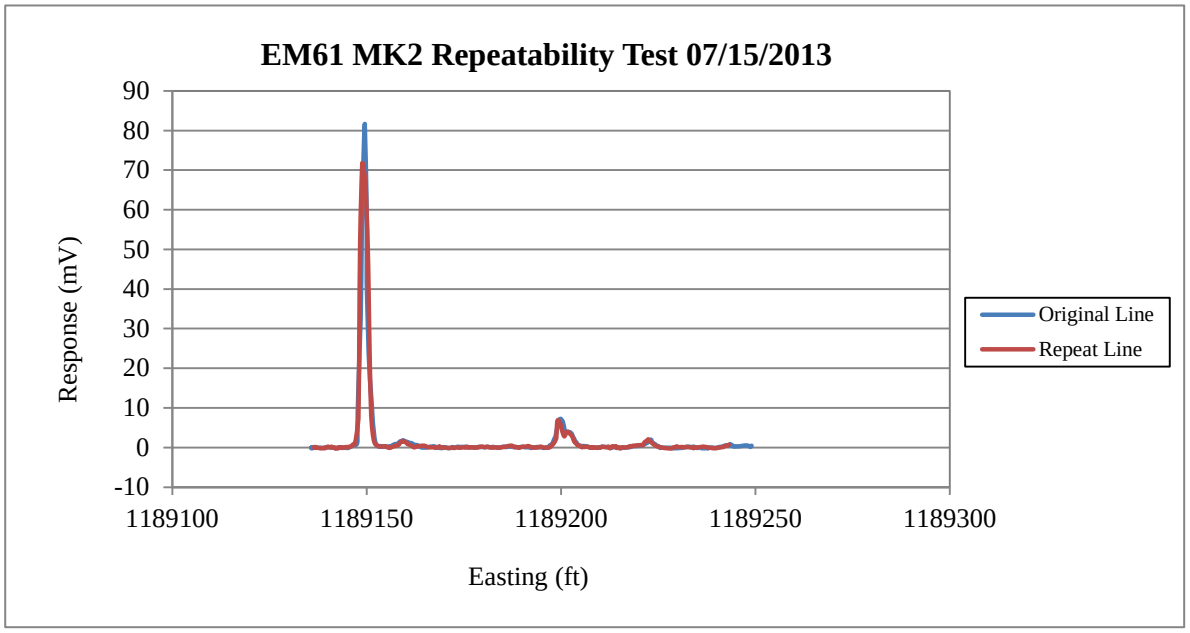


Curtis Bay, June - July 2013

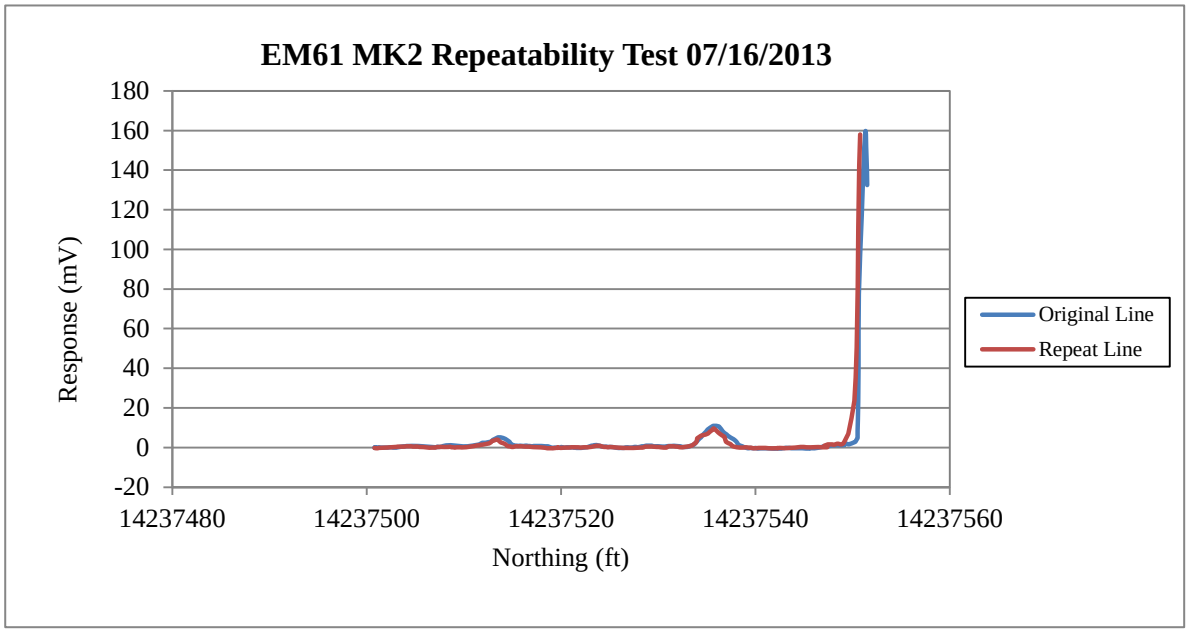


Curtis Bay, June - July 2013

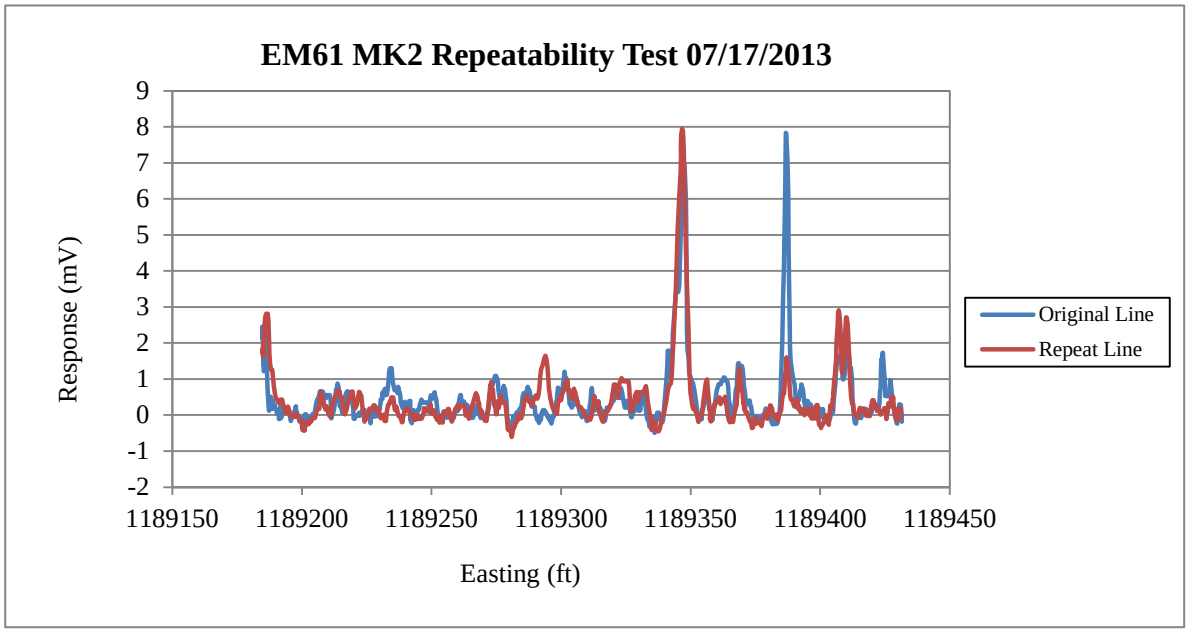



EM61 MK2 Repeatability Test 07/15/2013
Response (mV)
90
80
70
60
50
40
30
20
10
0
-10
1189100
1189150
1189200
1189250
1189300
Easting (ft)
Original Line
Repeat Line

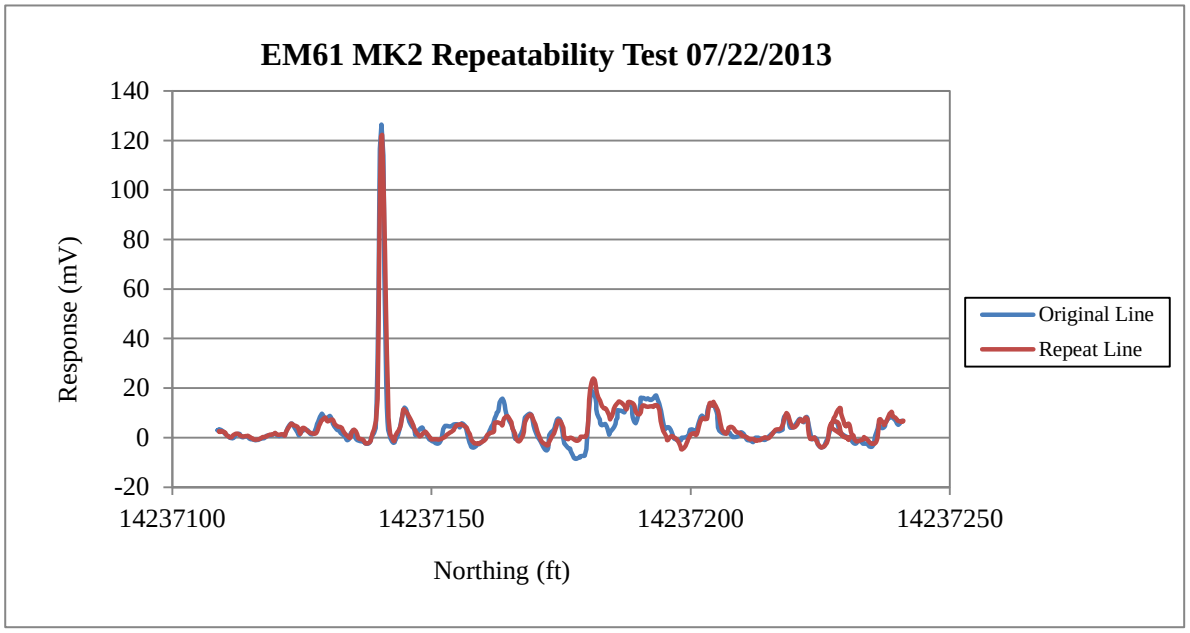
Curtis Bay, June - July 2013



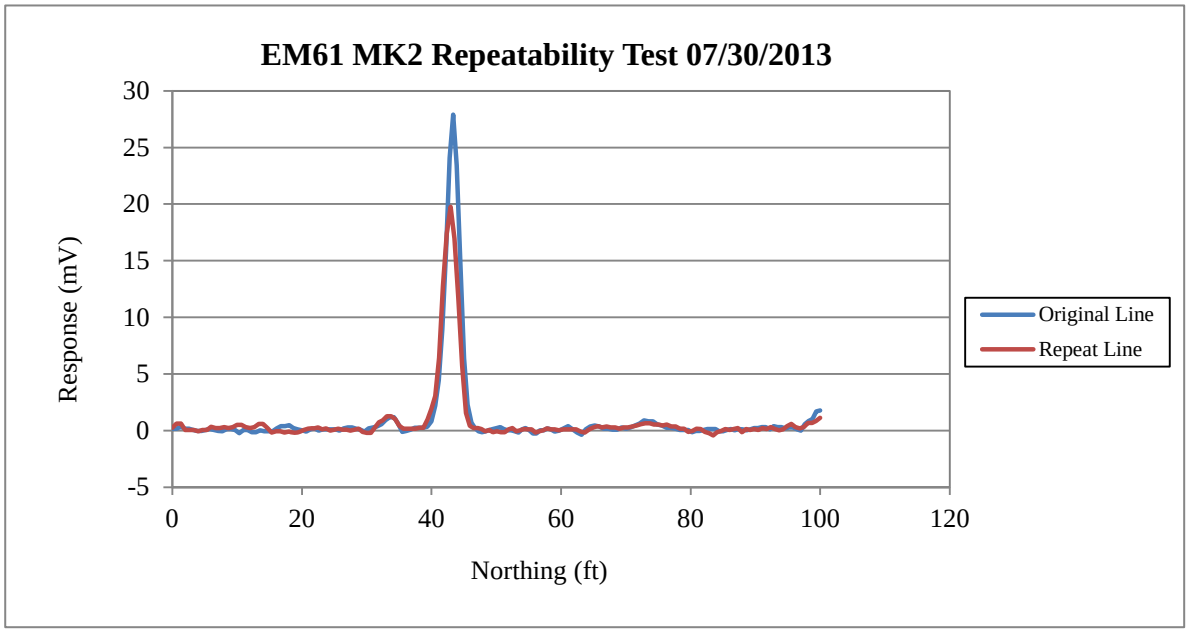
Curtis Bay, June - July 2013



Curtis Bay, June - July 2013



Curtis Bay, June - July 2013



Curits Bay DAILY ACTIVITIES REPORT		DATE:	1-Aug-2013
CONTRACT: USACE/[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156		

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	9		
[redacted]	Tech II	9		
[redacted]	Tech II	9		
[redacted]	Tech I	9		
[redacted]	Tech I	9		
[redacted]	GEO	9		
[redacted]	GEO	3		
[redacted]	Soil Sampling	10		
[redacted]	USACOE	8		
	Totals	**95**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	64-85	Cloudy/Rain

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today: N/A

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	4	# pits/trenches dug today	
# of trenches dug to date	10	# of trenches dug to date	
EC - 52		**EC-57C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	

MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	176
Pounds of MD Today:	16	Pounds of MD To Date:	217
Pounds of Non-MEC Scrap Today:	231	Pounds of Non-MEC Scrap To Date:	814

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700 Start day. SUXOS, Safety, and [redacted]h on site evaluating site conditions due to rain. 0800-0830 Safety Brief/SUXOS Brief. 0830-1630 UXO/Sampling Team conducting trenching operations in EC-25. Completed trenching in Trench 1, Trench 2, Trench 6 and Trench 14. All trenches were backfilled prior to leaving the site at 1700.
Trench 1 went to a depth of 2 feet (hit groundwater at 26 inches), Trench 2 went to a depth of 2 feet (hit groundwater at 26 inches and native soil at 18 inches), Trench 6 went to a depth of 2 feet (hit groundwater at 26 inches), and Trench 14 went to a depth of 40 to 44 inches (hit groundwater and clay at 44 inches). A total of 6 samples were taken including (1 duplicate, 4 surface, and 1 subsurface). The subsurface was taken from Trench 2 as that was the "dirtiest" of the four trenches that were done today.

Next Day Proposed Activities:
UXO/Sampling Team will continue trenching operations in EC-25 Monday Aug. 5

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the [redacted]tions excepted as noted above.

[redacted]

Date: 1-Aug-2013

Title: SUXOS



Trench 1



Trench 2



Trench 6



Trench 14

Curits Bay DAILY ACTIVITIES REPORT **DATE:** **5-Aug-2013**

CONTRACT: USACE/[redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	**10**		
[redacted]	QC/Safety	**10**		
[redacted]	Team Leader/Tech III	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech I	**10**		
[redacted]	Tech I	**10**		
[redacted]	GEO	**10**		
[redacted]	GEO	**6**		
[redacted]	Soil Sampling	**10**		
	USACOE			
	Totals	**96**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	64-85	**Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today: N/A

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	4	# pits/trenches dug today	
# of trenches dug to date	14	# of trenches dug to date	
EC - 52		**EC-57C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	

MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	17	Number of MPPEH/MD Items To Date:	193
Pounds of MD Today:	45	Pounds of MD To Date:	262
Pounds of Non-MEC Scrap Today:	400	Pounds of Non-MEC Scrap To Date:	1,214

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700 Safety Brief/SUXOS Brief. 0730-1630 UXO/Sampling Team conducting trenching operations in EC-25. Completed trenching in Trench 16, Trench 8, Trench 10, Trench 21, and started on Trench 19. All trenches expect 19 were backfilled. Trench 16 went to a depth of 3 1/2 feet (hit native soil at 2, went to 3 ½ confirming), Trench 8 went to a depth of 4 feet (hit groundwater at 42 inches and clay at 38 inches), Trench 10 went to a depth of 2 feet (hit clay at 1 foot confirmed native at 2), and Trench 21 went to an average overall depth of 36 inches (groundwater was located at 40 inches in one portion of the trench - therefore trench was not dug any farther than 36 inches in the remaining portion of the trench). A total of 6 samples were taken including (5 surface, and 1 subsurface). The subsurface was taken from Trench 8 as that was the "dirtiest" of the four trenches that were done today. Ryan was on site to collect elevation data in EC-21 and collect equipment from the conex to return to ERT.1700 End of day.

Next Day Proposed Activities:
UXO/Sampling Team will continue trenching operations in EC-25

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the
ions excepted as noted above.

[redacted]

Date: 5-Aug-2013

Title: SUXOS



Trench 8 in EC-25



Trench 10 in EC-25



Trench 16 in EC-25



Trench 21 in EC-25

Curits Bay DAILY ACTIVITIES REPORT			DATE:	6-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	10		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	USACOE	7		
	Totals	87	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	64-85	Rain/Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today: [redacted]

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	4	# pits/trenches dug today	
# of trenches dug to date	18	# of trenches dug to date	
EC - 52		**EC-57C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	

MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	193
Pounds of MD Today:	0	Pounds of MD To Date:	262
Pounds of Non-MEC Scrap Today:	327	Pounds of Non-MEC Scrap To Date:	1,541

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700 Safety Brief/SUXOS Brief. 0730-1630 UXO/Sampling Team conducting trenching operations in EC-25. Completed trenching in Trench 19, Trench 18, Trench 20, and Trench 25. All trenches were backfilled.Trench 19 went to a depth of 4 feet (hit clay at 3 ½ feet and GW just below 4 feet), Trench 18 went to a depth of 4 feet (hit clay between 3 and 4 feet), Trench 20 went to a depth of 3 1/2 to 4 1/2 feet (hit clay at 2 ½ to 3 ½ feet), and Trench 25 went to a overall total depth of 48 inches (groundwater was located around 60 inches and had clay just above 3 feet).

A total of 9 samples were taken including (1 MS, 1 MSD, 1 Duplicate, 2 TCLP [1 surface and 1 subsurface], 3 surface, and 1 subsurface). The subsurface was taken from Trench 25 and the TCLP samples were taken from Trench 20.

Next Day Proposed Activities:
UXO/Sampling Team will continue trenching operations in EC-25

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract specifications excepted as noted above.

[redacted]

Date: 6-Aug-2013

Title: SUXOS





Trench 18 in EC-25





Trench 19 in EC-25





Trench 20 in EC-25





Trench 25 in EC-25

Curits Bay DAILY ACTIVITIES REPORT **DATE:** **7-Aug-2013**

CONTRACT: USACE/ [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	**10**		
[redacted]	QC/Safety	**10**		
[redacted]	Team Leader/Tech III	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech I	**10**		
[redacted]	Tech I	**10**		
[redacted]	GEO/Trenching CP	**0**		
[redacted]	Soil Sampling	**10**		
	Totals	**80**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	64-85	**Cloudy**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	3	# pits/trenches dug today	
# of trenches dug to date	21	# of trenches dug to date	
EC - 52		**EC-57C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	

MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	193
Pounds of MD Today:	0	Pounds of MD To Date:	262
Pounds of Non-MEC Scrap Today:	757	Pounds of Non-MEC Scrap To Date:	2,298

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700 Safety Brief/SUXOS Brief. 0730-1630 UXO/Sampling Team conducting trenching operations in EC-25. Completed trenching in Trench 27, Trench 24, Trench 23, and started Trench 17. All trenches except 17 were backfilled. Trench 27 went to a depth of 3 ½ feet (confirmed native soil at just over 3 feet), Trench 24 went to a depth of 3 ½ feet (confirmed native soil just after 3 feet), Trench 23 went to a depth of 4 ½ feet (confirmed native soil at 2 ½ to 3 feet), and Trench 17 is at a depth of 6 feet where it hit groundwater. Although Trench 17 has been completely dug, it is still in need of sloping before anyone can enter to take samples/finish soil classifications. A total of 7 samples were taken including (1 Duplicate, 4 surface, and 2 subsurface). The subsurface samples were taken from Trench 27 and Trench 23 as they were 2 of the dirtiest trenches for the day.

Next Day Proposed Activities:
UXO/Sampling Team will continue trenching operations in EC-25 and move into EC-49

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the

[redacted] tions excepted as noted above.

Title: SUXOS

Date: 7-Aug-2013




Trench 23 in EC-25




Trench 24 in EC-25




Trench 27 in EC-25

Curits Bay DAILY ACTIVITIES REPORT **DATE:** **8-Aug-2013**

CONTRACT: USACE/ [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	**10**		
[redacted]	QC/Safety	**10**		
[redacted]	Team Leader/Tech III	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech I	**10**		
[redacted]	Tech I	**10**		
[redacted]	GEO/Trenching CP	**10**		
[redacted]	Soil Sampling	**0**		
[redacted]	GEO	**2.5**		
[redacted]	GEO	**10**		
	Totals	**92.5**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	65-85	**Cloudy/Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	1	# pits/trenches dug today	2
# of trenches dug to date	22	# of trenches dug to date	2
EC - 52		**EC-57C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	N/A	% surface clearance completed today	N/A
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	N/A	% DGM completed today	N/A
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	4	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	71	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	128	Pounds of Non-MEC Scrap To Date:	2,426

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700 Safety Brief/SUXOS Brief. 0730-1630 UXO/Sampling Team conducting trenching operations in EC-25 and EC-49. Trench 27 in EC25 excavated to 5 ft bgs - need to go deeper but need larger excavator for sloping purposes. Trench backfilled and will be re-excavated towards end of project. Trench 7 at 6 inches bgs located culvert pipe (cause of anomaly). Began trenching in EC-49. Trench E excavated to 40 inches deep; native soil located at 36 inches bgs. Trench Fexcavated to 40 inches deep; native soil located at 36 inches bgs. Trench G was excavated to 6 feet bgs; additional trenching is needed but a larger excavator is required for sloping purposes. Trench was backfilled and will be re-excavated towards end of project.

Collected 9 soil samples today (4 surface, 2 subsurface, and 3 QC).

Next Day Proposed Activities:
UXO/Sampling Team will continue trenching operations in EC-49

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 8-Aug-2013




EC-25 Trench 7




EC-49 Trench E




EC-49 Trench F

Curits Bay DAILY ACTIVITIES REPORT **DATE:** **12-Aug-2013**

CONTRACT: USACE [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	**10.5**		
[redacted]	QC/Safety	**10.5**		
[redacted]	Team Leader/Tech III	**10**		
[redacted]	Tech II	**0**		
[redacted]	Tech II	**10**		
[redacted]	Tech I	**9**		
[redacted]	Tech I	**10**		
[redacted]	GEO/Trenching CP	**10**		
	Totals	**70**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE
[redacted]	USIC	Utility Locator

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	75-90	**Cloudy/Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	0	# pits/trenches dug today	3
# of trenches dug to date	22	# of trenches dug to date	5
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	35	Pounds of Non-MEC Scrap To Date:	2,461

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling Team conducted trenching operations in EC-49.

Trench A: The test pit in this area recovered a drum lid from the top surface, which is the cause of the anomaly in this location. This area was comprised entirely of sand and clay was noted at 8 ft bgs.
Trench B: A test pit in this area recovered a metal plate/fence post, which along with the downed fence was the cause of the anomaly in this location. Steadily collapsing, loose, sandy fill was observed in this trench down to 5.4 feet.
Trench C: A test pit in this area determined the soil profile was entirely sand, and groundwater was reached at 7 ft bgs. No anomalies were found in this area.
Trench D: A test pit in this area determined the area was sand down to at least 7 ft bgs. No anomalies were located here; this area was directly next to the fence and did not contain fill material. Due to safety concerns associated with the bluff edge, a trench with slopes could not be installed at this location.

[redacted] discussed the findings of the test pits with [redacted] and both agreed that a full-blown trench was not needed in these areas that were entirely sand, as the goal of these trenches is to determine the area covered by fill. These pits will help provide information that the fill does not extend to these areas.

Trench H: At approximately 3 feet bgs, the excavator encountered a utility line and operations ceased in order for the utility locater to be contacted and confirm that the utility was non-functional. Trenching at this location will continue the next day of site operations, as native soil was observed below the sand material but above the depth of the utility. The trench was covered with a tarp and secured with safety fencing.

A total of 5 surface soil samples were collected from the test pit/trenches in EC-49 today.

Next Day's Proposed Activities:
UXO/Sampling Team will continue trenching operations in EC-49 and 25.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

Date: 12-Aug-2013

Title: SUXOS



EC-49 Trench A



EC-49 Trench A profile



EC-49: Trench B



EC-49: Trench B scrap





EC-49: Trench D

Curits Bay DAILY ACTIVITIES REPORT			DATE:	13-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	2		
[redacted]	QC/Safety	2		
[redacted]	Team Leader/Tech III	2		
[redacted]	Tech II	2		
[redacted]	Tech II	2		
[redacted]	Tech I	2		
[redacted]	Tech I	2		
[redacted]	Soil Sampling	2		
[redacted]	CENAB	2		
[redacted]	CENAB	2		
	Totals	**20**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN	TEMPERATURE RANGE:	WEATHER CONDITIONS:
LAST 24 HOURS: 1-2 inches pr	67-88	Rain

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today: [redacted]

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	0
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	0	# pits/trenches dug today	0
# of trenches dug to date	22	# of trenches dug to date	5
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,461

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling team continued excavation of Trench H in EC-49, but excavation was not completed due to weather. The trench was covered and surrounded with safety fence. Site operations for the day were suspended at 0900 due to heavy rains and lightening.

Next Day Proposed Activities:
UXO/Sampling team will continue trenching operations in EC-25 and EC-49.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the

[redacted]ions excepted as noted above.

[redacted]

Title: SUXOS

Date: 13-Aug-2013

Curits Bay DAILY ACTIVITIES REPORT **DATE:** **14-Aug-2013**

CONTRACT: USACE [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	**10**		
[redacted]	QC/Safety	**10**		
[redacted]	Team Leader/Tech III	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech II	**10**		
[redacted]	Tech I	**10**		
[redacted]	Tech I	**10**		
[redacted]	Soil Sampling	**10**		
[redacted]	CENAB	**4**		
	Totals	**84**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN	TEMPERATURE RANGE:	WEATHER CONDITIONS:
LAST 24 HOURS: 1-2 inches pr	**65-85**	**Rain**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today: [redacted]

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	4	# pits/trenches dug today	1
# of trenches dug to date	26	# of trenches dug to date	7
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	22	Pounds of Non-MEC Scrap To Date:	2,483

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling team continued trenching operations in EC-49 and EC-25; EC-49-H, EC-25-13, EC-25-15, EC-25-22, EC-25-9 were completed today. All trenches were backfilled.

EC-49-H: native soil was reached between 3-4 ft bgs
EC-25-13: native soil was reached between 2-3 ft bgs
EC-25-15: native soil was reached between 2-3 ft bgs
EC-25-22: native soil was reached between 2.5-4 ft bgs
EC-25-9: native soil was reached between 3.75-4 ft bgs

A total of 6 samples were taken: 4 surface and 2 subsurface.

Next Day Proposed Activities:
UXO/Sampling Team will begin hand auguring known sample locations in EC-49.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 14-Aug-2013

Title: SUXOS




EC-49 H




EC-25-9




EC-25-13




EC-25-15




EC-25-22

Curits Bay DAILY ACTIVITIES REPORT			DATE:	15-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	0		
[redacted]	Tech II	0		
[redacted]	Tech II	10		
[redacted]	Tech I	0		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	CENAB	3		
	Totals	53	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	Sunny

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today: [redacted]

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	0	# pits/trenches dug today	0
# of trenches dug to date	26	# of trenches dug to date	7
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,483

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling Team conducted sampling operations in EC-49. Completed surface and subsurface soil sampling at 10 of the 13 random sample locations in EC-49. Sampling locations 5, 6, and 12 remain. Co-located soil and groundwater samples will be collected via DPT at sample location 12 for EC-49. Sample location 9 in EC-49 had to be offset due to being located in the water. Per the EC-25 and EC-49 trenching memo, sample location 9 was re-located on land and the GPS coordinates recorded in the field log.

A total of 24 soil samples were collected today, including QC samples.

Next Day Proposed Activities:
UXO/Sampling Team will continue sampling in EC-49 and begin sampling the grid locations in the EC-52 propellant grain area.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the [redacted]ons excepted as noted above.

Title: [redacted]

Date: 15-Aug-2013



Sampling in EC-49



Curits Bay DAILY ACTIVITIES REPORT			DATE:	16-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	0		
[redacted]	Tech II	0		
[redacted]	Tech I	4.5		
[redacted]	Tech I	6	3	OSHA Physical
[redacted]	Soil Sampling	10		
	Totals	**50.5**	**3**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	65-85	Sunny

VERBAL COMMUNICATIONS FROM CUSTOMER

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	0	# pits/trenches dug today	0
# of trenches dug to date	26	# of trenches dug to date	7
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,483

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling team conducting sampling operations in EC-49 and EC-52. Completed collecting soil samples at sampling locations 5 and 6 in EC-49 and completed 12 of the 13 grid soil sample locations in the EC-52 propellant grain area. A total of 34 soil samples, including QC samples, were collected today.

Next Day Proposed Activities:
The remaining soil sample in EC-52 will be collected. Soil sampling will begin in EC-57D and EC-57B.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 16-Aug-2013





Sampling in EC-49





Sampling EC-52

Curits Bay DAILY ACTIVITIES REPORT			DATE:	19-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	0		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	GEO	10		
	Totals	80	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	**Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	0	# pits/trenches dug today	0
# of trenches dug to date	26	# of trenches dug to date	7
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
		# pits/trenches dug today	
		# of trenches dug to date	

MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,483

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling Team conducting sampling operations. Completed sampling location 13 in EC-52 propellant grain area, completed EC-52 biased sample 1 (EC-52-14), completed EC-21 biased sample 1 (EC-21-29), and completed 4 of the EC-22 biased samples (all except for sample location #2). A total of 27 samples were collected today, including 4 QC samples.
The Geo team placed the remainder of the trench and sampling points in the MMRP ECs.

The Curtis Bay Property Manager, [redacted] was briefly on-site to manage a small fire on the property in a nearby abondoned building. The fire and investigation did not create safety concerns for on-site staff or otherwise impact site operations.

Next Day Proposed Activities:
Trenching operations will resume in conjunction with sampling operations in EC-58B.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 19-Aug-2013




MMRP ECs soil sample collection



GEO team placing in trench/sampling points.

Curits Bay DAILY ACTIVITIES REPORT		DATE:	20-Aug-2013
CONTRACT: USACE [redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156		

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	0		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	ACOE	8		
	Totals	**68**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	65-85	Sunny

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	0	# pits/trenches dug today	0
# of trenches dug to date	26	# of trenches dug to date	7
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	1	# pits/trenches dug today	2
# pits/trenches dug to date	1	# of trenches dug to date	2
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	45	Pounds of Non-MEC Scrap To Date:	2,528

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO/Sampling Team completed sampling/trenching operations in EC-58B and completed trenching in EC-58C. Trench 58B-A was excavated to a depth of 4 feet; some concrete and a few miscellaneous metal scrap items were found. Trench 58C-C was found to be a potential burn area with a large metal pipe at the southern end; the burn area ended at 2 feet bgs. Trench 58C-B was found to be a railroad rail that continued into the berm and was at a max depth of 1 foot. Trench 58C-A held a metal sign post, concrete block, and contained at least a 1 foot wide layer of cinder fill. Ten soil samples, including 3 QC samples were collected today.

Next Day Proposed Activities:
Trenching operations will resume in conjunction with sampling operations in EC-49 and 25.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the [redacted]cations excepted as noted above.

[redacted]

Title: SUXOS

Date: 20-Aug-2013




Trench 58B-A




Trench 58C-A





Trench 58C-B





Trench 58C-C

Curits Bay DAILY ACTIVITIES REPORT			DATE:	21-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	0		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	CENAB	4		
[redacted]	Trench Competent Person	10		
	Totals	74	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-90	**Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today		# pits/trenches dug today	
# of trenches dug to date		# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	1	# pits/trenches dug today	1
# of trenches dug to date	27	# of trenches dug to date	8
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today			
# of trenches dug to date			
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	1
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	350	Pounds of Non-MEC Scrap To Date:	2,878

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO Team/Sampling Team conducted trenching/sampling operations in EC-25 and EC-49. TCLP and subsurface samples were collected from Trench 25-17. Trench 25-17 went to 5.5 feet bgs and groundwater was reached just above 6 feet bgs. Completed trench EC-49-G and collected a subsurface sample at the southern end on the western side of the trench (closest to water). Trench 49-G had native soil at about 2 feet bgs. A total of 4 soil samples were collected today.

Next Day Proposed Activities:

Trenching/Sampling operations will continue in EC-49, followed by trenching and sampling in EC-52.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 21-Aug-2013





EC-25, Trench #17





EC-49, Trench G

Curits Bay DAILY ACTIVITIES REPORT			DATE:	22-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	10		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	Trench Competent Person	4		
	Totals	74	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**
[redacted]	GSA	Site Visit/Property Inspection

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-90	**Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	1	# pits/trenches dug today	
# of trenches dug to date	1	# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	1
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	1		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	17	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO Team/Sampling Team conducted trenching/sampling operations in EC-49, EC-52, and EC-21.

Sampling in trench 49-C was completed; total depth was 6 feet bgs, as native soil was reached. Completed sampling in trench A in EC-52, which went to a depth of 3 feet as native soil was reached within 2 feet bgs. Completed trench A in EC-21; this trench went down to approximately 5 to 6 inches as there was an asphalt pad lying underneath the surface layer. No subsurface sample was taken for this trench. A surface sample was collected from Trench B in EC-21, however due to the time and a lightning hold on-site, this trench was fenced and left to be completed tomorrow.

Next Day Proposed Activities:
Complete sampling EC-21-B trench and complete trench EC-21-C. Begin soil sampling in EC-57B and EC-57C.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 22-Aug-2013





EC-49, Trench C



EC-21, Trench A

SAMPLING TEAM DAILY FIELD REPORT

Project: Curtis Bay	**Date:** 8/22/13
Time of Arrival at Site: 0700	Time of Safety Brief: 0700
Prepared By: [redacted]	

Weather/Site Conditions:

Weather: High 80s to 90s, humid, mostly sunny, light breeze

Site Activities Conducted:

The sampling team consisted of [redacted] and all the techs ([redacted] Chad)

Completed Trench 49-C. Total depth was 6 feet as native soil was reached. Completed trench A in EC-52. It went to a depth of 3 feet as native soil was reached within 2 feet. Completed trench A in EC-21. This trench only went down approximately 5 to 6 inches as there was an asphalt pad lying underneath the surface layer. No subsurface sample was taken for this trench. Trench B in EC-21 was started and a surface sample was taken, however due to the time and being put on a lightning hold, it was fenced and left to be completed tomorrow. However the depth on the East end went to 3.5 feet as native soil was reached between 2 and 3 feet.

1 QA/QC sample was taken. 1 Field Duplicate

EC-52-SO-FD4 was from EC-52-A-SO-03

Please refer to the DCQR for the exact samples taken.

All samples were given to the courier at 1613.

Equipments Used at Site:

Trimble GPS Unit
Schonstedt
Excavator

Issues Encountered and Resolutions:

None

Planned Activities:

Tomorrow we will begin with EC-21-B trench and then completed the last trench EC-21-C. Time permitting we will start some of the soil sampling in either EC-57B or EC-57C. If not then sampling bottles will be prepared and readied for Monday.

Time of Departure from Site: 1700

Curits Bay DAILY ACTIVITIES REPORT			DATE:	23-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	8.5		
[redacted]	QC/Safety	8.5		
[redacted]	Team Leader/Tech III	8.5		
[redacted]	Tech II	10		
[redacted]	Tech II	8.5		
[redacted]	Tech I	8.5		
[redacted]	Soil Sampling	10		
	Totals	62.5	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	**Overcast**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	2	# pits/trenches dug today	
# of trenches dug to date	3	# of trenches dug to date	
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. UXO Team/Sampling Team conducted trenching/sampling operations in EC-21. EC-21, Trench B was excavated to 3 feet bgs, where native soil was found; all metallic items (bullets, cartridge cases, etc) were found within 1ft bgs. EC 21, Trench C was excavated to 5 feet bgs, where native soil was confirmed. Cultural debris was located down to 4 feet bgs in Trench C. For Trench C, the lateral boundary of where the debris ended was estimated using a Schonstedt and test pitting. Twelve points were taken with the GPS to show this boundary. Trench in EC-52-A was back filled.

Next Day Proposed Activities:
Site operations will resume 8/26/13; DPT sampling in the MMRP ECs will begin. Collection of the remaining hand auger soil samples in the MMRP ECs (58B, 58C, 57B, 57C, and 57D) will also begin.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the

ns excepted as noted above.

[redacted]

Title: SUXOS

Date: 23-Aug-2013





EC-52, Trench A





EC-21, Trench B





EC-21, Trench C

Curits Bay DAILY ACTIVITIES REPORT			DATE:	26-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	10		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	Soil Sampling	10		
[redacted]	DPT Operator	9.5		
[redacted]	CENAB	8		
	Totals	97.5	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	**Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. Sampling Team conducted hand auger sampling in ECs 57C, 57D, and 58B. DPT sampling was conducted in EC 22; groundwater collection was conducted in ECs 3 and 36. A total of 17 soil samples and 5 groundwater samples (including grounwater QC samples) were collected today.

Next Day Proposed Activities:
DPT/sampling operations will continue in EC 21 and EC 52.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 26-Aug-2013





MMRP EC Soil Sampling





DPT Sampling

Curits Bay DAILY ACTIVITIES REPORT			DATE:	27-Aug-2013
CONTRACT: USACE [redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	10		
[redacted]	Tech II	9		
[redacted]	Tech I	9		
[redacted]	Soil Sampling	10		
[redacted]	DPT Operator	10		
	Totals	78	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	**Rain/Overcast/Sunny**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. The DPT team completed soil and groundwater sampling in EC-21 and the propellant grain are in EC-52. The soil samples for the second biased sample in EC-52 were also collected.

As of the end of 8/27 there have been 288 soil samples, 7 groundwater, 1 sediment, and 1 surface water sample collected. There are currently 27 field duplicates, and 13 MS/MSDs currently for soil.

Next Day Proposed Activities:
DPT will continue with the last remaining groundwater sample in EC-52 followed by EC-49, then EC-25. MMRP hand auger soil sampling will also be completed tomorrow.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 27-Aug-2013



DPT/Sampling Operations



Curits Bay DAILY ACTIVITIES REPORT		DATE:	28-Aug-2013
CONTRACT: USACE [redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156		

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence NOTES
[redacted]	SUXOS	11		
[redacted]	QC/Safety	11		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	10		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	11		
[redacted]	Soil Sampling	11		
[redacted]	DPT Operator	10		
[redacted]	CENAB	8		
	Totals	**102**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	65-85	Rain/Overcast

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. The DPT team completed soil and groundwater sampling in EC-52, EC-49, EC-25, and EC-58B. The groundwater sample in EC-58B could not be collected because the location went dry after approximately 30 seconds of pumping with the screen down to the DPT equipment maximum depth of 23 feet. The hand auger sampling team completed the remaining two soil sample locations in EC-57D and four locations in 57B. Biased soil sample location 2B in EC-58B was only able to produce a surface sample due to the presence of an asphalt layer at around 10 inches to 1 ft bgs. A hole was augered in each direction about a foot off of the sample location in order to confirm the asphalt layer.

Next Day Proposed Activities:

Hand augering in the MMRP ECs is complete. DPT will continue, beginning with EC-57B and EC-57D and then moving to EC-57C and EC-58C.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

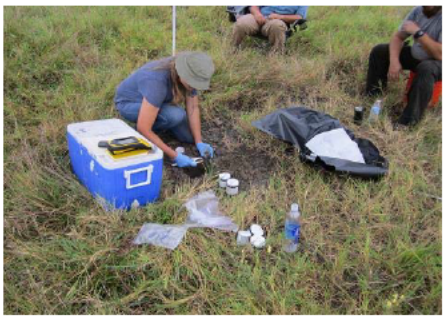
Date: 28-Aug-2013





DPT Sampling





Hand Auger Sampling

Curits Bay DAILY ACTIVITIES REPORT			DATE:	29-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	10		
[redacted]	QC/Safety	10		
[redacted]	Team Leader/Tech III	10		
[redacted]	Tech II	10		
[redacted]	Tech I	10		
[redacted]	Soil Sampling	10		
[redacted]	DPT Operator	10		
	Totals	**70**	**0**	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	**Fog/Overcast**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. The DPT team completed soil and groundwater sampling in EC-57D, EC-57B, EC-57C, and soil sampling only in EC-58C. The groundwater sample in EC-57B could not be collected due to the location going dry after approximately 30 seconds and hitting refusal at 12 feet bgs. The groundwater sample in EC-57C could also not be taken due to hitting refusal at 13 feet and having no groundwater above that point. On both groundwater samples, a second and third location was attempted and also hit refusal. Groundwater resampling was also conducted in EC-34 today.

12 soil and 3 groudwater samples, including 5 QC samples, were collected today.

Next Day Proposed Activities:
DPT operations to continue in EC-58C. Collection of the remaining IRP groundwater locations will begin. Vehicle maintenance for turn in of rental trucks. Site close out for UXO Support.

CERTIFICATION

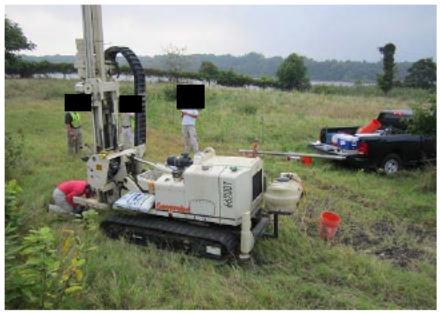
On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 28-Aug-2013





DPT Soil and Groundwater Sampling



Curits Bay DAILY ACTIVITIES REPORT			DATE:	30-Aug-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	SUXOS	9.5		
[redacted]	QC/Safety	9.5		
[redacted]	Team Leader/Tech III	9.5		
[redacted]	Tech II	7		
[redacted]	Tech I	7		
[redacted]	Soil Sampling	9.5		
[redacted]	DPT Operator	9.5		
[redacted]	CENAB	1		
	Totals	62.5	0	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	65-85	**Fog/Overcast**

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE OE Safety Representative onsite Today:

EXPLOSIVE ORDNANCE-RELATED MATERIAL RECORD
(to include donor materials)

ID & CONDITION	LOCATION	DISPOSITION	COMMENTS

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

0700-0730 Safety Brief/SUXOS Brief. The team completed groundwater sampling in EC-58C, and resampling groundwater in EC-27, EC-28, and EC-29. One groundwater resample was taken in EC-30. Nine groundwater samples, including 2 QC samples were collected today.

Next Day Proposed Activities: No further UXO support planned after 30 August 2013. DPT will continue on Tuesday in the IRP ECs. The unnamed tributary will also be sampled on Tuesday and background sampling will begin as well.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: SUXOS

Date: 30-Aug-2013



DPT sampling in MMRP ECs



Curits Bay DAILY ACTIVITIES REPORT			DATE:	3-Sep-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	Soil Sampling	10		
[redacted]	Soil Sampling	10		
[redacted]	SSHO/DPT Sampling	10		
[redacted]	DPT Operator	10		
	Totals	**40**	**0**	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	70-83	**Mostly Sunny**

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

All groundwater samples in the IRP ECs were recollected (EC-30, EC-31, EC-32, and EC-33). Resampling of groundwater at EC-50 was attempted for a fourth time, but no groundwater could be collected at this location.

All surface water, sediment, and QC samples were collected for the Unnamed Tributary except for the northern section of the tributary where no surface water was present; only sediment was collected for this sample location.

One background sample was taken (SB08). It was determined that the soil at 3.5 feet bgs is very similar to the soil found at the bottom of the trenches and other soil samples throughout the site. Therefore due to the similarity of the soil, the samples will only be analyzed for PAHs and the samples will be collected on the surface and 3-4 feet bgs for subsurface.

Next Day Proposed Activities: Background sampling will continue at the background soil locations and background well location.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: Deputy Project Manager

Date: 3-Sep-2013

Curits Bay DAILY ACTIVITIES REPORT			DATE:	4-Sep-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
[redacted]	Soil Sampling	10		
[redacted]	Soil Sampling	10		
	Totals	**20**	**0**	
SITE VISITORS				
NAME	**ORGANIZATION**	**PURPOSE**		
WEATHER CONDITIONS				
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**		
	70-83	**Mostly Sunny**		

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

All background soil samples were completed; all subsurface samples were taken from 3 to 4 feet bgs. SB03 had to be offset 10 feet due west because the original sample location was in a retention pond. SB09 had to be relocated further southeast because the original sample location was in the middle of an asphalt road.

22 soil samples were collected today, including 5 QC samples. The Soil IDM sample was also collected today.

Next Day Proposed Activities: The background monitoring well will be sampled as well as the aqueous IDM.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: Deputy Project Manager

Date: 4-Sep-2013



Background Soil Sampling



Original SB09 location within asphalt

Curits Bay DAILY ACTIVITIES REPORT			DATE:	5-Sep-2013
CONTRACT: USACE[redacted]		PROJECT NAME: Former Curtis Bay Depot, Maryland		
PROJECT: Delivery Order 0007		ERT PROJECT NO: 3156		
PERSONNEL HOURS (includes subcontractors)				
Name	**Position**	**Hours On-Site**	**Hours Absent**	**Reason for Absence NOTES**
Michael Barsa	Background Well Sampling	4.5		
[redacted]	Background Well Sampling	4.5		
	Totals	**9**	**0**	

SITE VISITORS		
NAME	**ORGANIZATION**	**PURPOSE**

WEATHER CONDITIONS		
PRECIPITATION WITHIN LAST 24 HOURS:	**TEMPERATURE RANGE:**	**WEATHER CONDITIONS:**
	70-83	**Mostly Sunny**

PRODUCTION DATA			
EC - 21		**EC-22**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	3	# of trenches dug to date	-
EC - 25		**EC-49**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# of trenches dug to date	27	# of trenches dug to date	9
EC - 52		**EC-57C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-		
# of trenches dug to date	1		
EC-58B		**EC-58C**	
% surface clearance completed today	-	% surface clearance completed today	-
% surface clearance completed to date	100	% surface clearance completed to date	100
% DGM completed today	-	% DGM completed today	-
% DGM completed to date	100	% DGM completed to date	100
# pits/trenches dug today	-	# pits/trenches dug today	-
# pits/trenches dug to date	1	# of trenches dug to date	4
MEC/MPPEH/MD Data			
Number of Live MEC Items Today:	0	Number of Live MEC Items To Date:	0
Number of MPPEH/MD Items Today:	0	Number of MPPEH/MD Items To Date:	197
Pounds of MD Today:	0	Pounds of MD To Date:	333
Pounds of Non-MEC Scrap Today:	0	Pounds of Non-MEC Scrap To Date:	2,895

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Sampling team conducted sampling at the background monitoring well (BG-MW-01). The aqueous IDM sample was also collected.

This concludes sampling activities at the site. As of the end of today, 330 soil samples, 26 groundwater samples, 4 sediment samples, 3 surface water samples, and all waste characterization samples have been collected.

The remaining ERT equipment was demobilized from the site. IDM drums will remain on-site until the waste profile is generated. Vendors have been contacted to retrieve the Conex storage container and portable toilets.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Title: Deputy Project Manager

Date: 5-Sep-2013



Background Monitoring Well Sampling

Curits Bay DAILY ACTIVITIES REPORT	DATE:	9/21/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	8		
[redacted]	Deputy PM	8.5		
[redacted]	SSHO/UXO	8.5		
Michael Barsa	ERT Safety	0.5		
	Totals	25.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	62-83 F	Cloudy, drizzle in the afternoon

VERBAL COMMUNICATIONS FROM CUSTOMER

Cyprian notified us that he will be out on the site for no more than 8 hours a day including his travel time and that he will have 10 days in total to be at the site.

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected	6	6	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected			# soil samples collected		
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		
			# soil samples collected to date		

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

EC-21-36 through EC-21-40 all had to be offset due to location being located within the stream bank area. GPS locations were taken of all new locations and GPS coordinates written in the log book. EC-21-44 and EC-21-45 were offset however GPS locations were not able to be obtained due to field conditions. Measurements were taken to obtain distance from original sample.

Three QC samples were taken, 1 Field Duplicate and 1 MS/MSD

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 21-Sep-2015

Curits Bay DAILY ACTIVITIES REPORT	DATE:	9/22/2015

CONTRACT: USACE [redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Deputy PM	9.5		
[redacted]	SSHO/UXO	9.5		
	Totals	28.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	62-78 F	Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

None

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected	12	18	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected			# soil samples collected		
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		
			# soil samples collected to date		

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Pine delivered the generator in order to operate the power auger. However, it was later discovered that the power auger power cord was frayed through to the wire. The SSHO took the equipment out of service per OSHA regulations. Pine was contacted and a replacement will arrive at the site tomorrow.

Twelve soil samples were collected from EC-21. Three QC samples, 2 Field Duplicates and 1 ERB were also collected. Samples from 9/21/15 and 9/22/15 were delivered to the courier at the North Gate. The courier notified us that he will be the driver for our pickup every day.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 22-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	9/23/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
	Totals	28.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	58-78 F	Sunny

VERBAL COMMUNICATIONS FROM CUSTOMER

None

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected	15	33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected			# soil samples collected		
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		
			# soil samples collected to date		

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Groundwater was encountered at 2 1/2 feet at EC-21-36 location. The offset location would have ended up close to EC-21C and EC-21-35. It was decided not to offset and take the subsurface sample at the soil/water interface. Groundwater was also encountered above 5 feet at EC-21-37, EC-21-38, EC-21-39, and EC-21-40. All subsurface samples were taken at the soil/water interface per guidance received from M. Chesnut and the PM, [redacted]

An error occurred with the MiniRAE PID, it read 28.5 at EC-21-37, however it still read 28 after removed from the area. It was serviced, recalibrated and the issue was resolved.

Fifteen soil samples were collected from EC-21, in addition to 4 QC samples, 1 Field Duplicate, 1 MS/MSD, and 1 ERB. Samples from 9/23/15 were delivered to the courier at the North Gate at 1647.

Soil Sampling was completed at EC-21. Soil sampling at EC-57D will start on Thursday.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 23-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	9/24/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	5		
	Totals	33.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	58-80 F	Sunny

VERBAL COMMUNICATIONS FROM CUSTOMER

None

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected	12	12	# soil samples collected		
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected	11	11	# soil samples collected		
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		
			# soil samples collected to date		

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

We hit concrete/rock at EC-57D-11; instructed to offset to new coordinates provided by [redacted] Subsurface sample was labeled EC-57D-11a-SO-2. Refusal was also hit at EC-57D-10 at 1 ft and EC-57D-10 at 4 inches. Guidance was given not to take those subsurface samples and DPT may be utilized in the future to obtain the samples.

Twenty-three soil samples collected today with 7 QC samples: 2 field duplicates, 2 MS/MSD, and 1 ERB. Samples from 9/24/15 were delivered to the courier at the North Gate at 1703.

Soil Sampling was completed at EC-57D. One sampling location is left at EC-57B.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 24-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	9/25/2015

CONTRACT: USACE [redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	9.5		
	Totals	38	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	60-75 F	Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

None

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected	2	14	# soil samples collected	6	6
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected		11	# soil samples collected	6	6
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		
			# soil samples collected to date		

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

We hit hard rock at EC-58B-06 at 1 foot. We utilized a pry bar to get through the rock layer. The pry bar was deconned before and after use and the soil auger was used to obtain the sample below where the pry bar was used.

Fourteen soil samples were collected along with four QC samples: 3 field duplicates, and 1 ERB. Samples from 9/25/15 were delivered to the courier at the North Gate at 1630.

Soil Sampling was completed at EC-57B and 57C. One sampling location is left at EC-58B at a depth of 7-9 feet co-located with the groundwater sample. That sample will be obtained using DPT when the temporary monitoring well is installed.

The plan for monday is to begin installing the temporary monitoring wells with 58B working clockwise around the site. Further EC-36 and the Tributary will also be sampled on monday.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 25-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	9/28/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	9.5		
[redacted]	UXO Tech	9.5		
[redacted]	A-Zone Driller	9.5		
	Totals	57	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	65-78 F	Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

None

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected	2	13	# soil samples collected	1	7
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today	3	3
			# SW samples collected to date	3	3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

A-zone mobilized to the site and brought a Geoprobe rig (Model 6620). Temporary groundwater wells were installed and developed in EC-58B, EC-57D, EC-34, EC-25, and EC-49.

Three soil samples, 3 sediment samples, 3 surface water and 6 QC samples were taken (2 field duplicates and 2 MS/MSDs). All samples from 9/28/15 were delivered to the courier at the North Gate at 1657.

Soil Sampling was completed at EC-58B and 57D. Sediment and Surface water sampling was completed in the Tributary. The only remaining soil samples are in the Shop area and in EC-36.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 28-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	9/29/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	8.5		AM Doctors appt
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	9.5		
[redacted]	UXO Tech	9.5		
[redacted]	A-Zone Driller	9.5		
	Totals	56	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	68-80 F	Cloudy with periodic rain

VERBAL COMMUNICATIONS FROM CUSTOMER

In the event of a government shut down, work will continue at Curtis Bay.

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected			# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected	11	11
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected					
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected			# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		3
			# SW samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

One PID would not turn on and the PIDs screen went blank. Pine was contacted and one PID was fixed on site while the second PID was replaced by Pine. Both PIDs were operational by 11am.

Three temporary groundwater wells were installed and developed in EC-52 (2 wells) and EC-58C.

Eleven soil samples were completed (6 surface, and 5 subsurface) from EC-36. Three sampling locations remain at EC-36. No QC samples were taken. All samples from 9/29/15 were delivered to the courier at the North Gate at 1700.

The groundwater well at EC-58B ran dry in 3 minutes and produced less than 500 ml of water. This well will be resampled at the end of groundwater sampling. The well at EC-34 was purged until 1650 when it had to be halted in order to prepare samples and deliver them to the courier since the turbidity was above 10 NTU at 75.8. The well will continue to be sampled in the am in order to reach an acceptable turbidity.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 29-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	9/30/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	A-Zone Driller	9.5		
[redacted]	UXO Tech	9.5		
	Totals	47.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-75 F	Cloudy with periodic rain

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected	1	1	# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		11
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected			# GW samples collected		
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected	1	1			
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected	1	1	# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		3
			# soil samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Five temporary groundwater wells were installed and developed in the shop area. A total of 13 wells have been installed.

Three groundwater locations were sampled. One QC sample was collected (1 Field Duplicate). All samples from 9/30/15 were delivered to the courier at the North Gate at 1700.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 30-Sep-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/1/2015

CONTRACT: USACE [redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	A-Zone Driller	9.5		
[redacted]	UXO Tech	9.5		
[redacted]	Team Member	9.5		
	Totals	57	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-75 F	Rain

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected			# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected		
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		11
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected	1	1	# GW samples collected	1	1
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		1	# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		3
			# SW samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Four temporary groundwater wells were installed and developed (2 in the shop area, 1 in EC-3, and 1 in EC-21), for a total of 17 wells. Well installation should be complete on Friday 10/2.

Two groundwater locations were sampled. No QC sample was collected. All samples from 10/1/15 were delivered to the courier at a personal residence at 1750.

The plan for Friday is to continue sampling groundwater wells in the MMRP sites and the shop area. The driller will install the remaining two temporary wells in the EC-21 area.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 1-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/2/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	3.5		Doctors appt in pm
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	A-Zone Driller	9.5		
[redacted]	UXO Tech	9.5		
[redacted]	Team Member	9.5		
	Totals	51	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-75 F	Rain

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected	1	1	# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected					
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected	1	1
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected	1	1
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		11
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected		1	# GW samples collected		1
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		1	# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected			# sediment samples collected today		3
			# SW samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

One temporary groundwater well was installed in EC-21. The well to be installed inside the bunker at EC-21 was initially relocated due to a downed tree within the barricade and flooding from rain. The relocated well hit refusal at 15 feet bgs, was offset10 feet were we also hit refusal at 15 feet below ground surface. All wells have been installed. Wells will be abandoned starting October 8th.

Three groundwater locations were sampled. No QC sample was collected. All samples from 10/2/15 were delivered to the courier at 1700.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.



Date: 2-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/5/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	7		Work at office in AM
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	9.5		
[redacted]	UXO Tech	9.5		
	Totals	45	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE
[redacted]	ERT	Field Audit

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	49-65 F	Mostly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected					
EC - 3			**EC-16**		
# GW samples collected		1	# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected	1	1			
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected		1
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected			# GW samples collected		
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		1
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected	6	17
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected		1	# GW samples collected	1	2
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		1	# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected	1	1	# sediment samples collected today		3
			# SW samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Three groundwater locations were sampled. One QC sample was collected (1 - Field Duplicate). The remaining soil samples at EC-36 were completed including four QC samples (2 Field Duplicates, and 1 MS/MSD). All samples from 10/5/15 were delivered to the courier at 1645.

While attempting to sample at EC-58B for a second time, the well ran dry after just over seven minutes and we were unable to get the well below 10 NTU. The attempt was discontinued and per instructions from the PM, we will not be sampling that well.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 5-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/6/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	5.5		
[redacted]	UXO Tech	9.5		
	Totals	43.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-72 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected	34	34			
EC - 3			**EC-16**		
# GW samples collected		1	# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		
# GW samples collected		1			
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected		1
EC - 28			**EC-29**		
# soil samples collected			# soil samples collected		
# GW samples collected	2	2	# GW samples collected	1	1
EC-31			**EC-33**		
# GW samples collected			# GW samples collected		1
EC - 32			**EC-36**		
# soil samples collected			# soil samples collected		17
# GW samples collected					

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected		1	# GW samples collected		2
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		1	# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected		1	# sediment samples collected today		3
			# soil samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Three groundwater locations were sampled. One QC sample was collected (1 - ERB). All shop soil samples for arsenic (only samples with IDs beginning with SHOP) were completed including seven QC samples (4 Field Duplicates, 1 MS/MSD, and 1 ERB). All samples from 10/6/15 were delivered to the courier at 1720.

Due to a laboratory holding issue hexavalent chromium for the tributary surface water and 1 groundwater sample will need to be recollected.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 6-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/7/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	9.5		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	9.5		
[redacted]	UXO Tech	9.5		
	Totals	47.5	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-75 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date		Today	To Date
# soil samples collected		34			
EC - 3			**EC-16**		
# GW samples collected		1	# soil samples collected		
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected	2	2
# GW samples collected		1			
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected		1
EC - 28			**EC-29**		
# soil samples collected	6	6	# soil samples collected	6	6
# GW samples collected		2	# GW samples collected		1
EC-31			**EC-33**		
# GW samples collected	1	1	# GW samples collected		1
EC - 32			**EC-36**		
# soil samples collected	12	12	# soil samples collected		17
# GW samples collected	1	1			

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected		1	# GW samples collected		**2**
EC - 57B			**EC-57C**		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			**EC-58B**		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		**1**	# GW samples collected		
EC - 58C			**Unnamed Tributary**		
# GW samples collected		1	# sediment samples collected today		3
			# soil samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Three groundwater locations were sampled. Two QC samples were collected (1 - MS/MSD). Twenty four soil samples were collected in EC-28, EC-29, and EC-32. Eleven QC samples were collected (3- Field Duplicates, 3 - MS/MSD, and 2-ERBs). All samples from 10/7/15 were delivered to the courier at 1700.

Subsurface samples in EC-29 were unable to be obtained due to gravel, as this appears to be an area that was previoulsy part of the railroad tracks. Four subsurface samples in EC-32 were unable to be obtained due to refusal, also due to gravel, most likely from the prior building foundation or parking area.

Samples for hexavalent chromium were separated out into a smaller cooler and a seperate COC per instructions from the Deputy PM.

The plan for Thursday is to begin abandoning the temporary wells and continue soil sampling. Remaining soil sampling locations include EC-16, 4 subsurface at EC-32, 6 subsurface at EC-29, and 9 subsurface at EC-28.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 7-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/8/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	6		
[redacted]	Team Member	9.5		
[redacted]	SSHO/UXO	9.5		
[redacted]	Team Member	9.5		
[redacted]	UXO Tech	9.5		
[redacted]	A-Zone	5.5		
[redacted]	A-Zone	5.5		
	Totals	55	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-75 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date	Background	Today	To Date
# soil samples collected		34	# GW samples collected	1	1
EC - 3			**EC-16**		
# GW samples collected		1	# soil samples collected	8	8
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		2
# GW samples collected		1			
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected		1
EC - 28			**EC-29**		
# soil samples collected	9	15	# soil samples collected		6
# GW samples collected		2	# GW samples collected		1
EC-31			**EC-33**		
# GW samples collected		1	# GW samples collected		1
EC - 32			**EC-36**		
# soil samples collected		12	# soil samples collected		17
# GW samples collected		1			

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected		1	# GW samples collected		2
EC - 57B			EC-57C		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			EC-58B		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		1	# GW samples collected		
EC - 58C			Unnamed Tributary		
# GW samples collected		1	# sediment samples collected today		3
			# soil samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Two groundwater locations were sampled (Background well and the resample of EC-33 for hexavalent chromium). The tributary was also resampled for hexavalent chromium including QC samples. Seventeen soil samples were collected in EC-28 and EC-16. Six QC samples were collected (2- Field Duplicates, 1 - MS/MSD, and 2-ERBs). All samples from 10/8/15 were delivered to the courier at 1700.

A-zone was onsite and abandoned all temporary groundwater wells.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 8-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	10/9/2015

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Field Team Lead	2		
[redacted]	SSHO/UXO	2		
[redacted]	Team Member	2		
[redacted]	UXO Tech	2		
	Totals	8	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	55-75 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

IRP Shop Area (Arsenic samples)	Today	To Date	Background	Today	To Date
# soil samples collected		34	# GW samples collected		1
EC - 3			**EC-16**		
# GW samples collected		1	# soil samples collected		8
EC - 21			**EC-22**		
# soil samples collected		33	# GW samples collected		2
# GW samples collected		1			
EC - 25			**EC-27**		
# GW samples collected		1	# GW samples collected		1
EC - 28			**EC-29**		
# soil samples collected		15	# soil samples collected	1	7
# GW samples collected		2	# GW samples collected		1
EC-31			**EC-33**		
# GW samples collected		1	# GW samples collected		1
EC - 32			**EC-36**		
# soil samples collected		12	# soil samples collected		17
# GW samples collected		1			

EC - 49	Today	To Date	EC-52	Today	To Date
# GW samples collected		1	# GW samples collected		2
EC - 57B			EC-57C		
# soil samples collected		14	# soil samples collected		6
# GW samples collected		1			
EC - 57D			EC-58B		
# soil samples collected		13	# soil samples collected		7
# GW samples collected		1	# GW samples collected		
EC - 58C			Unnamed Tributary		
# GW samples collected		1	# sediment samples collected today		3
			# SW samples collected to date		3

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Soil IDW sample collected from one (1) 55-gallon drum containing soil cuttings. Aquious IDW sample collected from three (3) 55-gallon drums containing a mixture of development water, purge water and decontamination water.

Soil sample recollected from EC-29-05 due to broken sampleware during shipping; sample ID: EC-29-05-SO-0.5.

All samples from 10-09-205 were picked up by lab courier at 1420.

CERTIFICATION

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 9-Oct-2015

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	1/19/2016

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Team Member	9		
[redacted]	Team Member	9		
[redacted]	Field Team Lead	9		
	Totals	27	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	15-20 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: None

PRODUCTION DATA

EC-32	Today	To Date	EC-36	Today	To Date
# soil samples collected	40	40	# soil samples collected		
EC - 57B			**EC - 57D**		
# soil samples collected			# soil samples collected		

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Initial issues with the Trimble were fixed following a call to Michelle Chesnut at 9:15. Michelle and Brandon will work on said issues prior to mobilization on Thursday however work-around has been discovered.

Pick-Axe was required to collect all surface samples because ground was frozen. Pick-axe was de-conned following each sampling event.

Trouble collecting soil sample from EC-32-19 due to large rocks encountered in first 12" of soil. Offset of 10ft NW suggested by Michelle Chesnut.

Successfully collected soil sample at EC-32-11, however soil became completely saturated at 4.5ft

Trouble collecting soil sample from EC-32-05 due to large rocks encountered in first 24" of soil. Offset of 10ft SE suggested by Michelle Chesnut. Sample collected at 4ft however soil becomes completed saturated around 5ft, water table appears to be around 4 or 5ft and EC-32 be probelmatic for samples deeper than said depth

Samples were dropped off at Fed-Ex by R. Koroncai

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 19-Jan-2016

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	1/21/2016

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Team Member	9		
[redacted]	Team Member	9		
[redacted]	Field Team Lead	9		
[redacted]	UXO Tech II	9		
	Totals	36	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	15-20 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

EC-32	Today	To Date	EC-36	Today	To Date
# soil samples collected	40	40	# soil samples collected		
EC - 57B			**EC - 57D**		
# soil samples collected	7	7	# soil samples collected	27	27

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Arrival to the site was slightly delayed due to hazardous road conditions.

Pick-Axe was required to collect all surface samples because ground was frozen. Pick-axe was de-conned following each sampling event.

Debris was located north of EC-57D. [redacted] supplied pictures and descriptions to the ERT PM, who coordinated with USACE to determine there were no explosive hazards in that area and work could continue.

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 21-Jan-2016

Curtis Bay DAILY ACTIVITIES REPORT	DATE:	1/22/2016

CONTRACT: USACE[redacted]	PROJECT NAME: Former Curtis Bay Depot, Maryland
PROJECT: Delivery Order 0007	ERT PROJECT NO: 3156

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Team Member	4		
[redacted]	Team Member	4		
[redacted]	Field Team Lead	4		
	Totals	12	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	15-20 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today: [redacted]

PRODUCTION DATA

EC-32	Today	To Date	EC-36	Today	To Date
# soil samples collected	0	40	# soil samples collected	0	0
EC - 57B			**EC - 57D**		
# soil samples collected	24	31	# soil samples collected	0	27

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Pick-Axe was required to collect all surface samples because ground was frozen. Pick-axe was de-conned following each sampling event.

Field activities only conducted for half day due to impending snow storm.

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 22-Jan-2016

Curtis Bay DAILY ACTIVITIES REPORT

DATE: 2/8/2016

CONTRACT: USACE [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Team Member	9		
[redacted]	Team Member	9		
[redacted]	Field Team Lead	9		
	Totals	27	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	20-45 F	Partly Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

None

USACE Representative onsite Today: N/A

PRODUCTION DATA

EC-32	Today	To Date	EC-36	Today	To Date
# soil samples collected	0	40	# soil samples collected	47	47
EC - 57B			**EC - 57D**		
# soil samples collected	0	7	# soil samples collected	0	27

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Collected 47 samples from EC-36 today. No issues were encountered during sampling. Will continue EC-36 sampling on Tuesday.

Samples were dropped off at Fed-Ex by [redacted]

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 8-Feb-2016

Curtis Bay DAILY ACTIVITIES REPORT

DATE: 2/9/2016

CONTRACT: USACE [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Team Member	9		
[redacted]	Team Member	9		
[redacted]	Field Team Lead	9		
	Totals	27	0	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	25-35 F	Freezing Rain/Snow

VERBAL COMMUNICATIONS FROM CUSTOMER

USACE Representative onsite Today:

PRODUCTION DATA

EC-32	Today	To Date	EC-36	Today	To Date
# soil samples collected	0	40	# soil samples collected	12	59
EC - 57B			**EC - 57D**		
# soil samples collected	6	13	# soil samples collected	0	27

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Additional sampling locations for EC-57B were provided by [redacted] based on communications with the USACE PM. Samples were collected from EC-36 and EC-57B today.

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 9-Feb-2016

Curtis Bay DAILY ACTIVITIES REPORT

DATE: 2/10/2016

CONTRACT: USACE [redacted]	**PROJECT NAME: Former Curtis Bay Depot, Maryland**
PROJECT: Delivery Order 0007	**ERT PROJECT NO: 3156**

PERSONNEL HOURS (includes subcontractors)

Name	Position	Hours On-Site	Hours Absent	Reason for Absence/Notes
[redacted]	Team Member	4.5		
[redacted]	Team Member	4.5		
[redacted]	Field Team Lead	4.5		
	Totals	**13.5**	**0**	

SITE VISITORS

NAME	ORGANIZATION	PURPOSE

WEATHER CONDITIONS

PRECIPITATION WITHIN LAST 24 HOURS:	TEMPERATURE RANGE:	WEATHER CONDITIONS:
	25-35 F	Cloudy

VERBAL COMMUNICATIONS FROM CUSTOMER

N/A

USACE Representative onsite Today: N/A

PRODUCTION DATA

EC-32	Today	To Date	EC-36	Today	To Date
# soil samples collected	0	40	# soil samples collected	3	62
EC - 57B			**EC - 57D**		
# soil samples collected	14	27	# soil samples collected	0	27

GENERAL COMMENTS

(Include any delays in work progress, any possible modifications and/or claims, evaluation of work progress to include progress on critical path, work sequence, work behind schedule, proper staffing of trades and conflicts between trades.) Narrative of what was accomplished this date to include subcontractor activities.

Completed the remaining sample collection at EC-36 and EC-57B. All samples have been collected.

On behalf of ERT, I certify that this report is complete and correct and to the best of my knowledge, all equipment and material used and work performed during this reporting period are in compliance with the contract plans and specifications excepted as noted above.

[redacted]

Date: 10-Feb-2016

Trench EC-21-A

Items found – depth

- None



Photograph 1: Trench EC-21-A, facing west to east



Photograph 2: Close-up of asphalt

Trench EC-21-B

Items found – depth

- MD found in first 12 inches along entire 20 foot length of trench, MD items included flash tubes and scrap included small caliber bullets and cartridge cases



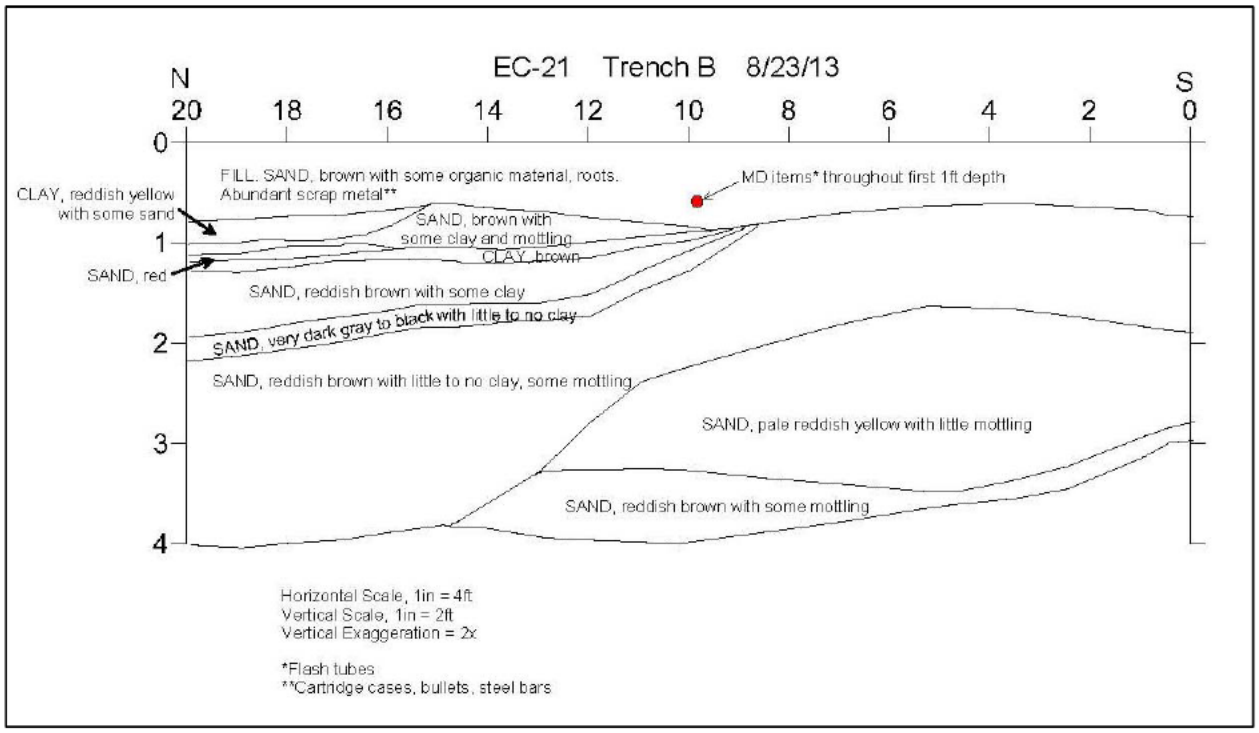
Photograph 3: Flash tubes found in EC-21-B



Photograph 4: Trench EC-21-B – facing north



Photograph 5: Trench EC-21-B soil profile - north to south



Photograph 6: Trench EC-21-B drawing

Trench EC-21-C

Items found – depth

- Scrap and trash material found throughout trench down to four feet.
    - Items included pipes, 55 gallon drums, bungee material, and other metal scrap.



Photograph 7: Bungee material found in EC-21-C



Photograph 8: 55 Gallon drums found in EC-21-C



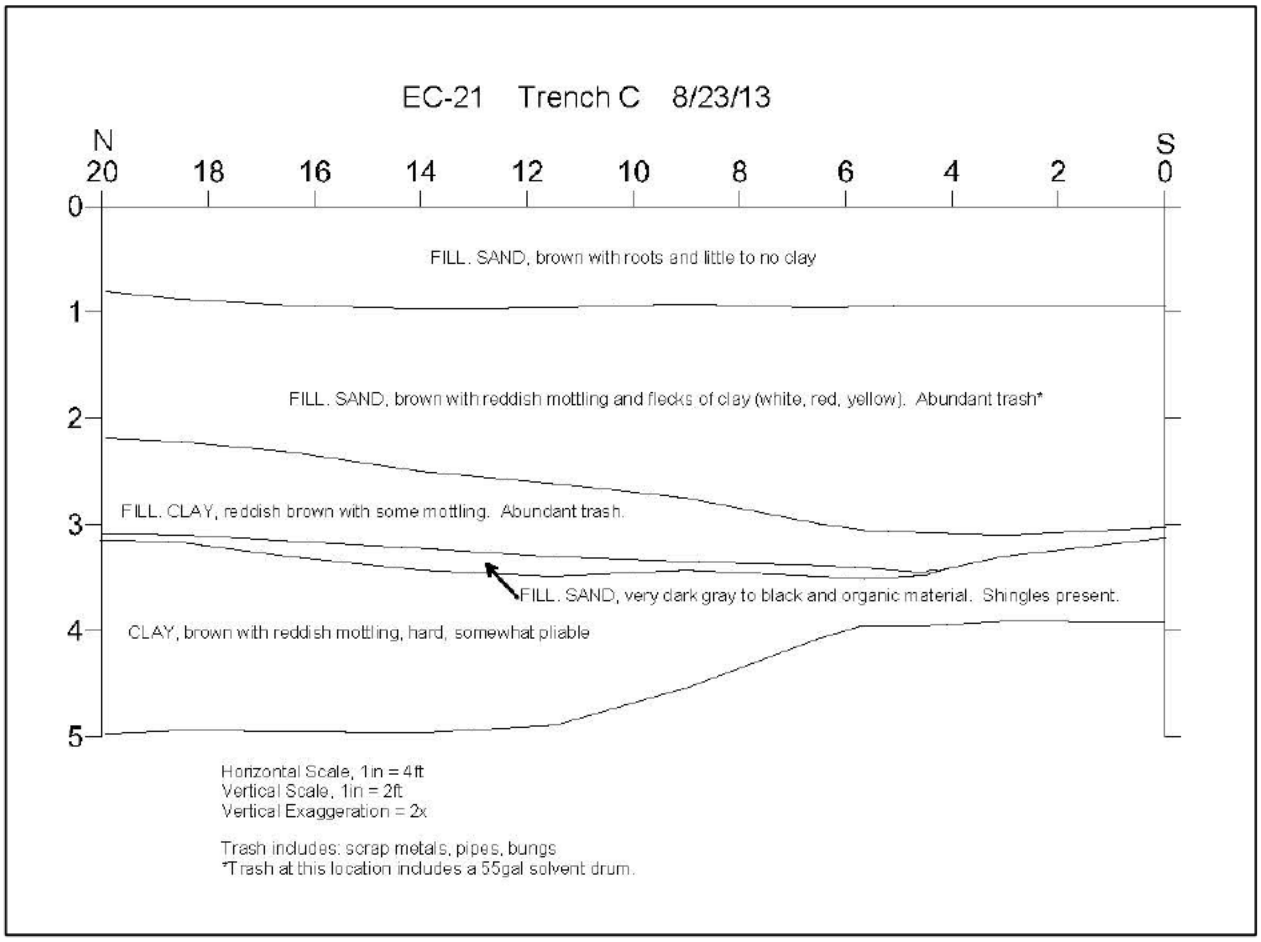
Photograph 9: Scrap wire found in EC-21-C



Photograph 10: Scrap metal found in EC-21-C



Photograph 11: Trench EC-21-C soil profile – north to south



Photograph 12: EC-21-C drawing

Trench EC-25-1

Items found – depth

- Scrap items found within top 12 inches



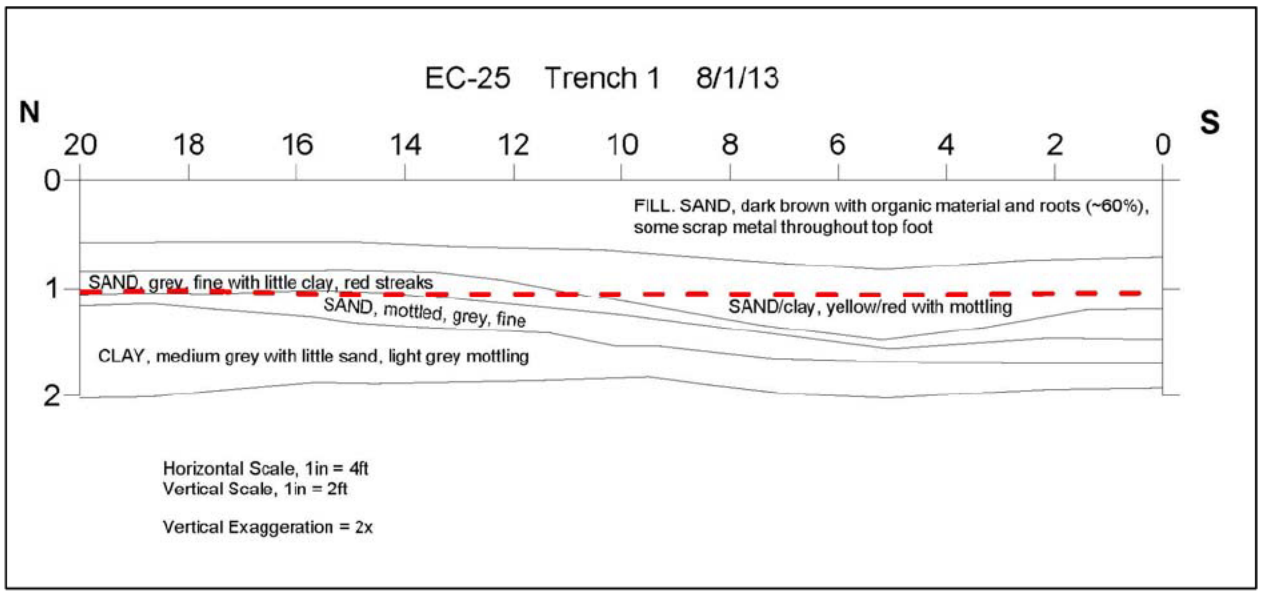
Photograph 13: Trench EC-25-1 facing east – scrap metal in spoils pile



Photograph 14: Trench EC-25-1 facing north



Photograph 15: Trench EC-25-1 soil profile – north to south



Photograph 16: Trench EC-25-1 Drawing

Trench EC-25-2

Items found – depth

- Heavy scrap and some MD founds along entire length and within first 12 inches of trench



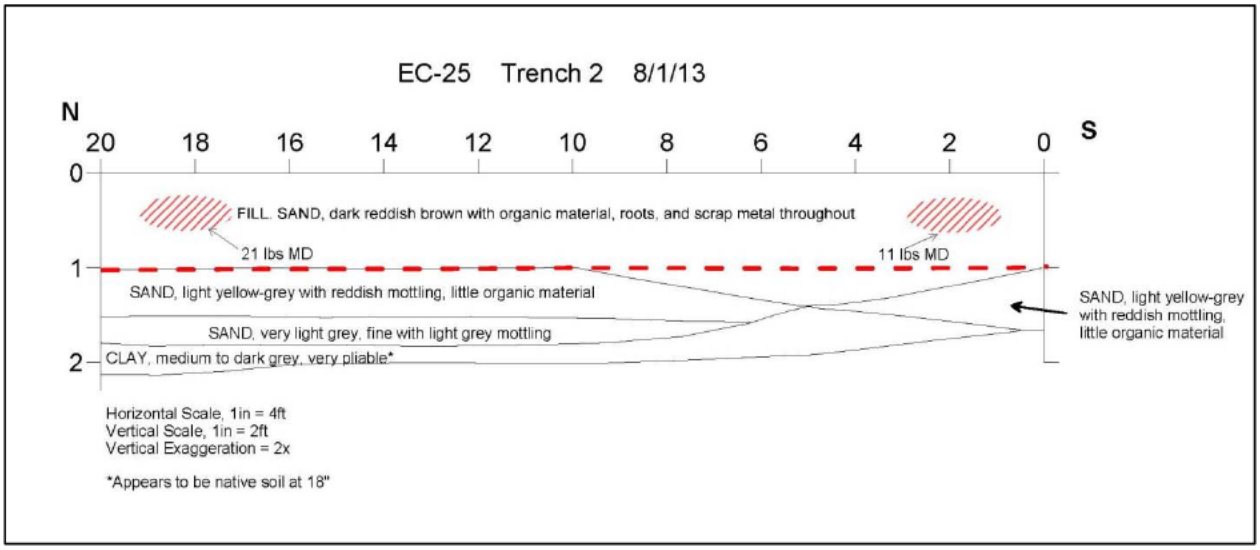
Photograph 17: Trench EC-25-2 spoils



Photograph 18: Trench EC-25-2 facing north



Photograph 19: Trench EC-25-2 soil profile – north to south



Photograph 20: Trench EC-25-2 drawing

Trench EC-25-3

Items found – depth

- Scrap items found within top 12 inches along entire length of trench, items included cables, wires, rod and other metal pieces.



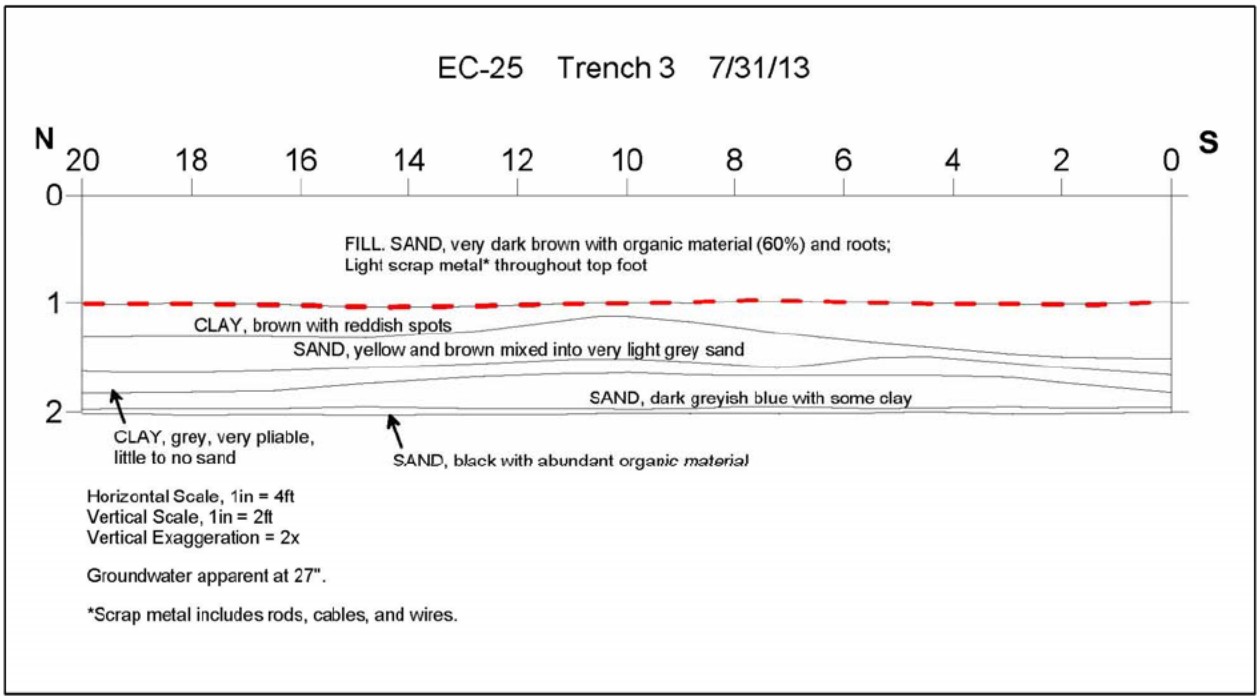
Photograph 21: Trench EC-24-3 facing north



Photograph 22: Close-up of soil profile at 10 foot mark



Photograph 23: Trench EC-25-3 soil profile – north to south



Photograph 24: Trench EC-25-4 drawing

Trench EC-25-5

Items found – depth

- Some rod and cable scrap within top 12 inches



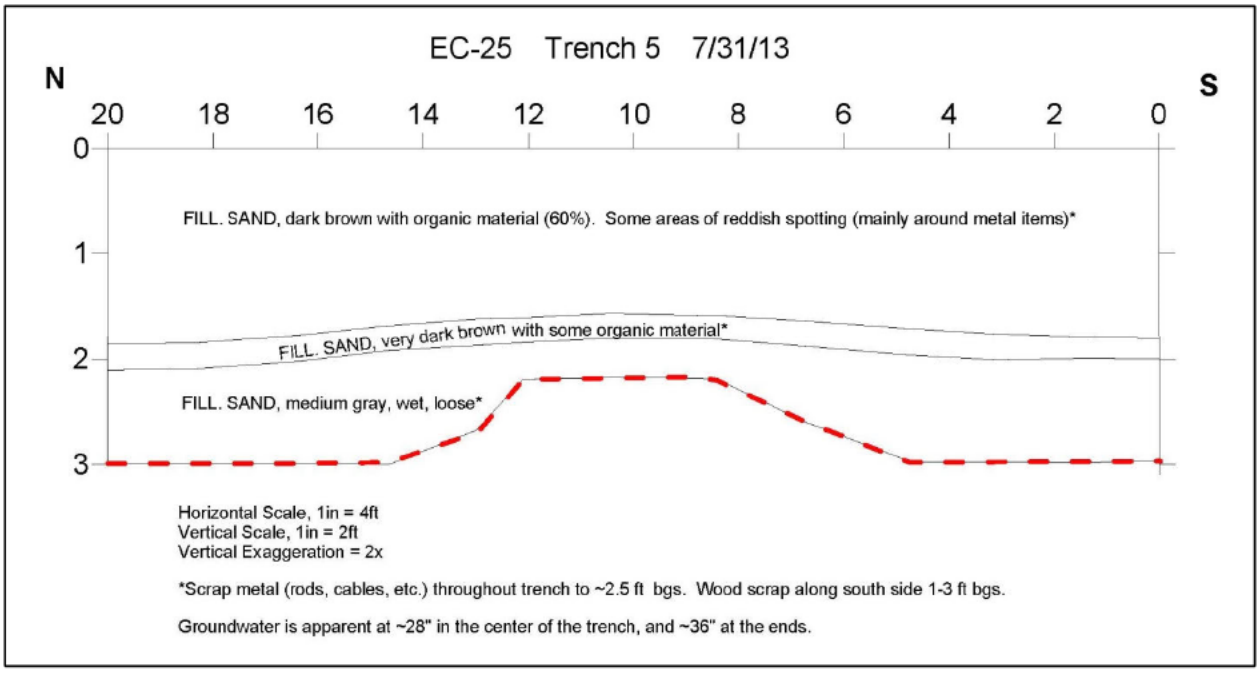
Photograph 25: Trench EC-25-5 spoils – facing east



Photograph 26: Trench EC-25-5 – facing north



Photograph 27: Trench EC-25-5 soil profile – north to south



Photograph 28: Trench EC-25-5 drawing

Trench EC-25-6

Items found – depth

- Light scrap found within top 12 inches



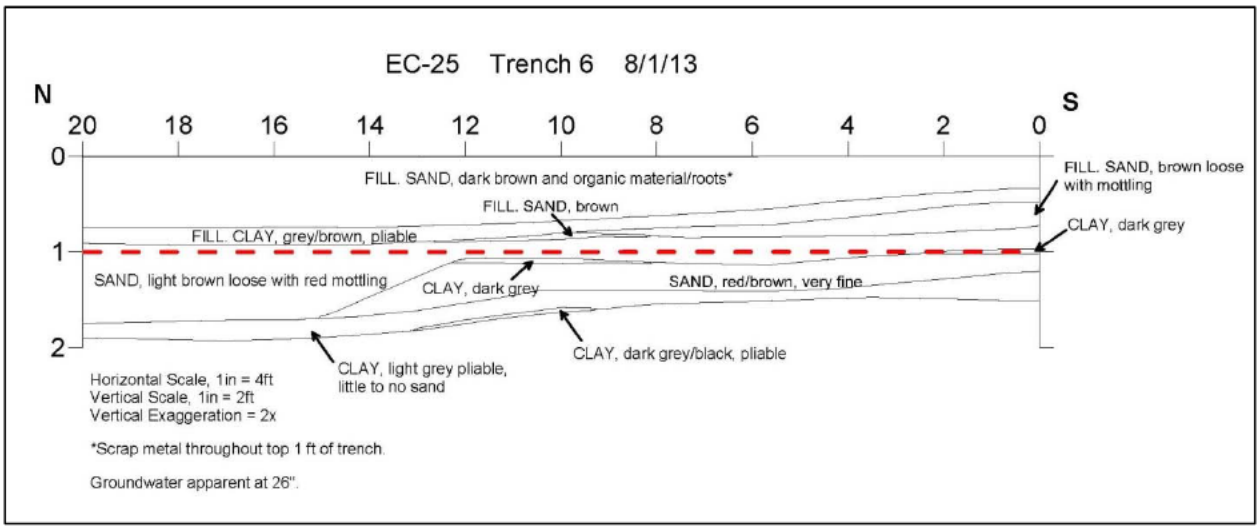
Photograph 29: Trench EC-25-6 spoils



Photograph 30: Trench EC-25-6 facing north



Photograph 31: Trench EC-25-6 soil profile – north to south



Photograph 32: Trench EC-25-6 drawing

Trench EC-25-7

Items found – depth

- Located on top of a culvert



Photograph 33: Zoom in of culvert at the bottom of EC-25-7



Photograph 34: Culvert located directly beneath EC-25-7



Photograph 35: Trench EC-25-7 facing east



Photograph 36: Side wall of EC-25-7 trench

Trench EC-25-8

Items found – depth

- Scrap in abundance down to groundwater on southern end and within top 12 inches along entire trench
- MD found at 12 inches on southern end including flash tubes and cartridge cases.



Photograph 37: Flash tubes from trench



Photograph 38: Metal scrap from trench



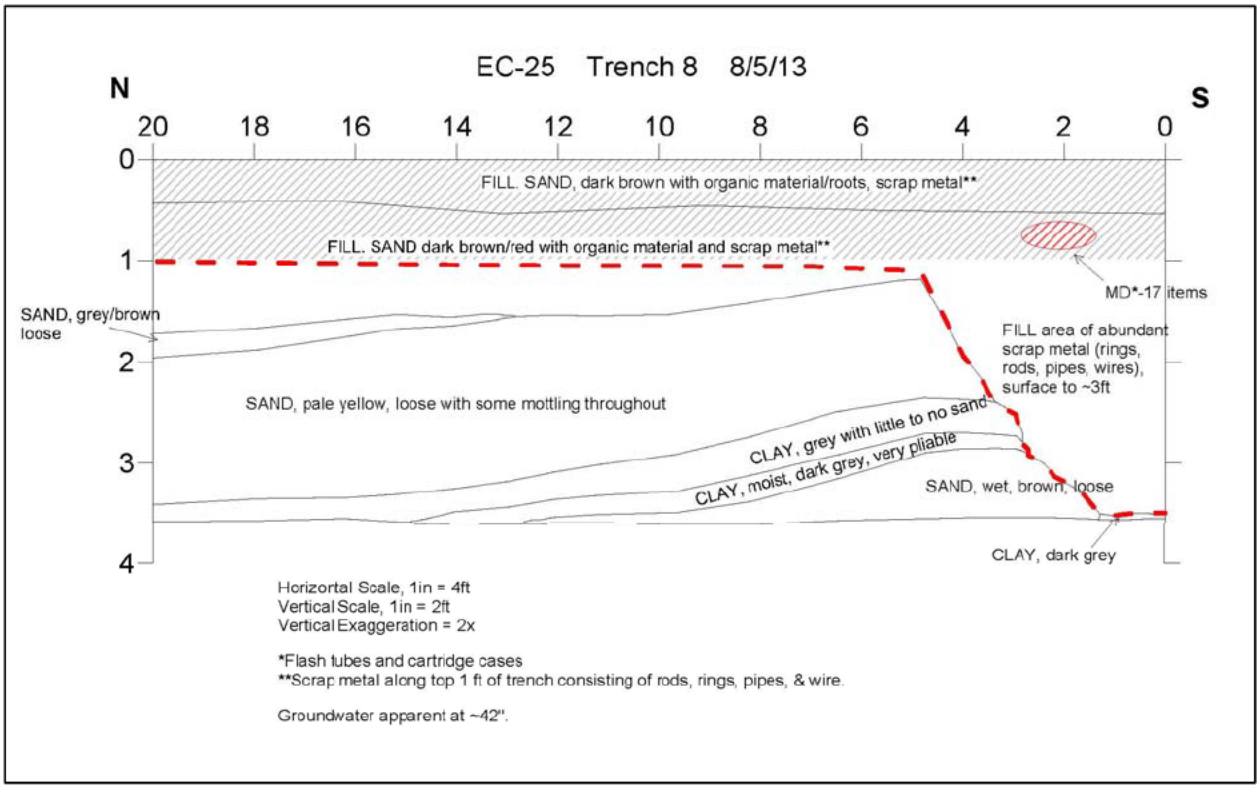
Photograph 39: MD items found within feet of trench



Photograph 40: EC-25-8 trench facing north



Photograph 41: Trench EC-25-8 soil profile – north to south



Photograph 42: Trench EC-25-8 drawing

Trench EC-25-9

Items found – depth

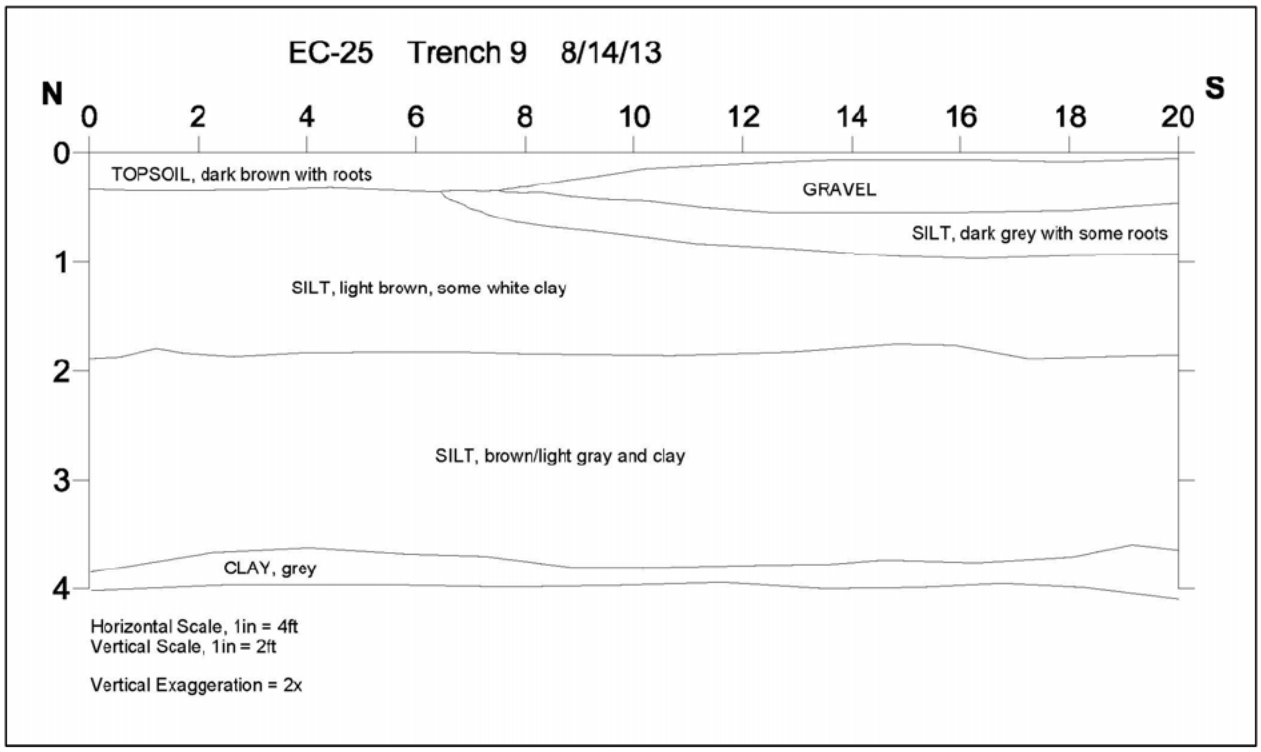
- None



Photograph 43: Trench EC-25-9 facing north



Photograph 44: Trench EC-25-9 north to south



Photograph 45: Trench EC-25-9 drawing

Trench EC-25-10

Items Found – Depth

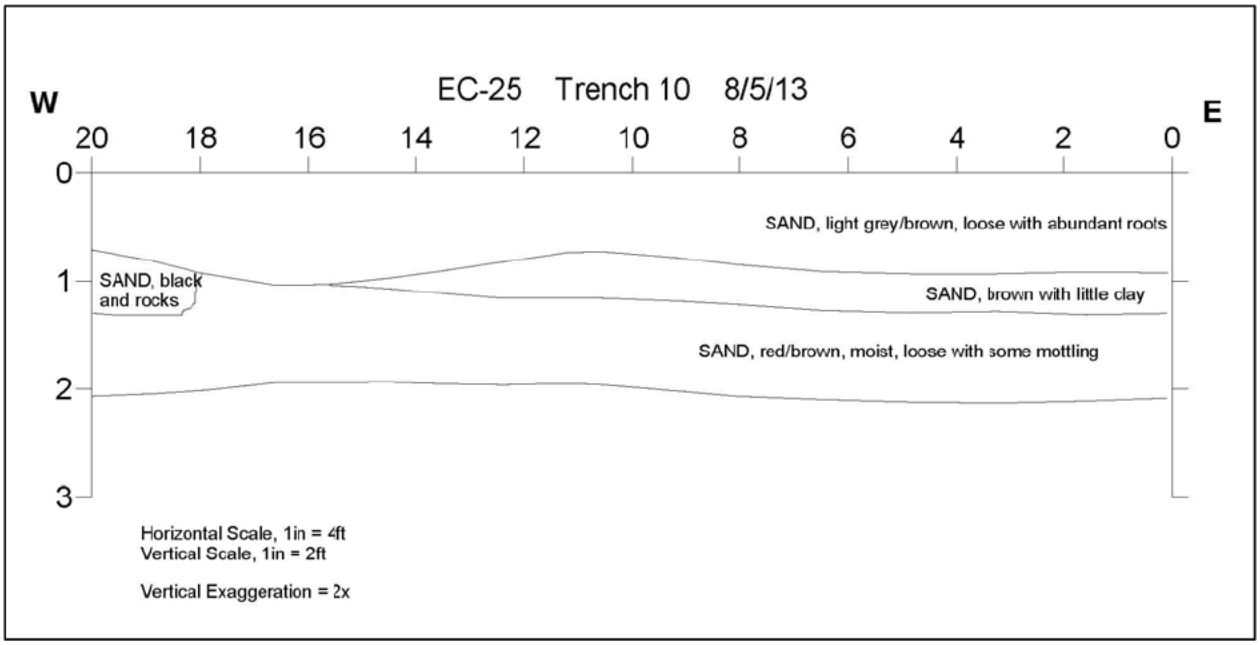
- None



Photograph 46: Trench EC-25-10 facing west



Photograph 47: Trench EC-25-10 soil profile – west to east



Photograph 48: Trench EC-25-10 drawing

Trench EC-25-11

Items found – depth

- Propellant ring found in west slope spoils – depth unknown
- Brick, scrap, building materials, and munitions shipping materials (not MD) throughout top three feet of the entire trench
- Railroad rail on south end at 36 inches depth



Photograph 49: Scrap items found



Photograph 50: Rail at three feet at south end



Photograph 51: Rail found on west sidewall of trench



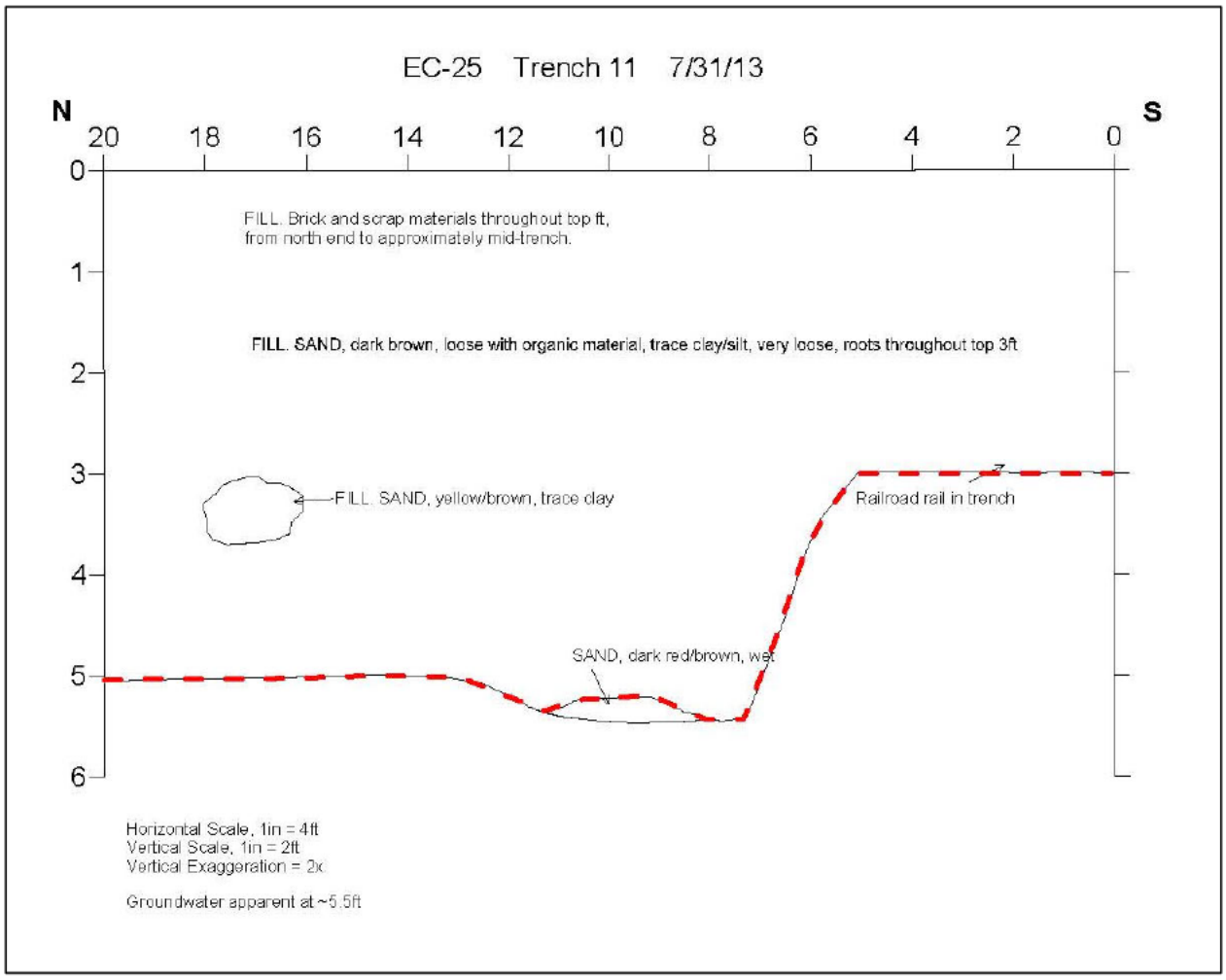
Photograph 52: Scrap metal



Photograph 53: Trench EC-25-11 facing north



Photograph 54: Trench EC-25-11 soil profile – north to south



Photograph 55: Trench EC-25-11 drawing

Trench EC-25-12

Items found – depth

- MD items (17 lbs) found within top 12 inches on north end, items included 105 cartridges
- Small arms cases, small arms brass, and shipping containers found throughout top 18 inches along entire trench



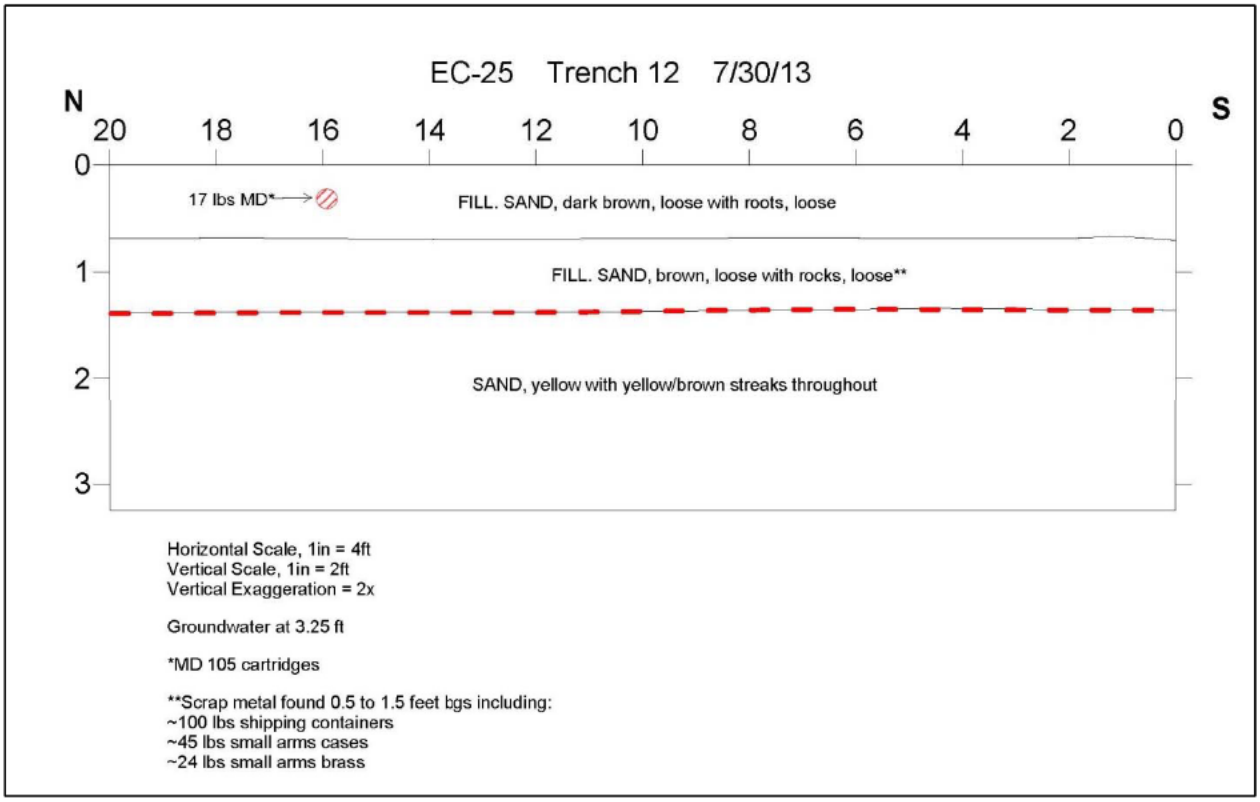
Photograph 56: Scrap and MD items



Photograph 57: Trench EC-25-12 facing south



Photograph 58: East wall of trench



Photograph 59: Trench EC-25-12 drawing

Trench EC-25-13

Items found – depth

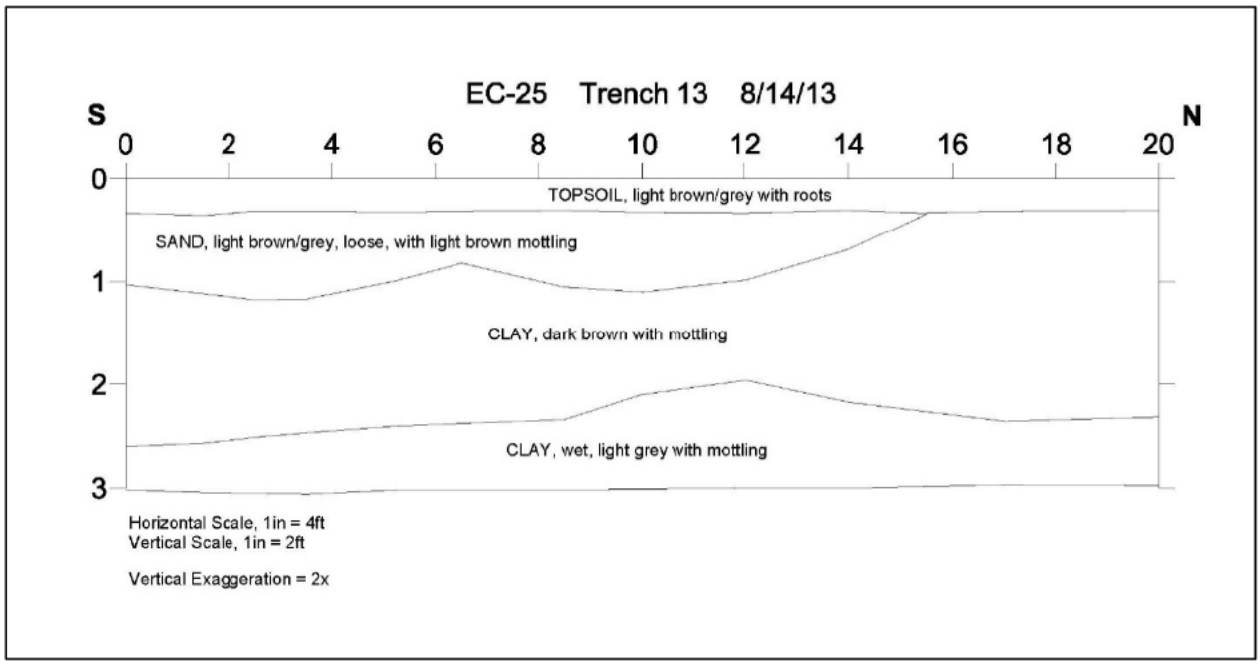
- None



Photograph 60: Trench EC-25-13 facing north



Photograph 61: Trench EC-25-13 soil profile – south to north



Photograph 62: Trench EC-25-13 drawing

Trench EC-25-14

Items found – depth

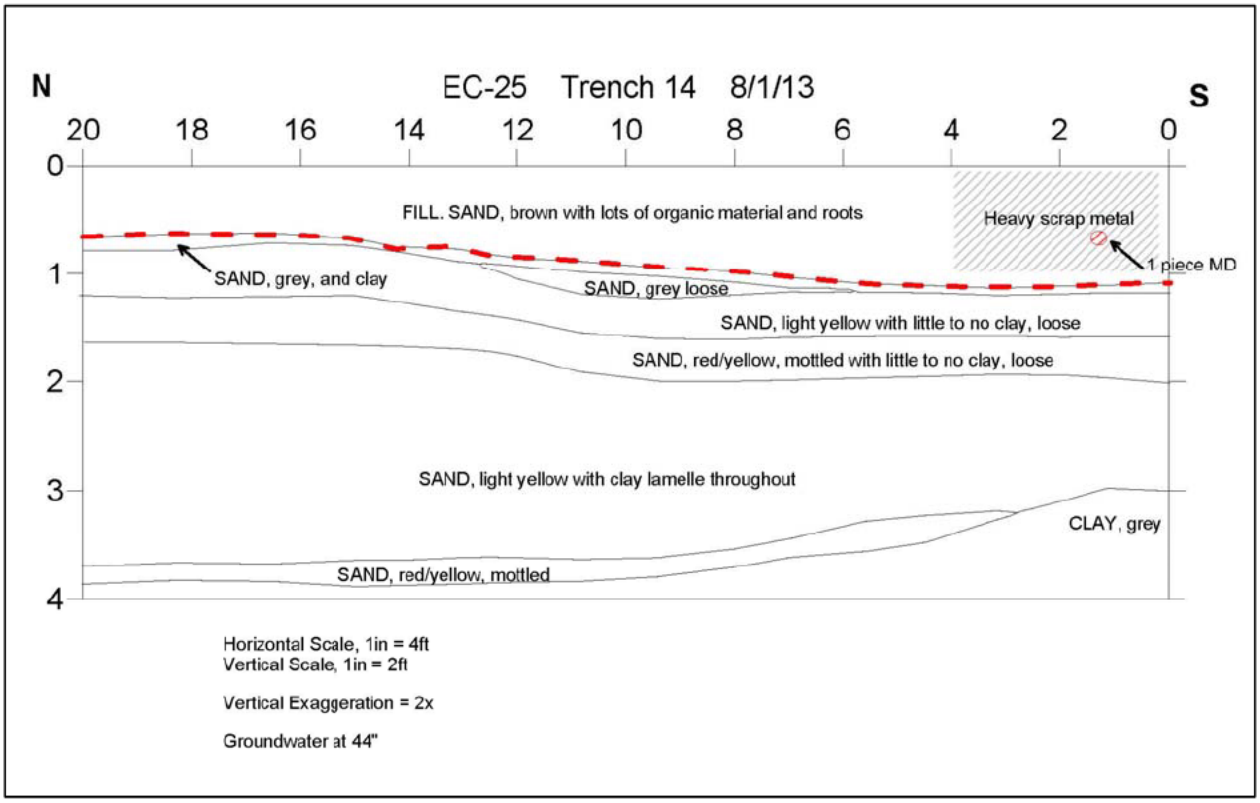
- Heavy scrap metal and one MD item found within top 12 inches on south end



Photograph 63: Trench EC-25-14 facing north



Photograph 64: Trench EC-25-14 soil profile – north to south



Photograph 65: EC-25-14 drawing

Trench EC-25-15

Items found – depth

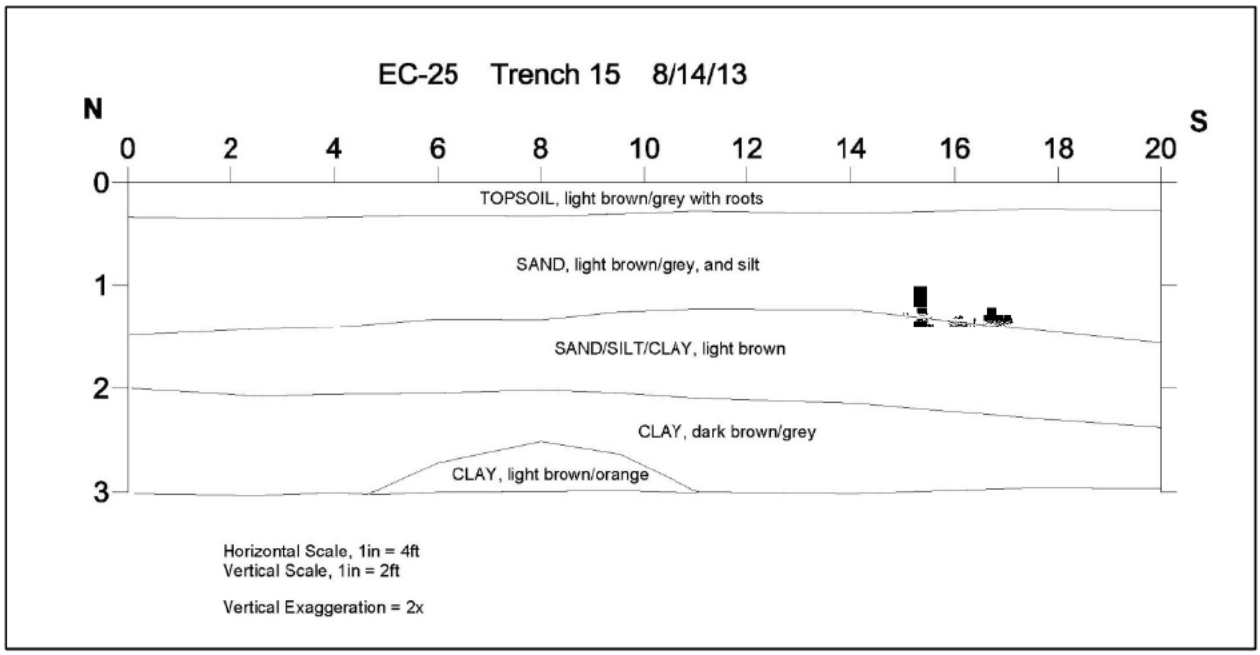
- Scrap metal on surface



Photograph 66: Metal on surface



Photograph 67: EC-25-15 soil profile – north to south



Photograph 68: Trench EC-25-15 drawing

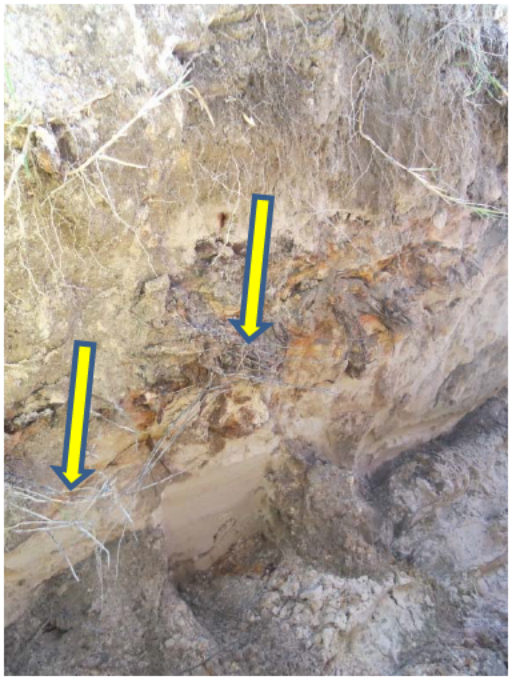
Trench EC-25-16

Items found – depth

- Empty barrel and wire found at two feet depth on south end
- Horizontal line of wire mat at 14 inches depth on north end for eight feet



Photograph 69: Scrap metal from trench



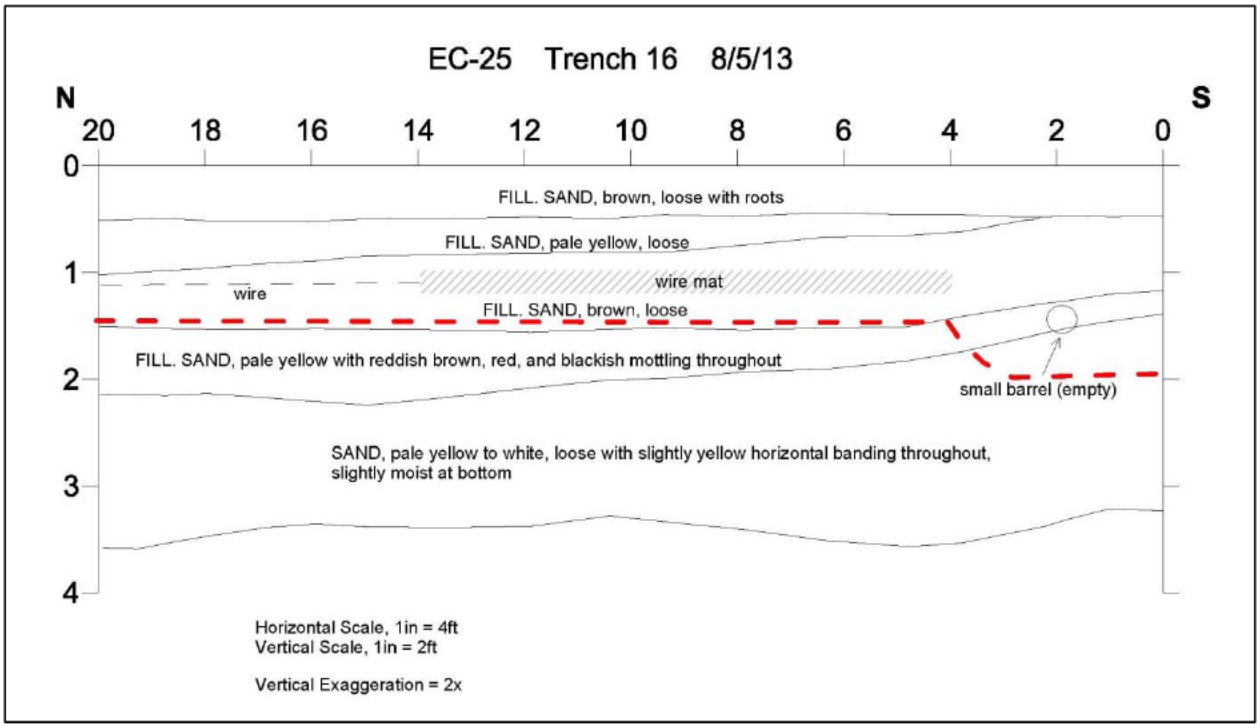
Photograph 70: Metal wire at 14 inches depth



Photograph 71: Trench EC-25-16 facing north



Photograph 72: Trench EC-25-16 soil profile – north to south



Photograph 73: Trench EC-25-16 drawing

Trench EC-25-17

Items found – depth

- Heavy amounts of scrap throughout entire trench past six feet depth
- MD found at two foot depth on south end



Photograph 74: Spoils from trench



Photograph 75: Intact glass bottle



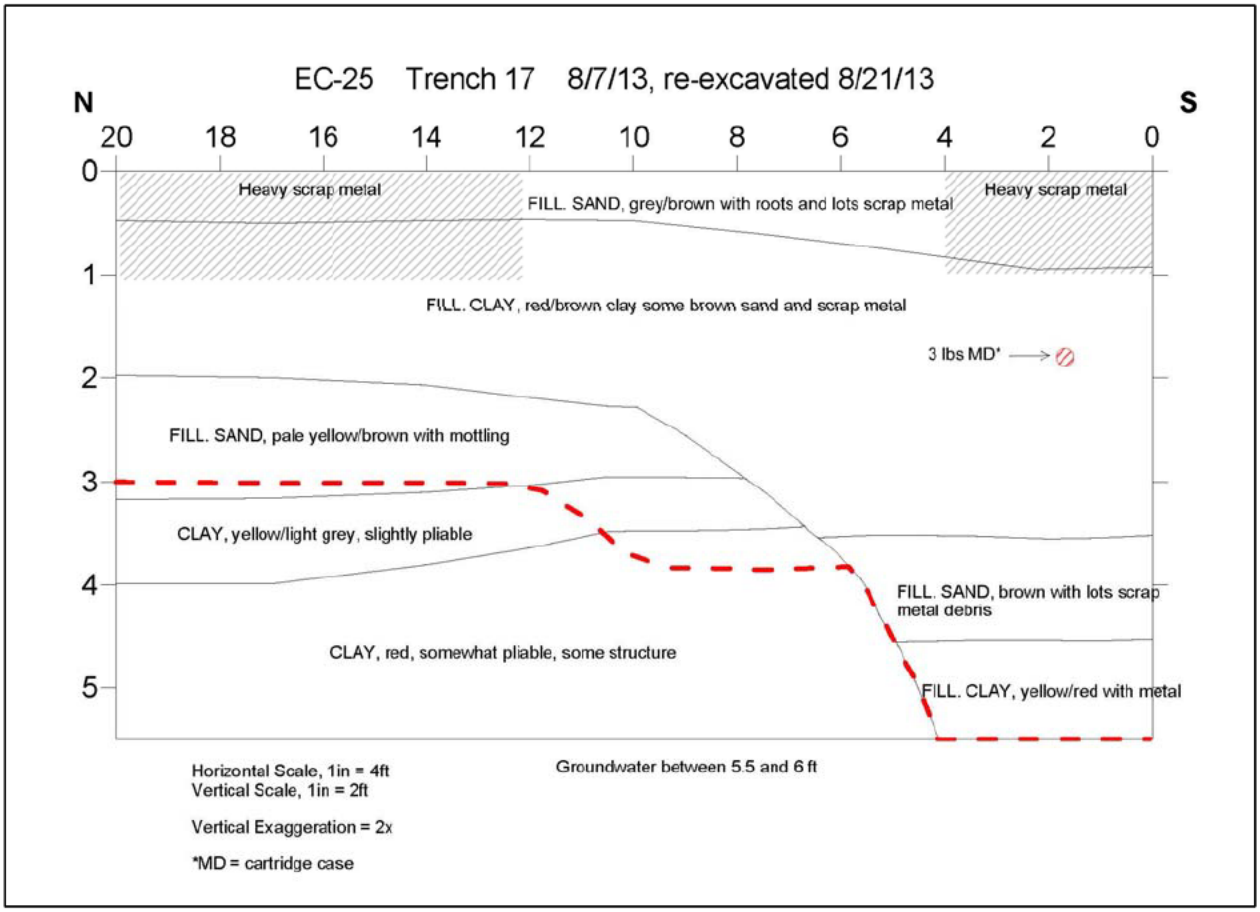
Photograph 76: Rusted metal at six feet depth at three feet north of south end



Photograph 77: Trench EC-25-17 facing north



Photograph 78: Trench EC-25-17 soil profile – north to south



Photograph 79: Trench EC-25-17 drawing

Trench EC-25-18

Items found – depth

- Concrete block and iron bar on east side of trench extending past depth of trench on north end



Photograph 80: Concrete block on east wall



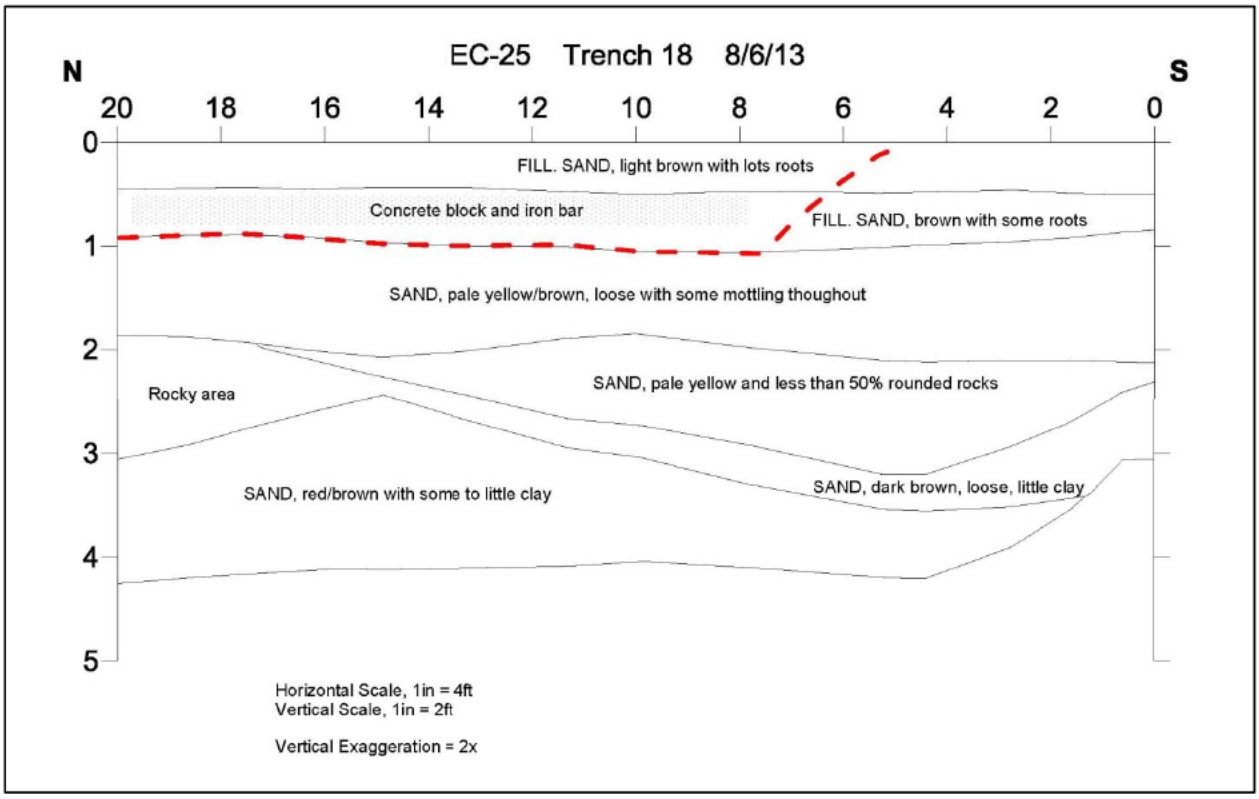
Photograph 81: Trench EC-25-18 facing north



Photograph 82: Soil profile on west wall opposite of concrete block



Photograph 83: Trench EC-25-18 soil profile – north to south



Photograph 84: Trench EC-25-18 drawing

Trench EC-25-19

Items found – depth

- None



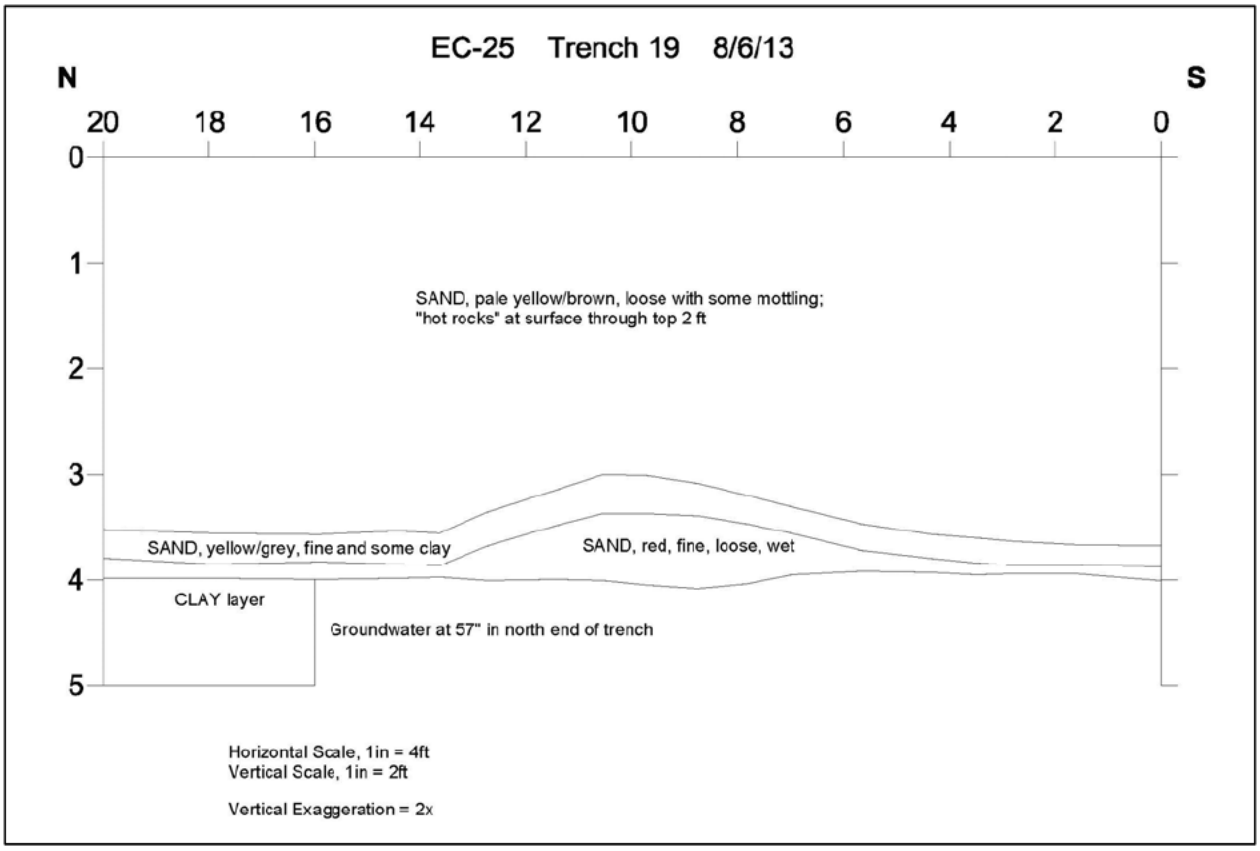
Photograph 85: Trench EC-25-19 facing north



Photograph 86: Soil profile close-up



Photograph 87: Trench EC-25-19 soil profile – north to south



Photograph 88: Trench EC-25-19 drawing

Trench EC-25-20

Items found – depth

- Scrap items including drums, wire, and other metal throughout top two feet of entire trench going to three feet at north end



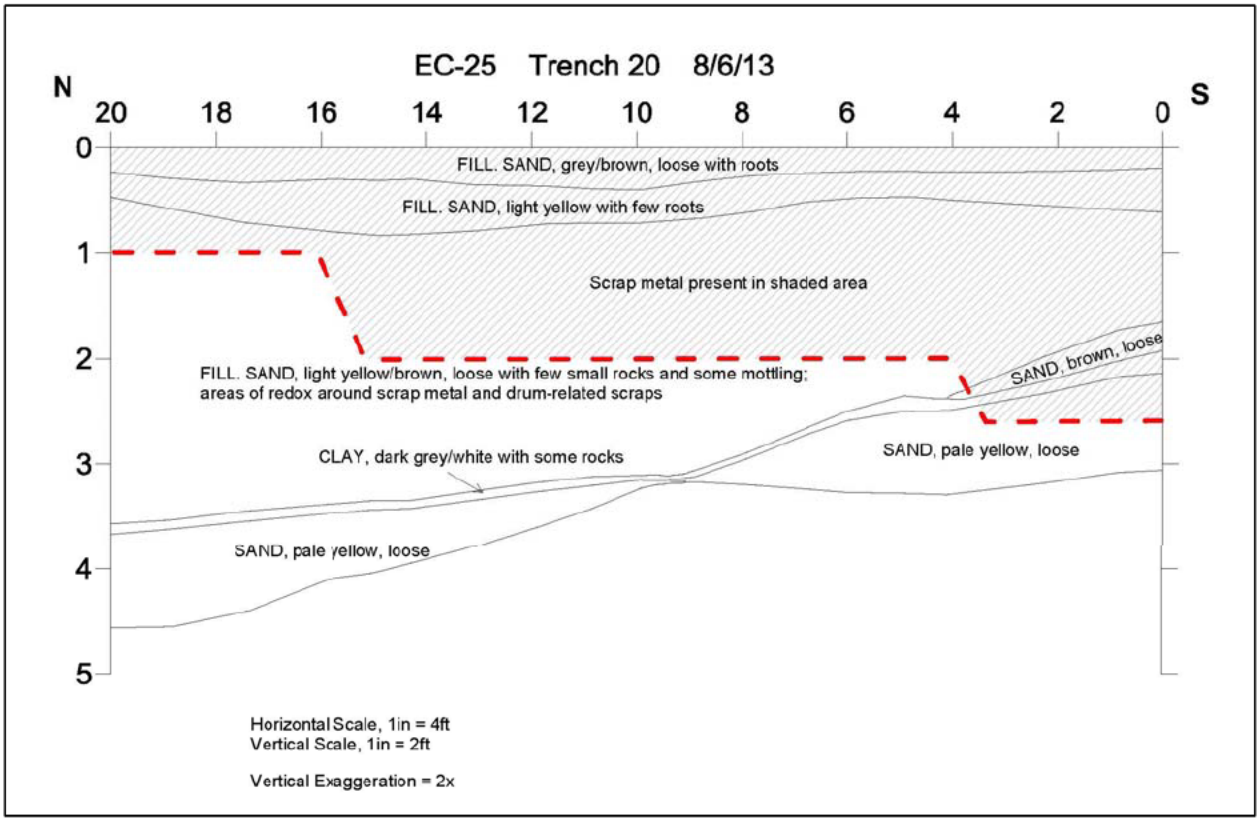
Photograph 89: Scrap barrels



Photograph 90: Trench EC-25-20 facing north



Photograph 91: Trench EC-25-20 soil profile – north to south



Photograph 92: Trench EC-25-20 drawing

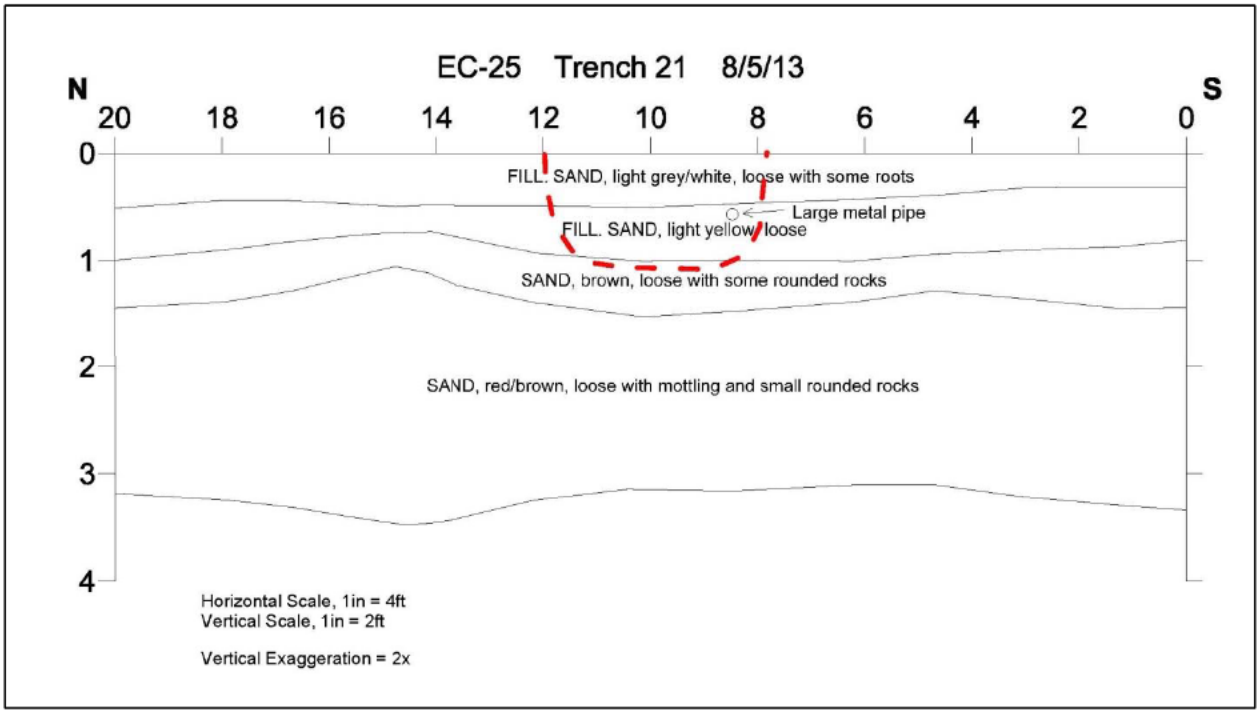
Trench EC-25-21

Items found – depth

- Large metal pipe at the center of the trench about 6 inches depth



Photograph 93: Trench EC-25-21 facing north – pip sticking upwards



Photograph 94: Trench EC-25-21 drawing

Trench EC-25-22

Items found – depth

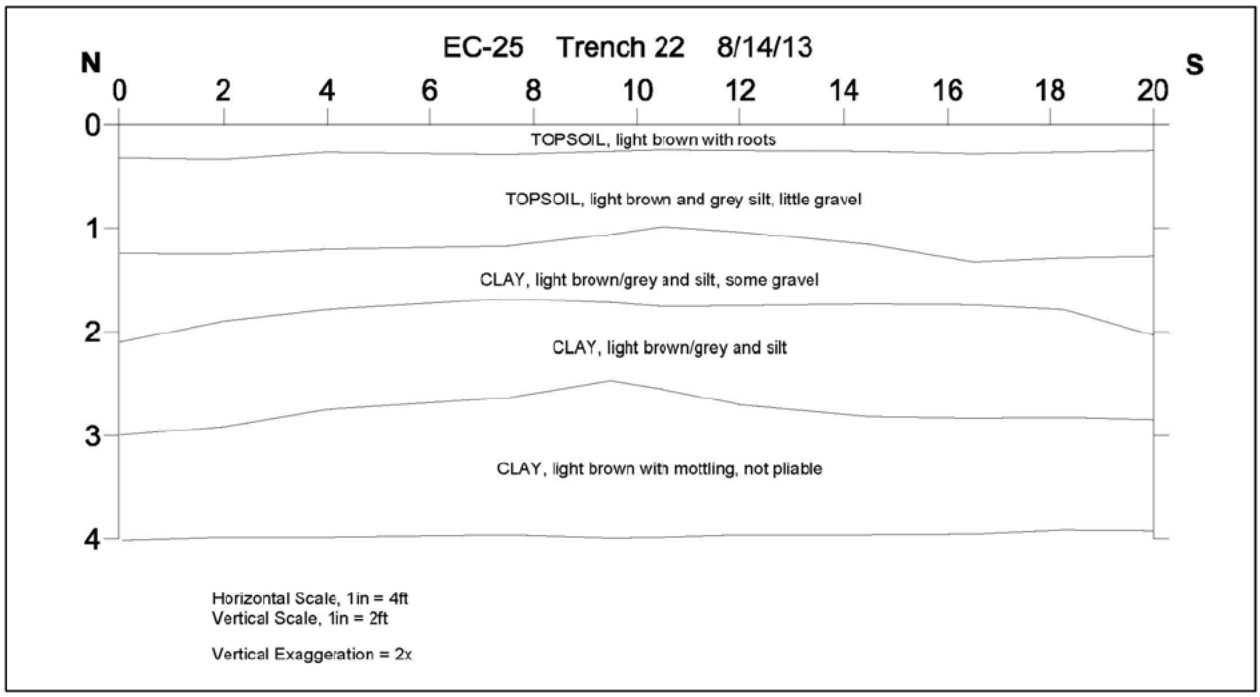
- None



Photograph 95: Trench EC-25-22 facing north



Photograph 96: Trench EC-25-22 soil profile – north to south



Photograph 97: Trench EC-25-22 drawing

Trench EC-25-23

Items found – depth

- Scrap throughout top two feet of entire trench



Photograph 98: Scrap from trench



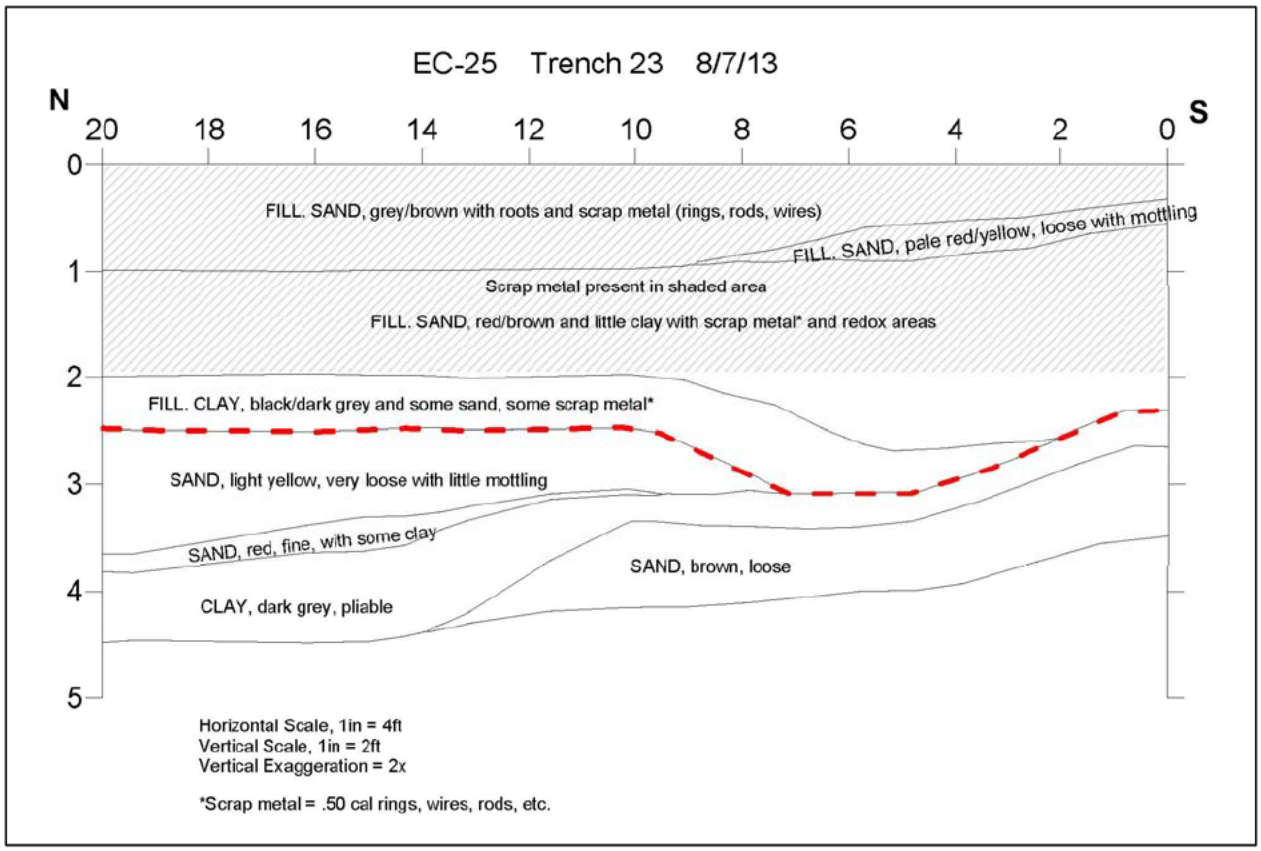
Photograph 99: Additional scrap from trench



Photograph 100: Trench EC-25-23 facing north



Photograph 101: Trench EC-25-23 soil profile – north to south



Photograph 102: Trench EC-25-23 drawing

Trench EC-25-24

Items found – depth

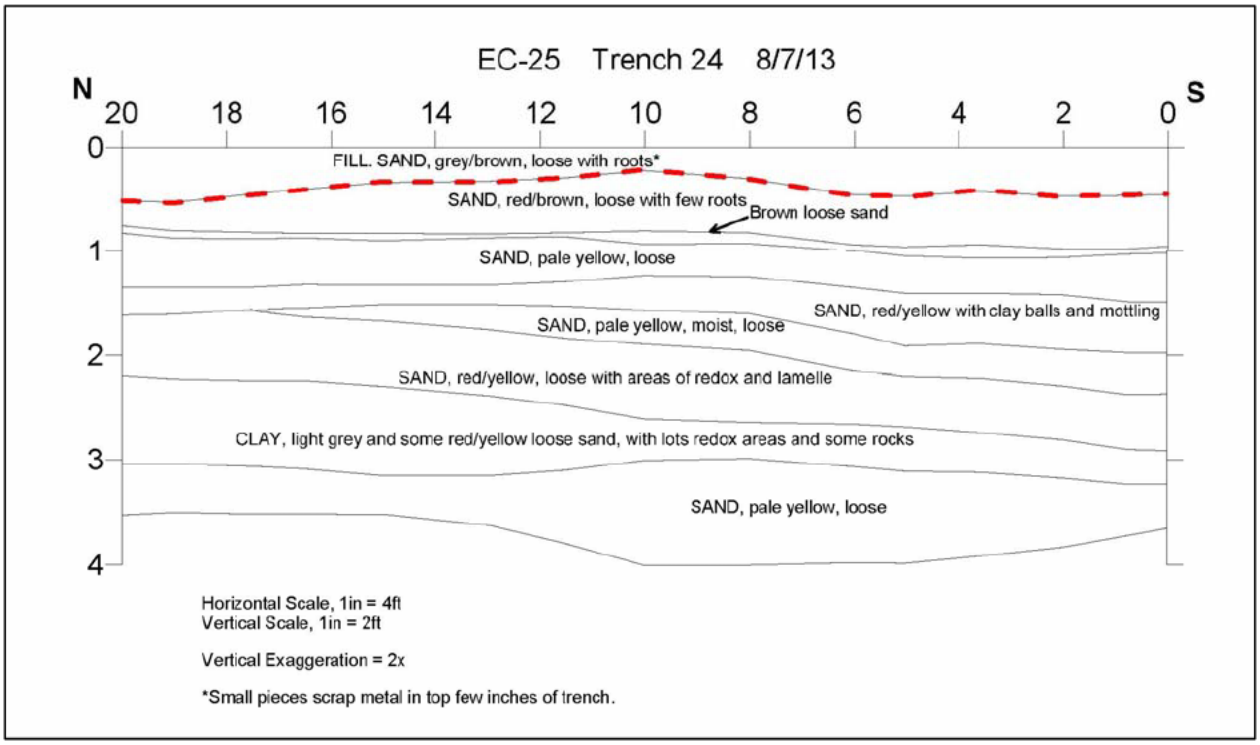
- None



Photograph 103: Trench EC-25-24 facing south



Photograph 104: Trench EC-25-24 soil profile – south to north



Photograph 105: Trench EC-25-24 drawing

Trench EC-25-25

Items found – depth

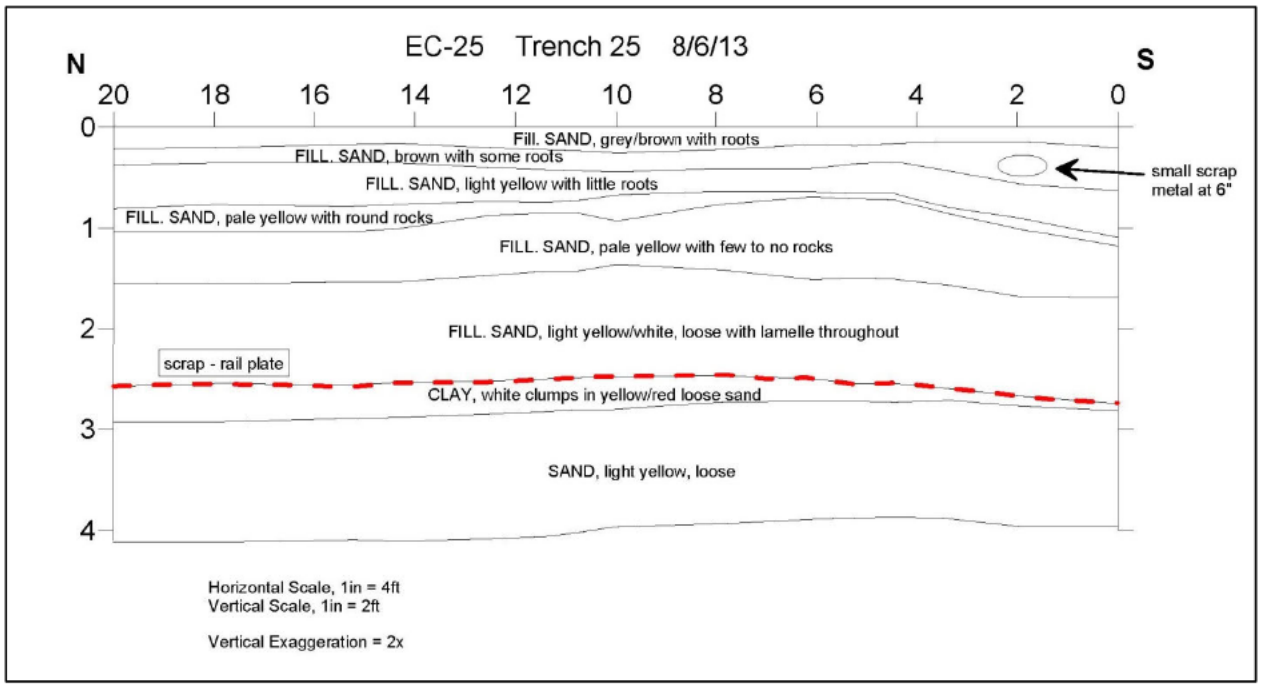
- Rail plate at three feet on north end
- Small scrap within first foot on south end



Photograph 106: Trench EC-25-25 facing north



Photograph 107: Trench EC-25-25 soil profile – north to south



Photograph 108: Trench EC-25-25 drawing

Trench EC-25-26

Items found – depth

- 105 cartridge cases along entire length of trench within top 12 inches
- Brass and additional cartridge cases in depths up to four feet



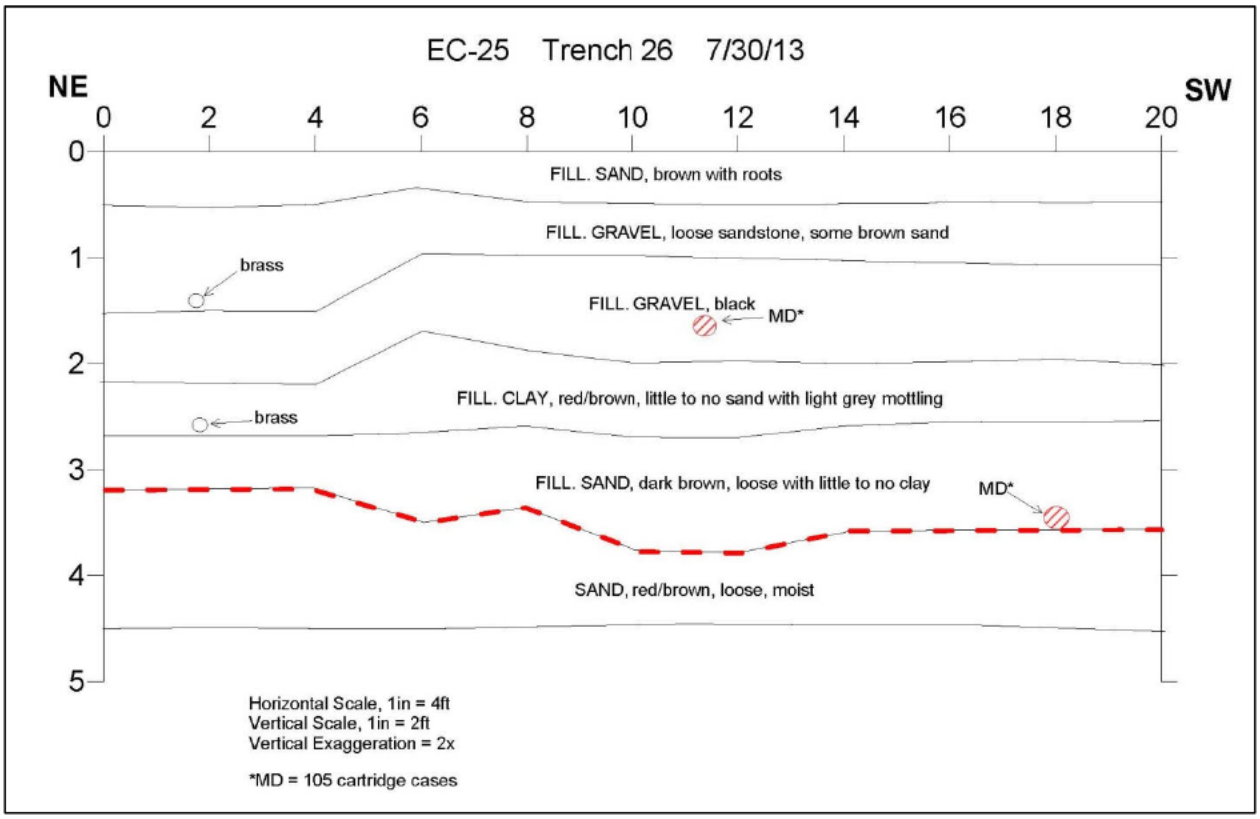
Photograph 109: Cartridges cases and brass



Photograph 110: 105 Cartridge case



Photograph 111: Trench EC-25-26 soil profile close-up



Photograph 112: Trench EC-25-26 drawing

Trench EC-25-27

Items found – depth

- Scrap (shipping containers) found at two feet along north end and at south end



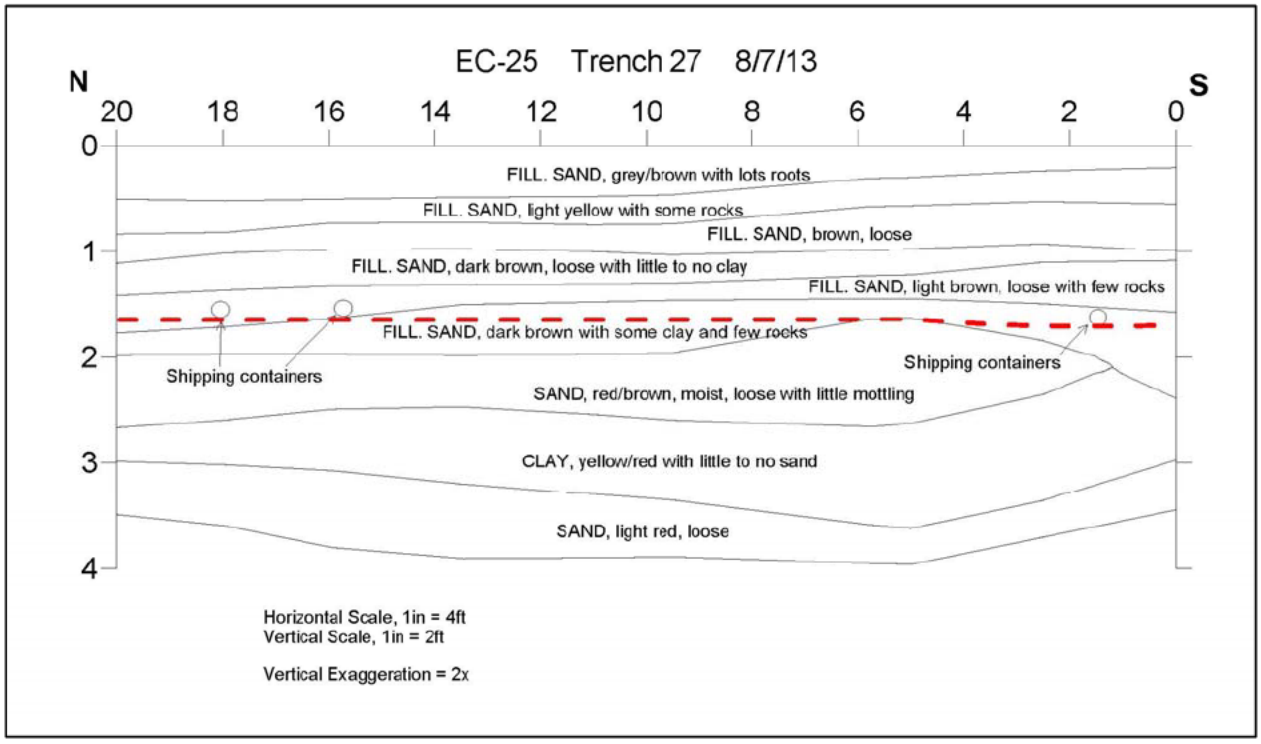
Photograph 113: Shipping containers



Photograph 114: Trench EC-25-27 facing north



Photograph 115: Trench EC-25-27 soil profile – north to south



Photograph 116: Trench EC-25-27 drawing

Trench EC-25-28

Items found – depth

- Trench located on top of a railroad line within top six inches of the surface



Photograph 117: Railroad tracks through trench line



Photograph 118: Test pit 30 inches west of trench

Trench EC-49-A

Items found – depth

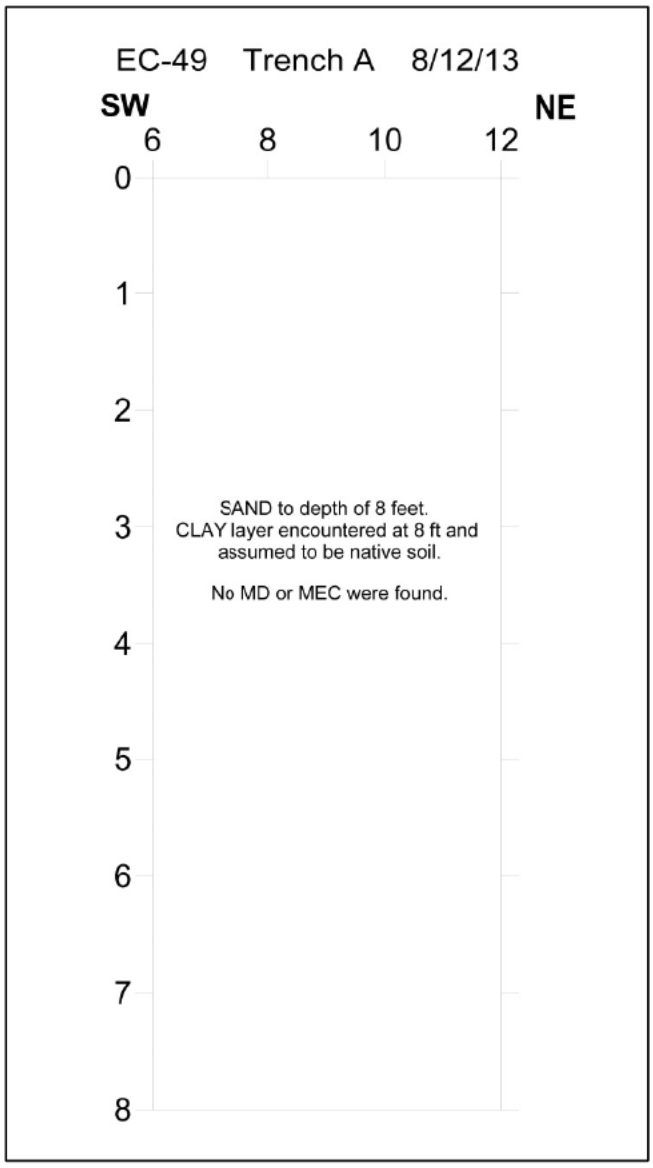
- None



Photograph 119: Trench EC-49-A facing southwest



Photograph 120: Trench EC-49-A side wall

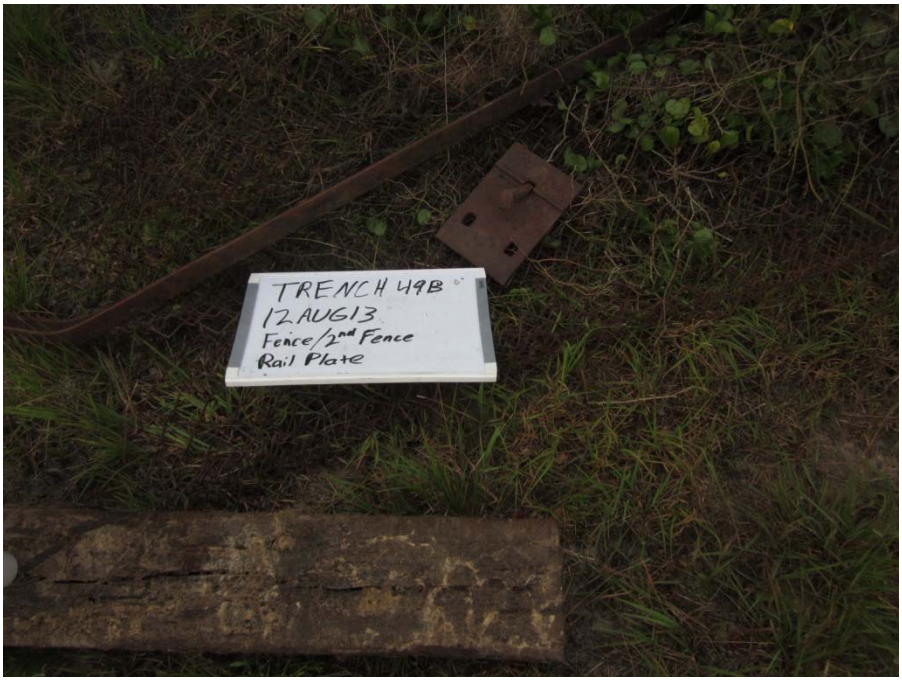


Photograph 121 Trench EC-49-A drawing

Trench EC-49-B

Items found – depth

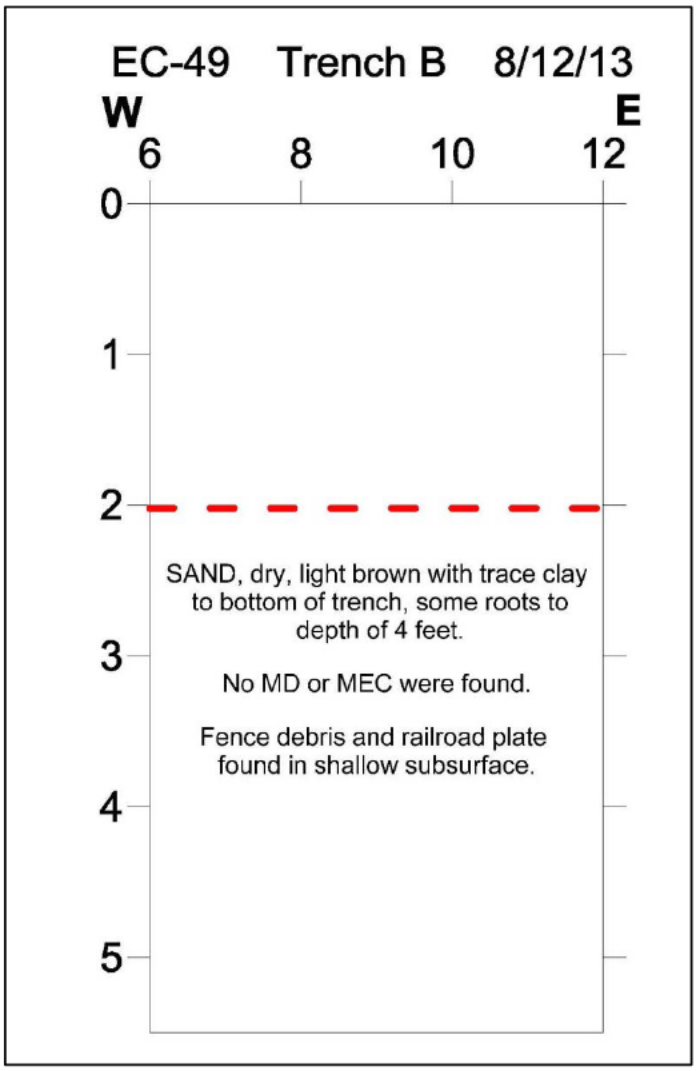
- Fence pieces and rail plate



Photograph 122: Fence pieces and rail plate



Photograph 123: Trench EC-49-B facing east



Photograph 124: Trench EC-49-B drawing

Trench EC-49-C

Items found – depth

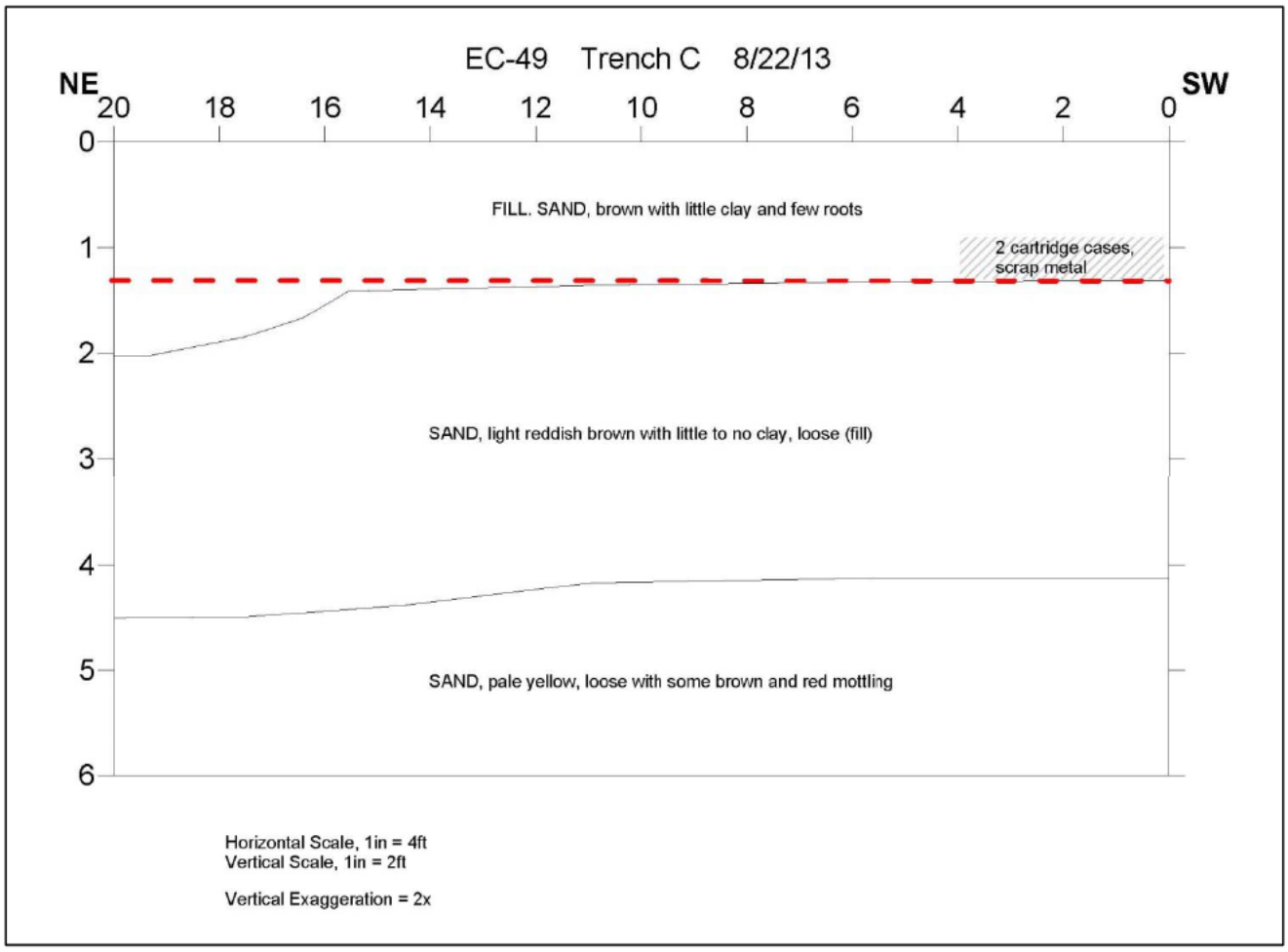
- Two cartridge cases and other scrap metal found at one foot depth on southwest end



Photograph 125: Trench EC-49-C facing northeast



Photograph 126: Trench EC-49-C soil profile - northeast to southwest



Photograph 127: Trench EC-49-C drawing

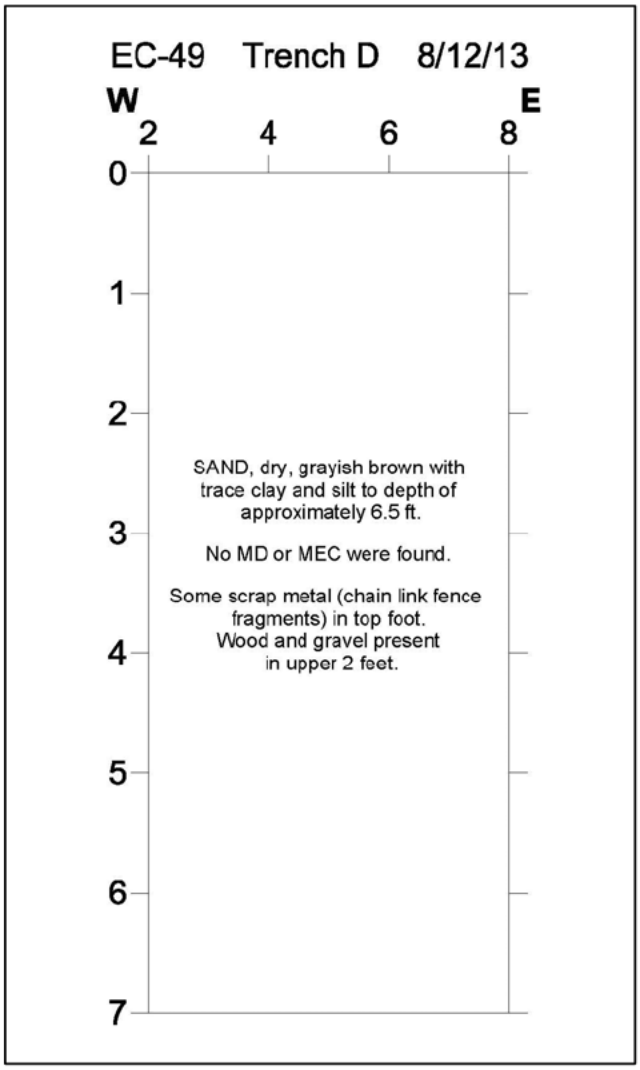
Trench EC-49-D

Items found – depth

- Some scrap metal in top foot (chain link fence)



Photograph 128: Trench EC-49-D facing northeast



Photograph 129: Trench EC-49-D drawing

Trench EC-49-E

Items found – depth

- Two shipping plus and little other scrap metal found at one foot near center of trench



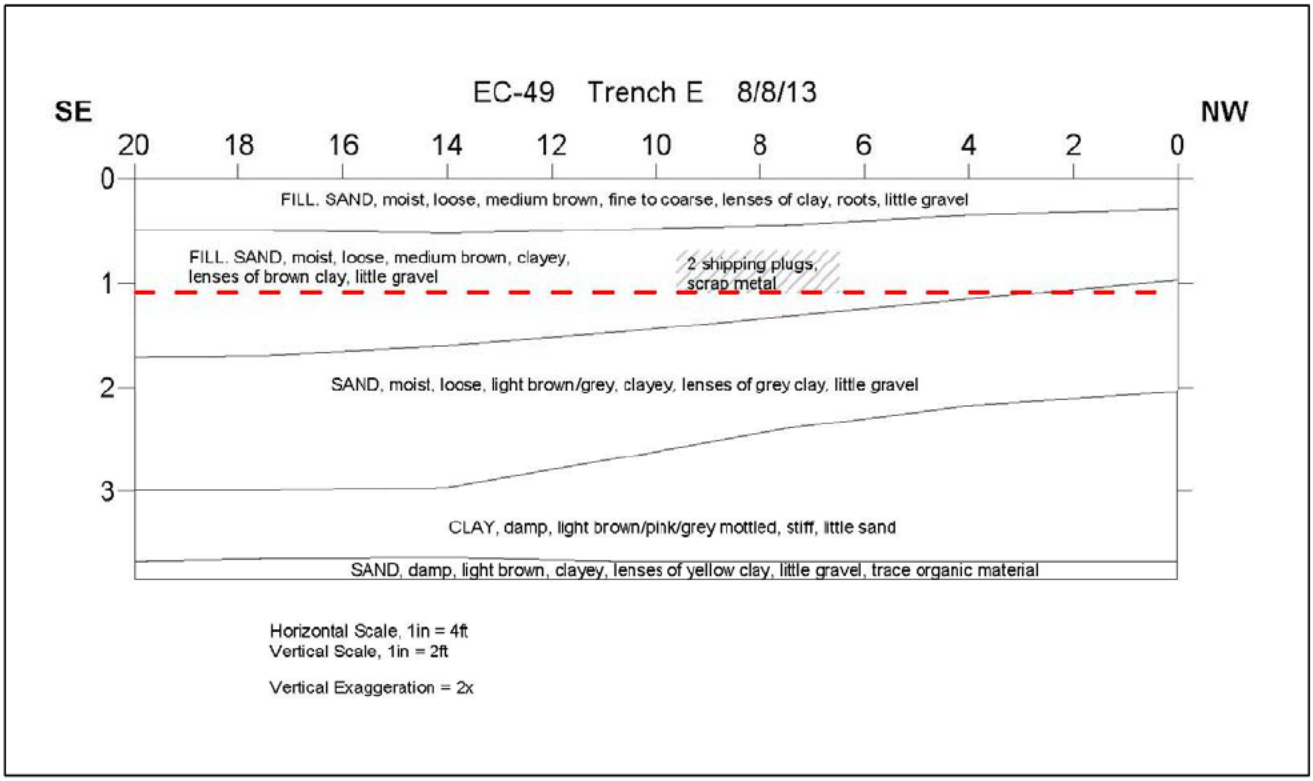
Photograph 130: Shipping Plugs



Photograph 131: Trench EC-49-E facing north



Photograph 132: Trench EC-49-E side wall close-up



Photograph 133: Trench EC-49-E drawing

Trench EC-49-F

Items found – depth

- Scrap metal throughout top foot of trench



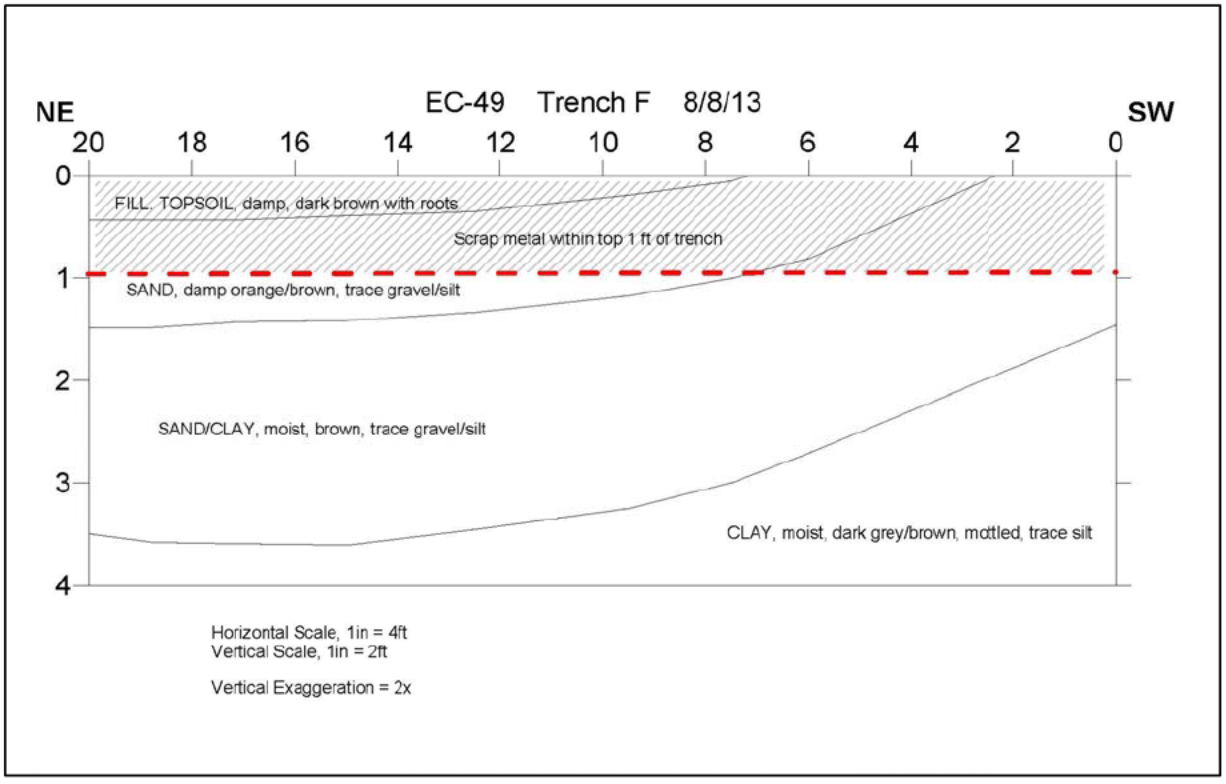
Photograph 134: Scrap metal from trench



Photograph 135: Trench EC-49-F facing north



Photograph 136: Trench EC-49-F side wall close-up



Photograph 137: Trench EC-49-F drawing

Trench EC-49-G

Items found – depth

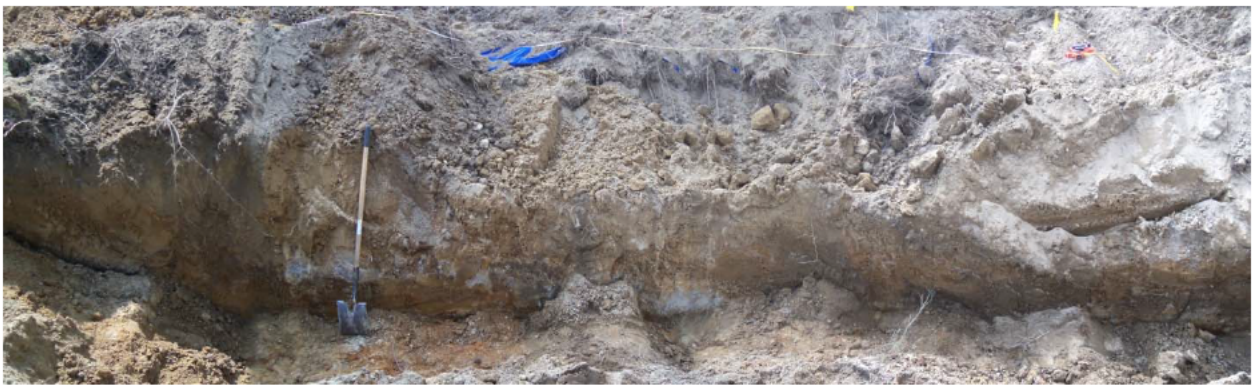
- MD (Illumination round) found at three foot depth six feet from south end
- Some scrap metal found in top foot



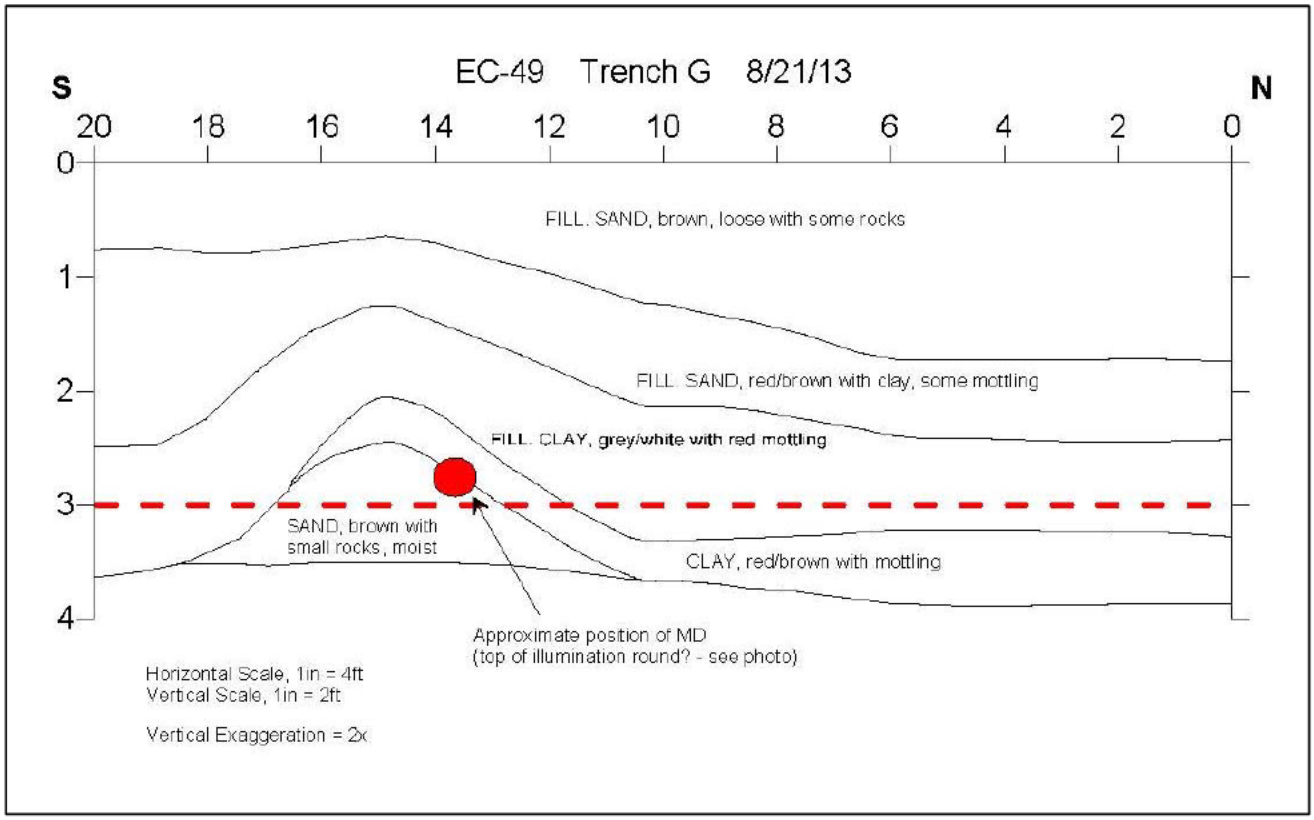
Photograph 138: Illumination Round (MD)



Photograph 139: Trench EC-49-G facing north



Photograph 140: Trench EC-49-G soil profile – north to south



Photograph 141: Trench EC-49-G drawing

Trench EC-49-H

Items found – depth

- Cable located at just above four feet depth



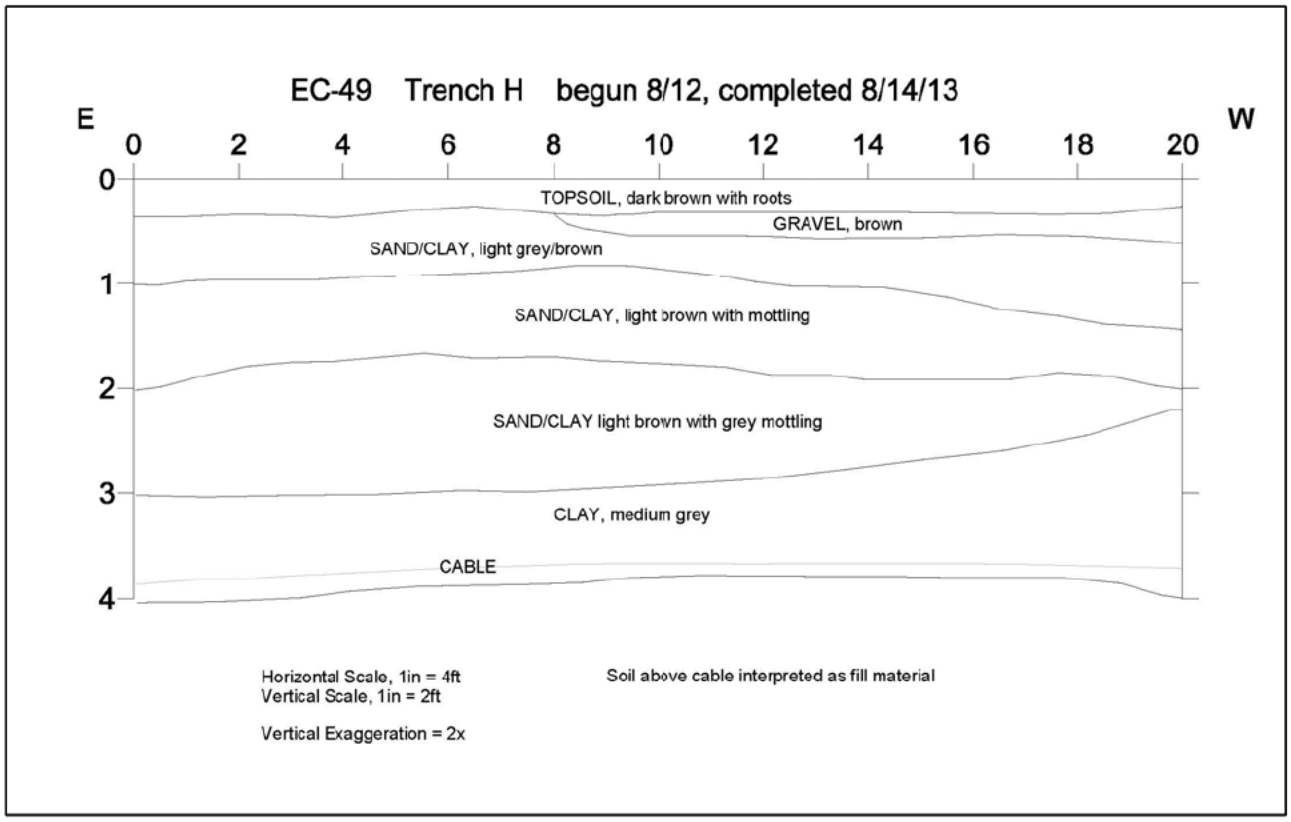
Photograph 142: Cable



Photograph 143: Trench EC-49-H facing east



Photograph 144: Trench EC-49-H soil profile – east to west



Photograph 145: Trench EC-49-H drawing

Trench EC-52-A

Items found – depth

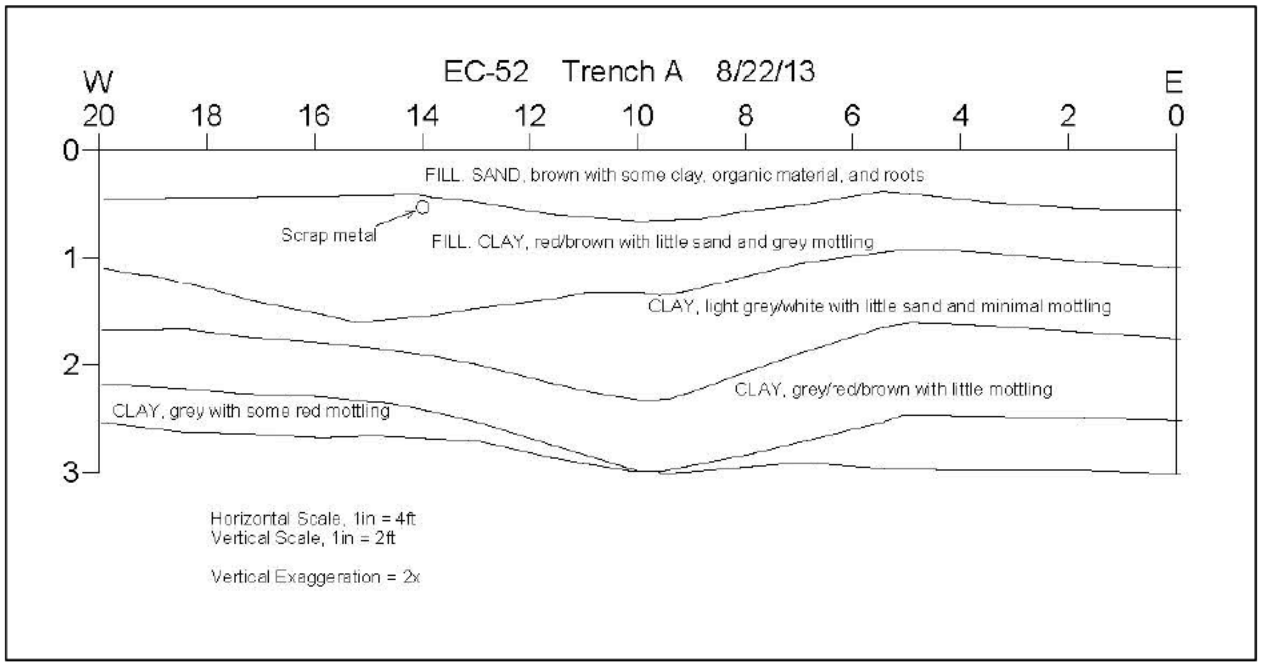
- Metal tray found within first 12 inches in center of trench



Photograph 146: Trench EC-52-A, facing east



Photograph 147: Trench EC-52-A soil profile – west to east



Photograph 148: Trench EC-52-A drawing

Trench EC-58B-A

Items found – depth

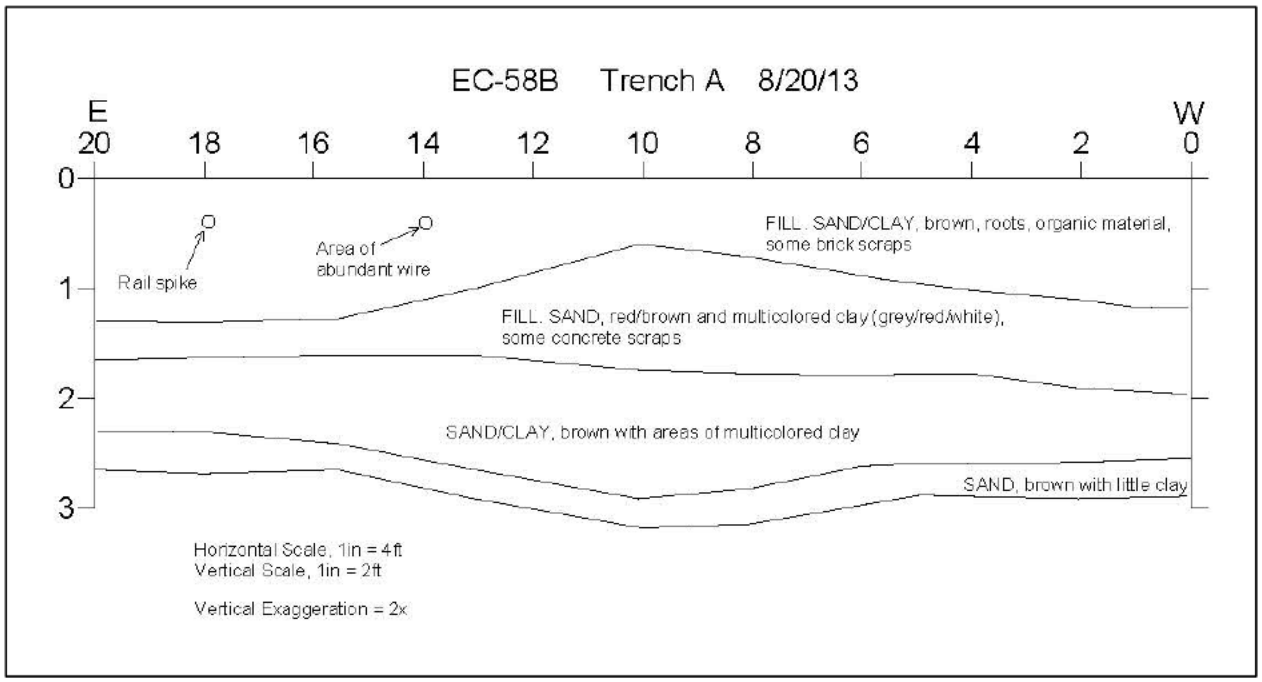
- Nail spike and wire found within top 12 inches on north end of trench



Photograph 149: Trench EC-58B-A, facing north



Photograph 150: Trench EC-58B-A soil profile – north to south

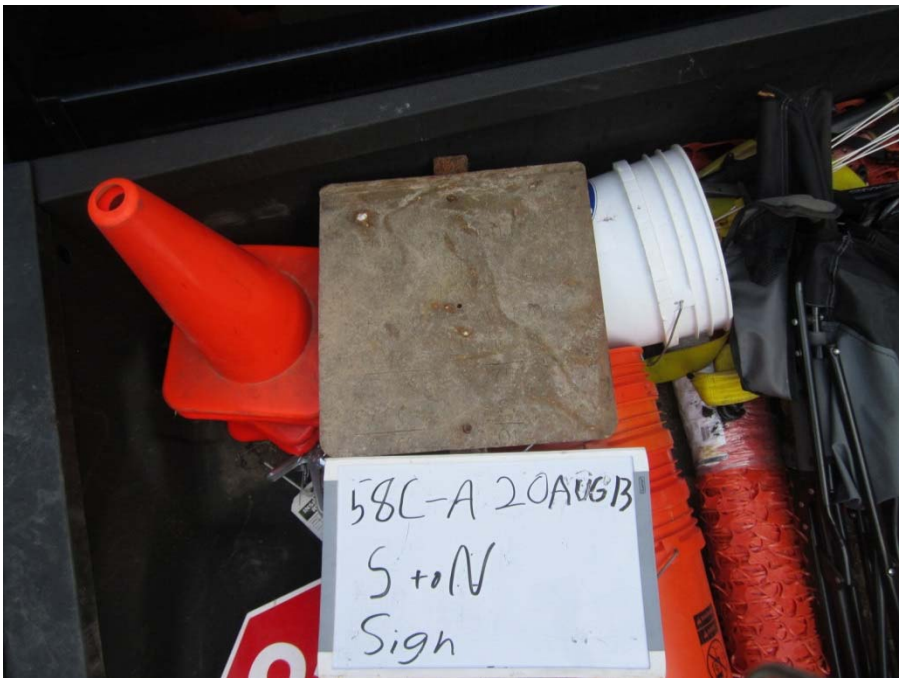


Photograph 151: Trench EC-58B-A drawing

Trench EC-58C-A

Items found – depth

- Sign post found at east end
- Burned cinder layer between one and two feet depth



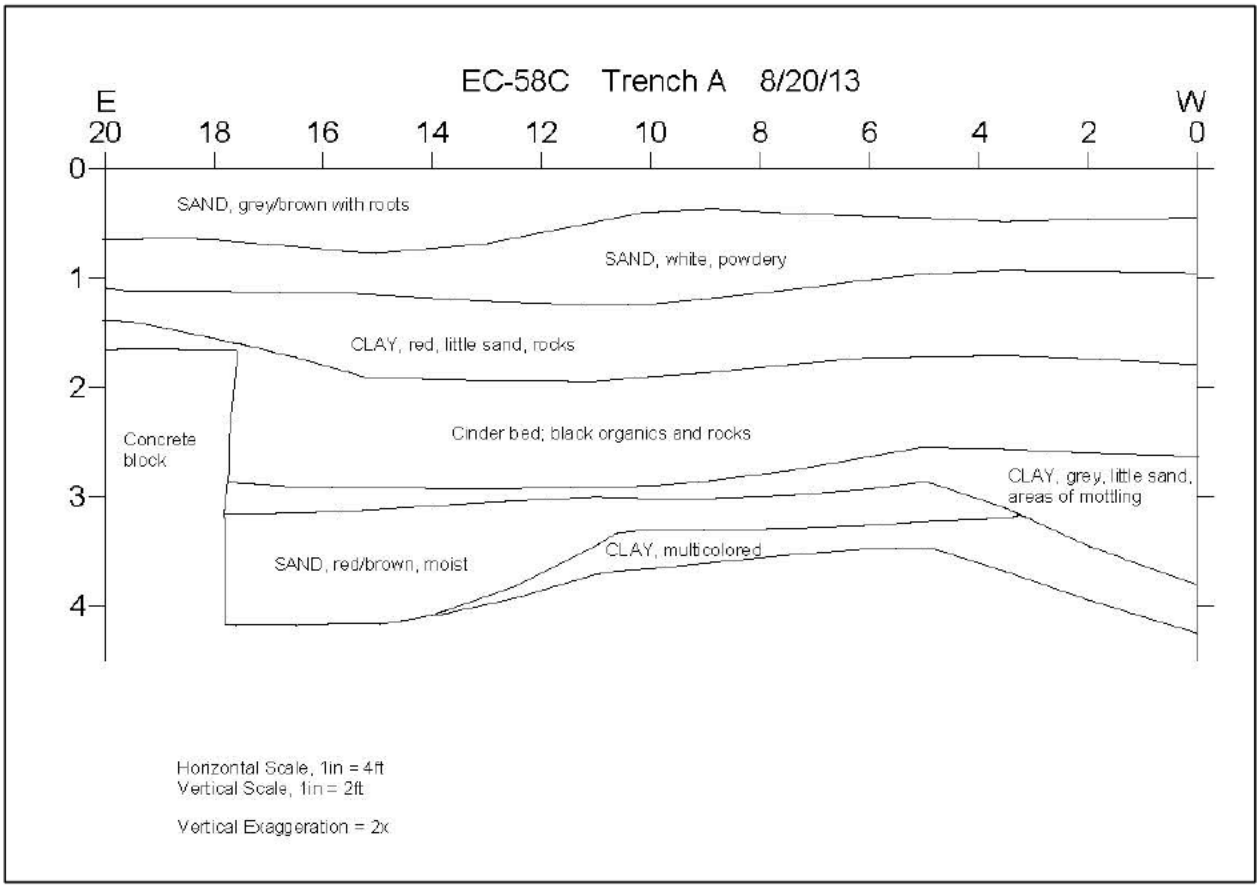
Photograph 152: Sign post found in trench EC-58C-A



Photograph 153: Trench EC-58C-A, facing east



Photograph 154: Trench EC-58C-A soil profile – east to west



Photograph 155: Trench EC-58C-A drawing

Trench EC-58C-B

Items found – depth

- Railroad tracks



Photograph 156: Trench EC-58C-B facing west



Photograph 157: End of railroad line



Photograph 158: Railroad rail



Photograph 159: Trench 58C-B facing south

Trench EC-58C-C

Items found – depth

- Metal pipe found at 12 inches on south end of trench
- Multiple rail ties laid out parallel found along surface



Photograph 160: Railroad tie found along surface of trench area



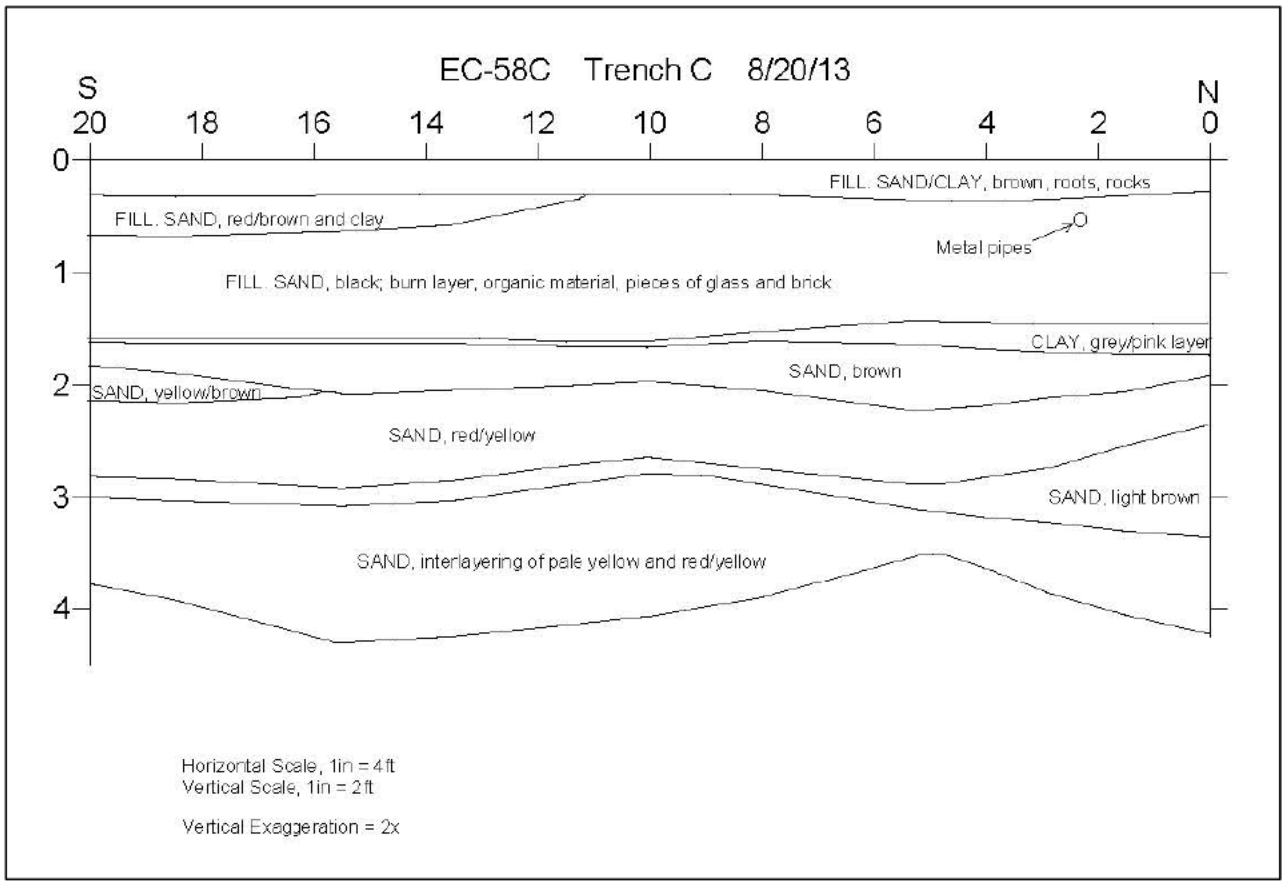
Photograph 161: Spray painted railroad ties (pin flags next to some ties)



Photograph 162: Spray painted and marked railroad ties parallel to one another



Photograph 163: Trench EC-58C-C soil profile - north to south



Photograph 164: Trench EC-58C-C drawing

Curtis Bay

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

PREVIOUS EDITION MAY BE USED

DOCUMENT	RI FROM	M&S	UNIT	ISS	QUANTITY	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD	DELL DATE	ADV	RI	O/P	CONDO	MGT	UNIT PRICE DOLLARS	UNIT PRICE CTS	DOLLARS	CTS

1. TOTAL PRICE

2. SHIP FROM: Former Curtis Bay Ordnance Depot, Baltimore, MD

3. SHIP TO: [redacted] Laurel, MD 20707

4. MARK FOR

5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
29 Aug 07				

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE: Mixed Metals [Steel, Brass, Copper, Aluminum]

18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
	6	230 lbs	

22. REC [redacted]

23. DATE RECEIVED

24. DOCUMENT NUMBER & SUFFIX (30-44)

"This certifies that the materials listed has been 100 percent properly inspected and, to the best of our knowledge and belief are free of explosive hazards, engine fluids, illuminating dials and other visible liquid hazardous, toxic or radioactive waste materials"

[redacted]

25. NATIONAL STOCK NO. & ADD (9-22)

Senior UXO Supervisor [SUXOS]
Earth Resources Technology, Inc
[redacted]
Laurel, MD 20707

[redacted]

26. RIC (4-6) UI (23-24) QTY (25-30) CON CODE (71) DIST (56-66) LIP (74-80)

UXO Quality Control Specialist
Earth Resources Technology, Inc
[redacted]
Laurel, MD 20707

Printed Name and Title of Person Receiving

27. ADDITIONAL DATA

USACE/FCBOD/ERT Inc/Container # 1/Serial Number: Container not sealed
USACE/FCBOD/ERT Inc/Container # 2/Serial Number: Container not sealed
USACE/FCBOD/ERT Inc/Container # 3/Serial Number: Container not sealed
USACE/FCBOD/ERT Inc/Container # 4/Serial Number: Container not sealed
USACE/FCBOD/ERT Inc/Container # 5/Serial Number: Container not sealed
USACE/FCBOD/ERT Inc/Container # 6/Serial Number: Container not sealed

Adobe Designer 7.0

Received By?

[redacted]

GeoMetrics GPS
[redacted]
Fredericksburg, VA 22405
USA
Phone: [redacted]
Fax:
[redacted].com

Project information		Coordinate System	
Name:	[redacted] Earth Resources Technology-Curtis Bay RI DGM activities GeoMetric\Survey\TBC\ERT, Curtis Bay Control.vce	Name:	[redacted]
		Datum:	NAD83
		Zone:	18 North (75W)
		Geoid:	GEOID12A (Conus)
Size:	794 KB	Vertical datum:	NAVD88
Modified:	6/14/2013 6:51:33 PM (UTC:-4)		
Time zone:	Eastern Standard Time		
Reference number:			
Description:			

Point List

ID	Latitude (Local)	Longitude (Local)	Height (Local) (US survey foot)	Feature Code
1001	N39°11'18.76037"	W76°35'09.24123"	-78.950	CP1
1002	N39°11'20.62661"	W76°35'08.32142"	-78.921	CP2
1003	N39°11'19.18712"	W76°34'59.86082"	-91.655	CP3
1004	N39°11'20.57385"	W76°34'58.82496"	-91.586	CP4

6/14/2013 6:58:51 PM	[redacted] ERT, Curtis Bay Control.vce	Trimble Business Center

GeoMetrics GPS
[redacted]
Fredericksburg, VA 22405
USA
Phone: [redacted]
Fax:
[redacted]com

Project information		Coordinate System	
Name:	[redacted] Earth Resources Technology-Curtis Bay RI DGM activities GeoMetric\Survey\TBC\ERT, Curtis Bay Control.vce	Name:	[redacted]
		Datum:	NAD83
		Zone:	18 North (75W)
		Geoid:	GEOID12A (Conus)
Size:	794 KB	Vertical datum:	NAVD88
Modified:	6/14/2013 6:51:33 PM (UTC:-4)		
Time zone:	Eastern Standard Time		
Reference number:			
Description:			

Point List

ID	Northing (US survey foot)	Easting (US survey foot)	Elevation (US survey foot)	Feature Code
1001	14235200.596	1191059.788	29.055	CP1
1002	14235388.088	1191135.488	29.085	CP2
1003	14235230.853	1191798.883	16.369	CP3
1004	14235369.688	1191882.866	16.438	CP4

6/14/2013 7:00:13 PM	[redacted]	Trimble Business Center

ERT, CURTIS BAY, MD
STAKEOUT OF AREAS
JUNE, 2013

DESIGN				AS-STAKED					DIFFERENCE		REMARKS
POINT	NORTH	EAST	ELEVATION	POINT	NORTH	EAST	ELEVATION	CODE	NORTH	EAST	
1A	14235207.13	1191217.79		71A	14235207.16	1191217.70		1A	-0.03	0.09	
1B	14235108.85	1191217.79		71B	14235108.85	1191217.77		1B	0.00	0.02	
2A	14235222.58	1191267.79		72A	14235222.59	1191267.78		2A	-0.01	0.01	
2B	14235104.73	1191267.79		72B	14235104.58	1191267.86		2B	0.15	-0.07	
3A	14235238.03	1191317.79		73A	14235238.03	1191317.80		3A	0.00	-0.01	
3B	14235100.61	1191317.79		73B	14235100.55	1191317.86		3B	0.06	-0.07	
4A	14235253.49	1191367.79		74A	14235253.30	1191367.72		4A	0.19	0.07	
4B	14235209.96	1191367.79		74B	14235209.90	1191367.87		4B	0.06	-0.08	
4C	14235173.38	1191367.79		74C	14235173.44	1191367.80		4C	-0.06	-0.01	
4D	14235096.49	1191367.79		74D	14235096.40	1191367.74		4D	0.09	0.05	
5A	14235155.59	1191417.79		75A	14235155.59	1191417.70		5A	0.00	0.09	
5B	14235109.82	1191417.79		75B	14235109.91	1191417.84		5B	-0.09	-0.05	
6A	14235259.82	1191467.79		76A	14235259.82	1191467.71		6A	0.00	0.08	
6B	14235112.33	1191467.79		76B	14235112.28	1191467.87		6B	0.05	-0.08	
7A	14235263.29	1191517.79		77A	14235263.18	1191517.69		7A	0.11	0.10	
7B	14235114.84	1191517.79		77B	14235114.93	1191517.78		7B	-0.09	0.01	
8A	14235266.75	1191567.79		78A	14235266.70	1191567.73		8A	0.05	0.07	
8B	14235117.35	1191567.79		78B	14235117.39	1191567.77		8B	-0.04	0.02	
9A	14235270.40	1191617.79		79A	14235270.34	1191617.80		9A	0.06	-0.01	
9B	14235119.85	1191617.79		79B	14235119.82	1191617.80		9B	0.03	-0.01	
10A	14235266.13	1191667.79		710A	14235266.05	1191667.77		10A	0.08	0.02	
10B	14235115.61	1191667.79		710B	14235115.56	1191667.85		10B	0.05	-0.06	
11A	14235261.87	1191717.79		711A	14235261.75	1191717.83		11A	0.12	-0.04	
11B	14235106.58	1191717.79		711B	14235106.70	1191717.91		11B	-0.12	-0.12	
12A	14235174.64	1191767.79		712A	14235174.54	1191767.69		12A	0.10	0.10	
12B	14235097.55	1191767.79		712B	14235097.50	1191767.75		12B	0.05	0.04	
13A	14235206.96	1191817.79		713A	14235206.92	1191817.78		13A	0.04	0.01	
13B	14235088.52	1191817.79		713B	14235088.52	1191817.88		13B	0.00	-0.09	
14A	14235249.06	1191867.79		714A	14235249.09	1191867.70		14A	-0.03	0.09	
14B	14235079.50	1191867.79		714B	14235079.59	1191867.80		14B	-0.09	-0.01	
15A	14235244.80	1191917.79		715A	14235244.78	1191917.79		15A	0.02	0.00	
15B	14235070.47	1191917.79		715B	14235070.50	1191917.71		15B	-0.03	0.08	
16A	14235261.64	1191967.79		716A	14235261.52	1191967.86		16A	0.12	-0.07	
16B	14235067.92	1191967.79		716B	14235067.91	1191967.76		16B	0.01	0.03	
17A	14235353.78	1192017.79		717A	14235353.80	1192017.87		17A	-0.02	-0.07	
17B	14235078.54	1192017.79		717B	14235078.51	1192017.63		17B	0.03	0.17	
18A	14235445.92	1192067.79		718A	14235445.95	1192067.80		18A	-0.03	-0.01	
18B	14235131.42	1192067.79		718B	14235131.36	1192067.80		18B	0.06	-0.01	
19A	14235495.26	1192117.79		719A	14235495.36	1192117.73		19A	-0.10	0.06	
19B	14235223.56	1192117.79		719B	14235223.53	1192117.73		19B	0.03	0.06	
20A	14235603.94	1192167.79		720A	14235603.90	1192167.73		20A	0.04	0.06	
20B	14235315.70	1192167.79		720B	14235315.77	1192167.80		20B	-0.07	-0.01	
21A	14235722.34	1192217.79		721A	14235722.33	1192217.85		21A	0.01	-0.06	
21B	14235407.84	1192217.79		721B	14235407.83	1192217.89		21B	0.01	-0.10	
22A	14235759.62	1192267.79		722A	14235759.62	1192267.82		22A	0.00	-0.03	
22B	14235499.98	1192267.79		722B	14235499.96	1192267.78		22B	0.02	0.01	
23A	14235761.21	1192317.79		723A	14235761.17	1192317.75		23A	0.04	0.04	
23B	14235592.13	1192317.79		723B	14235591.98	1192317.78		23B	0.15	0.01	
24A	14235664.09	1192367.79		724A	14235664.05	1192367.81		24A	0.04	-0.02	

24B	14235590.11	1192367.79		724B	14235590.21	1192367.79	24B	-0.10	0.00	
25A	14235622.32	1192417.79		725A	14235622.40	1192417.78	25A	-0.08	0.01	
25B	14235563.08	1192417.79		725B	14235563.04	1192417.79	25B	0.04	0.00	
28A	14235623.66	1192567.79		728A OS	14235622.48	1192567.60	28A	1.18	0.20	1' OFFSET
28B	14235560.99	1192567.79		728B	14235560.98	1192567.85	28B	0.01	-0.06	
29A	14235659.27	1192617.79		729A	14235659.28	1192617.69	29A	-0.01	0.10	
29B	14235537.69	1192617.79		729B	14235537.67	1192618.02	29B	0.02	-0.22	
30A	14235679.88	1192667.79		730A	14235679.97	1192667.67	30A	-0.09	0.12	
30B	14235514.40	1192667.79		930B	14235514.32	1192667.68	30B	0.08	0.11	
31A	14235656.58	1192717.79		730B	14235656.54	1192717.76	31A	0.04	0.03	
32B	14235491.10	1192717.79		932B	14235491.04	1192717.70	32B	0.06	0.09	
33A	14235633.29	1192767.79		733A	14235633.30	1192767.75	33A	-0.01	0.04	
33B	14235467.80	1192767.79		7338	14235467.84	1192767.79	33B	-0.04	0.00	
34A	14235609.99	1192817.79		734A	14235609.94	1192817.82	34A	0.05	-0.03	
34B	14235444.51	1192817.79								
								0.00	0.00	
21-1	14236874.12	1189506.60		7211	14236874.19	1189506.65	21-1	-0.07	-0.05	
21-2	14236886.74	1189486.31		7212	14236886.85	1189486.45	21-2	-0.11	-0.14	
21-3	14236929.42	1189437.84		7213	14236929.47	1189437.87	21-3	-0.05	-0.02	
21-4	14236990.34	1189387.18		7214	14236990.40	1189387.13	21-4	-0.06	0.04	
21-5	14237050.09	1189360.65		7215	14237050.11	1189360.67	21-5	-0.02	-0.02	
21-6	14237067.25	1189384.92		7216	14237067.23	1189384.94	21-6	0.02	-0.02	
21-7	14237015.86	1189425.55		7217	14237005.02	1189425.29	21-7MOVED11N	10.84	0.26	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-8	14237040.00	1189458.10		7218	14237040.00	1189457.97	21-8	0.00	0.13	
21-9	14237108.14	1189550.00		7219	14237108.22	1189550.02	21-9	-0.08	-0.02	
21-10	14237140.00	1189592.97		7220	14237140.15	1189593.08	7210	-0.15	-0.11	
21-11	14237182.29	1189650.00		7211A	14237182.29	1189650.13	21-11	0.00	-0.13	
21-12	14237241.14	1189729.37		72112	14237241.06	1189729.52	21-12	0.08	-0.16	
21-13	14237197.39	1189764.09		72113	14237197.45	1189764.14	21-13	-0.06	-0.05	
21-14	14237227.94	1189806.80		72114	14237228.16	1189806.74	21-14	-0.22	0.06	
21-15	14237282.46	1189765.13		72115	14237282.57	1189764.94	21-15	-0.11	0.19	
21-16	14237321.83	1189817.21		72116	14237321.66	1189817.43	21-16	0.17	-0.22	
21-17	14237347.53	1189799.16		72117	14237347.46	1189799.16	21-17	0.07	-0.01	
21-18	14237372.87	1189831.80		72118	14237372.84	1189831.93	21-18	0.03	-0.13	
21-19	14237412.11	1189802.98		72119	14237411.98	1189802.81	21-19	0.13	0.17	
21-20	14237449.12	1189849.50		72120	14237449.09	1189849.53	21-20	0.03	-0.03	
21-21	14237489.05	1189819.30		72121	14237488.83	1189819.18	21-21	0.22	0.11	
21-22	14237510.93	1189848.81		72122	14237510.72	1189848.62	21-22	0.21	0.19	
21-23	14237550.51	1189819.64		72123	14237550.42	1189819.84	21-23	0.09	-0.19	
21-24	14237561.86	1189886.06		72124	14237561.93	1189885.85	21-24	-0.07	0.21	
21-25	14237547.48	1189901.88		72125	14237547.52	1189901.97	21-25	-0.04	-0.09	
21-26	14237440.00	1189880.07		72126	14237440.01	1189880.00	21-26	-0.01	0.07	
21-27	14237340.00	1189859.14		72127	14237339.84	1189859.27	21-27	0.16	-0.12	
21-28	14237240.00	1189838.31		72128	14237239.99	1189838.16	21-28	0.01	0.14	
21-29	14237151.42	1189820.44		72129	14237151.33	1189820.61	21-29	0.09	-0.17	
21-30	14237147.77	1189840.23		72130	14237147.88	1189840.21	21-30	-0.11	0.03	
21-31	14237073.76	1189750.00		72131	14237073.67	1189750.00	21-31	0.09	0.00	
21-32	14237089.07	1189768.72		72132-1	14237088.95	1189768.77	21-32	0.12	-0.05	
21-33	14237104.92	1189757.10		72133	14237105.04	1189757.09	21-33	-0.12	0.00	
21-34	14237137.28	1189827.52		72134	14237137.44	1189827.80	21-34	-0.16	-0.29	
21-35	14237152.51	1189813.73								DID NOT SET, DID NOT SEE ON MAP
21-36	14237040.00	1189708.84		72136	14237039.87	1189732.93	21-36MOVE24	0.13	-24.09	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-37	14237017.75	1189681.77		72137	14237017.68	1189682.03	21-37	0.07	-0.26	
21-38	14237023.13	1189677.55		72138	14237023.23	1189677.43	21-38	-0.10	0.13	
21-39	14237004.02	1189650.00		72139	14237004.01	1189649.87	21-39	0.01	0.13	

21-40	14236967.32	1189597.49	72140	14236967.19	1189597.61	21-40	0.13	-0.12	
21-41	14236954.75	1189604.95	72141	14236954.62	1189605.33	21-41	0.13	-0.38	
21-42	14236909.72	1189550.00	72142	14236909.61	1189550.11	21-42	0.11	-0.11	
21-43	14236940.00	1189450.00	72143	14236939.85	1189450.01	21-43	0.15	-0.01	
21-44	14236940.00	1189550.00	72144	14236940.00	1189549.75	21-44	0.00	0.25	
21-45	14237040.00	1189550.00	72145	14237051.86	1189550.33	21-45MOVE2	-11.86	-0.33	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-46	14237040.00	1189650.00	72146	14237040.15	1189650.04	21-46	-0.15	-0.04	
21-47	14237140.00	1189650.00	72147	14237140.23	1189649.95	21-47	-0.23	0.05	
21-48	14237140.00	1189750.00	72148	14237118.58	1189757.87	21-48MOVE22	21.43	-7.87	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-49	14236747.51	1189786.15	72149	14236747.66	1189786.21	21-49	-0.15	-0.06	
21-51	14236748.34	1189850.00	72151	14236748.41	1189850.01	21-51	-0.07	-0.01	
21-52	14236748.47	1189860.34	72152	14236748.53	1189860.35	21-52	-0.06	-0.01	
21-53	14236763.10	1189904.87	72153	14236763.04	1189904.97	21-53	0.06	-0.10	
21-54	14236784.43	1189950.00	72154	14236785.30	1189951.20	21-54 1.5MOVED	-0.87	-1.20	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-56	14236840.00	1189985.62	72156	14236840.14	1189985.77	21-56	-0.14	-0.15	
21-57	14236877.83	1190008.82	72157	14236877.75	1190008.90	21-57	0.08	-0.09	
21-58	14236940.00	1190021.29	72158	14236939.83	1190021.39	21-58	0.17	-0.10	
21-59	14236994.33	1190032.19	72159	14236994.54	1190032.27	21-59	-0.21	-0.08	
21-60	14237040.00	1190034.65	72160	14237039.96	1190034.59	21-60	0.04	0.05	
21-61	14237140.00	1190040.03	72161	14237141.57	1190039.56	21-61 1.6MOVED	-1.57	0.47	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-62	14237157.97	1190041.00	72162	14237157.98	1190040.94	21-62	0.00	0.06	
21-63	14237240.00	1190031.32	72163	14237240.50	1190030.03	21-63 .4MOVED	-0.50	1.29	SHOT THIS POINT, BUT SET STAKE AT DESIGN LOCATION
21-64	14237261.01	1190028.84	72164	14237260.99	1190028.67	21-64	0.02	0.17	
21-65	14237264.96	1190006.93	72165	14237265.00	1190006.92	21-65	-0.04	0.01	
21-66	14237216.69	1189997.91	72166	14237216.64	1189997.84	21-66	0.05	0.07	
21-67	14237218.08	1189985.41	72167	14237218.03	1189985.33	21-67	0.05	0.08	
21-68	14237140.00	1189969.04	72168	14237140.01	1189968.79	21-68	-0.01	0.24	
21-69	14237122.46	1189958.32	72169	14237122.58	1189958.38	21-69	-0.12	-0.06	
21-70	14237105.79	1189938.53	72170A	14237105.84	1189938.63	21-70	-0.05	-0.10	
21-71	14237091.90	1189949.64	72170	14237091.83	1189949.76	21-71	0.07	-0.11	
21-72	14237040.00	1189886.62	72172	14237039.97	1189886.64	21-72	0.04	-0.02	
21-73	14237009.84	1189850.00	72173	14237009.89	1189850.06	21-73	-0.05	-0.06	
21-74	14236956.07	1189784.71	72174	14236956.02	1189784.75	21-74	0.05	-0.04	
21-75	14236931.76	1189803.46	72175	14236931.79	1189803.48	21-75	-0.03	-0.02	
21-76	14236900.51	1189763.53	72176	14236900.39	1189763.62	21-76	0.12	-0.09	
21-77	14236840.00	1189814.28	72177	14236839.97	1189814.14	21-77	0.03	0.14	
21-78	14236798.92	1189848.74	72178	14236798.99	1189848.77	21-78	-0.07	-0.03	
21-79	14236840.00	1189850.00	72179	14236840.04	1189849.94	21-79	-0.04	0.06	
21-80	14236840.00	1189950.00	72180	14236840.00	1189950.11	21-80	0.00	-0.11	
21-81	14236940.00	1189850.00	72181	14236940.04	1189849.97	21-81	-0.04	0.03	
21-82	14236940.00	1189950.00	72182	14236940.02	1189950.15	21-82	-0.02	-0.15	
21-83	14237040.00	1189950.00	72183	14237039.93	1189950.18	21-83	0.07	-0.18	
22-1	14237323.06	1189157.86	72201	14237323.07	1189157.92	22-1	-0.01	-0.06	
22-2	14237373.25	1189122.56	72202	14237373.21	1189122.61	22-2	0.04	-0.05	
22-3	14237540.00	1189066.75	72203	14237540.04	1189066.80	22-3	-0.04	-0.05	
22-4	14237440.00	1189100.22	72204	14237439.99	1189100.11	22-4	0.01	0.11	
22-5	14237650.71	1189040.26	72205	14237650.77	1189040.27	22-5	-0.05	-0.01	
22-6	14237692.30	1189041.18	72206	14237692.22	1189041.19	22-6	0.09	-0.02	
22-7	14237715.46	1189052.09	72207	14237715.42	1189052.10	22-7	0.04	-0.01	
22-8	14237725.52	1189067.91	72208	14237725.57	1189067.96	22-8	-0.05	-0.04	
22-9	14237722.87	1189107.48	72209	14237722.92	1189107.42	22-9	-0.05	0.06	
22-10	14237719.75	1189150.00	72210	14237719.72	1189149.91	22-10	0.03	0.09	
22-11	14237712.72	1189250.00	72211	14237712.73	1189249.95	22-11	-0.01	0.05	
22-12	14237705.69	1189350.00	72212	14237705.64	1189350.05	22-12	0.05	-0.05	

ERT, CURTIS BAY, MD
STAKEOUT OF AREAS
JUNE, 2013

22-13	14237698.66	1189450.00	72213	14237698.58	1189449.88	22-13	0.08	0.12	
22-14	14237695.22	1189498.93	72214	14237695.11	1189498.91	22-14	0.11	0.01	
22-15	14237673.55	1189491.45	72215	14237673.42	1189491.50	22-15	0.13	-0.05	
22-16	14237678.67	1189450.00	72216	14237678.70	1189450.00	22-16	-0.03	0.00	
22-17	14237691.02	1189350.00	72217	14237691.10	1189350.08	22-17	-0.08	-0.08	
22-18	14237703.37	1189250.00	72218	14237703.30	1189250.02	22-18	0.07	-0.02	
22-20	14237722.32	1189096.66	72220	14237722.35	1189096.60	22-20	-0.03	0.05	
22-21	14237647.80	1189086.93	72221	14237647.79	1189086.94	22-21	0.01	-0.01	
22-22	14237634.26	1189188.32	72222	14237634.31	1189188.33	22-22	-0.05	-0.01	
22-23	14237651.97	1189189.37	72223	14237651.92	1189189.46	22-23	0.05	-0.10	
22-24	14237644.49	1189250.00	72224	14237644.60	1189250.06	22-24	-0.11	-0.06	
22-25	14237632.16	1189350.00	72225	14237632.13	1189350.06	22-25	0.03	-0.06	
22-26	14237627.32	1189389.30	72226	14237627.27	1189389.18	22-26	0.05	0.11	
22-27	14237644.68	1189391.73	72227	14237644.75	1189391.65	22-27	-0.07	0.07	
22-28	14237637.65	1189450.00	72228	14237637.63	1189449.93	22-28	0.02	0.07	
22-29	14237626.97	1189538.60	72229	14237626.97	1189538.63	22-29	0.00	-0.03	
22-30	14237602.32	1189535.82	72230	14237602.30	1189535.75	22-30	0.02	0.08	
22-31	14237590.86	1189618.81	72231	14237590.86	1189618.83	22-31	0.00	-0.02	
22-32	14237551.07	1189564.99	72232	14237551.16	1189565.03	22-32	-0.09	-0.04	
22-33	14237569.82	1189550.06	72233	14237569.82	1189550.17	22-33	0.00	-0.11	
22-34	14237540.00	1189508.11	72234	14237539.97	1189508.16	22-34	0.03	-0.05	
22-35	14237518.78	1189522.28	72235	14237518.78	1189522.22	22-35	0.00	0.06	
22-36	14237500.72	1189497.98	72236	14237500.59	1189497.97	22-36	0.13	0.01	
22-37	14237499.33	1189387.14	72237	14237499.30	1189387.25	22-37	0.03	-0.10	
22-38	14237510.10	1189387.49	72238	14237510.05	1189387.43	22-38	0.05	0.06	
22-39	14237509.32	1189350.00	72239	14237509.35	1189349.98	22-39	-0.03	0.02	
22-40	14237507.26	1189250.00	72240	14237507.25	1189250.08	22-40	0.01	-0.08	
22-41	14237505.20	1189150.00	72241	14237505.17	1189150.09	22-41	0.03	-0.09	
22-42	14237575.00	1189150.00	72242	14237575.02	1189150.05	22-42	-0.02	-0.05	
22-43	14237575.00	1189250.00	72243	14237574.90	1189250.08	22-43	0.10	-0.07	
22-44	14237575.00	1189350.00	72244	14237574.91	1189349.97	22-44	0.09	0.03	
22-45	14237575.00	1189450.00	72245	14237576.14	1189448.88	22-45	-1.14	1.12	
22-46	14237504.89	1189135.06	72246	14237504.86	1189135.08	22-46	0.04	-0.02	
22-47	14237440.00	1189136.06	72247	14237440.00	1189136.07	22-47	0.01	-0.01	
22-48	14237392.60	1189136.80	72248	14237392.55	1189136.88	22-48	0.05	-0.08	
22-49	14237392.25	1189187.84	72249	14237392.20	1189187.79	22-49	0.05	0.05	
22-50	14237342.83	1189189.29	72250	14237342.63	1189189.97	22-50	0.20	-0.68	
25-1	14235562.00	1192419.80	7251	14235561.92	1192419.74	25-1	0.08	0.07	
25-2	14235615.39	1192451.05	7252 OS	14235615.36	1192450.07	25-2	0.03	0.98	1' OFFSET
25-3	14235610.48	1192461.59	7253 OS	14235610.52	1192455.49	25-3	-0.04	6.10	6' OFFSET
25-4	14235555.48	1192431.85	7254	14235555.53	1192431.66	25-4	-0.05	0.19	
25-5	14235568.17	1192552.39	7255	14235568.12	1192552.34	25-5	0.05	0.05	
25-6	14235507.92	1192519.81	7256	14235507.91	1192519.73	25-6	0.01	0.08	
25-7	14235525.86	1192643.20	9257	14235525.76	1192643.24	25-7	0.10	-0.04	
25-8	14235460.35	1192607.78	7258	14235460.36	1192607.68	25-8	-0.01	0.10	
25-9	14235483.55	1192734.00	7259	14235483.66	1192733.88	25-9	-0.11	0.12	
25-10	14235412.79	1192695.74	72510	14235412.79	1192696.10	25-10	0.00	-0.36	
25-11	14235447.68	1192810.99	7339	14235453.25	1192798.83	25-11-33B	-5.56	12.16	IN WATER SET 13.4' OFFSET
25-12	14235365.22	1192783.70							IN WATER DID NOT SET
25-13	14235277.26	1192736.14	72513	14235292.45	1192708.01	25-13-25-29	-15.19	28.13	IN WATER SET 32' OFFSET
25-14	14235189.29	1192688.57	72514	14235189.65	1192688.64	25-14	-0.36	-0.06	
25-15	14235101.33	1192641.01	72515	14235101.34	1192641.39	25-15	-0.01	-0.39	
25-16	14235013.37	1192593.44	72516	14235013.35	1192593.47	25-16-25-25	0.02	-0.03	
25-17	14234837.79	1192390.36	92517	14234838.00	1192390.45	25-17	-0.21	-0.09	

25-18	14234850.87	1192366.32		92518	14234850.87	1192366.30	25-18	0.00	0.01	
25-19	14234870.85	1192329.60		92519	14234870.69	1192329.49	25-19	0.16	0.10	
25-20	14234903.22	1192270.12		92520	14234903.39	1192269.98	25-20	-0.17	0.14	
25-21	14234796.59	1192229.16		72521	14234822.10	1192217.47	25-21	-25.51	11.68	IN WATER SET 28' OFFSET @ 155 AZIMUTH
25-22	14234955.57	1192173.92		7493	14234955.59	1192173.96	25-22	-0.02	-0.04	
25-23	14234875.69	1192267.96		92523	14234875.78	1192267.89	25-23	-0.09	0.07	
25-24	14234949.19	1192501.89		72524	14234949.56	1192501.96	25-24	-0.37	-0.06	
25-25	14235037.15	1192549.46		72525	14235037.12	1192549.50	25-25	0.03	-0.04	
25-26	14235125.11	1192597.03		72526	14235125.08	1192597.04	25-26	0.03	-0.01	
25-27	14235213.08	1192644.59		72527	14235213.10	1192644.63	25-27	-0.02	-0.04	
25-28	14235165.51	1192732.55		72528	14235172.46	1192718.12	25-28-25-14	-6.95	14.43	IN WATER SET 16' OFFSET
25-29	14235301.04	1192692.16		72529	14235300.99	1192692.12	25-29	0.05	0.04	
25-30	14235389.00	1192739.72		72530	14235388.93	1192739.72	25-30	0.07	0.01	
49-1	14234991.03	1192076.40		7491	14234990.89	1192076.53	49-1	0.14	-0.13	
49-2	14234988.07	1192114.21		7492	14234988.05	1192114.17	49-2	0.02	0.04	
49-3	14234883.52	1192168.27		7493-1	14234883.41	1192168.17	49-3	0.11	0.10	
49-4	14234891.34	1192068.57		70494	14234891.34	1192068.53	49-4	0.00	0.04	
49-5	14235007.92	1192077.72		7495	14235007.80	1192077.76	49-5	0.12	-0.04	
49-6	14235034.40	1192029.07		30,043,005	14235034.40	1192029.07	49-6	0.00	0.00	RE-SET 6-27-13
49-7	14235077.80	1192052.73		7497	14235077.85	1192052.68	49-7	-0.05	0.05	
49-8	14235083.66	1192041.88		7498	14235083.78	1192041.78	49-8	-0.12	0.10	
49-9	14235071.31	1191982.44		7499	14235071.36	1191982.36	49-9	-0.05	0.07	
49-10	14234998.86	1191976.70		3002	14234998.82	1191976.64	49-10	0.04	0.07	RE-SET 6-27-13
49-11	14234899.17	1191968.88		74911	14234899.07	1191968.83	49-11	0.10	0.05	
49-12	14235064.42	1191951.31		74912	14235064.44	1191951.35	49-12	-0.02	-0.03	
49-16	14235120.89	1191638.51		74916	14235120.91	1191638.53	49-16	-0.02	-0.02	
49-19	14235109.41	1191409.61		74919	14235109.43	1191409.55	49-19	-0.02	0.05	
49-20	14235095.28	1191382.43		74920	14235095.16	1191382.47	49-20	0.12	-0.04	
49-21	14235087.07	1191482.09		74921	14235087.13	1191482.14	49-21	-0.06	-0.05	
49-22	14235078.85	1191581.75		74922	14235078.91	1191581.71	49-22	-0.06	0.04	
49-23	14235070.64	1191681.42		74923	14235070.68	1191681.48	49-23	-0.04	-0.06	
49-24	14235062.42	1191781.08		74924	14235062.44	1191781.14	49-24	-0.02	-0.06	
49-25	14235054.44	1191880.76		74925	14235054.37	1191880.85	49-25	0.07	-0.09	
49-26	14235053.16	1191899.43		74926	14235053.15	1191899.37	49-26	0.01	0.06	
49-27	14235005.21	1191895.78		3003	14235005.17	1191895.73	49-27	0.04	0.05	RE-SET 6-27-13
49-28	14234905.50	1191888.18		74928	14234905.39	1191888.15	49-28	0.11	0.03	
49-29	14234825.99	1191882.13		74929	14234826.05	1191882.16	49-29	-0.06	-0.03	
49-30	14234821.65	1191930.95		74930	14234821.64	1191930.88	49-30	0.01	0.08	
49-31	14234801.96	1191929.34		74931	14234801.93	1191929.36	49-31	0.03	-0.02	
49-32	14234799.47	1191961.05		3006	14234799.48	1191955.97	49-32 5OSE	-0.01	5.09	RE-SET 6-27-13 5' OFFSET
49-33	14234702.30	1191921.19		74933	14234702.24	1191921.26	49-33	0.06	-0.07	
49-34	14234707.61	1191853.54		74934	14234707.64	1191853.55	49-34	-0.03	-0.01	
49-35	14234715.43	1191753.84		74935	14234715.40	1191753.84	49-35	0.03	0.00	
49-36	14234723.26	1191654.15		74936	14234723.30	1191654.11	49-36	-0.04	0.04	
49-37	14234731.08	1191554.46		74937	14234731.09	1191554.43	49-37	-0.01	0.03	
49-38	14234738.90	1191454.76		74938	14234738.84	1191454.68	49-38	0.06	0.09	
49-39	14234746.73	1191355.07		74939	14234746.80	1191355.01	49-39	-0.07	0.05	
49-40	14234708.00	1191367.85		3009	14234722.24	1191363.16	49-40-49-39	-14.24	4.69	RE-SET 6-27-13 15' OFFSET ON LINE FROM 49-39
52-1	14235442.39	1190479.09		7521 4 OS	14235442.54	1190483.27	52-1	-0.15	-4.19	4' OFFSET
52-2	14235450.58	1190488.65		7522	14235450.51	1190488.76	52-2	0.07	-0.11	
52-3	14235485.80	1190466.36		7523	14235485.82	1190466.49	52-3	-0.02	-0.13	
52-4	14235479.55	1190456.46		7524	14235479.58	1190456.27	52-4	-0.03	0.19	
52-5	14235521.22	1190428.86		7525	14235521.11	1190428.65	52-5	0.11	0.20	

52-6	14235513.41	1190416.88	7526	14235513.30	1190416.78		52-6	0.11	0.10	
52-7	14235598.75	1190362.29	7527	14235598.87	1190362.35		52-7	-0.12	-0.05	
52-8	14235577.76	1190354.64	7528 13 OS	14235578.25	1190367.66		52-8	-0.49	-13.01	13' OFFSET
52-9	14235510.08	1190416.86	7529	14235510.13	1190416.94		52-9	-0.05	-0.07	
52-10	14235676.91	1190390.77	75210	14235676.95	1190390.72		52-10	-0.04	0.06	
52-11	14235710.70	1190444.10	75211	14235710.66	1190444.02		52-11	0.04	0.08	
52-12	14235898.06	1190323.41	75212	14235898.10	1190323.34		52-12	-0.04	0.07	
52-13	14235881.39	1190298.06	75213	14235881.38	1190298.13		52-13	0.02	-0.07	
52-14	14236009.45	1190216.81	NA	14236009.45	1190216.81		NA	0.00	0.00	SET AT DESIGN WITH TAPE, NOT RECORDED
52-15	14236019.52	1190231.04	75215	14236019.44	1190230.85		52-15	0.08	0.20	
52-16	14236041.77	1190217.17	75216	14236041.86	1190217.18		52-16	-0.09	-0.01	
52-17	14236015.78	1190184.86	75217	14236015.69	1190184.83		52-17	0.09	0.03	
52-18	14235714.49	1190404.47	75218	14235714.60	1190404.54		52-18	-0.11	-0.07	
52-19	14235865.14	1190294.66	75219	14235865.13	1190294.45		52-19	0.01	0.21	
57C-1	14238978.11	1190555.07	757C1	14238978.12	1190554.98		57C-1	-0.01	0.09	
57C-2	14238912.66	1190717.05	757C2	14238912.57	1190717.09		57C-2	0.09	-0.03	
57C-3	14238746.92	1190461.66	757C3	14238746.96	1190461.56		57C-3	-0.04	0.10	
57C-4	14238681.47	1190623.64	757C4	14238681.36	1190623.80		57C-4	0.11	-0.16	
58B-1	14238005.99	1192933.57	758B1	14238005.95	1192933.48		58B-1	0.04	0.09	
58B-2	14238044.65	1193065.52	758B2	14238044.63	1193065.63		58B-2	0.02	-0.11	
58B-3	14238083.31	1193197.48	758B3	14238083.23	1193197.51		58B-3	0.08	-0.03	
58B-4	14238178.72	1192882.96	758B4 OS	14238179.16	1192882.68		58B-4	-0.44	0.28	0.5' OFFSET
58B-5	14238217.39	1193014.91	758B5	14238217.36	1193014.76		58B-5	0.03	0.15	
58B-6	14238256.05	1193146.87	758B6	14238256.09	1193146.80		58B-6	-0.04	0.06	
58B-7	14238351.46	1192832.35	758B7 OS	14238351.51	1192833.24		58B-7	-0.05	-0.89	1' OFFSET
58B-8	14238390.12	1192964.30	758B8	14238390.21	1192964.15		58B-8	-0.09	0.15	
58B-9	14238428.78	1193096.26	758B9	14238428.85	1193096.34		58B-9	-0.07	-0.09	
58C-1	14237120.55	1190473.71	758C1	14237120.49	1190473.74		58C-1	0.07	-0.03	
58C-2	14237108.44	1190504.37	758C2	14237108.40	1190504.35		58C-2	0.04	0.01	
58C-3	14236978.34	1190416.30	758C3	14236978.39	1190416.23		58C-3	-0.05	0.07	
58C-4	14236967.70	1190447.10	758C4	14236967.77	1190447.20		58C-4	-0.07	-0.10	
58C-5	14236836.13	1190358.89	758C5	14236836.02	1190358.97		58C-5	0.11	-0.08	
58C-6	14236826.97	1190389.84	758C6-MOVED	14236826.89	1190391.31		58C-6	0.08	-1.47	MOVED DUE TO UXO
			1001	14235200.60	1191059.79	29.06	CP1			CONTROL POINTS & TRAVERSE
			1002	14235388.09	1191135.49	29.09	CP2			CONTROL POINTS & TRAVERSE
			1003	14235230.86	1191798.94	16.39	CP3			CONTROL POINTS & TRAVERSE
			1004	14235369.69	1191882.87	16.44	CP4			CONTROL POINTS & TRAVERSE
			1006	14234746.72	1191358.54	6.80	CP6			CONTROL POINTS & TRAVERSE
			1007	14234738.80	1191454.59	9.62	CP7			CONTROL POINTS & TRAVERSE
			1008	14235412.88	1192695.41	3.73	CP8			CONTROL POINTS & TRAVERSE
			1009	14235318.75	1192659.81	3.46	CP9			CONTROL POINTS & TRAVERSE
			1010	14235484.14	1192734.03	3.36	CP10			CONTROL POINTS & TRAVERSE
			1011	14235224.08	1192624.07	3.35	CP11			CONTROL POINTS & TRAVERSE
			1012	14235130.87	1192586.18	2.77	CP12			CONTROL POINTS & TRAVERSE
			1013	14235039.26	1192544.89	3.30	CP13			CONTROL POINTS & TRAVERSE
			1014	14234952.64	1192477.81	2.69	CP14			CONTROL POINTS & TRAVERSE
			1015	14236022.87	1190202.83	15.33	CP15			CONTROL POINTS & TRAVERSE
			1016	14235793.49	1190362.02	12.73	CP16			CONTROL POINTS & TRAVERSE
			1017	14237122.52	1189958.03	15.87	CP17			CONTROL POINTS & TRAVERSE
			1018	14236939.89	1189949.63	11.37	CP18			CONTROL POINTS & TRAVERSE
			1019	14236838.06	1189919.82	9.36	CP19			CONTROL POINTS & TRAVERSE

1020	14236773.14	1189775.15	12.79	CP20	CONTROL POINTS & TRAVERSE
1021	14236901.94	1189580.65	23.63	CP21	CONTROL POINTS & TRAVERSE
1022	14236997.32	1189672.88	25.91	CP22	CONTROL POINTS & TRAVERSE
2000	14236540.74	1190677.89	25.85	TRAV	CONTROL POINTS & TRAVERSE
2001	14237823.06	1190834.89	32.63	TRAV	CONTROL POINTS & TRAVERSE
2002	14237997.47	1190280.13	19.46	TRAV	CONTROL POINTS & TRAVERSE
2003	14237903.63	1189995.91	28.07	TRAV	CONTROL POINTS & TRAVERSE
2004	14237688.10	1189597.33	29.26	TRAV	CONTROL POINTS & TRAVERSE
2005	14237562.91	1189522.68	27.79	TRAV	CONTROL POINTS & TRAVERSE
2006	14237471.51	1189460.74	27.56	TRAV	CONTROL POINTS & TRAVERSE
2007	14237704.09	1189364.08	27.61	TRAV	CONTROL POINTS & TRAVERSE
2008	14237738.91	1189045.00	24.43	TRAV	CONTROL POINTS & TRAVERSE
2009	14237389.41	1189129.51	20.83	TRAV	CONTROL POINTS & TRAVERSE
2010	14237581.30	1189350.75	23.42	TRAV	CONTROL POINTS & TRAVERSE
2011	14236740.18	1190427.26	26.75	TRAV	CONTROL POINTS & TRAVERSE
2012	14236800.98	1190414.58	42.87	TRAV	CONTROL POINTS & TRAVERSE
2013	14236949.86	1190476.80	38.57	TRAV	CONTROL POINTS & TRAVERSE
2014	14237086.65	1190520.06	26.12	TRAV	CONTROL POINTS & TRAVERSE
2015	14236987.07	1190723.78	28.92	TRAV	CONTROL POINTS & TRAVERSE
5001	14235009.78	1192130.56	3.89	TRAV	CONTROL POINTS & TRAVERSE
9001	14235111.91	1190906.86	21.33	ng	INST VERIFICATION STRIP
9002	14235112.24	1190907.26	21.07	iso1	INST VERIFICATION STRIP
9003	14235118.63	1190899.58	20.79	iso2a	INST VERIFICATION STRIP
9004	14235118.41	1190899.39	20.79	iso2b	INST VERIFICATION STRIP
9005	14235118.01	1190899.20	21.50	ng	INST VERIFICATION STRIP
9006	14235124.69	1190891.88	20.31	iso3a	INST VERIFICATION STRIP
9007	14235124.59	1190891.77	20.30	iso3b	INST VERIFICATION STRIP
9008	14235123.95	1190891.17	21.78	ng	INST VERIFICATION STRIP
9009	14235133.56	1190879.39	22.01	ng	INST VERIFICATION STRIP
9010	14235133.86	1190880.41	20.64	iso4a	INST VERIFICATION STRIP
9011	14235134.06	1190880.12	20.67	iso4b	INST VERIFICATION STRIP
9012	14235134.22	1190879.86	20.68	iso4c	INST VERIFICATION STRIP
9013	14235133.66	1190879.48	22.01	ng	INST VERIFICATION STRIP
9014	14235143.01	1190867.58	22.07	ng	INST VERIFICATION STRIP
9015	14235143.42	1190868.30	20.16	iso5a	INST VERIFICATION STRIP
9016	14235143.69	1190868.42	20.17	iso5b	INST VERIFICATION STRIP

GeoMetrics GPS	Phone: [redacted]
[redacted]	Fax:
Fredericksburg, VA 22405	[redacted].com
USA	

Project information		Coordinate System	
Name:	[redacted]	Name:	[redacted]
Size:	790 KB	Datum:	NAD 83
Modified:	6/14/2013 7:06:14 PM (UTC:-4)	Zone:	18 North (75W)
Time zone:	Eastern Standard Time	Geoid:	GEOID12A (Conus)
Reference number:		Vertical datum:	NAVD88
Description:			

Additional Coordinate System Details

Local Site Settings			
Project latitude:	?	Ground scale factor:	1
Project longitude:	?	False northing offset:	0.000
Project height:	0.000	False easting offset:	0.000

Point List

ID	Northing	Easting	Elevation	Feature Code
9001	14235111.908	1190906.858	21.327	ng
9002	14235112.236	1190907.260	21.069	iso1
9003	14235118.633	1190899.582	20.788	iso2a
9004	14235118.408	1190899.384	20.786	iso2b
9005	14235118.007	1190899.203	21.502	ng
9006	14235124.692	1190891.882	20.305	iso3a
9007	14235124.590	1190891.767	20.299	iso3b
9008	14235123.946	1190891.174	21.782	ng
9009	14235133.559	1190879.393	22.006	ng
9010	14235133.855	1190880.407	20.642	iso4a
9011	14235134.059	1190880.119	20.668	iso4b
9012	14235134.217	1190879.858	20.682	iso4c
9013	14235133.655	1190879.482	22.014	ng
9014	14235143.013	1190867.581	22.066	ng
9015	14235143.421	1190868.302	20.162	iso5a
9016	14235143.688	1190868.420	20.174	iso5b

Former Curtis Bay Ordnance Depot
Draft Remedial Investigation Report for MMRP and IRP Sites
Appendix E1: Data Quality Assessment

1.0 DATA QUALITY ASSESSMENT

The analytical data provided by ALS, Inc. and the sample procedures followed by ERT, Inc. (ERT) have been reviewed by the ERT Project Chemist and validated by the Senior Chemist at HSW Engineering, Inc. (HSW). This data quality assessment (DQA) section is prepared to summarize those findings in accordance with the approved Final Work Plan, Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP) (ERT, 2013) and the Work Plan Addendum No. 1 (ERT, 2015), and specifically evaluates the data quality indicators (DQIs) of precision, accuracy, reproducibility, comparability, completeness, and sensitivity (PARCCS) with respect to the project data quality objectives (DQOs).

In order to reduce the data uncertainties and biases, field instrument calibration, sample collection, and laboratory analyses were conducted in accordance with the standard operating procedures as outlined in the UFP-QAPP (ERT, 2013) and Addendum No. 1 (ERT, 2015), except as noted in the DQA sections below. Over 99 percent of the analytical data from the regular environmental and field QC samples collected and analyzed were considered to be of an acceptable quality (as qualified) for use in project decisions. However, due to uncertainties concerning the reported chemical concentrations 22 percent (3,604 of 16,397) of the detected results from regular environmental samples were qualified. Data qualifications were primarily based on data that were detected at concentrations greater than the Limit of Detection (LOD), but less than the Limit of Quantitation (LOQ) or accuracy outside of control limits.

1.1 Analytical Program

Environmental and field quality control (QC) samples were analyzed by ALS and ALS subcontracted laboratories during the RI sampling activities. The laboratories analyzed all environmental samples and field QC samples (i.e., field duplicates, matrix spikes [MS], and matrix spike duplicates [MSD], equipment rinsate blanks [ERBs], and trip blanks) using accepted laboratory standard operating procedures (SOPs) based on *SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (United States Environmental Protection Agency [USEPA], 2007); Standard Methods (SM) for the Examination of Water and Waste Water (American Public Health Association [APHA], 2005); Department of Energy (DOE) test methods; and American Society for Testing and Materials (ASTM) test methods. Specific analytical methods included the following:

- SW-846 8260B for volatile organic compounds (VOCs)
- SW-846 8270D/8270 SIM for select semi-volatile organic compounds (SVOCs)
- SW-846 8270D for select semi-volatile organic compounds (SVOCs)
- SW-846 8015B for methanol and ethanol
- SW-846 6020A for select metals
- SW-846 7471A for mercury
- SW-846 7470A for mercury
- SW-846 7196A for hexavalent chromium
- SW-846 8330B for explosives and nitroguanidine by high performance liquid chromatography

- SW-846 6850 for perchlorate
- SW-846 8082A for polychlorinated biphenyls
- SW-846 8151A for herbicides
- SW-846 8290 for dioxin/furan compounds
- SW-846 2320B for alkalinity
- SW-846 2340C for hardness
- SW846 9056 for anions
- EPA 410.4 for chemical oxygen demand (COD)
- ASTM D 6919-03 for ammonia
- SW-846 2540C for total dissolved solids (TDS)

The analytical data packages included the following list of sample delivery groups (SDGs) during the sampling activities:

- 1037034
- 1037210
- 1037681
- 1037814
- 1038642
- 1038644
- 1038645
- 1038646
- 1038666
- 1038667
- 1038936
- 1038937
- 1038938
- 1039010
- 1039011
- 1039012
- 1039239
- 1039240
- 1039702
- 1039926
- 1040048
- 1040312
- 1040717
- 1041136
- 1041415
- 1041687
- 1041688
- 1042002
- 1042469
- 1042470
- 1042889
- 1043120
- 1043271
- 1043391
- 1043392
- 1043394
- 1043649
- 1043861
- 1043863
- 1044128
- 1044130
- 1044131
- 1044417
- 1044593
- 1044594
- 1044595
- 1044663
- 1044664
- 1044665
- 1044758
- 1044919
- 1044920
- 1045059
- 1045060
- 1045061
- 1045062
- 1045063
- 1045065
- 1045186
- 1045330
- 1045331
- 1045332
- 1045647
- 1045648
- 1045649
- 1045650
- 1045723
- 1045724
- 1045725
- 1045969
- 1045970
- 1045971
- 1045972
- 1045973
- 1046043
- E1500941
- E1500945
- E1500962
- E1500970
- E1500971
- E1500977
- E1500989
- E1500993
- E1501012
- E1501013
- E1501025
- E1501030
- E1600056
- E1600071
- E1600073
- E1600105
- E1600124
- HS15091116
- HS15091150
- HS15091163
- HS15091306
- HS15091310
- HS15100124
- HS15100126
- HS15100149
- HS15100243
- HS15100246
- HS15100248
- HS15100267
- HS15100275
- HS15100331
- HS15100336
- HS15100393
- HS15100401
- HS15100440
- HS15100493
- HS15100514

- HS16010775
- HS16010784
- HS16010850
- HS16010855
- HS16010858
- HS16010999
- HS16011008
- HS16020446
- HS16020490
- HS16020493

- Two additional SDGs (1046795 and HS15100033) were produced for waste characterization samples at the end of the sampling activities.

All samples were collected, shipped, handled, and analyzed in compliance with the UFP-QAPP (ERT, 2013), except as noted below.

Analytical data summary tables are provided in Appendix E2.

1.2 Field and Quality Control Sample Summary

The project utilized both field and analytical laboratory QC measures to meet the DQOs. The allocation of regular and corresponding QC samples per analytical group by matrix is shown in Table E1-1. QC sampling frequency met or exceeded compliance with project objectives, as shown in Table E1-1.

Table E1-1. Sample QC Summary for SI and RI Sampling at the Former Curtis Bay Ordnance Depot

Matrix	Normal Environmental Samples	Field Duplicate Samples	
	Number Collected	Number Collected	Percent Field Duplicates
Soil	583	63	10.81
Groundwater[1]	50	5	10.00
Sediment	4	1	25.00
Surface Water	6	2	33.33
Total Samples	643	71	11.04

MS/MSD		ERB[2]		TB	
Number Collected	Percent	Number Collected	Percent	Number Collected	Percent
68	10.58	20	5.76	24	NA

Notes:

1. Includes groundwater samples (and QC samples) that were collected in 2013, but rejected due to high turbidity. These groundwater samples were re-collected in 2015 so that reported results would be representative of site conditions. The total number of useable groundwater samples is 26.
2. Dedicated, disposable sampling equipment was used for all surface soil samples. Therefore, the number of samples for which an ERB was required at a 1 in 20 frequency was 347 (surface water, sediment, subsurface soil, and groundwater).

ERB - Equipment Rinsate Blank
FD - Field Duplicate Sample
MS/MSD - Matrix Spike/Matrix Spike Duplicate
NA - Not applicable
TB - Trip Blank

In addition to field duplicate, MS/MSD, and ERB field QC sample types; trip blanks accompanied each cooler per shipment of samples to be analyzed for VOCs. A total of 24 trip blanks were submitted for analysis during sampling activities for the RI. Additional laboratory QC samples were also added by the laboratory during sample analyses, including laboratory blanks, method blanks, blank spikes, laboratory replicates, laboratory control samples, surrogates, and other method-specific QC sample types.

1.3 Data Deliverables

Complete analytical data packages, including raw data and appropriate electronic data deliverables (EDDs), were submitted by ALS to ERT. The data packages were provided in an error-free electronic format.

ALS prepared USEPA Contract Laboratory Program (CLP) Level IV data packages to include a cover sheet, table of contents, case narrative, the analytical results, sample receipt and data management records, internal laboratory QA/QC information, and raw data. The laboratory data packages were organized so that the analytical results were reported on a per batch basis. Complete analytical laboratory reports are presented in Appendix E-3 (electronic only). Data validation reports (DVRs), validated SEDD files, and additional Automated Data Review (ADR) output files, are provided in Appendix E-4 (electronic only). ERIS files were also required for this project and are provided in Appendix E-5 (electronic only).

1.4 Data Quality Objectives

The DQOs for the activities are detailed in Worksheet #11 of the UFP-QAPP (ERT, 2013). The goals (i.e., Step 2 of the DQO process) are summarized as:

- determining if chemicals of potential concern (COPCs) and chemicals of potential ecological concern (COPECs) are present;
- determining if COPCs and COPECs present an unacceptable risk to human health or the environment;
- delineating the extent of COPCs and COPECs; and
- determining if further management decisions are necessary to reduce risk to acceptable levels.

The project DQOs were developed based on the investigation needs. Quality assurance objectives and measurement performance criteria (MPC) were also developed to support the project DQOs and to ensure the collected data would be defensible and support the conclusions of the investigation.

Performance and acceptance criteria were developed in order to minimize the potential for study error rates. Quality assurance objectives for the DQIs of precision, accuracy, completeness, and sensitivity were developed in order to define acceptable measurement error and to assess the overall quality of the analytical data collected. MPC for precision and accuracy were established to be in accordance with the DoD Quality Systems Manual (QSM) for Environmental Laboratories (DoD, 2010), the specific analytical methodologies, and laboratory control limits; which are also identified in the UFP-QAPP (ERT, 2013). The objective of the percentage of data to be within established precision and accuracy limits was 90 percent. Completeness, which was defined in the UFP-QAPP as the difference between planned data and the actual amount of data

collected, was established at 95 percent. In general for sensitivity, limits of detection should be lower than the screening level benchmarks.

1.5 Data Evaluation

Accuracy, precision, and completeness percentages were calculated for the sampling data for the RI. These DQIs provide the main point of reference for an assessment of the environmental data as a whole. A detailed assessment of the data quality results, including quantitative and qualitative evaluations, is presented in the following sections.

Note that the data qualifiers used by the data validator have evolved during the course of the RI field investigations. Table E1-2 provides the data validation qualifiers and definitions that were used to qualify the CBD RI data.

Table E1-2. Data Validation Qualifier Rationale and Definitions

Data Validation Qualifier Rationale	Qualifier Definition	Sample Collection Year	
		2013	2015/2016
Possible blank contamination (blanks may be field or laboratory generated).	Tentative non-detect, LOD, LOQ, and MDL are estimates	B	U/UJ
Percent recovery of spiked sample or surrogate is greater than DQO.	Sample result may be biased high	K	J+ (no 2015/2016 data required this qualifier)
Percent recovery of spiked sample or surrogate is less than DQO.	Sample result may be biased low	L	J- (no 2015/2016 data required this qualifier)
Data quality is unreliable due to one or more DQIs extremely outside of QC limits.	Data are unusable for project purposes.	R	R
Result is greater than LOD, but less than LOQ or minor DQI issue(s) that does(do) not indicate direction of bias.	Result is estimated.	J	J
Compound was not detected. Percent recovery of spiked sample or surrogate is less than DQO.	LOQ and LOD may be biased low.	UL	UJ

1.5.1 Precision

Precision is defined as the reproducibility, or degree of agreement, among replicate measurements of the same compound analyzed under identical conditions. For samples collected and analyzed as field duplicates, precision is expressed as the RPD of the concentration of parameters detected in the sample and associated duplicate; providing an assessment of the cumulative (i.e., field and laboratory) precision, as well as insight into the extent to which a discrete sample is representative of a sampling location. Field duplicates were required at a 10 percent frequency. MS/MSD data also served as indications of the matrix sampled and precision in the analytical system. An MS/MSD analysis was required for every 20 samples in a laboratory batch.

Data validation indicated that field duplicate and matrix spike precision data were within acceptable validation guidelines, such that all data were usable. An assessment of the data quality results for precision is presented below. Additional QC evaluation is further presented in the Data Validation Reports (DVRs), located in Appendix E-4 (electronic only).

1.5.1.1 Field Duplicates

Field duplicate environmental field samples were collected at selected locations at a frequency equal to or greater than 1 per 10 regular samples collected (actual frequency was 11.04 percent)

(see Table E1-1). Field duplicate samples were used to evaluate the precision of the sampling and analytical techniques. The RPD value of each detected compound or element was reviewed to assess the reproducibility and matrix variability in duplicate samples. When standard field and laboratory operation procedures are consistently implemented and matrix effects are minimal, the RPDs are expected to be low. Summary tables of the field duplicate analyses greater than the MPC of 30% RPD, as specified in the UFP-QAPP (ERT, 2013), are presented per matrix Tables E1-3 through E1-26 (soil sampling), Tables E1-27 through E1-30 (groundwater sampling), Table E1-31 (sediment sampling), and Table E1-32 (surface water sampling). Field Duplicate RPD Reports are also included in the Data Validation Reports (DVRs) in Appendix E-4.

- For the soil parameters, 76 percent of the field duplicate sample results were within the established MPC (i.e. the precision limit) of 30% RPD.
- For the groundwater parameters, 96 percent of the field duplicate results were within the established precision limit of 30% RPD.
- For the sediment parameters, 81 percent of the field duplicate results were within the established precision limit of 30% RPD.
- For the surface water parameters, 93 percent of the field duplicate results were within the established precision limit of 30% RPD.

The objective of the percentage of field duplicate data to be within the 30% RPD precision limit was 90 percent. Although this objective was not achieved for the soil or sediment sampling activities, RPDs greater than 30% are common in soil and sediment samples due to the heterogeneous nature of the matrix and/or routine laboratory analytical measurement uncertainty, and do not necessarily indicate improper field or analytical techniques. No soil or sediment sample results were qualified due to field duplicate RPD values (Appendix E-4). Groundwater and surface water field duplicate RPDs met or exceeded the DQO of 90% of RPDs evaluated at less than 30%. No groundwater or surface water sample results were qualified due to field duplicate RPD values (Appendix E-4).

1.5.1.2 Matrix Spike Duplicates

MS/MSD sample pairs were collected and analyzed in order to evaluate the precision of the preparatory and analytical procedures, and evaluate matrix effects. Per the UFP-QAPP (ERT, 2013), the MPC (i.e. the precision limits) used to evaluate MSD precision were taken from DoD QSM version 4.2 (DoD, 2010) and presented in Worksheet #12 of the UFP-QAPP. Consistent with specifications in the UFP-QAPP and validation guidance in the U.S. Environmental Protection Agency (USEPA) National Functional Guidelines (NFG) for validation of organics and inorganics environmental data (USEPA, 2008 and USEPA, 2010c), MS/MSD data are concluded to be not meaningful if the spiked concentration is less than one-fourth the concentration of the analyte in the native parent sample; i.e., detection of the spiked concentration is assumed to have been obscured by routine analytical measurement uncertainty. This is often the case with metals that occur naturally at relatively high concentrations in soil and groundwater (e.g., aluminum).

For this report, MSD evaluation was performed only on MS/MSD samples collected in the field and does not include additional MS/MSD analysis performed by the laboratory. MS/MSD samples were collected at a frequency of 1 per 20 regular sample or 5% (actual MS/MSD sample rate over all sampling activities and parameters was 10.6%).

Results qualified due to MS/MSD RPD issues were coded with "J" (estimated value) or "UJ" (estimated value less than detection limits) qualifiers indicating that the data are qualitative, but still useable for project purposes. Qualitative data values are estimated due to the increased uncertainties in the measurement. These data are useable because they provide information that is considered valid, albeit with more uncertainty than data classified as fully quantitative (un-flagged). Data uncertainties are discussed in Section 1.5.7.

Summaries of RPD results from MSD samples that had a qualifying effect on sample data are presented in the DVRs and the Data Qualifier Summaries that are provided in Appendix E-4. All data qualified based on MS/MSD precision evaluation have a level of uncertainty associated with those data. None of the data that were qualified based on MS and MSD results were considered to be unusable for project purposes (i.e., rejected).

1.5.2 Accuracy

Accuracy is defined as the extent of agreement between a measured or calculated value and the true value. Accuracy was determined using spike percent recovery (%R) data from MS and MSD samples that were collected in the field with the batch of regular environmental samples to identify matrix effects. MS and MSD analyses were required for every 20 samples per matrix. ERBs and trip blanks were also collected to evaluate measurement accuracy, and to identify contamination effects on sample results. ERBs were required for every 20 samples collected using non-disposable sampling equipment. Trip blanks were required to accompany each cooler containing samples for VOCs analysis. Method blanks, laboratory control samples, and surrogate samples, and other method-specific QC samples were also processed and analyzed by the laboratories to also serve in identifying contamination effects. Data validation indicated that the number and magnitude accuracy failures from field and laboratory QC samples used as a measurement of accuracy were within acceptable validation guidelines such that all data were usable, except for the results for explosives analyzed by SW846 8330B in the sample collected from EC-58B-1-SW due to surrogate recoveries.

An assessment of the data quality results for accuracy from the QC samples is presented below. Additional QC evaluation is further presented in the Data Validation Reports (DVRs), located in Appendix E-4.

1.5.2.1 Matrix Spikes

Per the UFP-QAPP (ERT, 2013), the MPC (i.e., the precision limits) used to evaluate MSD precision were taken from DoD QSM version 4.2 (DoD, 2010). For this report, MSD evaluation was performed only on MS/MSD samples collected in the field and does not include MS/MSD analysis performed by the laboratory. MS/MSD samples were collected at a frequency of 1 per 20 regular sample or 5% (actual MS/MSD sample rate over all sampling activities and parameters was 10.6%). Consistent with specifications in the UFP QAPP and validation guidance in the NFG, MS/MSD data are concluded to be not meaningful if the spiked concentration is less than one-fourth the concentration of the analyte in the native parent sample; i.e., detection of the spiked concentration is assumed to have been obscured by routine analytical measurement uncertainty. This is often the case with metals that occur naturally at relatively high concentrations in soil and groundwater (e.g., aluminum or calcium). Also, qualification of data based on MS/MSD recoveries is routinely limited to the results for the native parent sample for organics analyses and extended to all project samples within the same preparation batch for inorganics analyses.

Results qualified due to MS/MSD %R issues were coded with "UJ" (estimated value less than detection limits), "L" (estimated value, reported result may be biased low), "J" (estimated value), or "K" (estimated value, reported result may be biased high) qualifiers indicating that the data are qualitative rather than fully quantitative. Qualitative data values are estimated due to the increased uncertainties in the measurement. These data are useable because they provide information that is considered valid, albeit with more uncertainty than data classified as fully quantitative (un-flagged). Data uncertainties are discussed in Section 1.5.7.

Summaries of %R results from MS/MSD samples that had a qualifying effect on sample data are presented in the DVRs and the Data Qualifier Summaries that are provided in Appendix E-4. All data qualified based on MS and MSD accuracy evaluation have a level of uncertainty associated with those data. None of the data that were qualified due to MS/MSD results were considered to be unusable for further evaluation based on matrix interferences alone.

1.5.2.2 Equipment Rinsate Blanks

ERBs were collected to evaluate the decontamination technique used for non-disposable sampling equipment (i.e., sample tubing for groundwater and macrocore parts and stainless steel bowl for soil). ERBs were collected by pouring laboratory-supplied deionized water through a recently decontaminated piece of equipment into a prepared sample container appropriate for the required analysis. As indicated in Table E1-1, ERBs were analyzed at the correct frequency (1 per 20 regular samples collected, or 5 percent) when non-disposable sampling equipment was employed. The MPC (i.e., the accuracy/bias contamination limit) used to evaluate ERB accuracy was one-half of the reporting limit (RL), according to the DoD QSM (DoD, 2010) and the UFP-QAPP (ERT, 2013).

All parameters detected in ERBs by analytical method are presented in Tables E1-33 through E1-36. DVR sections in Appendix E-4 also address blank contamination issues and provide justification for qualifying associated sample results. No regular environmental sample results were determined to be unusable (i.e., rejected) based on ERB contamination issues. Overall, there were 46 reported detections out of 594 reported results (8 percent) in ERB samples.

Soil:

EC-49-SO-ERB1 contained low levels of naphthalene (0.27 micrograms per liter [µg/L]) and zinc (0.015 milligrams per liter [mg/L]). The concentrations of zinc detected in the soil samples ranged from 3.9 milligrams per kilogram (mg/kg) reported for sample EC-49-4-SO-02 to 545 mg/kg reported for sample EC-49-13-SO-0.5. These concentrations exceeded the qualifying limit of five times the amount detected in the blank and thus were not qualified. Naphthalene was detected in 15 of the 43 soil samples, with all but one of these detections (1.9 µg/kg reported for EC-49-SO-FD3, the field duplicate of sample EC-49-8-SO-0.5) less than five times the concentration detected in the ERB. These 14 results were coded with B qualifiers to indicate that they may have been impacted by low-level cross contamination resulting from field and/or laboratory activities.

A trace amount of manganese was detected in EC-21-SO-ERB2-092315, but it was insufficient to have resulted in qualifications to any sample data, given the elevated concentrations detected.

EC-57B-SO-ERB contained low levels of copper and zinc. The concentrations of these metals detected in soil samples from EC-57B, as well as all other sampling locations from EC-57, precluded the need for qualification of sample data for copper or zinc, based on the ERB detections.

EC-57B-GW-ERB1 (collected on 22 January 2016) contained low levels of two of the five target PAHs, each at concentrations equal to or only very slightly greater than the LODs. The concentrations of these analytes in all samples far exceeded the levels that would have been impacted by contamination on the order of that reflected by the ERB. No qualification of sample data was warranted.

EC-57B-GW-ERB1 (collected on 10 February 2016) contained low levels of three target PAHs; however, any cross-contamination on the order indicated by the blank concentrations would have been insufficient to have had any measureable impact on the concentrations reported for the two samples (EC-57B-22-SO-1 and EC-57B-23-SO-1).

Several analytes were reported detected in the equipment blank sample EC-36-SO-ERB1-100515; however, the concentrations detected were insufficient to warrant qualification of sample data, some of which was qualified based on detections in the method blank.

Three target dioxin/furan compounds were detected in EC-36-GW-ERB1. However, all three of these analytes were detected in the method blank associated with the ERB and, thus, their presence in the ERB was attributed to laboratory contamination.[1]

Five analytes were detected in EC-21-SO-ERB1-092215. Four of these were qualified as non-detections, based on detections of the analytes in the aqueous method blank analyzed in association with the ERB, and therefore were not used to qualify sample data. The detected concentration of 1,2,3,5,7,8-hexachlorodibenzofuran was too low (0.308 pg/L, or 0.000308 ng/L= 0.000308 ng/Kg) to warrant qualification of the detected concentrations in soil samples. Any results reported as detections that might have been minimally affected were results that were less than the LOQs and, therefore, were already reported as estimated concentrations (i.e., coded with J qualifiers by the laboratory and retained as overall validation qualifiers of J)[1].

The reported result for total hexachlorodibenzofuran in ERB EC-21-SO-ERB2-092315 should be interpreted with caution as total hexachlorodibenzofuran was also reported in the associated method blank.

Several analytes were reported detect in EC-36-SO-ERB1-100515; however, the concentrations detected were insufficient to warrant qualification of sample data.

Four analytes were detected in EC-57B-SO-ERB1-092515. Three of these analytes also were detected in the method blank associated with the equipment blank, and all four (as well as others) were detected in the method blank associated with the soil samples. The concentrations of these analytes in the samples were sufficiently higher than the concentrations in the equipment blank such that qualification was not warranted.

Groundwater:

Naphthalene, copper, and zinc were detected in EC-33-GW-ERB1. Detections of naphthalene reported for sample EC-33-1-GW and of copper and zinc reported for sample EC-33-2-GW were

[1] Reported results for total dioxin/furan compounds in this sample are also likely due to method blank contamination. The total dioxin/furan compounds reported by the laboratory are calculated values that sum the identified congeners plus other chromatogram peaks for unidentified dioxin/furan congeners. As such, no limit of detection or limit of quantitation were identified by the laboratory for these calculated totals and no data qualifiers due are applied to these results (ADR.net requires detection and quantitation limits for validation). Reported results shown in Table E1-36 should be interpreted with caution.

less than the qualifying values of five times the amounts detected in the equipment blank and therefore were coded with B qualifiers

Manganese and zinc were detected in EC-58C-GW-ERB1. The detection of zinc reported for groundwater sample EC-58C-1-GW was less than the qualifying value of five times the amount detected in the equipment blank and therefore was coded with a B qualifier. The detection of manganese in this sample exceeded the qualifying value and therefore was not qualified, based on the equipment blank detection. No other target analytes were detected in the ERB.

Naphthalene and aluminum (both total and dissolved) were detected in EC-21-SO-ERB2-092315. All detections of dissolved aluminum (EC-28-16-GW and EC-29-11-GW) and one detection of total aluminum (EC-28-17-GW) were classified as non-detections. Note that total and dissolved aluminum were also reported in the method blank associated with the ERB. The absence of methylene chloride and naphthalene in all samples precluded the need for qualification.

Detections in the ERBs may indicate inadequate or inefficient decontamination of sampling equipment and indicate potential cross-contamination. Where ERB results indicate potential cross-contamination, detected results in field samples were qualified as non-detect during data validation in accordance with the NFG (i.e., field sample results that were less than five times the concentration reported in the ERB were "B" or "U" qualified).

1.5.2.3 Trip Blanks

Trip blanks were collected to determine whether external VOC constituents from bottle handling and analytical processes, independent of the field sample processing procedures, contaminated samples. Seven VOCs were detected in the 11 of the 24 trip blanks that were collected. All parameters detected in trip blanks are presented in Table E1-37.

Low levels of methylene chloride were detected in trip blanks TB-07252013A and TB-07262013 and in all samples submitted under these two SDGs (1039012 and 1039239). Methylene chloride also was detected in the method blank associated with both trip blanks, and resulted in B qualifiers being applied to each trip blank result; despite these qualifications, the trip blank results still were used to evaluate the sample data. Detections in the soil samples exceeded the qualifying values of ten times the amounts detected in the trip blanks; none of the results were qualified, based on trip blank data.

A low level of tetrachloroethene was detected in TB-08212013. Samples associated with this trip blank were collected to evaluate disposal characteristics and were not validated. However, tetrachloroethene was not detected in any of the associated TCLP samples. Therefore, the trip blank detections have no effect on the sample results.

A low level of chloromethane was detected in TB-08272013. Groundwater was re-sampled at EC-21 in November 2015 due to high turbidity in the 2013 sample. This trip blank result is not applicable to the November 2015 sample of groundwater at EC-21.

A low level of chloromethane was detected in TB-08282013. Groundwater was re-sampled at EC-52 in November 2015 due to high turbidity in the 2013 sample. This trip blank result is not applicable to the November 2015 sample of groundwater at EC-52.

A low level of toluene was detected in TB-09032013. The tributary sediment and surface water samples were recollected in November 2015 due to extraction holding time issues with the 2013

samples. This trip blank is not applicable to the November 2015 sample results for sediment and surface water.

Low levels of acetone and toluene were detected in TB-09052013 TRIP BLANK. The absence of these analytes in the groundwater sample precluded the need for qualification of the sample data (BG-MW-01 collected in 2013 and IDW-I-WW).

A low level of ethylbenzene was detected in Trip-093015. However, this analyte was not detected in the single associated environmental sample (EC-34-04-GW) analyzed for VOCs.

A low level of methylene chloride was detected in Trip-100515. However, this analyte was not detected in any of the associated environmental samples (EC-21-41-GW, GW-FD1-100515, or C-52-17-GW).

A low level of methylene chloride was detected in Trip-100615. However, this analyte was not detected in any of the associated environmental samples (EC-29-11-GW, EC-28-16-GW, or EC-28-17-GW).

A low level of 2-butanone was detected in Trip-100715. However, this analyte was not detected in the associated environmental sample EC-31-06-GW.

No regular environmental sample results were determined to be unusable based on trip blank contamination issues. DVR sections in Appendix E-4 further address blank contamination issues and provide justification for qualifying associated sample results.

1.5.2.4 Laboratory QC Samples

Per method protocol, the laboratory processed and analyzed method blanks for each method exactly like the field samples, in order to assess contamination introduced during sample preparation. Analytes detected in the method blank and in the field samples at similar concentrations likely do not represent environmental conditions at the Former Curtis Bay Ordnance Depot. Method blank results that were identified as having potential issues without qualification during the data validation are summarized below. No regular sample results were determined to be unusable (i.e., rejected) based on method blank contamination issues.

Where method blank results indicate potential laboratory contamination, field sample results were qualified during data validation in accordance with the NFG (i.e., field sample results that were less than five times the concentration reported in the method blank were “B”, “U” or “UJ” qualified.) See the DVRs in Appendix E-4 for details. The laboratory processed and analyzed LCSs for each method, in order to assess overall laboratory performance. Per protocol, at least one laboratory control sample was analyzed with each batch of samples. Several recoveries of target parameters in the analysis of the LCSs were outside of acceptance limits. However, no regular sample results were determined to be unusable (i.e., rejected) based on LCS recoveries.

Per method protocol, surrogate compounds were added to all samples analyzed for organics (i.e., VOCs, SVOCs, and explosives). Surrogate recovery data were used to evaluate the capability of the analytical methods to detect the target parameters in each sample and to assess bias and variability that were due to matrix effects and gross laboratory processing errors. There were few surrogate recoveries that were outside of acceptance limits. The surrogate recoveries for the explosives analyzed by SW846 8330B in the sample collected from EC-58B-1-SW were outside of QC limits and the data were “R” qualified. No other surrogate recoveries resulted in qualifying regular environmental sample results as unusable.

Additional method-specific QC measures were performed by the laboratory at the correct frequencies, including: serial dilutions, post-digestion spikes, laboratory duplicates, calibration verifications and blanks, and interference check samples. Analyses of these QC samples resulted in limited qualification of associated sample data.

Qualification of all sample data based on laboratory QC sample results are provided in detail in the DVRs presented in Appendix E-4.

1.5.3 Representativeness

Representativeness was evaluated by comparing preservation and analytical procedures to those described in the UFP-QAPP (ERT, 2013), by evaluating holding times, and by examining blanks for possible contamination of samples during collection and analysis.

All samples were preserved, prepared, and analyzed following methods specified in the UFP-QAPP (ERT, 2013), except as noted herein.

ERT identified probable laboratory cross-contamination for the sampling results from samples collected at BG-SB02-SO-4 by Method SW846 8270D and all results were "R" qualified. Cross-contamination was confirmed by the laboratory. However, results for Method SW846 8270SIM were of sufficient quality and were used as the reported results for this sample. Therefore, there was no loss of reportable results for this sample.

Holding times are defined as the maximum amount of time allowed to lapse between the date and time of sample collection and the date and time of sample extraction and date and time of sample analysis. All regular samples were extracted and analyzed within the recommended method holding times, except as noted below.

The result for hexavalent chromium in the 5 September 2013 sample collected from the background well (BG-MW-01) was analyzed outside of the 48-hour hold time. The result was rejected during data validation as unusable. BG-MW-01 was re-sampled on 8 October 2015 and analyzed within holding time. The chlorinated herbicide results in the 5 September 2013 sample collected from BG-MW-01 were not extracted within the 7-day holding time specified for the method. The sample was collected on 9/5/2013 and extracted on 9/16/2013. However, as this extended holding time to extraction (11 days) was less than twice the specified maximum holding time, the results for chlorinated herbicides reported for this sample – all of which were findings of non-detect – were classified as less than fully quantitative and were coded with UJ qualifiers. All other samples that were analyzed outside of holding time were re-collected and re-submitted for analysis within holding time.

Representativeness, in part, is ensured by the consistent use of approved sampling techniques, environmental sample collection methods, equipment, decontamination methods, and sample containers for the field work according to the guidelines and specifications described in the UFP-QAPP (ERT, 2013).

ERT recollected several groundwater samples in 2015. The groundwater samples collected in 2013 exhibited high turbidity and the project delivery team believed that these samples were not representative of site groundwater conditions. Only those results from groundwater samples with acceptable turbidity collected in 2013 and groundwater samples collected in 2015 are included in the RI.

The sampling team followed approved standard operating procedures for sample collection and handling, and the laboratory followed approved standard operating procedures for sample

handling, preparation, and analysis as designated in the UFP-QAPP (ERT, 2013), except as noted above. Therefore, the data, as qualified, are considered representative of site conditions for the purpose of the sampling activities for the RI.

1.5.4 Completeness

Completeness determinations were made separately for samples obtained from the field collection effort and data obtained from the analytical measurement system.

Field collection completeness is determined by the difference between the planned or proposed number of samples and the actual number of samples collected. ERT conducted field sampling of surface and subsurface soil that was sufficient to determine that Army activities did not result in environmental impacts at SI ECs (biased) and sufficient samples to delineate identified environmental impacts at RI ECs (unbiased). Because surface and subsurface soil at all ECs was sufficiently characterized, field completeness for soil is 100 percent.

ERT planned to collect 28 groundwater samples and collected 26 for field completeness for groundwater of 93 percent. The well at EC-21-31 could not be completed due to refusal during drilling at the original and multiple offset locations. ERT could not collect a groundwater sample at location EC-58B-4B as the well went dry during purging.

ERT planned to collect and collected five sediment and five surface water samples. Therefore, field sampling completeness for sediment and surface water is 100 percent.

There were 583 soil (combined surface and subsurface) samples, 26 groundwater samples (excluding the groundwater samples collected in 2013 that were resampled in 2015), five sediment samples, and five surface water samples collected and analyzed during the SI/RI field efforts. All ECs were sufficiently characterized for project purposes.

Completeness also refers to the fraction of valid analytical data obtained (i.e., not rejected) compared to that which was planned. Completeness is calculated as follows:

$$\text{Analytical Completeness (\%)} = \frac{\text{Number of Valid Measurements Made}}{\text{Number of Measurements Planned}}$$

There were four analytical results that were qualified as unusable and 16,397results qualified as usable. Therefore, analytical completeness is nearly 100% (99.98%).

The DQOs for completeness were met.

1.5.5 Comparability

Comparability refers to the confidence with which one data set can be compared to another. To improve data comparability, the data set used for sampling activities for the RI was generated by employing standardized analytical methods and standardized data validation procedures. Project planning, including lab selection, incorporated various appropriate USEPA guidance documents, as well as direct input from USACE on field, laboratory, and data screening issues to ensure the comparability of the data. Because of the implementation of standard and consistent planning, field, analytical, and validation procedures during this investigation; the site data can be compared with confidence to historical site data of acceptable data quality.

1.5.6 Sensitivity

Sensitivity was evaluated as a function of the laboratory limits with respect to chemical specific screening level (SL) benchmarks that were appropriate for the sampling activity. Typically,

laboratory limits should be less than the screening levels, but this does not always occur (i.e. because of dilutions or extremely sensitive screening criteria).

For this sensitivity evaluation, soil and sediment sampling results were evaluated against USEPA Regional Screening Levels (RSLs) for Industrial Soil (USEPA, November 2015) and USEPA Region III Biological Technical Assistance Group (BTAG) Screening Benchmarks (USEPA, 1995), USEPA Ecological Soil Screening Levels (ECO) (USEPA, 2007b). Sediment sampling results were also evaluated against the USEPA Region III Freshwater Sediment Screening Levels (SED) (USEPA, 2006b). Groundwater and surface water sampling results were evaluated against USEPA National Primary Drinking Water Standards. Maximum Contaminant Levels (MCLs) (USEPA, 2009, and as listed in the USEPA RSL table, May 2016). Surface water sampling results were also evaluated against the USEPA Ambient Water Quality Criteria for Aquatic Life (WQ) (chronic) (for screening of surface water samples only) (USEPA, 2012b). Sensitivity analysis are presented per matrix Table E1-38 (soil sampling), Table E1-39 (groundwater sampling), Table E1-40 (sediment sampling), and Table E1-41 (surface water sampling).

Many of the poor sensitivity occurrences for the soil and sediment sampling activities were identified in the UFP-QAPP (ERT, 2013), as a result of extremely sensitive screening criteria associated mostly with the USEPA ECO and USEPA SED (sediment only). Other instances where sensitivity objectives were not met are a result of increases to laboratory limits from dilution and soil moisture content.

The three analytes that exhibited poor sensitivity (1,2-dibromo-3-chloropropane, 1,2-dibromoethane, and pentachlorophenol) for the groundwater RI sampling activities were as a result of extremely sensitive screening criteria associated with the USEPA MCLs.

Cadmium in surface water exhibited poor sensitivity for surface water RI sampling activities due to the extremely sensitive screening criterion associated with the USEPA WQ.

1.5.7 Data Uncertainty

As with all datasets, a level of uncertainty is typically associated with the data and its usability. In order to reduce the data uncertainties and biases, field instrument calibration, sample collection, and laboratory analyses were conducted in accordance with the standard operating procedures as outlined in the UFP-QAPP (ERT, 2013), except as noted above. Overall, it is not possible to completely characterize the nature and extent of contamination on any site. Additionally, laboratory analytical techniques have a degree of uncertainty associated with them. These uncertainties are documented by using data qualifiers to reflect the uncertainty of the measurement. The presence of “K”, “L”, “UL”, “J”, and “UJ” qualified data in this dataset could create a bias. The direction of bias is unclear for the “J” qualified data. The “K” qualifiers indicate a potential high bias. The “L” and “UL” qualifiers indicate a potential low bias. There were 174 (out of 17,803 or 1 percent) results that were qualified as having a high bias (“K”) and 107 (out of 17,803 or 0.6 percent) results that were qualified as having a low bias (“L“ or “UL” flagged). Note that the estimated result totals include samples that were qualified as estimated by the laboratory (reported results was less than the LOQ, but greater than the LOD).

Data that are flagged with “J”, “L”, “UL”, or “K” qualifiers have more measurement uncertainty surrounding them than do un-flagged data. However, they are usable because they provide information that is considered valid, albeit with more measurement uncertainty that data classified as fully quantitative (un-flagged).

There is not necessarily any difference in degree of uncertainty associated with "J", "L", "UL", or "K". For example, one result could be flagged "L" based on a low spike recovery (e.g. 79% when QC limits specify a lower recovery limit of 80%) while another result could be flagged "K" based on a high spike recovery (e.g. 160% when QC limits specify an upper recovery limit of 120%). The "L" and "K" qualifiers are intended to provide additional useful information to the data user.

Qualified data are usable for risk assessment, but not for making a decision about a particular sampling location (e.g., whether to abandon a well because a clean-up goal was met). Data uncertainties are discussed in the Human Health Risk Assessment and Screening Level Ecological Risk Assessment (RI, Chapter 4).

Analytical data were used in risk assessments and not for making decisions about a particular sampling location. Therefore, the analytical results for soil, groundwater, sediment and surface water are useable for project purposes.

The presence of rejected data decreased the sample size for the data sets associated with the sampling at CBD; however, the datasets were still large enough to provide valid statistical analysis of the datasets.

2.0 REFERENCES

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E1. Data Quality Assessment Tables

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Table E1-3. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Background Soil Samples

Location			BG-SB03					BG-SB09				
Sample Name			BG-SB03-SO-04		BG-SO-FD1			BG-SB09-SO-04		BG-SO-FD2		
Parent Sample Name					BG-SB03-SO-04					BG-SB09-SO-04		
Sample Date			4-Sep-13					4-Sep-13				
Start Depth (ft bgs)			3					3				
End Depth (ft bgs)			4					4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
SW846 8270 SIM												
Acenaphthene	30	µg/kg	1.9	U	1.9	U	NC	1.8	U	1.8	U	NC
Acenaphthylene	30	µg/kg	1	J	0.48	J	70.27	1.4	J	1.6	J	13.33
Anthracene	30	µg/kg	1.9	U	1.9	U	NC	0.52	J	0.85	J	48.18
Benzo(a)anthracene	30	µg/kg	1.9	U	1.9	U	NC	2.7		5.1		61.54
Benzo(a)pyrene	30	µg/kg	1.9	U	1.9	U	NC	2.9	B	5.2		56.79
Benzo(b)fluoranthene	30	µg/kg	1.9	U	1.9	U	NC	4.9	B	8.2		50.38
Benzo(ghi)perylene	30	µg/kg	0.7	B	0.67	B	4.38	2.4	B	3.8	B	45.16
Benzo(k)fluoranthene	30	µg/kg	1.9	U	1.9	U	NC	1.7	J	2.8		48.89
Chrysene	30	µg/kg	1.9	U	1.9	U	NC	3.7		6.6		56.31
Dibenz(a,h)anthracene	30	µg/kg	1.9	U	1.9	U	NC	0.81	J	1.2	J	38.81
Fluoranthene	30	µg/kg	0.88	J	1.9	U	NC	5.4		10.3		62.42
Fluorene	30	µg/kg	1.9	U	1.9	U	NC	1.8	U	1.8	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	1.9	U	1.9	U	NC	2.3		3.7		46.67
Naphthalene	30	µg/kg	1.9	U	1.9	U	NC	1.8	U	1.8	U	NC
Phenanthrene	30	µg/kg	0.53	J	1.9	U	NC	2.3		4.3		60.61
Pyrene	30	µg/kg	0.84	J	0.48	J	54.55	4.9		9		58.99

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Table E1-4. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-3 Soil Samples

Location			EC-03-01				
Sample Name			EC-3-1-SO-04		EC-3-SO-FD1		
Parent Sample Name					EC-3-1-SO-04		
Sample Date			22-Jul-13				
Start Depth (ft bgs)			3				
End Depth (ft bgs)			4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/kg	7900		6510		19.29
Cadmium	30	mg/kg	0.48	U	0.53	U	NC
Chromium	30	mg/kg	17.6	K	12.3	K	35.45
Cobalt	30	mg/kg	2.3		1.6		35.90
Lead	30	mg/kg	7.4	K	5.5	K	29.46
Titanium	30	mg/kg	39.1	J	37	K	5.52
Zinc	30	mg/kg	15.4		10.9		34.22
SW846 8015C							
Ethanol	30	mg/kg	22.4	U	22.3	U	NC
Methanol	30	mg/kg	22.4	U	22.3	U	NC
SW846 8260B							
2-Butanone	30	µg/kg	10.4	U	9.6	U	NC
Acetone	30	µg/kg	10.4	U	9.6	U	NC
Benzene	30	µg/kg	2.1	U	1.9	U	NC
Carbon tetrachloride	30	µg/kg	2.1	U	1.9	U	NC
Ethylbenzene	30	µg/kg	2.1	U	1.9	U	NC
Methylene chloride	30	µg/kg	2.1	U	2.2	K	NC
Toluene	30	µg/kg	2.1	U	1.9	U	NC
Xylenes (total)	30	µg/kg	6.2	U	5.7	U	NC

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Table E1-5. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-21 Soil Samples

Location			EC-21-07					EC-21-08					EC-21-32				
Sample Name			EC-21-7-SO-0.5		EC-21-SO-FD2			EC-21-8-SO-06		EC-21-SO-FD1			EC-21-32-SO-6		EC-21-SO-FD4-092215		
Parent Sample Name					EC-21-7-SO-0.5					EC-21-8-SO-06					EC-21-32-SO-6		
Sample Date			16-Jul-13					15-Jul-13					22-Sep-15				
Start Depth (ft bgs)			0					5					5				
End Depth (ft bgs)			0.5					6					6				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																	
Aluminum	30	mg/kg	5690		7670		29.64	1630		1590		2.48					
Antimony	30	mg/kg	1.9		2		5.13	0.6	J	1.4		80.00	0.283	U	0.281	U	NC
Copper	30	mg/kg	19.6		22.3		12.89	7.7		17.1		75.81					
Lead	30	mg/kg	88		111		23.12	21.2		66.4		103.20	9.77		9.8		0.31
Manganese	30	mg/kg	183		175	K	4.47	13.1		29.2		76.12	105		130		21.28
Zinc	30	mg/kg	39.6		41.7		5.17	16		28		54.55					
SW846 8082A																	
Aroclor 1016	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
Aroclor 1221	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
Aroclor 1232	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
Aroclor 1242	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
Aroclor 1248	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
Aroclor 1254	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
Aroclor 1260	30	mg/kg	0.044	U	0.038	U	NC	0.039	UJ	0.036	UJ	NC					
SW846 8270D/ 8270 SIM																	
Acenaphthene	30	µg/kg	0.76	J	1.8	J	81.25	1.9	UJ	1.9	UJ	NC					
Acenaphthylene	30	µg/kg	4.5		5.4		18.18	1.9	UJ	1.9	UJ	NC					
Anthracene	30	µg/kg	3.5		5.4		42.70	1.9	UJ	1.9	U	NC					
Benzo(a)anthracene	30	µg/kg	36.9		54.7		38.86	1.2	J	2.1	J	54.55	2	U	2	U	NC
Benzo(a)pyrene	30	µg/kg	33.7		45.1		28.93	1.1	J	1.9	J	53.33	2	U	2	U	NC
Benzo(b)fluoranthene	30	µg/kg	59.3		74.8		23.12	1.9	J	3.4	J	56.60	2	U	2	U	NC
Benzo(ghi)perylene	30	µg/kg	33.6		40.2		17.89	1.9	UJ	0.92	J	NC					
Benzo(k)fluoranthene	30	µg/kg	21.2		25		16.45	0.87	J	1.5	J	53.16					
Chrysene	30	µg/kg	47.7		62.4		26.70	1.4	J	2.4	J	52.63					
Dibenz(a,h)anthracene	30	µg/kg	7.6		10		27.27	1.9	UJ	1.9	UJ	NC	2	U	2	U	NC
Fluoranthene	30	µg/kg	52.7		97.7		59.84	2.1	J	2.4	J	13.33					
Fluorene	30	µg/kg	0.99	J	1.5	J	40.96	1.9	UJ	1.9	UJ	NC					
Indeno(1,2,3-cd)pyrene	30	µg/kg	31.2		37.7		18.87	1.9	UJ	1.4	J	NC	2	U	2	U	NC
Naphthalene	30	µg/kg	2.3		1.9		19.05	1.9	UJ	1.9	UJ	NC					
Phenanthrene	30	µg/kg	17.7		35.2		66.16	1.1	J	1.1	J	0.00					
Pyrene	30	µg/kg	47.2		84		56.10	2	J	2.6	J	26.09					
SW846 8290																	
1,2,3,4,6,7,8,9-OCDD	30	pg/g	1740		1260		32.00	726		1260		53.78	5750	J	6470	J	11.78
1,2,3,4,6,7,8,9-OCDF	30	pg/g	12.3		16.4		28.57	7.45	U	7.34	U	NC	8.82	J	0.86	J	164.46
1,2,3,4,6,7,8-HpCDD	30	pg/g	37.2		44.3		17.42	5.25	J	7.6		36.58	59.3		51.3		14.47
1,2,3,4,6,7,8-HpCDF	30	pg/g	8.38		11.9		34.71	3.74	U	3.68	U	NC	1.54	J	0.0914	U	NC
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.9	U	3.96	U	NC	3.74	U	3.68	U	NC	0.455	J	0.101	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	3.9	U	3.96	U	NC	3.74	U	3.68	U	NC	0.38	J	0.517	J	30.55
1,2,3,4,7,8-HxCDF	30	pg/g	2.11	J	6.41		100.94	3.74	U	3.68	U	NC	0.261	J	0.118	U	NC
1,2,3,6,7,8-HxCDD	30	pg/g	3.9	U	3.96	U	NC	3.74	U	3.68	U	NC	0.633	J	0.99	J	43.99

Table E1-5. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-21 Soil Samples

Location			EC-21-07					EC-21-08					EC-21-32				
Sample Name			EC-21-7-SO-0.5		EC-21-SO-FD2			EC-21-8-SO-06		EC-21-SO-FD1			EC-21-32-SO-6		EC-21-SO-FD4-092215		
Parent Sample Name					EC-21-7-SO-0.5					EC-21-8-SO-06					EC-21-32-SO-6		
Sample Date			16-Jul-13					15-Jul-13					22-Sep-15				
Start Depth (ft bgs)			0					5					5				
End Depth (ft bgs)			0.5					6					6				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
1,2,3,6,7,8-HxCDF	30	pg/g	3.9	U	2.06	J	NC	3.74	U	3.68	U	NC	0.218	J	0.22	J	0.91
1,2,3,7,8,9-HxCDD	30	pg/g	3.9	U	2.32	J	NC	3.74	U	3.68	U	NC	8.48		6.24		30.43
1,2,3,7,8,9-HxCDF	30	pg/g	3.9	U	3.96	U	NC	3.74	U	3.68	U	NC	0.104	J	0.277	J	90.81
1,2,3,7,8-PeCDD	30	pg/g	3.9	U	3.96	U	NC	3.74	U	3.68	U	NC	0.206	J	0.25	U	NC
1,2,3,7,8-PeCDF	30	pg/g	3.9	U	3.96	U	NC	3.74	U	3.68	U	NC	0.123	J	0.205	U	NC
2,3,4,6,7,8-HxCDF	30	pg/g	3.9	U	2.04	J	NC	3.74	U	3.68	U	NC	0.124	J	0.121	U	NC
2,3,4,7,8-PeCDF	30	pg/g	3.9	U	2.03	J	NC	3.74	U	3.68	U	NC	0.0459	U	0.216	U	NC
2,3,7,8-TCDD	30	pg/g	0.777	U	0.79	U	NC	0.745	U	0.734	U	NC	0.0372	U	0.242	U	NC
2,3,7,8-TCDF	30	pg/g	0.856	J	1.02	J	17.48	0.745	U	0.734	U	NC	0.0306	U	0.309	U	NC
Total Heptachlorodibenzofuran	30	pg/g	13.3		18.2		31.11	3.74	U	3.68	U	NC	2.8		0.0957	U	NC
Total Heptachlorodibenzo-p-dioxin	30	pg/g	84.9		104		20.22	11.2		16.3		37.09	105		103		1.92
Total Hexachlorodibenzofuran	30	pg/g	6.12		23.5		117.35	3.74	U	3.68	U	NC	1.21	J	0.119	U	NC
Total Hexachlorodibenzo-p-dioxin	30	pg/g	12.3		16.7		30.34	3.74	U	3.68	U	NC	19.9		17.5		12.83
Total Pentachlorodibenzofuran	30	pg/g	6.83		11.8		53.35	3.74	U	3.68	U	NC	0.218	J	0.21	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.9	U	2.06	J	NC	3.74	U	3.68	U	NC	1.31	J	0.25	U	NC
Total Tetrachlorodibenzofuran	30	pg/g	4.84		11.5		81.52	0.745	U	0.734	U	NC	0.0748	J	0.309	U	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.777	U	0.79	U	NC	0.745	U	0.734	U	NC	0.0372	U	0.242	U	NC
SW846 8330B																	
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC	0.25	U	0.25	U	NC					
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC					
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC					

Table E1-5. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-21 Soil Samples

Location			EC-21-35					EC-21-39					EC-21-42				
Sample Name			EC-21-35-SO-0.5		EC-21-SO-FD1-092215			EC-21-39-SO-2		EC-21-SO-FD2-092315			EC-21-42-SO-0.5		EC-21-SO-FD3-092115		
Parent Sample Name					EC-21-35-SO-0.5					EC-21-39-SO-2					EC-21-42-SO-0.5		
Sample Date			22-Sep-15					23-Sep-15					21-Sep-15				
Start Depth (ft bgs)			0					1					0				
End Depth (ft bgs)			0.5					2					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																	
Aluminum	30	mg/kg															
Antimony	30	mg/kg	0.28	J	0.312	J	10.81	1.23	J	0.253	J	131.76	0.337	J	0.31	J	8.35
Copper	30	mg/kg															
Lead	30	mg/kg	28.1		33.4		17.24	137		43.6		103.43	26.2		25.5		2.71
Manganese	30	mg/kg	94.6		99.2		4.75	577	J	352	J	48.44			124		100.00
Zinc	30	mg/kg															
SW846 8082A																	
Aroclor 1016	30	mg/kg															
Aroclor 1221	30	mg/kg															
Aroclor 1232	30	mg/kg															
Aroclor 1242	30	mg/kg															
Aroclor 1248	30	mg/kg															
Aroclor 1254	30	mg/kg															
Aroclor 1260	30	mg/kg															
SW846 8270D/ 8270 SIM																	
Acenaphthene	30	µg/kg															
Acenaphthylene	30	µg/kg															
Anthracene	30	µg/kg															
Benzo(a)anthracene	30	µg/kg	31		97		103.13	130		90		36.36	14		9.8		35.29
Benzo(a)pyrene	30	µg/kg	33		100		100.75	130		94		32.14	14		11		24.00
Benzo(b)fluoranthene	30	µg/kg	53		170		104.93	190		130		37.50	29		23		23.08
Benzo(ghi)perylene	30	µg/kg															
Benzo(k)fluoranthene	30	µg/kg															
Chrysene	30	µg/kg															
Dibenz(a,h)anthracene	30	µg/kg	13		40		101.89	27		13		70.00	6.9		4.2		48.65
Fluoranthene	30	µg/kg															
Fluorene	30	µg/kg															
Indeno(1,2,3-cd)pyrene	30	µg/kg	33		110		107.69	150		78		63.16	18		18		0.00
Naphthalene	30	µg/kg															
Phenanthrene	30	µg/kg															
Pyrene	30	µg/kg															
SW846 8290																	
1,2,3,4,6,7,8,9-OCDD	30	pg/g	7540	J	7520	J	0.27	8560	J	5350		46.15	7340	J	6250	J	16.04
1,2,3,4,6,7,8,9-OCDF	30	pg/g	13.7	J	13.4	J	2.21	4.85	J	3.2	J	40.99	3.45	J	3.05	J	12.31
1,2,3,4,6,7,8-HpCDD	30	pg/g	87.5		94		7.16	147		52.1		95.33	49.3		56.2		13.08
1,2,3,4,6,7,8-HpCDF	30	pg/g	8.17		7.91		3.23	3.16	J	2.01	J	44.49	2.63	U	2.61	U	NC
1,2,3,4,7,8,9-HpCDF	30	pg/g	0.77	J	0.69	J	10.96	3.17	U	3.67	UJ	NC	0.178	J	0.0923	J	63.41
1,2,3,4,7,8-HxCDD	30	pg/g	1.49	J	1.56	J	4.59	1.27	J	0.667	J	62.26	0.573	J	0.525	J	8.74
1,2,3,4,7,8-HxCDF	30	pg/g	1.42	J	1.43	J	0.70	0.633	J	0.438	J	36.41	0.171	J	0.119	J	35.86
1,2,3,6,7,8-HxCDD	30	pg/g	2.47	J	2.72	J	9.63	2.24	J	1.29	J	53.82	0.805	J	0.803	J	0.25

Table E1-5. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-21 Soil Samples

Location			EC-21-35					EC-21-39					EC-21-42				
Sample Name			EC-21-35-SO-0.5		EC-21-SO-FD1-092215			EC-21-39-SO-2		EC-21-SO-FD2-092315			EC-21-42-SO-0.5		EC-21-SO-FD3-092115		
Parent Sample Name					EC-21-35-SO-0.5					EC-21-39-SO-2					EC-21-42-SO-0.5		
Sample Date			22-Sep-15					23-Sep-15					21-Sep-15				
Start Depth (ft bgs)			0					1					0				
End Depth (ft bgs)			0.5					2					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
1,2,3,6,7,8-HxCDF	30	pg/g	1.49	J	1.19	J	22.39	0.517	J	0.324	J	45.90	0.149	J	0.103	J	36.51
1,2,3,7,8,9-HxCDD	30	pg/g	2.28	J	2.62	J	13.88	2.72	J	1.69	J	46.71	1.05	J	0.925	J	12.66
1,2,3,7,8,9-HxCDF	30	pg/g	0.484	J	0.431	J	11.58	3.17	UJ	3.67	UJ	NC	0.114	J	0.0457	J	85.54
1,2,3,7,8-PeCDD	30	pg/g	0.832	J	0.868	J	4.24	0.524	J	0.455	J	14.10	0.242	J	0.232	J	4.22
1,2,3,7,8-PeCDF	30	pg/g	0.819	J	0.88	J	7.18	0.347	J	0.252	J	31.72	0.0925	J	0.072	J	24.92
2,3,4,6,7,8-HxCDF	30	pg/g	1.59	J	1.63	J	2.48	0.618	J	0.371	J	49.95	0.159	J	0.121	J	27.14
2,3,4,7,8-PeCDF	30	pg/g	1.58	J	1.68	J	6.13	0.591	J	0.456	J	25.79	0.142	J	0.117	J	19.31
2,3,7,8-TCDD	30	pg/g	0.176	J	0.21	J	17.62	0.0819	U	0.173	J	NC	0.112	J	0.0373	U	NC
2,3,7,8-TCDF	30	pg/g	1.19	J	1.28	J	7.29	0.346	J	0.341	J	1.46	0.0911	J	0.0601	J	41.01
Total Heptachlorodibenzofuran	30	pg/g	15.6		16.8		7.41	4.84		3.2	J	40.80	2.73		2.33	J	15.81
Total Heptachlorodibenzo-p-dioxin	30	pg/g	208		226		8.29	342		127		91.68	117		129		9.76
Total Hexachlorodibenzofuran	30	pg/g	13.2		15.6		16.67	4.66		3.66	J	24.04	1.1	J	1.09	J	0.91
Total Hexachlorodibenzo-p-dioxin	30	pg/g	32.3		35.6		9.72	43.7		21.8		66.87	12.5		11.5		8.33
Total Pentachlorodibenzofuran	30	pg/g	14.4		16.5		13.59	4.21		2.04	J	69.44	1.06	J	0.87	J	19.69
Total Pentachlorodibenzo-p-dioxin	30	pg/g	8.66		9.7		11.33	7.73		2.93	J	90.06	1.36	J	1.29	J	5.28
Total Tetrachlorodibenzofuran	30	pg/g	13.3		15.8		17.18	4.62		2.2		70.97	0.609		0.534		13.12
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	3.58		3.25		9.66	1.45		0.173	J	157.36	0.0315	J	0.21	J	147.83
SW846 8330B																	
2,4,6-Trinitrotoluene	30	mg/kg															
2,4-Dinitrotoluene	30	mg/kg															
2,6-Dinitrotoluene	30	mg/kg															

Table E1-6. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-21 Propellant Grain Area Soil Samples

Location			EC-21-14					EC-21-21					EC-21-25				
Sample Name			EC-21-14-SO-1.5		EC-21-SO-FD4			EC-21-21-SO-02.5		EC-21-SO-FD3			EC-21-25-SO-0.5		EC-21-SO-FD5		
Parent Sample Name					EC-21-14-SO-1.5					EC-21-21-SO-02.5					EC-21-25-SO-0.5		
Sample Date			17-Jul-13					17-Jul-13					18-Jul-13				
Start Depth (ft bgs)			0.5					1.5					0				
End Depth (ft bgs)			1.5					2.5					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 8330B																	
2,4-Dinitrotoluene		mg/kg	0.2	U	0.2	U	NC	0.19	U	0.2	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene		mg/kg	0.2	U	0.2	U	NC	0.19	U	0.2	U	NC	0.2	U	0.2	U	NC
Nitroglycerin		mg/kg	1.2	U	1.2	U	NC	1.2	U	1.2	U	NC	1.2	U	1.2	U	NC
High Performance Liquid Chromatography																	
Nitroguanidine		mg/kg	0.24	U	0.25	U	NC	0.24	U	0.24	U	NC	0.24	U	0.23	U	NC

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Table E1-7. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-22 Soil Samples

Location			EC-22-05				
Sample Name			EC-22-5-SO-02.5		EC-22-SO-FD1		
Parent Sample Name					EC-22-5-SO-02.5		
Sample Date			19-Aug-13				
Start Depth (ft bgs)			1.5				
End Depth (ft bgs)			2.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/kg	3290		5690		53.45
Antimony	30	mg/kg	0.94	U	0.92	U	NC
Copper	30	mg/kg	1.6	J	2.9		57.78
Lead	30	mg/kg	4.5		7.1		44.83
Manganese	30	mg/kg	16		33.9		71.74
Zinc	30	mg/kg	7.1		13		58.71
SW846 8082A							
Aroclor 1016	30	mg/kg	0.036	U	0.036	U	NC
Aroclor 1221	30	mg/kg	0.036	U	0.036	U	NC
Aroclor 1232	30	mg/kg	0.036	U	0.036	U	NC
Aroclor 1242	30	mg/kg	0.036	U	0.036	U	NC
Aroclor 1248	30	mg/kg	0.036	U	0.036	U	NC
Aroclor 1254	30	mg/kg	0.036	U	0.036	U	NC
Aroclor 1260	30	mg/kg	0.036	U	0.036	U	NC
SW846 8270 SIM							
Acenaphthene	30	µg/kg	1.9	U	1.8	U	NC
Acenaphthylene	30	µg/kg	1.9	U	1.8	U	NC
Anthracene	30	µg/kg	1.9	U	1.8	U	NC
Benzo(a)anthracene	30	µg/kg	1.9	U	1.8	U	NC
Benzo(a)pyrene	30	µg/kg	1.9	U	1.8	U	NC
Benzo(b)fluoranthene	30	µg/kg	1.9	U	1.8	U	NC
Benzo(ghi)perylene	30	µg/kg	1.9	U	1.8	U	NC
Benzo(k)fluoranthene	30	µg/kg	1.9	U	1.8	U	NC
Chrysene	30	µg/kg	1.9	U	1.8	U	NC
Dibenz(a,h)anthracene	30	µg/kg	1.9	U	1.8	U	NC

Table E1-7. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-22 Soil Samples

Location			EC-22-05				
Sample Name			EC-22-5-SO-02.5		EC-22-SO-FD1		
Parent Sample Name					EC-22-5-SO-02.5		
Sample Date			19-Aug-13				
Start Depth (ft bgs)			1.5				
End Depth (ft bgs)			2.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
Fluoranthene	30	µg/kg	0.73	J	1.8	U	NC
Fluorene	30	µg/kg	1.9	U	1.8	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	1.9	U	1.8	U	NC
Naphthalene	30	µg/kg	1.9	U	1.8	U	NC
Phenanthrene	30	µg/kg	1.9	U	1.8	U	NC
Pyrene	30	µg/kg	0.59	J	1.8	U	NC
SW846 8290							
1,2,3,4,6,7,8,9-OCDD	30	pg/g	275		247		10.73
1,2,3,4,6,7,8,9-OCDF	30	pg/g	7.2	U	7.09	U	NC
1,2,3,4,6,7,8-HpCDD	30	pg/g	6.04		5.11	J	16.68
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.61	U	3.55	U	NC
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.61	U	3.55	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	3.61	U	3.55	U	NC
1,2,3,4,7,8-HxCDF	30	pg/g	3.61	U	3.55	U	NC
1,2,3,6,7,8-HxCDD	30	pg/g	3.61	U	3.55	U	NC
1,2,3,6,7,8-HxCDF	30	pg/g	3.61	U	3.55	U	NC
1,2,3,7,8,9-HxCDD	30	pg/g	3.61	U	3.55	U	NC
1,2,3,7,8,9-HxCDF	30	pg/g	3.61	U	3.55	U	NC
1,2,3,7,8-PeCDD	30	pg/g	3.61	U	3.55	U	NC
1,2,3,7,8-PeCDF	30	pg/g	3.61	U	3.55	U	NC
2,3,4,6,7,8-HxCDF	30	pg/g	3.61	U	3.55	U	NC
2,3,4,7,8-PeCDF	30	pg/g	3.61	U	3.55	U	NC
2,3,7,8-TCDD	30	pg/g	0.72	U	0.709	U	NC
2,3,7,8-TCDF	30	pg/g	0.72	U	0.709	U	NC
Total Heptachlorodibenzofuran	30	pg/g	3.61	U	3.55	U	NC
Total Heptachlorodibenzo-p-dioxin	30	pg/g	14.4		11.9		19.01

Table E1-7. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-22 Soil Samples

Location			EC-22-05				
Sample Name			EC-22-5-SO-02.5		EC-22-SO-FD1		
Parent Sample Name					EC-22-5-SO-02.5		
Sample Date			19-Aug-13				
Start Depth (ft bgs)			1.5				
End Depth (ft bgs)			2.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
Total Hexachlorodibenzofuran	30	pg/g	3.61	U	3.55	U	NC
Total Hexachlorodibenzo-p-dioxin	30	pg/g	3.61	U	3.55	U	NC
Total Pentachlorodibenzofuran	30	pg/g	3.61	U	3.55	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.61	U	3.55	U	NC
Total Tetrachlorodibenzofuran	30	pg/g	0.72	U	0.709	U	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.72	U	0.709	U	NC
SW846 8330B							
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC

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Table E1-8. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-25 Soil Samples

Location			EC-25-02		EC-25-02			EC-25-12		EC-25-12		
Sample Name			EC-25-2-SO-02		EC-25-SO-FD2			EC-25-12-SO-0.5		EC-25-SO-FD1		
Parent Sample Name					EC-25-2-SO-02					EC-25-12-SO-0.5		
Sample Date			1-Aug-13		1-Aug-13			30-Jul-13		30-Jul-13		
Start Depth (ft bgs)			1		1			0		0		
End Depth (ft bgs)			2		2			0.5		0.5		
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
EPA 6850												
Perchlorate	30	µg/kg	28	U	29	U	NC					
SW846 6020A												
Aluminum	30	mg/kg	8510		4610		59.45	4870		4450		9.01
Antimony	30	mg/kg	12.2		1.3		161.48	11.7		6.5		57.14
Copper	30	mg/kg	433		49.8		158.74	278		228		19.76
Lead	30	mg/kg	774		96		155.86	501		354		34.39
Manganese	30	mg/kg	1090		48.4		182.99	521		316		48.98
Zinc	30	mg/kg	1370		57.9		183.78	404		307		27.29
SW846 8082A												
Aroclor 1016	30	mg/kg	0.042	U	0.048	U	NC	0.043	U	0.035	U	NC
Aroclor 1221	30	mg/kg	0.042	U	0.048	U	NC	0.043	U	0.035	U	NC
Aroclor 1232	30	mg/kg	0.042	U	0.048	U	NC	0.043	U	0.035	U	NC
Aroclor 1242	30	mg/kg	0.042	U	0.048	U	NC	0.043	U	0.035	U	NC
Aroclor 1248	30	mg/kg	0.042	U	0.048	U	NC	0.043	U	0.035	U	NC
Aroclor 1254	30	mg/kg	0.042	U	0.048	U	NC	0.043	U	0.035	U	NC
Aroclor 1260	30	mg/kg	0.042	U	0.048	U	NC	0.04	J	0.039		
SW846 8270D/8270 SIM												
Acenaphthene	30	µg/kg	511	J	4.8		196.28	9.6		12.1		23.04
Acenaphthylene	30	µg/kg	226	J	4.6		192.02	30.2		25.3		17.66
Anthracene	30	µg/kg	2950		22.8		196.93	43.7		57.1	J	26.59
Benzo(a)anthracene	30	µg/kg	10900		73.5		197.32	231		207		10.96
Benzo(a)pyrene	30	µg/kg	9670	J	64.1		197.37	291		225		25.58
Benzo(b)fluoranthene	30	µg/kg	12500	J	99.5		196.84	427		346		20.96
Benzo(ghi)perylene	30	µg/kg	4110	J	46.8		195.50	216		123		54.87
Benzo(k)fluoranthene	30	µg/kg	5460	J	37.2		197.29	176	J	142		21.38
Chrysene	30	µg/kg	12100	J	86.4		197.16	292		260		11.59
Dibenz(a,h)anthracene	30	µg/kg	1480	J	15.8		195.77	38.3		39.2	J	2.32
Fluoranthene	30	µg/kg	19800		145		197.09	502		458		9.17
Fluorene	30	µg/kg	686	J	9.8		194.37	10.7		13.4		22.41
Indeno(1,2,3-cd)pyrene	30	µg/kg	4910	J	46.5		196.25	193		134		36.09
Naphthalene	30	µg/kg	461	J	9.1		192.26	10.3		8.1		23.91
Phenanthrene	30	µg/kg	12600		103		196.76	224		257	J	13.72
Pyrene	30	µg/kg	18000		124		197.26	417		379		9.55
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	30	pg/g	3170		9740	J	101.78	765		918		18.18
1,2,3,4,6,7,8,9-OCDF	30	pg/g	129		9.42	J	172.78	45		70.3		43.89
1,2,3,4,6,7,8-HpCDD	30	pg/g	753		232		105.79	54.1		72.6		29.20
1,2,3,4,6,7,8-HpCDF	30	pg/g	123		9.15		172.30	23.4		37.6		46.56
1,2,3,4,7,8,9-HpCDF	30	pg/g	21.2	U	5	U	NC	3.2	U	3.44	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	20.1	J	3.69	J	137.96	3.2	U	3.44	U	NC

Table E1-8. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-25 Soil Samples

Location			EC-25-02		EC-25-02			EC-25-12		EC-25-12		
Sample Name			EC-25-2-SO-02		EC-25-SO-FD2			EC-25-12-SO-0.5		EC-25-SO-FD1		
Parent Sample Name					EC-25-2-SO-02					EC-25-12-SO-0.5		
Sample Date			1-Aug-13		1-Aug-13			30-Jul-13		30-Jul-13		
Start Depth (ft bgs)			1		1			0		0		
End Depth (ft bgs)			2		2			0.5		0.5		
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
1,2,3,4,7,8-HxCDF	30	pg/g	23	J	5	U	NC	2.84	J	3.86	J	30.45
1,2,3,6,7,8-HxCDD	30	pg/g	57.8		6.55	J	159.29	2.9	J	3.98	J	31.40
1,2,3,6,7,8-HxCDF	30	pg/g	16.5	J	5	U	NC	2.69	J	3.75	J	32.92
1,2,3,7,8,9-HxCDD	30	pg/g	64		11.5		139.07	2.44	J	2.81	J	14.10
1,2,3,7,8,9-HxCDF	30	pg/g	21.2	UJ	5	U	NC	3.2	U	3.44	U	NC
1,2,3,7,8-PeCDD	30	pg/g	19.7	J	5	U	NC	3.2	U	3.44	U	NC
1,2,3,7,8-PeCDF	30	pg/g	13	J	5	U	NC	3.2	U	1.86	J	NC
2,3,4,6,7,8-HxCDF	30	pg/g	21.4	J	5	U	NC	3.27	J	4.41	J	29.69
2,3,4,7,8-PeCDF	30	pg/g	22.2	J	5	U	NC	3.2	J	4.55	J	34.84
2,3,7,8-TCDD	30	pg/g	4.22	U	0.997	U	NC	0.639	U	0.686	U	NC
2,3,7,8-TCDF	30	pg/g	20.5		0.997	U	NC	4.02		6.06		40.48
Total Heptachlorodibenzofuran	30	pg/g	235		15.8		174.80	51.7		90.1		54.16
Total Heptachlorodibenzo-p-dioxin	30	pg/g	1390		793		54.70	147		179		19.63
Total Hexachlorodibenzofuran	30	pg/g	222	J	8.57		185.13	39.7		61.8		43.55
Total Hexachlorodibenzo-p-dioxin	30	pg/g	618	J	200		102.20	30.2		38.8		24.93
Total Pentachlorodibenzofuran	30	pg/g	223	J	3.52	J	193.78	47.8	J	71.3		39.46
Total Pentachlorodibenzo-p-dioxin	30	pg/g	187	J	13.9		172.32	7.35		10.8		38.02
Total Tetrachlorodibenzofuran	30	pg/g	367		1.63		198.23	56.1	J	77.5		32.04
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	48.7		12.5		118.30	8.36		9.85		16.36
SW846 8330B												
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	4.4		2.2		66.67
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.22		0.14	J	44.44

Table E1-8. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-25 Soil Samples

Location			EC-25-25		EC-25-25			EC-25-27SUB		EC-25-27SUB		
Sample Name			EC-25-25-SO-04		EC-25-SO-FD3			EC-25-27-SO-04		EC-25-SO-FD4		
Parent Sample Name					EC-25-25-SO-04					EC-25-27-SO-04		
Sample Date			6-Aug-13		6-Aug-13			7-Aug-13		7-Aug-13		
Start Depth (ft bgs)			3		3			3		3		
End Depth (ft bgs)			4		4			4		4		
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
EPA 6850												
Perchlorate	30	µg/kg										
SW846 6020A												
Aluminum	30	mg/kg	202	K	209	K	3.41	355		1630		128.46
Antimony	30	mg/kg	1	U	0.96	U	NC	0.63	J	0.76	J	18.71
Copper	30	mg/kg	2.6	U	2.4	U	NC	29		33.3		13.80
Lead	30	mg/kg	1.2	K	1.4	K	15.38	13.7		51.9		116.46
Manganese	30	mg/kg	2.6	U	0.88	J	NC	5.4		33.2		144.04
Zinc	30	mg/kg	2.6	U	0.79	J	NC	17.3		39.9		79.02
SW846 8082A												
Aroclor 1016	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
Aroclor 1221	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
Aroclor 1232	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
Aroclor 1242	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
Aroclor 1248	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
Aroclor 1254	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
Aroclor 1260	30	mg/kg	0.033	U	0.033	U	NC	0.033	U	0.034	U	NC
SW846 8270D/8270 SIM												
Acenaphthene	30	µg/kg	1.7	U	1.7	U	NC	2.1		1.7	U	NC
Acenaphthylene	30	µg/kg	1.7	U	1.7	U	NC	1.8		1.8		0.00
Anthracene	30	µg/kg	1.7	U	1.7	U	NC	5.1		1.2	J	123.81
Benzo(a)anthracene	30	µg/kg	1.7	U	1.7	U	NC	19.9		9.5		70.75
Benzo(a)pyrene	30	µg/kg	1.7	U	1.7	U	NC	14.8		11.1		28.57
Benzo(b)fluoranthene	30	µg/kg	1.7	U	1.7	U	NC	21.5		17.8		18.83
Benzo(ghi)perylene	30	µg/kg	1.7	U	1.7	U	NC	10.3		10.5		1.92
Benzo(k)fluoranthene	30	µg/kg	1.7	U	1.7	U	NC	8.3		6.6		22.82
Chrysene	30	µg/kg	1.7	U	1.7	U	NC	21.6		12.9		50.43
Dibenz(a,h)anthracene	30	µg/kg	1.7	U	1.7	U	NC	3.8		3.4		11.11
Fluoranthene	30	µg/kg	1.7	U	1.7	U	NC	39.5		19.9		65.99
Fluorene	30	µg/kg	1.7	U	1.7	U	NC	1.9		1.7	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	1.7	U	1.7	U	NC	9.8		9.5		3.11
Naphthalene	30	µg/kg	1.7	U	1.7	U	NC	0.61	J	1.7		94.37
Phenanthrene	30	µg/kg	1.7	U	1.7	U	NC	28.4		7		120.90
Pyrene	30	µg/kg	1.7	U	1.7	U	NC	34.9		19.4		57.09
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	30	pg/g	14.7	B	16.7	B	12.74	102		119		15.38
1,2,3,4,6,7,8,9-OCDF	30	pg/g	6.4	U	6.4	U	NC	11.3		12.5	L	10.08
1,2,3,4,6,7,8-HpCDD	30	pg/g	3.21	U	3.21	U	NC	6.22		8.09		26.14
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.21	U	3.21	U	NC	7.81		9.47		19.21
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC

Table E1-8. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-25 Soil Samples

Location			EC-25-25		EC-25-25			EC-25-27SUB		EC-25-27SUB		
Sample Name			EC-25-25-SO-04		EC-25-SO-FD3			EC-25-27-SO-04		EC-25-SO-FD4		
Parent Sample Name					EC-25-25-SO-04					EC-25-27-SO-04		
Sample Date			6-Aug-13		6-Aug-13			7-Aug-13		7-Aug-13		
Start Depth (ft bgs)			3		3			3		3		
End Depth (ft bgs)			4		4			4		4		
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
1,2,3,4,7,8-HxCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,6,7,8-HxCDD	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,6,7,8-HxCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,7,8,9-HxCDD	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,7,8,9-HxCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,7,8-PeCDD	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
1,2,3,7,8-PeCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
2,3,4,6,7,8-HxCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
2,3,4,7,8-PeCDF	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
2,3,7,8-TCDD	30	pg/g	0.64	U	0.64	U	NC	0.718	U	0.678	U	NC
2,3,7,8-TCDF	30	pg/g	0.64	U	0.64	U	NC	0.505	J	0.485	J	4.04
Total Heptachlorodibenzofuran	30	pg/g	3.21	U	3.21	U	NC	11		15.3		32.70
Total Heptachlorodibenzo-p-dioxin	30	pg/g	3.21	U	3.21	U	NC	14		17.7		23.34
Total Hexachlorodibenzofuran	30	pg/g	3.21	U	3.21	U	NC	4.17	J	6.7		46.55
Total Hexachlorodibenzo-p-dioxin	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.99	J	NC
Total Pentachlorodibenzofuran	30	pg/g	3.21	U	3.21	U	NC	4.99	J	5.48		9.36
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.21	U	3.21	U	NC	3.6	U	3.4	U	NC
Total Tetrachlorodibenzofuran	30	pg/g	0.64	U	0.64	U	NC	8.32		6.53		24.11
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.64	U	0.64	U	NC	0.453	J	0.487	J	7.23
SW846 8330B												
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC

Table E1-9. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-27 Soil Samples

Location			EC-27-01				
Sample Name			EC-27-1-SO-04		EC-27-SO-FD1		
Parent Sample Name					EC-27-1-SO-04		
Sample Date			23-Jul-13				
Start Depth (ft bgs)			3				
End Depth (ft bgs)			4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/kg	6100		6720		9.67
Cadmium	30	mg/kg	0.59	U	0.5	U	NC
Chromium	30	mg/kg	17.7		28		45.08
Cobalt	30	mg/kg	1.3	J	0.95	J	31.11
Lead	30	mg/kg	8.9		10.9		20.20
Titanium	30	mg/kg	24.8		21.7		13.33
Zinc	30	mg/kg	14.7		10		38.06
SW846 8015C							
Ethanol	30	mg/kg	24.5	U	23.8	U	NC
Methanol	30	mg/kg	24.5	U	23.8	U	NC
SW846 8260B							
2-Butanone	30	µg/kg	12.2	U	11.5	U	NC
Acetone	30	µg/kg	30.5		11.4	J	91.17
Benzene	30	µg/kg	2.4	U	2.3	U	NC
Carbon tetrachloride	30	µg/kg	2.4	U	2.3	U	NC
Ethylbenzene	30	µg/kg	2.4	U	2.3	U	NC
Methylene chloride	30	µg/kg	2.4	U	2.3	U	NC
Naphthalene	30	µg/kg	2.4	U	2.3	U	NC
Tetrachloroethene	30	µg/kg	2.4	U	2.3	U	NC
Toluene	30	µg/kg	2.4	U	2.3	U	NC
Trichloroethene	30	µg/kg	2.4	U	2.3	U	NC
Xylenes (total)	30	µg/kg	7.3	U	6.9	U	NC

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Table E1-10. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-28 Soil Samples

Location				EC-28-03					EC-28-08					EC-28-09				
Sample Name				EC-28-3-SO-04		EC-28-SO-FD1			EC-28-08-SO-0.5		EC-28-SO-FD1-10/7/15			EC-28-09-SO-4		EC-28-SO-FD2-100815		
Parent Sample Name						EC-28-3-SO-04					EC-28-08-SO-0.5					EC-28-09-SO-4		
Sample Date				23-Jul-13					7-Oct-15					8-Oct-15				
Start Depth (ft bgs)				3					0					3				
End Depth (ft bgs)				4					0.5					4				
Parameter Name	CAS	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																		
Aluminum	7429-90-5	30	mg/kg	7830		9140		15.44										
Arsenic	7440-38-2	30	mg/kg	4.6	K	4	K	13.95	14.4	J	15.1	J	4.75	2.83	J	2.79	J	1.42
Cadmium	7440-43-9	30	mg/kg	0.52	U	0.53	U	NC										
Chromium	7440-47-3	30	mg/kg	16.4	K	11.6	K	34.29										
Cobalt	7440-48-4	30	mg/kg	3.7	K	3.1	K	17.65										
Copper	7440-50-8	30	mg/kg	9	K	7.7	K	15.57										
Lead	7439-92-1	30	mg/kg	11.3	K	7.2	K	44.32										
Nickel	7440-02-0	30	mg/kg	5.9	K	4.9	K	18.52										
Titanium	7440-32-6	30	mg/kg	125		87.6		35.18										
Zinc	7440-66-6	30	mg/kg	22.3		18.1		20.79										
SW846 7196A																		
Chromium, Hexavalent	18540-29-	30	mg/kg	2.3	U	2.3	U	NC										
SW846 8015C																		
Ethanol	64-17-5	30	mg/kg	23.1	U	23.1	U	NC										
Methanol	67-56-1	30	mg/kg	23.1	U	23.1	U	NC										
SW846 8082A																		
Aroclor 1016	12674-11-	30	mg/kg	0.038	U	0.037	U	NC										
Aroclor 1221	11104-28-	30	mg/kg	0.038	U	0.037	U	NC										
Aroclor 1232	11141-16-	30	mg/kg	0.038	U	0.037	U	NC										
Aroclor 1242	53469-21-	30	mg/kg	0.038	U	0.037	U	NC										
Aroclor 1248	12672-29-	30	mg/kg	0.038	U	0.037	U	NC										
Aroclor 1254	11097-69-	30	mg/kg	0.038	U	0.037	U	NC										
Aroclor 1260	11096-82-	30	mg/kg	0.038	U	0.037	U	NC										
SW846 8260B																		
2-Butanone	78-93-3	30	µg/kg	9.9	U	9.5	U	NC										
Acetone	67-64-1	30	µg/kg	10.3		16.9		48.53										
Benzene	71-43-2	30	µg/kg	2	U	1.9	U	NC										
Carbon tetrachloride	56-23-5	30	µg/kg	2	U	1.9	U	NC										
Ethylbenzene	100-41-4	30	µg/kg	2	U	1.9	U	NC										
Methylene chloride	75-09-2	30	µg/kg	13.7		1.9	U	NC										
Naphthalene	91-20-3	30	µg/kg	2	U	1.9	U	NC										
Toluene	108-88-3	30	µg/kg	2	U	1.9	U	NC										
Xylenes (total)	1330-20-7	30	µg/kg	6	U	5.7	U	NC										
SW846 8270D																		
Pentachlorophenol	87-86-5	30	µg/kg	605	U	609	U	NC										

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Table E1-11. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-29 Soil Samples

Location			EC-29-03				
Sample Name			EC-29-3-SO-04		EC-29-SO-FD1		
Parent Sample Name					EC-29-3-SO-04		
Sample Date			24-Jul-13				
Start Depth (ft bgs)			3				
End Depth (ft bgs)			4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/kg	6480		9440		37.19
Cadmium	30	mg/kg	0.52	U	0.56	U	NC
Chromium	30	mg/kg	13.5		17.8		27.48
Cobalt	30	mg/kg	8		15.9		66.11
Lead	30	mg/kg	6.5		9		32.26
Titanium	30	mg/kg	34		67.3		65.75
Zinc	30	mg/kg	19.8		28.4		35.68
SW846 8015C							
Ethanol	30	mg/kg	23.1	U	23	U	NC
Methanol	30	mg/kg	23.1	U	23	U	NC
SW846 8082A							
Aroclor 1016	30	mg/kg	0.037	U	0.037	U	NC
Aroclor 1221	30	mg/kg	0.037	U	0.037	U	NC
Aroclor 1232	30	mg/kg	0.037	U	0.037	U	NC
Aroclor 1242	30	mg/kg	0.037	U	0.037	U	NC
Aroclor 1248	30	mg/kg	0.037	U	0.037	U	NC
Aroclor 1254	30	mg/kg	0.037	U	0.037	U	NC
Aroclor 1260	30	mg/kg	0.037	U	0.037	U	NC
SW846 8151A							
2,4,5-T	30	µg/kg	1.1	U	1.1	U	NC
2,4,5-TP	30	µg/kg	1.1	U	1.1	U	NC
2,4-D	30	µg/kg	1.1	U	1.1	U	NC
2,4-DB	30	µg/kg	1.1	U	1.1	U	NC
Dalapon	30	µg/kg	1.1	U	1.1	U	NC
Dicamba	30	µg/kg	1.1	U	1.1	U	NC
Dichloroprop	30	µg/kg	1.1	U	1.1	U	NC
Dinoseb	30	µg/kg	25.9	U	26.2	U	NC
MCPA	30	µg/kg	1800	U	1820	U	NC
MCPP	30	µg/kg	1800	U	1820	U	NC
Pentachlorophenol	30	µg/kg	1.1	U	1.1	U	NC
SW846 8260B							
2-Butanone	30	µg/kg	8.5	J	6.6	J	25.17
Acetone	30	µg/kg	44.1		40.9		7.53
Benzene	30	µg/kg	2.1	U	2	U	NC
Carbon tetrachloride	30	µg/kg	2.1	U	2	U	NC
Ethylbenzene	30	µg/kg	2.1	U	2	U	NC
Methylene chloride	30	µg/kg	5.4		4.6		16.00
Naphthalene	30	µg/kg	2.1	U	2	U	NC
Tetrachloroethene	30	µg/kg	2.1	U	2	U	NC
Toluene	30	µg/kg	2.1	U	2	U	NC
Trichloroethene	30	µg/kg	2.1	U	2	U	NC
Xylenes (total)	30	µg/kg	6.4	U	6.1	U	NC

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Table E1-12. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-30 Soil Samples

Location			EC-30-03				
Sample Name			EC-30-3-SO-04		EC-30-SO-FD1		
Parent Sample Name					EC-30-3-SO-04		
Sample Date			26-Jul-13				
Start Depth (ft bgs)			3				
End Depth (ft bgs)			4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Lead	30	mg/kg	7.7	K	6.4	K	18.44
SW846 8015C							
Ethanol	30	mg/kg	23.8	U	23.7	U	NC
Methanol	30	mg/kg	23.8	U	23.7	U	NC
SW846 8260B							
2-Butanone	30	µg/kg	11.7	U	11.2	U	NC
Acetone	30	µg/kg	6.7	J	11.2	U	NC
Benzene	30	µg/kg	2.3	U	2.2	U	NC
Carbon tetrachloride	30	µg/kg	2.3	U	2.2	U	NC
Ethylbenzene	30	µg/kg	2.3	U	2.2	U	NC
Methylene chloride	30	µg/kg	74.1		20.9		112.00
Naphthalene	30	µg/kg	2.3	U	2.2	U	NC
Tetrachloroethene	30	µg/kg	2.3	U	2.2	U	NC
Toluene	30	µg/kg	2.3	U	2.2	U	NC
Trichloroethene	30	µg/kg	2.3	U	2.2	U	NC
Xylenes (total)	30	µg/kg	7	U	6.7	U	NC

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Table E1-13. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-31 Soil Samples

Location			EC-31-01				
Sample Name			EC-31-1-SO-02		EC-31-SO-FD1		
Parent Sample Name					EC-31-1-SO-02		
Sample Date			25-Jul-13				
Start Depth (ft bgs)			1				
End Depth (ft bgs)			2				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/kg	3080		3920		24.00
Arsenic	30	mg/kg	4.8		7.2		40.00
Cadmium	30	mg/kg	0.2	J	0.26	J	26.09
Chromium	30	mg/kg	7.3		8.3		12.82
Cobalt	30	mg/kg	4.2		4.7		11.24
Copper	30	mg/kg	31.3		24.7		23.57
Lead	30	mg/kg	41.1		61		38.98
Nickel	30	mg/kg	17.3		26.4		41.65
Titanium	30	mg/kg	108		62		54.12
Zinc	30	mg/kg	25.1		46.4		59.58
SW846 7196A							
Chromium, Hexavalent	30	mg/kg	2.4	U	2.2	U	NC
SW846 8015C							
Ethanol	30	mg/kg	24.5	U	21.5	U	NC
Methanol	30	mg/kg	24.5	U	21.5	U	NC
SW846 8082A							
Aroclor 1016	30	mg/kg	0.039	U	0.034	U	NC
Aroclor 1221	30	mg/kg	0.039	U	0.034	U	NC
Aroclor 1232	30	mg/kg	0.039	U	0.034	U	NC
Aroclor 1242	30	mg/kg	0.039	U	0.034	U	NC
Aroclor 1248	30	mg/kg	0.039	U	0.034	U	NC
Aroclor 1254	30	mg/kg	0.38		0.034	U	NC
Aroclor 1260	30	mg/kg	0.039	U	0.037		NC
SW846 8260B							
2-Butanone	30	µg/kg	6	J	10.6		55.42
Acetone	30	µg/kg	32.4		63.9		65.42
Benzene	30	µg/kg	1.8	U	1.9	U	NC
Carbon tetrachloride	30	µg/kg	1.8	U	1.9	U	NC
Ethylbenzene	30	µg/kg	1.8	U	1.9	U	NC
Methylene chloride	30	µg/kg	18.8	K	1.9	U	NC
Naphthalene	30	µg/kg	6.9		1.9	U	NC
Toluene	30	µg/kg	1.8	U	1.9	U	NC
Xylenes (total)	30	µg/kg	5.3	U	5.7	U	NC
SW846 8270D							
Pentachlorophenol	30	µg/kg	645	U	578	U	NC

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Table E1-14. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-32 Soil Samples

			Location	EC-32-05					EC-32-10					EC-32-20					
			Sample Name	EC-32-5-SO-4		EC-32-SO-FD3-011916			EC-32-10-SO-0.5		EC-32-SO-FD2-10-7-15			EC-32-20-SO-0.5		EC-32-SO-FD2-011916			
			Parent Sample Name			EC-32-5-SO-4					EC-32-10-SO-0.5					EC-32-20-SO-0.5			
			Sample Date	19-Jan-16					7-Oct-15					19-Jan-16					
			Start Depth (ft bgs)	4					0					0					
			End Depth (ft bgs)	5					0.5					0.5					
Parameter Name	CAS	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																			
Arsenic	7440-38-	30	mg/kg						16.7	J	2.83	J	142.04					
SW846 8270D																			
Benzo(a)anthracene	56-55-3	30	µg/kg	29		45		43.24	790	J	33		183.96	3400		1300		89.36
Benzo(a)pyrene	50-32-8	30	µg/kg	36		53		38.20	770	J	33		183.56	2500		1100		77.78
Benzo(b)fluoranthene	205-99-2	30	µg/kg	51		71		32.79	1200		67		178.85	3500		1600		74.51
Dibenz(a,h)anthracene	53-70-3	30	µg/kg	6.5		7.8		18.18	130		9.3		173.30	410		180		77.97

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Table E1-15. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-34 Soil Samples

Location			EC-34-03				
Sample Name			EC-34-03-SO-04		EC-34-SO-FD1		
Parent Sample Name					EC-34-03-SO-04		
Sample Date			22-Jul-13				
Start Depth (ft bgs)			3				
End Depth (ft bgs)			4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 8260B							
Benzene	30	µg/kg	1.8	U	1.7	U	NC
Ethylbenzene	30	µg/kg	1.8	U	1.7	U	NC
Naphthalene	30	µg/kg	1.8	U	1.7	U	NC
Toluene	30	µg/kg	1.8	U	1.7	U	NC
Xylenes (total)	30	µg/kg	5.3	U	5.2	U	NC

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Table E1-16. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-36 Soil Samples

Location			EC-36-14					EC-36-15					EC-36-16					EC-36-21				
Sample Name			EC-36-14-SO-4		EC-36-SO-FD2-100515			EC-36-15-SO-0.5		EC-36-SO-FD1-100515			EC-36-16-SO-2		EC-36-SO-FD1-020816			EC-36-21-SO-0.5		EC-36-SO-FD2-020816		
Parent Sample Name					EC-36-14-SO-4					EC-36-15-SO-0.5					EC-36-16-SO-2					EC-36-21-SO-0.5		
Sample Date			5-Oct-15					5-Oct-15					8-Feb-16					8-Feb-16				
Start Depth (ft bgs)			4					0					2					0				
End Depth (ft bgs)			4.5					0.5					4					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																						
Lead	30	mg/kg	79.8		158		65.77	352		330		6.45										
SW846 8290																						
1,2,3,4,6,7,8,9-OCDD	30	pg/g	1780	J	1960	J	9.63	3440	J	4080	J	17.02	4330		4920	J	12.76	4390		8190	J	60.41
1,2,3,4,6,7,8,9-OCDF	30	pg/g	7.24	J	5.73	J	23.28	21.9	J	41.3	J	61.39	3.85	J	3.38	J	13.00	14.2		25.9		58.35
1,2,3,4,6,7,8-HpCDD	30	pg/g	18.2	J	15.3	J	17.31	55.3	J	74.6	J	29.72	22.7		20.3		11.16	49.1		106		73.37
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.13	J	2.93	J	6.60	14.3	J	20.8	J	37.04	2.12	J	1.88	J	12.00	8.56		14.5		51.52
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.1	UJ	2.54	UJ	NC	1.56	J	2.67	J	52.48	2.79	U	2.84	U	NC	1.17	J	1.62	J	32.26
1,2,3,4,7,8-HxCDD	30	pg/g	0.381	J	0.389	J	2.08	1.33	J	2.01	J	40.72	0.367	J	0.318	J	14.31	0.957	J	1.35	J	34.07
1,2,3,4,7,8-HxCDF	30	pg/g	0.648	J	0.488	J	28.17	2.76	J	3.89	J	33.98	0.524	J	0.437	J	18.11	1.88	J	2.91	J	43.01
1,2,3,6,7,8-HxCDD	30	pg/g	0.862	J	0.627	J	31.56	2.65	J	3.89	J	37.92	0.507	J	0.385	J	27.35	1.19	J	2.24	J	61.22
1,2,3,6,7,8-HxCDF	30	pg/g	0.456	J	0.269	J	51.59	2.02	J	2.53	J	22.42	2.79	U	2.84	U	NC	1.44	J	2.44	J	51.55
1,2,3,7,8,9-HxCDD	30	pg/g	0.369	J	0.543	J	38.16	2.22	J	2.85	J	24.85	0.601	J	0.491	J	20.15	1.3	J	1.99	J	41.95
1,2,3,7,8,9-HxCDF	30	pg/g	0.24	UJ	2.54	UJ	NC	0.842	J	1.38	J	48.42	2.79	UJ	2.84	U	NC	0.665	J	0.745	J	11.35
1,2,3,7,8-PeCDD	30	pg/g	0.156	UJ	0.288	J	NC	1.02	J	1.69	J	49.45	0.338	J	0.278	J	19.48	0.736	J	0.642	J	13.64
1,2,3,7,8-PeCDF	30	pg/g	0.21	UJ	0.275	J	NC	1.17	J	1.71	J	37.50	2.79	U	2.84	U	NC	0.795	J	1.34	J	51.05
2,3,4,6,7,8-HxCDF	30	pg/g	0.507	J	0.396	J	24.58	3.08	J	4.06	J	27.45	2.79	U	2.84	U	NC	1.92	J	2.91	J	40.99
2,3,4,7,8-PeCDF	30	pg/g	0.663	J	0.534	J	21.55	3.91	J	4.78	J	20.02	2.79	U	2.84	UJ	NC	2.12	J	3.21	J	40.90
2,3,7,8-TCDD	30	pg/g	0.196	UJ	0.206	UJ	NC	0.253	UJ	0.585	J	NC	0.133	J	0.0672	U	NC	0.229	J	0.284	J	21.44
2,3,7,8-TCDF	30	pg/g	0.368	UJ	0.338	UJ	NC	1.98	J	2.24	J	12.32	0.312	J	0.247	J	23.26	1.38	J	1.98	J	35.71
Total Heptachlorodibenzofuran	30	pg/g	10.4		9.24		11.81	30.2		55.6		59.21	3.15		2.79	J	12.12	15.7		26.2		50.12
Total Heptachlorodibenzo-p-dioxin	30	pg/g	33.4		28.7		15.14	116		155		28.78	47.7		44.1		7.84	104		383		114.58
Total Hexachlorodibenzofuran	30	pg/g	3.19		3.61		12.35	29.8		37.8		23.67	2.99		2.63	J	12.81	17.8		26.3		38.55
Total Hexachlorodibenzo-p-dioxin	30	pg/g	4.63		2.16	J	72.75	20.7		22.7		9.22	5.24		4.38		17.88	11.2		34		100.88
Total Pentachlorodibenzofuran	30	pg/g	1.15	J	3.62		103.56	32.2		31.9		0.94	4.37		2.04	J	72.70	18.9		33.3		55.17
Total Pentachlorodibenzo-p-dioxin	30	pg/g	0.156	U	0.476	J	NC	6.62		10.1		41.63	1.29	J	1.33	J	3.05	4.41		6.72		41.51
Total Tetrachlorodibenzofuran	30	pg/g	0.368	U	0.338	U	NC	14.4		17.5		19.44	2.46		2.3		6.72	17.2		28.1		48.12
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.196	U	0.206	U	NC	2.15		5.16		82.35	0.258	J	0.191	J	29.84	1.51		4.85		105.03

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Table E1-17. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-49 Soil Samples

Location			EC-49-01					EC-49-06				
Sample Name			EC-49-1-SO-02		EC-49-SO-FD2			EC-49-6-SO-02		EC-49-SO-FD4		
Parent Sample Name					EC-49-1-SO-02					EC-49-6-SO-02		
Sample Date			15-Aug-13					16-Aug-13				
Start Depth (ft bgs)			1					1				
End Depth (ft bgs)			2					2				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
EPA 6850												
Perchlorate	30	µg/kg	22	U	22	U	NC	25	U	25	U	NC
SW846 6020A												
Aluminum	30	mg/kg	8750		11100		23.68	5760		4990		14.33
Antimony	30	mg/kg	0.96	U	1	U	NC	1.1	U	1.1	U	NC
Copper	30	mg/kg	4.8		6.2		25.45	6		5.9		1.68
Lead	30	mg/kg	6.4		8.1		23.45	9.4		10.5		11.06
Manganese	30	mg/kg	124		166		28.97	516		523		1.35
Zinc	30	mg/kg	28.3		34.3		19.17	23.3		20.4		13.27
SW846 8270 SIM												
Acenaphthene	30	µg/kg	0.39	J	1.8	U	NC	1.9	U	1.8	U	NC
Acenaphthylene	30	µg/kg	1.8	J	1.2	J	40.00	0.87	J	0.75	J	14.81
Anthracene	30	µg/kg	8.7	K	2.9	K	100.00	0.74	J	0.57	J	25.95
Benzo(a)anthracene	30	µg/kg	5.1		1.5	J	109.09	4.1		3.7		10.26
Benzo(a)pyrene	30	µg/kg	1.7	J	1.3	J	26.67	3.7		3.7		0.00
Benzo(b)fluoranthene	30	µg/kg	3.7		2.7		31.25	5.3		5.2		1.90
Benzo(ghi)perylene	30	µg/kg	0.77	J	1.7	J	75.30	2.7		2.7		0.00
Benzo(k)fluoranthene	30	µg/kg	2.3		1.8		24.39	1.9		2		5.13
Chrysene	30	µg/kg	22.8		4.2		137.78	4.7		4.2		11.24
Dibenz(a,h)anthracene	30	µg/kg	1.9	U	1.4	J	NC	0.86	J	0.86	J	0.00
Fluoranthene	30	µg/kg	3.4		2		51.85	6.9		5.7		19.05
Fluorene	30	µg/kg	0.54	J	0.65	J	18.49	1.9	U	1.8	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	1.9	U	1.8		NC	2.7		2.4		11.76
Naphthalene	30	µg/kg	1.9	U	1.8	U	NC	0.88	B	0.7	B	22.78
Phenanthrene	30	µg/kg	3		1.1	J	92.68	3.8		2.8		30.30
Pyrene	30	µg/kg	2.7		1.7	J	45.45	5.9		5.2		12.61
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	30	pg/g	13300	J	14800	J	10.68	502		455		9.82
1,2,3,4,6,7,8,9-OCDF	30	pg/g	7.17	U	7.25	U	NC	8.26	U	7.18	U	NC
1,2,3,4,6,7,8-HpCDD	30	pg/g	67		84.3		22.87	12		10.8		10.53
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,4,7,8-HxCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,6,7,8-HxCDD	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,6,7,8-HxCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,7,8,9-HxCDD	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,7,8,9-HxCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,7,8-PeCDD	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
1,2,3,7,8-PeCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
2,3,4,6,7,8-HxCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
2,3,4,7,8-PeCDF	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
2,3,7,8-TCDD	30	pg/g	0.717	U	0.725	U	NC	0.826	U	0.718	U	NC
2,3,7,8-TCDF	30	pg/g	0.717	U	0.725	U	NC	0.826	U	0.718	U	NC
Total Heptachlorodibenzofuran	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
Total Heptachlorodibenzo-p-dioxin	30	pg/g	137		173		23.23	36.6		32.1		13.10
Total Hexachlorodibenzofuran	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
Total Hexachlorodibenzo-p-dioxin	30	pg/g	3.59	U	2.51	J	NC	5.49	J	5.53		0.73
Total Pentachlorodibenzofuran	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.59	U	3.64	U	NC	4.14	U	3.6	U	NC
Total Tetrachlorodibenzofuran	30	pg/g	0.717	U	0.725	U	NC	0.826	U	0.718	U	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.717	U	0.725	U	NC	0.826	U	0.718	U	NC
SW846 8330B												
2,4,6-Trinitrotoluene	30	mg/kg	0.24	U	0.25	U	NC	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.19	U	0.2	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.19	U	0.2	U	NC	0.2	U	0.2	U	NC

Table E1-17. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-49 Soil Samples

Location			EC-49-08					EC-49-E-Sub					
Sample Name			EC-49-8-SO-0.5		EC-49-SO-FD3			EC-49-E-SO-03		EC-49-SO-FD1			
Parent Sample Name					EC-49-8-SO-0.5					EC-49-E-SO-03			
Sample Date			15-Aug-13					8-Aug-13					
Start Depth (ft bgs)			0					2					
End Depth (ft bgs)			0.5					3					
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
EPA 6850													
Perchlorate	30	µg/kg	22	U	24	U	NC					
SW846 6020A													
Aluminum	30	mg/kg	3870		3280		16.50	1730	K	2830	K	48.25
Antimony	30	mg/kg	0.45	J	1.1	U	NC	1	U	1	U	NC
Copper	30	mg/kg	7		4.7		39.32	2.5	U	1.3	J	NC
Lead	30	mg/kg	14.3		8.3		53.10	2.3		2.2		4.44
Manganese	30	mg/kg	66.9		44.9		39.36	43.8		134		101.46
Zinc	30	mg/kg	15.2		9.1		50.21	7.1		14		65.40
SW846 8270 SIM													
Acenaphthene	30	µg/kg	1.8	U	1.9	U	NC	0.66	J	1.9	U	NC
Acenaphthylene	30	µg/kg	2.2		1.6	J	31.58	1.8	U	1.9	U	NC
Anthracene	30	µg/kg	1.3	J	1.1	J	16.67	1.8	U	1.9	U	NC
Benzo(a)anthracene	30	µg/kg	7.8		6.7		15.17	1.8	U	1.9	U	NC
Benzo(a)pyrene	30	µg/kg	12.2		10		19.82	1.8	U	1.9	U	NC
Benzo(b)fluoranthene	30	µg/kg	32.1		24.8		25.66	1.8	U	1.7	J	NC
Benzo(ghi)perylene	30	µg/kg	6.2		4.7		27.52	1.8	U	1.3	J	NC
Benzo(k)fluoranthene	30	µg/kg	10.2		9.4		8.16	1.8	U	1.1	J	NC
Chrysene	30	µg/kg	13.7		10.9		22.76	1.8	U	1.9	U	NC
Dibenz(a,h)anthracene	30	µg/kg	2.3		1.8	J	24.39	1.8	U	1.3	J	NC
Fluoranthene	30	µg/kg	17.2		13.9		21.22	1.8	U	1.9	U	NC
Fluorene	30	µg/kg	1.8	U	1.9	U	NC	1.8	U	1.9	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	6.7		5		29.06	1.8	U	1.6	J	NC
Naphthalene	30	µg/kg	1.8	U	1.9		NC	0.72	B	0.63	B	13.33
Phenanthrene	30	µg/kg	3.2		2.9		9.84	1.8	U	1.9	U	NC
Pyrene	30	µg/kg	16.8		13.3		23.26	1.8	U	1.9	U	NC
SW846 8290													
1,2,3,4,6,7,8,9-OCDD	30	pg/g	166		161		3.06	853	K	1170		31.34
1,2,3,4,6,7,8,9-OCDF	30	pg/g	7.35	U	7.12	U	NC	7.02	U	7.29	U	NC
1,2,3,4,6,7,8-HpCDD	30	pg/g	5.02	J	4.04	J	21.63	9.29		10.6		13.17
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,4,7,8-HxCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,6,7,8-HxCDD	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,6,7,8-HxCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,7,8,9-HxCDD	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,7,8,9-HxCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,7,8-PeCDD	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
1,2,3,7,8-PeCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
2,3,4,6,7,8-HxCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
2,3,4,7,8-PeCDF	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
2,3,7,8-TCDD	30	pg/g	0.735	U	0.712	U	NC	0.702	U	0.729	U	NC
2,3,7,8-TCDF	30	pg/g	0.735	U	0.712	U	NC	0.702	U	0.729	U	NC
Total Heptachlorodibenzofuran	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
Total Heptachlorodibenzo-p-dioxin	30	pg/g	22.1		17.5		23.23	28.3		27.1		4.33
Total Hexachlorodibenzofuran	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
Total Hexachlorodibenzo-p-dioxin	30	pg/g	3.68	U	3.57	U	NC	3.52	U	1.84	J	NC
Total Pentachlorodibenzofuran	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.68	U	3.57	U	NC	3.52	U	3.66	U	NC
Total Tetrachlorodibenzofuran	30	pg/g	0.735	U	0.712	U	NC	0.702	U	0.729	UJ	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.735	U	0.712	U	NC	0.702	U	0.729	U	NC
SW846 8330B													
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.24	U	NC	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.19	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.19	U	NC	0.2	U	0.2	U	NC

Table E1-18. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-50 Soil Samples

Location			EC-50-01				
Sample Name			EC-50-1-SO-04		EC-50-SO-FD1		
Parent Sample Name					EC-50-1-SO-04		
Sample Date			25-Jul-13				
Start Depth (ft bgs)			3				
End Depth (ft bgs)			4				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 8015C							
Ethanol	30	mg/kg	24.9	U	24.2	U	NC
Methanol	30	mg/kg	24.9	U	24.2	U	NC
SW846 8082A							
Aroclor 1016	30	mg/kg	0.039	U	0.038	U	NC
Aroclor 1221	30	mg/kg	0.039	U	0.038	U	NC
Aroclor 1232	30	mg/kg	0.039	U	0.038	U	NC
Aroclor 1242	30	mg/kg	0.039	U	0.038	U	NC
Aroclor 1248	30	mg/kg	0.039	U	0.038	U	NC
Aroclor 1254	30	mg/kg	0.039	U	0.038	U	NC
Aroclor 1260	30	mg/kg	0.039	U	0.038	U	NC
SW846 8260B							
2-Butanone	30	µg/kg	10.2	U	11.7	U	NC
Acetone	30	µg/kg	18.2		29		45.76
Benzene	30	µg/kg	2	U	2.3	U	NC
Carbon tetrachloride	30	µg/kg	2	U	2.3	U	NC
Ethylbenzene	30	µg/kg	2	U	2.3	U	NC
Methylene chloride	30	µg/kg	55.9	K	95.6		52.41
Tetrachloroethene	30	µg/kg	2	U	2.3	U	NC
Toluene	30	µg/kg	2	U	2.3	U	NC
Trichloroethene	30	µg/kg	2	U	2.3	U	NC
Xylenes (total)	30	µg/kg	6.1	U	7	U	NC
SW846 8270 SIM							
Acenaphthene	30	µg/kg	2.1	U	2	U	NC
Acenaphthylene	30	µg/kg	1.2	J	0.48	J	85.71
Anthracene	30	µg/kg	2.1	U	2	U	NC
Benzo(a)anthracene	30	µg/kg	2.1	U	2	U	NC
Benzo(a)pyrene	30	µg/kg	1.9	J	1.8	J	5.41
Benzo(b)fluoranthene	30	µg/kg	4.9	J	2		84.06
Benzo(ghi)perylene	30	µg/kg	1.7	J	3.1		58.33
Benzo(k)fluoranthene	30	µg/kg	2.2	J	2	U	NC
Chrysene	30	µg/kg	1.6	J	2	U	NC
Dibenz(a,h)anthracene	30	µg/kg	2.1	UJ	0.83	J	NC
Fluoranthene	30	µg/kg	2.1	U	2	U	NC
Fluorene	30	µg/kg	2.1	U	2	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	1.6	J	2.2		31.58
Naphthalene	30	µg/kg	0.67	J	2	U	NC
Phenanthrene	30	µg/kg	2.1	U	2	U	NC
Pyrene	30	µg/kg	2.1	U	2	U	NC

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Table E1-19. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-52 Soil Samples

Location			EC-52-14					EC-52-A				
Sample Name			EC-52-14-SO-0.5		EC-52-SO-FD3			EC-52-A-SO-03		EC-52-SO-FD4		
Parent Sample Name					EC-52-14-SO-0.5					EC-52-A-SO-03		
Sample Date			19-Aug-13					22-Aug-13				
Start Depth (ft bgs)			0					2				
End Depth (ft bgs)			5					3				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
SW846 6020A												
Aluminum	30	mg/kg	12400		6960		56.20	6180		6410		3.65
Antimony	30	mg/kg	2.6		1.2	B	73.68	0.39	B	0.56	J	35.79
Copper	30	mg/kg	14.2		7.8		58.18	7.9		9.8		21.47
Lead	30	mg/kg	37.4		20.1		60.17	7.5		9.7		25.58
Manganese	30	mg/kg	1820		1200		41.06	24.7		464		179.78
Zinc	30	mg/kg	58.2		32.4		56.95	15.7		20.6		27.00
SW846 8330B												
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC

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Table E1-20. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-52 Propellant Grain Area Soil Samples

Location			EC-52-07					EC-52-10				
Sample Name			EC-52-7-SO-5.5		EC-52-SO-FD1			EC-52-10-SO-3.5		EC-52-SO-FD2		
Parent Sample Name					EC-52-7-SO-5.5					EC-52-10-SO-3.5		
Sample Date			16-Aug-13					16-Aug-13				
Start Depth (ft bgs)			4.5					0.5				
End Depth (ft bgs)			5.5					1.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
SW846 8330B												
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC	0.2	U	0.2	U	NC
Nitroglycerin	30	mg/kg	1.2	U	1.2	U	NC	1.2	U	1.2	U	NC
High Performance Liquid Chromatography												
Nitroguanidine	30	mg/kg	0.25	U	0.25	U	NC	0.23	U	0.23	U	NC

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Table E1-21. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57B Soil Samples

Location			EC-57B-01					EC-57B-06					EC-57B-07				
Sample Name			EC-57B-1-SO-02		EC-57B-SO-FD1			EC-57B-06-SO-2		EC-57B-SO-FD1-020916			EC-57B-07-SO-0.5		EC-57B-SO-FD1-092415		
Parent Sample Name					EC-57B-1-SO-02					EC-57B-06-SO-2					EC-57B-07-SO-0.5		
Sample Date			28-Aug-13					9-Feb-16					24-Sep-15				
Start Depth (ft bgs)			1					2					0				
End Depth (ft bgs)			2					3					0.5				
Parameter Name	D QC Lim	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																	
Aluminum	30	mg/kg	1590		5380		108.75										
Antimony	30	mg/kg	2.3	L	15.2	L	147.43										
Copper	30	mg/kg	2.4	K	19.2	K	155.56										
Lead	30	mg/kg	3.6		150		190.63										
Manganese	30	mg/kg	35.2		898		184.91						1320		1100		18.18
Zinc	30	mg/kg	6.4		105		177.02										
SW846 8082A																	
Aroclor 1016	30	mg/kg	0.034	U	0.035	U	NC										
Aroclor 1221	30	mg/kg	0.034	U	0.035	U	NC										
Aroclor 1232	30	mg/kg	0.034	U	0.035	U	NC										
Aroclor 1242	30	mg/kg	0.034	U	0.035	U	NC										
Aroclor 1248	30	mg/kg	0.034	U	0.035	U	NC										
Aroclor 1254	30	mg/kg	0.034	U	0.035	U	NC										
Aroclor 1260	30	mg/kg	0.034	U	0.035	U	NC										
SW846 8270D/ 8270 SIM																	
Acenaphthene	30	µg/kg	0.94	J	5		136.70										
Acenaphthylene	30	µg/kg	12.9		22.9		55.87										
Anthracene	30	µg/kg	11.1		32.5		98.17										
Benzo(a)anthracene	30	µg/kg	33.5		96.7		97.08	4800		490		162.95	320		690		73.27
Benzo(a)pyrene	30	µg/kg	42.2	J	109		88.36	3900		440		159.45	300		690		78.79
Benzo(b)fluoranthene	30	µg/kg	103		232		77.01	5200		620		157.39	430		960		76.26
Benzo(ghi)perylene	30	µg/kg	32.3	J	33.5	J	3.65										
Benzo(k)fluoranthene	30	µg/kg	38.5	J	88.7		78.93										
Chrysene	30	µg/kg	44.5		129		97.41										
Dibenz(a,h)anthracene	30	µg/kg	10	J	11.8	J	16.51	490		68		151.25	69		160		79.48
Fluoranthene	30	µg/kg	53.1		198		115.41										
Fluorene	30	µg/kg	2.1		6.9		106.67										
Indeno(1,2,3-cd)pyrene	30	µg/kg	30.4	J	39.7	J	26.53	2100		350		142.86	310		710		78.43
Naphthalene	30	µg/kg	1.2	J	2.5		70.27										
Phenanthrene	30	µg/kg	17		111		146.88										
Pyrene	30	µg/kg	55.1		176		104.63										
SW846 8290																	
1,2,3,4,6,7,8,9-OCDD	30	pg/g	94.7		49.8		62.15	531		515		3.06	8940	J	9110	J	1.88
1,2,3,4,6,7,8,9-OCDF	30	pg/g	5.4	J	6.92	U	NC	5.37	J	4.42	J	19.41	60.3		67		10.53
1,2,3,4,6,7,8-HpCDD	30	pg/g	8.46		1.93	J	125.70	6.66		7.16		7.24	137		219		46.07
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.16	J	3.47	U	NC	2.45	J	2.29	J	6.75	33.6		40.3		18.13
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.67	U	3.47	U	NC	2.72	UJ	2.64	U	NC	1.58	J	2.33	J	38.36
1,2,3,4,7,8-HxCDD	30	pg/g	3.67	U	3.47	U	NC	0.308	J	0.196	J	44.44	2.07	J	3.74		57.49
1,2,3,4,7,8-HxCDF	30	pg/g	3.67	U	3.47	U	NC	0.605	J	2.64	UJ	NC	2.37	J	3.41		35.99
1,2,3,6,7,8-HxCDD	30	pg/g	3.67	U	3.47	U	NC	0.517	J	0.329	J	44.44	4.08		6.22		41.55
1,2,3,6,7,8-HxCDF	30	pg/g	3.67	U	3.47	U	NC	2.72	U	2.64	UJ	NC	2.39	J	2.62	J	9.18

Table E1-21. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57B Soil Samples

Location	EC-57B-01						EC-57B-06					EC-57B-07				
Sample Name	EC-57B-1-SO-02		EC-57B-SO-FD1				EC-57B-06-SO-2		EC-57B-SO-FD1-020916			EC-57B-07-SO-0.5		EC-57B-SO-FD1-092415		
Parent Sample Name			EC-57B-1-SO-02						EC-57B-06-SO-2					EC-57B-07-SO-0.5		
Sample Date	28-Aug-13						9-Feb-16					24-Sep-15				
Start Depth (ft bgs)	1						2					0				
End Depth (ft bgs)	2						3					0.5				
Parameter Name	D QC Lim	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
1,2,3,7,8,9-HxCDD	30	pg/g	3.67	U	3.47	U	NC	0.582	J	0.408	J	35.15	3.59		5.47		41.50
1,2,3,7,8,9-HxCDF	30	pg/g	3.67	U	3.47	U	NC	2.72	U	2.64	U	NC	0.599	J	0.803	J	29.10
1,2,3,7,8-PeCDD	30	pg/g	3.67	U	3.47	U	NC	0.321	J	0.13	J	84.70	1.41	J	1.8	J	24.30
1,2,3,7,8-PeCDF	30	pg/g	3.67	U	3.47	U	NC	0.286	J	0.196	J	37.34	1.13	J	1.38	J	19.92
2,3,4,6,7,8-HxCDF	30	pg/g	3.67	U	3.47	U	NC	2.72	U	2.64	U	NC	2.91		3.76		25.49
2,3,4,7,8-PeCDF	30	pg/g	3.67	U	3.47	U	NC	0.493	J	0.407	J	19.11	2.78		2.08	J	28.81
2,3,7,8-TCDD	30	pg/g	0.733	U	0.692	U	NC	0.114	U	0.163	U	NC	0.276	J	0.388	J	33.73
2,3,7,8-TCDF	30	pg/g	0.733	U	0.692	U	NC	0.208	J	0.17	U	NC	1.48		1.95		27.41
Total Heptachlorodibenzofuran	30	pg/g	6.92		3.47	U	NC	4.04		2.61	J	43.01	72.5		85.7		16.69
Total Heptachlorodibenzo-p-dioxin	30	pg/g	13.8		3.47	U	NC	16.5		20.9		23.53	345		544		44.77
Total Hexachlorodibenzofuran	30	pg/g	3.67	U	3.47	U	NC	4.34		3.25		28.72	43.8		48.8		10.80
Total Hexachlorodibenzo-p-dioxin	30	pg/g	3.67	U	3.47	U	NC	2.4	J	2.54	J	5.67	44		79		56.91
Total Pentachlorodibenzofuran	30	pg/g	2.23	J	3.47	U	NC	2	J	2.73		30.87	35.1		41.4		16.47
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.67	U	3.47	U	NC	0.271	J	0.162	J	50.35	13		16.7		24.92
Total Tetrachlorodibenzofuran	30	pg/g	0.552	J	0.692	U	NC	0.61		1.14		60.57	18.1		22.7		22.55
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.733	U	0.692	U	NC	0.404	J	0.163	U	NC	5.58		5.27		5.71
SW846 8330B																	
2,4,6-Trinitrotoluene	30	mg/kg	0.24	U	0.25	U	NC										
2,4-Dinitrotoluene	30	mg/kg	0.19	U	0.2	U	NC										
2,6-Dinitrotoluene	30	mg/kg	0.19	U	0.2	U	NC										

Table E1-21. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57B Soil Samples

Location			EC-57B-10					EC-57B-13					EC-57B-17				
Sample Name			EC-57B-10-SO-2		EC-57B-SO-FD2-092415			EC-57B-13-SO-0.5		EC-57B-SO-FD3-012116			EC-57B-17-SO-1		EC-57B-SO-FD1-012216		
Parent Sample Name					EC-57B-10-SO-2					EC-57B-13-SO-0.5					EC-57B-17-SO-1		
Sample Date			24-Sep-15					21-Jan-16					22-Jan-16				
Start Depth (ft bgs)			1					0					1				
End Depth (ft bgs)			2					0.5					2				
Parameter Name	D QC Lim	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																	
Aluminum	30	mg/kg															
Antimony	30	mg/kg															
Copper	30	mg/kg															
Lead	30	mg/kg															
Manganese	30	mg/kg	19.7		21.9		10.58										
Zinc	30	mg/kg															
SW846 8082A																	
Aroclor 1016	30	mg/kg															
Aroclor 1221	30	mg/kg															
Aroclor 1232	30	mg/kg															
Aroclor 1242	30	mg/kg															
Aroclor 1248	30	mg/kg															
Aroclor 1254	30	mg/kg															
Aroclor 1260	30	mg/kg															
SW846 8270D/ 8270 SIM																	
Acenaphthene	30	µg/kg															
Acenaphthylene	30	µg/kg															
Anthracene	30	µg/kg															
Benzo(a)anthracene	30	µg/kg	15		14		6.90	63		73		14.71	560		1000		56.41
Benzo(a)pyrene	30	µg/kg	11		8.4		26.80	62		69		10.69	810		610		28.17
Benzo(b)fluoranthene	30	µg/kg	26		25		3.92	87		96		9.84	1100		1300		16.67
Benzo(ghi)perylene	30	µg/kg															
Benzo(k)fluoranthene	30	µg/kg															
Chrysene	30	µg/kg															
Dibenz(a,h)anthracene	30	µg/kg	4		2.9	J	31.88	12		15		22.22	220		220		0.00
Fluoranthene	30	µg/kg															
Fluorene	30	µg/kg															
Indeno(1,2,3-cd)pyrene	30	µg/kg	17		15		12.50	51		2.3	U	NC	1000		980		2.02
Naphthalene	30	µg/kg															
Phenanthrene	30	µg/kg															
Pyrene	30	µg/kg															
SW846 8290																	
1,2,3,4,6,7,8,9-OCDD	30	pg/g	85.1		86.4		1.52	5860	J	4670		22.60					
1,2,3,4,6,7,8,9-OCDF	30	pg/g	5.03	U	5.04	U	NC	46.4		51.8		11.00					
1,2,3,4,6,7,8-HpCDD	30	pg/g	1.5	J	1.79	J	17.63	111	J	99.2		11.23					
1,2,3,4,6,7,8-HpCDF	30	pg/g	2.52	UJ	2.52	U	NC	18.9		19.5		3.13					
1,2,3,4,7,8,9-HpCDF	30	pg/g	2.52	UJ	2.52	UJ	NC	1.46	J	1.61	J	9.77					
1,2,3,4,7,8-HxCDD	30	pg/g	2.52	U	2.52	UJ	NC	1.91	J	1.8	J	5.93					
1,2,3,4,7,8-HxCDF	30	pg/g	2.52	U	2.52	U	NC	2.63	J	2.82	J	6.97					
1,2,3,6,7,8-HxCDD	30	pg/g	2.52	UJ	2.52	U	NC	3.56		3.73		4.66					
1,2,3,6,7,8-HxCDF	30	pg/g	2.52	U	2.52	UJ	NC	2.2	J	2.24	J	1.80					

Table E1-21. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57B Soil Samples

Location			EC-57B-10					EC-57B-13					EC-57B-17				
Sample Name			EC-57B-10-SO-2		EC-57B-SO-FD2-092415			EC-57B-13-SO-0.5		EC-57B-SO-FD3-012116			EC-57B-17-SO-1		EC-57B-SO-FD1-012216		
Parent Sample Name					EC-57B-10-SO-2					EC-57B-13-SO-0.5					EC-57B-17-SO-1		
Sample Date			24-Sep-15					21-Jan-16					22-Jan-16				
Start Depth (ft bgs)			1					0					1				
End Depth (ft bgs)			2					0.5					2				
Parameter Name	D QC Lim	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
1,2,3,7,8,9-HxCDD	30	pg/g	2.52	U	2.52	UJ	NC	2.96	J	3.09	J	4.30					
1,2,3,7,8,9-HxCDF	30	pg/g	2.52	UJ	2.52	UJ	NC	0.732	J	0.671	J	8.70					
1,2,3,7,8-PeCDD	30	pg/g	2.52	UJ	2.52	UJ	NC	1.18	J	1.36	J	14.17					
1,2,3,7,8-PeCDF	30	pg/g	0.0511	U	0.0501	U	NC	1.18	J	1.21	J	2.51					
2,3,4,6,7,8-HxCDF	30	pg/g	2.52	U	2.52	UJ	NC	3.38		3.17	J	6.41					
2,3,4,7,8-PeCDF	30	pg/g	0.0518	U	0.0512	U	NC	2.47	J	2.74	J	10.36					
2,3,7,8-TCDD	30	pg/g	0.0712	U	0.0581	U	NC	0.476	J	0.345	J	31.91					
2,3,7,8-TCDF	30	pg/g	0.0726	U	0.0655	U	NC	1.99		1.98		0.50					
Total Heptachlorodibenzofuran	30	pg/g	0.0208	U	0.637	J	NC	44.8		50		10.97					
Total Heptachlorodibenzo-p-dioxin	30	pg/g	3.18		3.75		16.45	255		232		9.45					
Total Hexachlorodibenzofuran	30	pg/g	0.393	J	0.323	J	19.55	38.2		36.6		4.28					
Total Hexachlorodibenzo-p-dioxin	30	pg/g	0.719	J	0.659	J	8.71	40.3		39.9		1.00					
Total Pentachlorodibenzofuran	30	pg/g	0.158	J	0.0506	U	NC	52.7		42.7		20.96					
Total Pentachlorodibenzo-p-dioxin	30	pg/g	0.097	J	0.123	J	23.64	10.4		11		5.61					
Total Tetrachlorodibenzofuran	30	pg/g	0.0726	U	0.0655	U	NC	20.9		20.9		0.00					
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.0712	U	0.0581	U	NC	5.59		4.6		19.43					
SW846 8330B																	
2,4,6-Trinitrotoluene	30	mg/kg															
2,4-Dinitrotoluene	30	mg/kg															
2,6-Dinitrotoluene	30	mg/kg															

Table E1-22. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57C Soil Samples

Location			EC-57C-02					EC-57C-09				
Sample Name			EC-57C-2-SO-0.5		EC-57C-SO-FD1			EC-57C-09-SO-2		EC-57C-SO-FD1-092515		
Parent Sample Name					EC-57C-2-SO-0.5					EC-57C-09-SO-2		
Sample Date			29-Aug-13					25-Sep-15				
Start Depth (ft bgs)			0					1				
End Depth (ft bgs)			0.5					2				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
SW846 8270D/8270 SIM												
Acenaphthene	30	µg/kg	6.8		8.4		21.05					
Acenaphthylene	30	µg/kg	7		11.8		51.06					
Anthracene	30	µg/kg	22.6		30.5		29.76					
Benzo(a)anthracene	30	µg/kg	118		116		1.71					
Benzo(a)pyrene	30	µg/kg	131		131		0.00	2.6	J	2.4	U	NC
Benzo(b)fluoranthene	30	µg/kg	191		190		0.52					
Benzo(ghi)perylene	30	µg/kg	95.8		88.8		7.58					
Benzo(k)fluoranthene	30	µg/kg	71.8	J	69.6		3.11					
Chrysene	30	µg/kg	160		161		0.62					
Dibenz(a,h)anthracene	30	µg/kg	18.8	J	8.3		77.49					
Fluoranthene	30	µg/kg	237		242		2.09					
Fluorene	30	µg/kg	7.3		9.8		29.24					
Indeno(1,2,3-cd)pyrene	30	µg/kg	100		95.3		4.81					
Naphthalene	30	µg/kg	4.2		6.4		41.51					
Phenanthrene	30	µg/kg	136		143		5.02					
Pyrene	30	µg/kg	220		221		0.45					
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	30	pg/g	5630	J	5570	J	1.07					
1,2,3,4,6,7,8,9-OCDF	30	pg/g	77		70.7		8.53					
1,2,3,4,6,7,8-HpCDD	30	pg/g	128		108		16.95					
1,2,3,4,6,7,8-HpCDF	30	pg/g	32.4		32.4		0.00					
1,2,3,4,7,8,9-HpCDF	30	pg/g	2.57	J	2.29	J	11.52					
1,2,3,4,7,8-HxCDD	30	pg/g	2.26	J	3.92	U	NC					
1,2,3,4,7,8-HxCDF	30	pg/g	6.28		5.44	J	14.33					
1,2,3,6,7,8-HxCDD	30	pg/g	4.46	J	4.22	J	5.53					
1,2,3,6,7,8-HxCDF	30	pg/g	3.72	J	3.37	J	9.87					
1,2,3,7,8,9-HxCDD	30	pg/g	4.09	J	3.95	J	3.48					
1,2,3,7,8,9-HxCDF	30	pg/g	4.13	U	3.92	U	NC					
1,2,3,7,8-PeCDD	30	pg/g	4.13	U	2.17	J	NC					
1,2,3,7,8-PeCDF	30	pg/g	3.69	J	2.89	J	24.32					
2,3,4,6,7,8-HxCDF	30	pg/g	5.09	J	5.33	J	4.61					
2,3,4,7,8-PeCDF	30	pg/g	4.61	J	5.07	J	9.50					
2,3,7,8-TCDD	30	pg/g	0.48	J	0.781	U	NC					
2,3,7,8-TCDF	30	pg/g	4.27		3.47		20.67					
Total Heptachlorodibenzofuran	30	pg/g	79.2		81.4		2.74					
Total Heptachlorodibenzo-p-dioxin	30	pg/g	285		240		17.14					
Total Hexachlorodibenzofuran	30	pg/g	52.5		45.5		14.29					
Total Hexachlorodibenzo-p-dioxin	30	pg/g	44.1		43.4		1.60					
Total Pentachlorodibenzofuran	30	pg/g	54.3		50.5		7.25					
Total Pentachlorodibenzo-p-dioxin	30	pg/g	7.3		6.29		14.86					

Table E1-22. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57C Soil Samples

Location			EC-57C-02					EC-57C-09				
Sample Name			EC-57C-2-SO-0.5		EC-57C-SO-FD1			EC-57C-09-SO-2		EC-57C-SO-FD1-092515		
Parent Sample Name					EC-57C-2-SO-0.5					EC-57C-09-SO-2		
Sample Date			29-Aug-13					25-Sep-15				
Start Depth (ft bgs)			0					1				
End Depth (ft bgs)			0.5					2				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
Total Tetrachlorodibenzofuran	30	pg/g	35.8		20.6		53.90					
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	6.41		4.37		37.85					
SW846 8330B												
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC					
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC					
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC					
Nitroglycerin	30	mg/kg	1.2	U	1.2	U	NC					
USACE												
Nitroguanidine	30	mg/kg	0.25	U	0.24	U	NC					

Table E1-23. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-57D Soil Samples

Location			EC-57D-02					EC-57D-12					EC-57D-17				
Sample Name			EC-57D-2-SO-3.5		EC-57D-SO-FD1			EC-57D-12-SO-1		EC-57D-SO-FD1-012116			EC-57D-17-SO-0.5		EC-57D-SO-FD2-012116		
Parent Sample Name					EC-57D-2-SO-3.5					EC-57D-12-SO-1					EC-57D-17-SO-0.5		
Sample Date			28-Aug-13					21-Jan-16					21-Jan-16				
Start Depth (ft bgs)			2.5					1					0				
End Depth (ft bgs)			3.5					2					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																	
Aluminum	30	mg/kg	2410		2260		6.42										
Antimony	30	mg/kg	2.6	L	1.3		66.67										
Copper	30	mg/kg	39.4	K	10		119.03										
Lead	30	mg/kg	12.3	K	4.4		94.61										
Manganese	30	mg/kg	131		128		2.32	203		131		43.11	17500		15900		9.58
Zinc	30	mg/kg	27.3		12.1		77.16										
SW846 8330B																	
2,4,6-Trinitrotoluene	30	mg/kg	0.25	U	0.25	U	NC										
2,4-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC										
2,6-Dinitrotoluene	30	mg/kg	0.2	U	0.2	U	NC										

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Table E1-24. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-58B Soil Samples

Location			EC-58B-05				
Sample Name			EC-58B-05-SO-2		EC-58B-SO-FD1-092515		
Parent Sample Name					EC-58B-05-SO-2		
Sample Date			25-Sep-15				
Start Depth (ft bgs)			1				
End Depth (ft bgs)			2				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 8270D							
Benzo(a)pyrene	30	µg/kg	68		24		95.65

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Table E1-25. Parent/Field Duplicate Results and Relative Percent Difference Calculations for EC-58C Soil Samples

Location			EC-58C-01					EC-58C-B				
Sample Name			EC-58C-1-SO-04		EC-58C-SO-FD2			EC-58C-B-SO-0.5		EC-58C-SO-FD1		
Parent Sample Name					EC-58C-1-SO-04					EC-58C-B-SO-0.5		
Sample Date			29-Aug-13					20-Aug-13				
Start Depth (ft bgs)			3					0				
End Depth (ft bgs)			4					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
SW846 6020A												
Aluminum	30	mg/kg	4240		3820		10.42	14700		10200		36.14
Antimony	30	mg/kg	1.1	U	1	U	NC	0.48	J	1.2	U	NC
Copper	30	mg/kg	5.8		8.2		34.29	8.1		8.8		8.28
Lead	30	mg/kg	6.3		6.6		4.65	24.7		23.4		5.41
Manganese	30	mg/kg	62.6		30.7		68.38	115		144		22.39
Zinc	30	mg/kg	14.3		8.1		55.36	31.5		33.3		5.56
SW846 8082A												
Aroclor 1016	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
Aroclor 1221	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
Aroclor 1232	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
Aroclor 1242	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
Aroclor 1248	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
Aroclor 1254	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
Aroclor 1260	30	mg/kg	0.035	U	0.036	U	NC	0.04	U	0.039	U	NC
SW846 8270 SIM												
Acenaphthene	30	µg/kg	1.8	U	0.62	J	NC	0.49	J	1	J	68.46
Acenaphthylene	30	µg/kg	1.8	U	2.1		NC	1.9	J	1.6	J	17.14
Anthracene	30	µg/kg	1.8	U	0.78	J	NC	2.7		2.7		0.00
Benzo(a)anthracene	30	µg/kg	1.8	U	1.8		NC	16.4		17.6		7.06
Benzo(a)pyrene	30	µg/kg	1.8	U	2		NC	17.1		16.6		2.97
Benzo(b)fluoranthene	30	µg/kg	1.8	U	4.8		NC	30		28.9		3.74
Benzo(ghi)perylene	30	µg/kg	1.8	U	0.63	J	NC	17.1		17.3		1.16
Benzo(k)fluoranthene	30	µg/kg	1.8	U	1.6	J	NC	9.5		10.9		13.73
Chrysene	30	µg/kg	1.8	U	3.6		NC	23.9		24.4		2.07
Dibenz(a,h)anthracene	30	µg/kg	1.8	U	1.8	U	NC	4.1		4.2		2.41
Fluoranthene	30	µg/kg	1.8	U	4.5		NC	30		33.1		9.83
Fluorene	30	µg/kg	1.8	U	0.62	J	NC	2.1	U	0.89	J	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	1.8	U	1.8	U	NC	15		14.8		1.34
Naphthalene	30	µg/kg	1.8	U	0.82	J	NC	0.83	J	0.61	J	30.56
Phenanthrene	30	µg/kg	0.65	J	2.5		117.46	9.5		12.1		24.07
Pyrene	30	µg/kg	1.8	U	4		NC	27.9		31.1		10.85
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	30	pg/g	9180	J	1090		157.55	2170		2080		4.24
1,2,3,4,6,7,8,9-OCDF	30	pg/g	7.21	U	7.37	U	NC	6.43	J	15.5		82.72
1,2,3,4,6,7,8-HpCDD	30	pg/g	29.2		5.31	J	138.45	20.4		30.9		40.94
1,2,3,4,6,7,8-HpCDF	30	pg/g	3.62	U	3.7	U	NC	2.89	J	5.87	J	68.04
1,2,3,4,7,8,9-HpCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,4,7,8-HxCDD	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,4,7,8-HxCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,6,7,8-HxCDD	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,6,7,8-HxCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,7,8,9-HxCDD	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,7,8,9-HxCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,7,8-PeCDD	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
1,2,3,7,8-PeCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
2,3,4,6,7,8-HxCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
2,3,4,7,8-PeCDF	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
2,3,7,8-TCDD	30	pg/g	0.721	U	0.737	U	NC	0.76	U	0.834	U	NC
2,3,7,8-TCDF	30	pg/g	0.721	U	0.737	U	NC	0.76	U	0.834	U	NC
Total Heptachlorodibenzofuran	30	pg/g	3.62	U	3.7	U	NC	5.54	J	12.9		79.83
Total Heptachlorodibenzo-p-dioxin	30	pg/g	62.2		11.7		136.67	51.7		73.3		34.56
Total Hexachlorodibenzofuran	30	pg/g	3.62	U	3.7	U	NC	1.95	J	3.05	J	44.00
Total Hexachlorodibenzo-p-dioxin	30	pg/g	3.57	J	3.7	U	NC	6.19		7.28		16.18
Total Pentachlorodibenzofuran	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/g	3.62	U	3.7	U	NC	3.81	U	4.18	U	NC
Total Tetrachlorodibenzofuran	30	pg/g	0.375	J	0.737	U	NC	2.5		2.7		7.69
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.721	U	12.3		NC	0.658	J	0.834	U	NC
SW846 8330B												
2,4,6-Trinitrotoluene	30	mg/kg	0.24	U	0.25	U	NC	0.25	U	0.25	U	NC
2,4-Dinitrotoluene	30	mg/kg	0.19	U	0.2	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	mg/kg	0.19	U	0.2	U	NC	0.2	U	0.2	U	NC

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Table E1-26. Parent/Field Duplicate Results and Relative Percent Difference Calculations for IRP Shop Area Soil Samples

Location			SHOP-04					SHOP-16					SHOP-18					SHOP-25				
Sample Name			Shop-04-SO-0.5		Shop-SO-FD1-100615			Shop-16-SO-0.5		Shop-SO-FD3-100615			Shop-18-SO-4		Shop-SO-FD2-100615			Shop-25-SO-0.5		Shop-SO-FD4-100615		
Parent Sample Name					SHOP-04-SO-0.5					SHOP-16-SO-0.5					SHOP-18-SO-4					SHOP-25-SO-0.5		
Sample Date			6-Oct-15					6-Oct-15					6-Oct-15					6-Oct-15				
Start Depth (ft bgs)			0					0					3					0				
End Depth (ft bgs)			0.5					0.5					4					0.5				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD	Result		Result		RPD
SW846 6020A																						
Arsenic	30	mg/kg	22.6		22.5		0.44	14.4		14.3		0.70	5.17		4.09		23.33	24.4		23.5		3.76

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Key for Soil Sampling Parent/Field Duplicate Results and Relative Percent Difference Tables E1-3 Through E1-26

Notes:
% - percent
µg/kg - micrograms per kilogram
B - possible blank contamination, tentative non-detect
FD - Field Duplicate
ft bgs - feet below ground surface
J - estimated value
K - estimated result may be biased high
L - estimated result may be biased low
mg/kg - milligrams per kilogram
NC - not calculated, one or more results are non-detect
pg/g - picograms per gram
QC - Quality Control
RPD - Relative Percent Difference
Shaded cells indicate RPD is outside of QC Limit
U - not detected
UJ - not detected result is estimated

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Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

Location			EC-21-41				
Sample Name			EC-21-41-GW		GW-FD1-100515		
Parent Sample Name					EC-21-41-GW		
Sample Date			5-Oct-15				
Start Depth (ft bgs)			15				
End Depth (ft bgs)			20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
9056							
Chloride	30	mg/L	6.34	J	6.3		0.63
Nitrate	30	mg/L	0.505		0.503	J	0.40
SULFATE	30	mg/L	16.9		16.7		1.19
EPA 410.4							
Chemical Oxygen Demand (COD)	30	mg/L	10	U	10	U	NC
SM202320B							
Alkalinity, Bicarbonate (As CaCO3)	30	mg/L	15.5		10.6		37.55
Alkalinity, Carbonate (As CaCO3)	30	mg/L	5	U	5	U	NC
Alkalinity, Hydroxide (As CaCO3)	30	mg/L	5	U	5	U	NC
Alkalinity, Total as CaCO3	30	mg/L	15.5		10.6		37.55
SM2340B							
Hardness	30	mg/L	18		17.9		0.56
SM2540C							
Total Dissolved Solids	30	mg/L	92		82		11.49
SM4500F							
Ammonia Nitrogen	30	mg/L	0.05	UJ	0.043	J	NC
SW846 9040C							
Corrosivity as pH	30	pH_Units					
pH	30	su	5.72	J	5.53	J	3.38
Temperature Celcius	30	su	20	J	20.1	J	0.50
SW846 9050A							
Specific Conductance	30	umhos/cm	91.7	J	93.4	J	1.84
SW846 6020A (Dissolved Fraction)							
Aluminum	30	mg/L	0.104	J	0.114	J	9.17

Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

Location			EC-21-41				
Sample Name			EC-21-41-GW		GW-FD1-100515		
Parent Sample Name					EC-21-41-GW		
Sample Date			5-Oct-15				
Start Depth (ft bgs)			15				
End Depth (ft bgs)			20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
Antimony	30	mg/L	0.001	U	0.001	U	NC
Copper	30	mg/L	0.0027	J	0.00267	J	1.12
Lead	30	mg/L	0.000976	J	0.00104	J	6.35
Manganese	30	mg/L	0.202		0.221		8.98
Zinc	30	mg/L	0.0415		0.0458		9.85
SW846 6020A (Total Fraction)							
Aluminum	30	mg/L	0.156		0.15		3.92
Antimony	30	mg/L	0.001	U	0.001	U	NC
Arsenic	30	mg/L	0.000443	J	0.001	U	NC
Barium	30	mg/L	0.0296		0.0292		1.36
Beryllium	30	mg/L	0.001	U	0.001	U	NC
Cadmium	30	mg/L	0.00035	J	0.00035	J	0.29
Calcium	30	mg/L	2.34		2.33		0.43
Chromium	30	mg/L	0.000884	J	0.00108	J	19.96
Cobalt	30	mg/L	0.00847		0.00833		1.67
Copper	30	mg/L	0.0018	J	0.00201	J	11.02
Iron	30	mg/L	4.39		4.42		0.68
Lead	30	mg/L	0.00171	J	0.00151	J	12.42
Magnesium	30	mg/L	2.95		2.93		0.68
Manganese	30	mg/L	0.29		0.293		1.03
Nickel	30	mg/L	0.0186		0.0182		2.17
Potassium	30	mg/L	1.1		1.08		1.83
Selenium	30	mg/L	0.0025	U	0.00122	J	NC
Silver	30	mg/L	0.001	U	0.001	U	NC
Sodium	30	mg/L	5.33		5.3		0.56
Thallium	30	mg/L	0.001	U	0.001	U	NC
Vanadium	30	mg/L	0.000978	J	0.00103	J	5.18

Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

		Location	EC-21-41				
		Sample Name	EC-21-41-GW		GW-FD1-100515		
		Parent Sample Name			EC-21-41-GW		
		Sample Date	5-Oct-15				
		Start Depth (ft bgs)	15				
		End Depth (ft bgs)	20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
Zinc	30	mg/L	0.0495		0.0517		4.35
SW846 7470A							
Mercury	30	mg/L	0.0001	U	0.0001	U	NC
SW846 8082A							
Aroclor 1016	30	µg/L	0.25	U	0.25	U	NC
Aroclor 1221	30	µg/L	0.25	U	0.25	U	NC
Aroclor 1232	30	µg/L	0.25	U	0.25	U	NC
Aroclor 1242	30	µg/L	0.25	U	0.25	U	NC
Aroclor 1248	30	µg/L	0.25	U	0.25	U	NC
Aroclor 1254	30	µg/L	0.25	U	0.25	U	NC
Aroclor 1260	30	µg/L	0.25	U	0.25	U	NC
SW846 8260C							
1,1,1,2-Tetrachloroethane	30	µg/L	0.5	U	0.5	U	NC
1,1,1-Trichloroethane	30	µg/L	0.5	U	0.5	U	NC
1,1,2,2-Tetrachloroethane	30	µg/L	0.5	U	0.5	U	NC
1,1,2-Trichloroethane	30	µg/L	0.5	U	0.5	U	NC
1,1-Dichloroethane	30	µg/L	0.5	U	0.5	U	NC
1,1-Dichloroethene	30	µg/L	0.5	U	0.5	U	NC
1,2,3-Trichloropropane	30	µg/L	0.5	U	0.5	U	NC
1,2-Dibromo-3-chloropropane	30	µg/L	1	U	1	U	NC
1,2-Dibromoethane	30	µg/L	0.5	U	0.5	U	NC
1,2-Dichlorobenzene	30	µg/L	0.5	U	0.5	U	NC
1,2-Dichloroethane	30	µg/L	0.5	U	0.5	U	NC
1,2-Dichloropropane	30	µg/L	0.5	U	0.5	U	NC
1,4-Dichlorobenzene	30	µg/L	0.5	U	0.5	U	NC
2-Butanone	30	µg/L	1	U	1	U	NC
2-Hexanone	30	µg/L	1	U	1	U	NC

Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

Location			EC-21-41				
Sample Name			EC-21-41-GW		GW-FD1-100515		
Parent Sample Name					EC-21-41-GW		
Sample Date			5-Oct-15				
Start Depth (ft bgs)			15				
End Depth (ft bgs)			20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
4-Methyl-2-pentanone	30	µg/L	1	U	1	U	NC
Acetone	30	µg/L	2	U	2	U	NC
Acrylonitrile	30	µg/L	1	U	1	U	NC
Benzene	30	µg/L	0.5	U	0.5	U	NC
Bromochloromethane	30	µg/L	0.5	U	0.5	U	NC
Bromodichloromethane	30	µg/L	0.5	U	0.5	U	NC
Bromoform	30	µg/L	0.5	U	0.5	U	NC
Bromomethane	30	µg/L	0.5	U	0.5	U	NC
Carbon disulfide	30	µg/L	1	U	1	U	NC
Carbon tetrachloride	30	µg/L	0.5	U	0.5	U	NC
Chlorobenzene	30	µg/L	0.5	U	0.5	U	NC
Chloroethane	30	µg/L	0.5	U	0.5	U	NC
Chloroform	30	µg/L	0.5	UJ	0.5	UJ	NC
Chloromethane	30	µg/L	0.5	U	0.5	U	NC
cis-1,2-Dichloroethene	30	µg/L	0.5	U	0.5	U	NC
cis-1,3-Dichloropropene	30	µg/L	0.5	U	0.5	U	NC
Dibromochloromethane	30	µg/L	0.5	U	0.5	U	NC
Dibromomethane	30	µg/L	0.5	U	0.5	U	NC
Ethylbenzene	30	µg/L	0.5	U	0.5	U	NC
Iodomethane	30	µg/L	2	U	2	U	NC
Methyl tert-butyl ether	30	µg/L	0.5	U	0.5	U	NC
Methylene chloride	30	µg/L	0.5	U	0.5	U	NC
Styrene	30	µg/L	0.5	U	0.5	U	NC
Tetrachloroethene	30	µg/L	0.5	U	0.5	U	NC
Toluene	30	µg/L	0.5	U	0.5	U	NC
trans-1,2-Dichloroethene	30	µg/L	0.5	U	0.5	U	NC
trans-1,3-Dichloropropene	30	µg/L	0.5	U	0.5	U	NC

Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

Location			EC-21-41				
Sample Name			EC-21-41-GW		GW-FD1-100515		
Parent Sample Name					EC-21-41-GW		
Sample Date			5-Oct-15				
Start Depth (ft bgs)			15				
End Depth (ft bgs)			20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
trans-1,4-Dichloro-2-butene	30	µg/L	1	U	1	U	NC
Trichloroethene	30	µg/L	0.5	U	0.5	U	NC
Trichlorofluoromethane	30	µg/L	0.5	U	0.5	U	NC
Vinyl Acetate	30	µg/L	1	U	1	U	NC
Vinyl chloride	30	µg/L	0.5	U	0.5	U	NC
Xylenes (total)	30	µg/L	1.5	U	1.5	U	NC
SW846 8270D							
Acenaphthene	30	µg/L	0.31		0.33		6.25
Acenaphthylene	30	µg/L	0.023	J	0.05	U	NC
Anthracene	30	µg/L	0.27		0.26		3.77
Benzo(a)anthracene	30	µg/L	0.23		0.22		4.44
Benzo(a)pyrene	30	µg/L	0.18		0.14		25.00
Benzo(b)fluoranthene	30	µg/L	0.27		0.28		3.64
Benzo(ghi)perylene	30	µg/L	0.13		0.11		16.67
Benzo(k)fluoranthene	30	µg/L	0.11		0.064	J	52.87
Chrysene	30	µg/L	0.24		0.22		8.70
Dibenz(a,h)anthracene	30	µg/L	0.05	U	0.033	J	NC
Fluoranthene	30	µg/L	0.71		0.76		6.80
Fluorene	30	µg/L	0.5		0.54		7.69
Indeno(1,2,3-cd)pyrene	30	µg/L	0.19		0.16		17.14
Naphthalene	30	µg/L	1.7		1.9		11.11
Phenanthrene	30	µg/L	1.6		1.7		6.06
Pyrene	30	µg/L	0.55		0.54		1.83
SW846 8290							
1,2,3,4,6,7,8,9-OCDD	30	pg/L	154	J	179	J	15.02
1,2,3,4,6,7,8,9-OCDF	30	pg/L	15.5	J	18.9	J	19.77
1,2,3,4,6,7,8-HpCDD	30	pg/L	46.3	J	43.1	J	7.16

Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

		Location	EC-21-41				
		Sample Name	EC-21-41-GW		GW-FD1-100515		
		Parent Sample Name			EC-21-41-GW		
		Sample Date	5-Oct-15				
		Start Depth (ft bgs)	15				
		End Depth (ft bgs)	20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
1,2,3,4,6,7,8-HpCDF	30	pg/L	8.74	J	7.34	J	17.41
1,2,3,4,7,8,9-HpCDF	30	pg/L	2.07	J	1.38	J	40.00
1,2,3,4,7,8-HxCDD	30	pg/L	0.507	U	1.29	U	NC
1,2,3,4,7,8-HxCDF	30	pg/L	2.18	J	2.39	J	9.19
1,2,3,6,7,8-HxCDD	30	pg/L	6.62	J	2.2	J	100.23
1,2,3,6,7,8-HxCDF	30	pg/L	1.37	J	1.63	J	17.33
1,2,3,7,8,9-HxCDD	30	pg/L	1.97	J	2.54	J	25.28
1,2,3,7,8,9-HxCDF	30	pg/L	0.748	U	1.06	U	NC
1,2,3,7,8-PeCDD	30	pg/L	1.68	U	2.27	U	NC
1,2,3,7,8-PeCDF	30	pg/L	0.79	U	1.17	J	NC
2,3,4,6,7,8-HxCDF	30	pg/L	0.672	U	0.89	U	NC
2,3,4,7,8-PeCDF	30	pg/L	0.691	U	1.9	J	NC
2,3,7,8-TCDD	30	pg/L	1.75	U	2.22	U	NC
2,3,7,8-TCDF	30	pg/L	4.01	U	4.68	U	NC
Total Heptachlorodibenzofuran	30	pg/L	25.8		17	J	41.12
Total Heptachlorodibenzo-p-dioxin	30	pg/L	77.9		43.1		57.52
Total Hexachlorodibenzofuran	30	pg/L	8.03	J	7.28	J	9.80
Total Hexachlorodibenzo-p-dioxin	30	pg/L	0.512	U	1.29	U	NC
Total Pentachlorodibenzofuran	30	pg/L	0.738	U	0.852	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/L	1.68	U	2.27	U	NC
Total Tetrachlorodibenzofuran	30	pg/L	4.01	U	4.68	U	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/L	1.75	U	2.22	U	NC
SW846 8330B							
2,4,6-Trinitrotoluene	30	µg/L	0.2	U	0.2	U	NC
2,4-Dinitrotoluene	30	µg/L	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	µg/L	0.2	U	0.2	U	NC
Nitroglycerin	30	µg/L	1	U	1	U	NC

Table B1-27. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-21

Location			EC-21-41				
Sample Name			EC-21-41-GW		GW-FD1-100515		
Parent Sample Name					EC-21-41-GW		
Sample Date			5-Oct-15				
Start Depth (ft bgs)			15				
End Depth (ft bgs)			20				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
High Performance Liquid Chromatography							
Nitroguanidine	30	µg/L	25	UJ	25	UJ	NC

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Table B1-28. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-25

Location			EC-25-02					EC-25-29				
Sample Name			EC-25-1-GW		EC-25-1-GW-FD1			EC-25-29-GW		GW-FD2-093015		
Parent Sample Name					EC-25-1-GW					EC-25-29-GW		
Sample Date			28-Aug-13					30-Sep-15				
Start Depth (ft bgs)			4					4				
End Depth (ft bgs)			8					9				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
EPA 314.0/EPA 6850												
Perchlorate	30	µg/L	4	U	4	U	NC	4	U	4	U	NC
SW846 6020A (Dissolved Fraction)												
Aluminum	30	mg/L						0.002	UJ	0.002	UJ	NC
Antimony	30	mg/L						0.001	U	0.001	U	NC
Copper	30	mg/L						0.001	U	0.001	U	NC
Lead	30	mg/L						0.001	UJ	0.001	UJ	NC
Manganese	30	mg/L						0.0643		0.0657		2.15
Zinc	30	mg/L						0.0038	J	0.0038	J	0.00
SW846 6020A (Total Fraction)												
Aluminum	30	mg/L	0.21		0.059	J	112.27	0.028	J	0.0334	J	17.59
Antimony	30	mg/L	0.0022	U	0.0022	U	NC	0.001	UJ	0.001	UJ	NC
Copper	30	mg/L	0.0036	J	0.0056	U	NC	0.001	UJ	0.001	UJ	NC
Lead	30	mg/L	0.0022	U	0.0022	U	NC	0.001	UJ	0.001	UJ	NC
Manganese	30	mg/L	0.083		0.041		67.74	0.0627		0.0644		2.68
Zinc	30	mg/L	0.23		0.22		4.44	0.0042	J	0.0043	J	3.55
SW846 8082A												
Aroclor 1016	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
Aroclor 1221	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
Aroclor 1232	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
Aroclor 1242	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
Aroclor 1248	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
Aroclor 1254	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
Aroclor 1260	30	µg/L	0.93	U	0.93	U	NC	0.25	U	0.25	U	NC
SW846 8270D/8270 SIM												
Acenaphthene	30	µg/L	0.047	U	0.047	U	NC	0.05	U	0.05	U	NC

Table B1-28. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-25

Location			EC-25-02					EC-25-29				
Sample Name			EC-25-1-GW		EC-25-1-GW-FD1			EC-25-29-GW		GW-FD2-093015		
Parent Sample Name					EC-25-1-GW					EC-25-29-GW		
Sample Date			28-Aug-13					30-Sep-15				
Start Depth (ft bgs)			4					4				
End Depth (ft bgs)			8					9				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
Acenaphthylene	30	µg/L	0.047	U	0.047	U	NC	0.05	U	0.05	U	NC
Anthracene	30	µg/L	0.028	J	0.024	J	15.38	0.018	J	0.05	U	NC
Benzo(a)anthracene	30	µg/L	0.085		0.047	U	NC	0.028	J	0.05	U	NC
Benzo(a)pyrene	30	µg/L	0.077		0.047	U	NC	0.025	J	0.05	U	NC
Benzo(b)fluoranthene	30	µg/L	0.093		0.047	U	NC	0.028	J	0.05	U	NC
Benzo(ghi)perylene	30	µg/L	0.076		0.047	U	NC	0.05	U	0.05	U	NC
Benzo(k)fluoranthene	30	µg/L	0.071		0.047	U	NC	0.05	U	0.05	U	NC
Chrysene	30	µg/L	0.077		0.047	U	NC	0.024	J	0.05	U	NC
Dibenz(a,h)anthracene	30	µg/L	0.05		0.047	U	NC	0.02	J	0.05	U	NC
Fluoranthene	30	µg/L	0.06		0.047	U	NC	0.039	J	0.05	U	NC
Fluorene	30	µg/L	0.047	U	0.047	U	NC	0.05	U	0.05	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/L	0.069		0.047	U	NC	0.035	J	0.05	U	NC
Naphthalene	30	µg/L	0.12		0.11		8.70	0.025	J	0.023	J	8.33
Phenanthrene	30	µg/L	0.047	U	0.047	U	NC	0.034	J	0.05	U	NC
Pyrene	30	µg/L	0.068		0.047	U	NC	0.04	J	0.05	U	NC
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	30	pg/L	62.8	U	62.9	U	NC	171	J	175	J	2.31
1,2,3,4,6,7,8,9-OCDF	30	pg/L	62.8	U	62.9	U	NC	14.9	J	17.8	J	17.74
1,2,3,4,6,7,8-HpCDD	30	pg/L	31.5	U	31.6	U	NC	36.8	J	41.5	J	12.01
1,2,3,4,6,7,8-HpCDF	30	pg/L	31.5	U	31.6	U	NC	7.95	J	4.44	J	56.66
1,2,3,4,7,8,9-HpCDF	30	pg/L	31.5	U	31.6	U	NC	0.935	J	3.03	J	105.67
1,2,3,4,7,8-HxCDD	30	pg/L	31.5	U	31.6	U	NC	3.62	J	0.966	U	NC
1,2,3,4,7,8-HxCDF	30	pg/L	31.5	U	31.6	U	NC	1.3	J	1.37	J	5.24
1,2,3,6,7,8-HxCDD	30	pg/L	31.5	U	31.6	U	NC	2.43	J	3.85	J	45.22
1,2,3,6,7,8-HxCDF	30	pg/L	31.5	U	31.6	U	NC	0.591	U	0.684	U	NC
1,2,3,7,8,9-HxCDD	30	pg/L	31.5	U	31.6	U	NC	0.695	U	2.98	J	NC

Table B1-28. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-25

Location			EC-25-02					EC-25-29				
Sample Name			EC-25-1-GW		EC-25-1-GW-FD1			EC-25-29-GW		GW-FD2-093015		
Parent Sample Name					EC-25-1-GW					EC-25-29-GW		
Sample Date			28-Aug-13					30-Sep-15				
Start Depth (ft bgs)			4					4				
End Depth (ft bgs)			8					9				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD	Result		Result		RPD
1,2,3,7,8,9-HxCDF	30	pg/L	31.5	U	31.6	U	NC	0.743	U	0.866	U	NC
1,2,3,7,8-PeCDD	30	pg/L	31.5	U	31.6	U	NC	0.949	U	1.97	J	NC
1,2,3,7,8-PeCDF	30	pg/L	31.5	U	31.6	U	NC	0.685	U	1.43	U	NC
2,3,4,6,7,8-HxCDF	30	pg/L	31.5	U	31.6	U	NC	0.624	U	0.752	U	NC
2,3,4,7,8-PeCDF	30	pg/L	31.5	U	31.6	U	NC	0.63	U	1.25	U	NC
2,3,7,8-TCDD	30	pg/L	6.28	U	6.29	U	NC	1.67	U	1.05	U	NC
2,3,7,8-TCDF	30	pg/L	6.28	U	6.29	U	NC	3.37	U	2.99	U	NC
Total Heptachlorodibenzofuran	30	pg/L	31.5	U	31.6	U	NC	0.586	U	17.1	J	NC
Total Heptachlorodibenzo-p-dioxin	30	pg/L	31.5	U	31.6	U	NC	68.3		0.507	U	NC
Total Hexachlorodibenzofuran	30	pg/L	31.5	U	31.6	U	NC	0.646	U	0.754	U	NC
Total Hexachlorodibenzo-p-dioxin	30	pg/L	31.5	U	31.6	U	NC	0.735	U	2.98	J	NC
Total Pentachlorodibenzofuran	30	pg/L	31.5	U	31.6	U	NC	0.656	U	1.34	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/L	31.5	U	31.6	U	NC	0.949	U	1.58	U	NC
Total Tetrachlorodibenzofuran	30	pg/L	6.28	U	6.29	U	NC	3.37	U	2.99	U	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/L	6.28	U	6.29	U	NC	1.67	U	1.05	U	NC
SW846 8330B												
2,4,6-Trinitrotoluene	30	µg/L	0.19	U	0.13	J	NC	0.2	U	0.2	U	NC
2,4-Dinitrotoluene	30	µg/L	0.19	U	0.19	U	NC	0.2	U	0.2	U	NC
2,6-Dinitrotoluene	30	µg/L	0.19	U	0.19	U	NC	0.2	U	0.2	U	NC

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Table B1-29. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-29

Location			EC-29-02				
Sample Name			EC-29-1-GW		EC-29-GW-FD1		
Parent Sample Name					EC-29-1-GW		
Sample Date			30-Aug-13				
Start Depth (ft bgs)			10				
End Depth (ft bgs)			14				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/L	0.51		0.24		72.00
Cadmium	30	mg/L	0.0011	U	0.0011	U	NC
Chromium	30	mg/L	0.0077		0.0039		65.52
Cobalt	30	mg/L	0.0024	J	0.002	J	18.18
Lead	30	mg/L	0.002	J	0.0022	U	NC
Titanium	30	mg/L	0.0033	J	0.0035	J	5.88
Zinc	30	mg/L	0.072		0.04		57.14
SW846 8015C							
Ethanol	30	mg/L	1	U	1	U	NC
Methanol	30	mg/L	1	U	1	U	NC
SW846 8082A							
Aroclor 1016	30	µg/L	0.93	UL	0.95	UL	NC
Aroclor 1221	30	µg/L	0.93	UL	0.95	UL	NC
Aroclor 1232	30	µg/L	0.93	UL	0.95	UL	NC
Aroclor 1242	30	µg/L	0.93	UL	0.95	UL	NC
Aroclor 1248	30	µg/L	0.93	UL	0.95	UL	NC
Aroclor 1254	30	µg/L	0.93	UL	0.95	UL	NC
Aroclor 1260	30	µg/L	0.93	UL	0.95	UL	NC
SW846 8151A							
2,4,5-T	30	µg/L	0.19	U	0.19	U	NC
2,4,5-TP	30	µg/L	0.19	U	0.19	U	NC
2,4-D	30	µg/L	0.19	U	0.19	U	NC
2,4-DB	30	µg/L	0.19	U	0.19	UJ	NC
Dalapon	30	µg/L	0.19	U	0.19	U	NC
Dicamba	30	µg/L	0.19	U	0.19	U	NC
Dichloroprop	30	µg/L	0.19	U	0.19	U	NC

Table B1-29. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-29

Location			EC-29-02				
Sample Name			EC-29-1-GW		EC-29-GW-FD1		
Parent Sample Name					EC-29-1-GW		
Sample Date			30-Aug-13				
Start Depth (ft bgs)			10				
End Depth (ft bgs)			14				
Dinoseb	30	µg/L	0.65	U	0.66	U	NC
MCPA	30	µg/L	37.2	U	37.6	U	NC
MCPP	30	µg/L	37.2	U	37.6	U	NC
Pentachlorophenol	30	µg/L	0.19	U	0.19	U	NC
SW846 8260B/8260C							
2-Butanone	30	µg/L	5	U	5	U	NC
Acetone	30	µg/L	5	U	5	U	NC
Benzene	30	µg/L	1	U	1	U	NC
Carbon tetrachloride	30	µg/L	1	U	1	U	NC
Ethylbenzene	30	µg/L	1	U	1	U	NC
Methylene chloride	30	µg/L	1	U	1	U	NC
Naphthalene	30	µg/L	1	U	1	U	NC
Tetrachloroethene	30	µg/L	1	U	1	U	NC
Toluene	30	µg/L	1	U	1	U	NC
Trichloroethene	30	µg/L	1	U	1	U	NC
Xylenes (total)	30	µg/L	3	U	3	U	NC

Notes:
Groundwater samples from August 2013 exhibited high turbidity. Therefore, the groundwater sampling was performed again in 2015.
Results from the August 2013 are included in the field duplicate analysis as these samples were collected to meet the DQOs (ERT, 2013).
However, results are not considered representative of site conditions.

Table B1-30. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Groundwater Samples at EC-57D

Location			EC-57D-05				
Sample Name			EC-57D-1-GW		EC-57D-GW-FD1		
Parent Sample Name					EC-57D-1-GW		
Sample Date			29-Aug-13				
Start Depth (ft bgs)			5				
End Depth (ft bgs)			9				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/L	0.18		0.11		48.28
Antimony	30	mg/L	0.0011	J	0.0022	U	NC
Copper	30	mg/L	0.0026	J	0.0019	J	31.11
Lead	30	mg/L	0.0022	U	0.0022	U	NC
Manganese	30	mg/L	0.26		0.24		8.00
Zinc	30	mg/L	0.018		0.017		5.71
SW846 8330B							
2,4,6-Trinitrotoluene	30	µg/L	0.19	U	0.19	U	NC
2,4-Dinitrotoluene	30	µg/L	0.19	U	0.19	U	NC
2,6-Dinitrotoluene	30	µg/L	0.19	U	0.19	U	NC

Notes:
Groundwater samples from August 2013 exhibited high turbidity. Therefore, the groundwater sampling was performed again in 2015.
Results from the August 2013 are included in the field duplicate analysis as these samples were collected to meet the DQOs (ERT, 2013).
However, results are not considered representative of site conditions.

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Key for Groundwater Sampling Parent/Field Duplicate Results and Relative Percent Difference Tables E1-3 Through E1-26

Notes:
% - percent
µg/L - micrograms per liter
B - possible blank contamination, tentative non-detect
FD - Field Duplicate
ft bgs - feet below ground surface
J - estimated value
K - estimated result may be biased high
L - estimated result may be biased low
mg/L - milligrams per liter
NC - not calculated, one or more results are non-detect
pg/L - picograms per liter
QC - Quality Control
RPD - Relative Percent Difference
Shaded cells indicate RPD is outside of QC Limit
U - not detected
UJ - not detected result is estimated
UL - not detected result may be biased low

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Table E1-31. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Sediment Samples at the Former Curtis Bay Ordnance Depot

	Location		EC-TRIB-2				
	Sample Name		EC-Trib-2-SD		EC-Trib-FD1-SD		
	Parent Sample Name				EC-TRIB-2-SD		
	Sample Date		28-Sep-15				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/kg	13700		9850		32.70
Antimony	30	mg/kg	0.598	UJ	0.508	J	NC
Arsenic	30	mg/kg	94.1		178		61.67
Cadmium	30	mg/kg	0.765	J	0.604	J	23.52
Chromium	30	mg/kg	21.4	J	14	J	41.81
Cobalt	30	mg/kg	9.45		8.02		16.37
Copper	30	mg/kg	33.7		35.9		6.32
Lead	30	mg/kg	47.1	J	47.2	J	0.21
Manganese	30	mg/kg	146	J	82.2	J	55.92
Nickel	30	mg/kg	14.2		12.9		9.59
Titanium	30	mg/kg	229		167		31.31
Zinc	30	mg/kg	147	J	173	J	16.25
SW846 7196A							
Chromium, Hexavalent	30	mg/kg	1.2	UJ	1.14	UJ	NC
SW846 7471B							
Mercury	30	mg/kg	0.0838		0.0709		16.68
SW846 8015C							
Ethanol	30	µg/kg	2500	U	2400	U	NC
Methanol	30	µg/kg	2500	U	2400	U	NC
SW846 8082A							
Aroclor 1016	30	µg/kg	20	U	20	U	NC
Aroclor 1221	30	µg/kg	20	U	20	U	NC
Aroclor 1232	30	µg/kg	20	U	20	U	NC
Aroclor 1242	30	µg/kg	20	U	20	U	NC
Aroclor 1248	30	µg/kg	20	U	20	U	NC
Aroclor 1254	30	µg/kg	20	U	20	U	NC
Aroclor 1260	30	µg/kg	20	U	20	U	NC
SW846 8151A							
2,4,5-T	30	µg/kg	10	U	9.9	U	NC
2,4,5-TP	30	µg/kg	10	U	9.9	U	NC
2,4-D	30	µg/kg	10	U	9.9	U	NC
2,4-DB	30	µg/kg	10	U	9.9	U	NC
Dalapon	30	µg/kg	10	U	9.9	U	NC
Dicamba	30	µg/kg	10	U	9.9	U	NC
Dichloroprop	30	µg/kg	10	U	9.9	U	NC
Dinoseb	30	µg/kg	10	U	9.9	U	NC
MCPA	30	µg/kg	1000	U	990	U	NC
MCPP	30	µg/kg	1000	U	990	U	NC
SW846 8260C							
2-Butanone	30	µg/kg	5.7	U	5.6	U	NC
Acetone	30	µg/kg	23	U	22	U	NC
Benzene	30	µg/kg	2.7	U	2.7	U	NC
Carbon tetrachloride	30	µg/kg	2.7	U	2.7	U	NC
Ethylbenzene	30	µg/kg	2.7	U	2.7	U	NC
Methylene chloride	30	µg/kg	11	U	11	U	NC
mp-Xylene	30	µg/kg	5.7	U	5.6	U	NC
o-Xylene	30	µg/kg	2.7	U	2.7	U	NC
Tetrachloroethene	30	µg/kg	2.7	U	2.7	U	NC
Toluene	30	µg/kg	2.7	U	2.7	U	NC
Trichloroethene	30	µg/kg	11	U	11	U	NC
SW846 8270D							
Acenaphthene	30	µg/kg	6.2	U	6	U	NC
Acenaphthylene	30	µg/kg+	6.2	U	6	U	NC
Anthracene	30	µg/kg	6.2	U	6	U	NC
Benzo(a)anthracene	30	µg/kg	7.2	J	6	J	18.18
Benzo(a)pyrene	30	µg/kg	5.8	J	7.5	J	25.56
Benzo(b)fluoranthene	30	µg/kg	8.2	J	12		37.62
Benzo(ghi)perylene	30	µg/kg	5.8	J	6.4	J	9.84
Benzo(k)fluoranthene	30	µg/kg	4.7	J	3.6	J	26.51
Chrysene	30	µg/kg	7.3	J	9.2	J	23.03
Dibenz(a,h)anthracene	30	µg/kg	6.2	U	6	U	NC
Fluoranthene	30	µg/kg	12	J	15		22.22
Fluorene	30	µg/kg	6.2	U	6	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/kg	7.4	J	9.4	J	23.81
Naphthalene	30	µg/kg	6.2	U	2.7	J	NC
Pentachlorophenol	30	µg/kg	12	U	12	U	NC
Phenanthrene	30	µg/kg	9.4	J	6.9	J	30.67
Pyrene	30	µg/kg	8.9	J	13		37.44

Table E1-31. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Sediment Samples at the Former Curtis Bay Ordnance Depot

Location			EC-TRIB-2				
Sample Name			EC-Trib-2-SD		EC-Trib-FD1-SD		
Parent Sample Name					EC-TRIB-2-SD		
Sample Date			28-Sep-15				
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 8290							
1,2,3,4,6,7,8,9-OCDD	30	pg/g	5890	J	6730	J	13.31
1,2,3,4,6,7,8,9-OCDF	30	pg/g	6.38	J	6.52	J	2.17
1,2,3,4,6,7,8-HpCDD	30	pg/g	60.1		58.2		3.21
1,2,3,4,6,7,8-HpCDF	30	pg/g	2.58	J	5.6	J	73.84
1,2,3,4,7,8,9-HpCDF	30	pg/g	4.21	U	0.727	J	NC
1,2,3,4,7,8-HxCDD	30	pg/g	0.78	J	0.783	J	0.38
1,2,3,4,7,8-HxCDF	30	pg/g	0.709	J	1.18	J	49.87
1,2,3,6,7,8-HxCDD	30	pg/g	1.38	J	1.51	J	9.00
1,2,3,6,7,8-HxCDF	30	pg/g	0.496	J	0.979	J	65.49
1,2,3,7,8,9-HxCDD	30	pg/g	1.62	J	1.59	J	1.87
1,2,3,7,8,9-HxCDF	30	pg/g	4.21	U	3.35	U	NC
1,2,3,7,8-PeCDD	30	pg/g	0.411	J	0.466	J	12.54
1,2,3,7,8-PeCDF	30	pg/g	0.379	J	0.386	J	1.83
2,3,4,6,7,8-HxCDF	30	pg/g	0.557	J	1.01	J	57.82
2,3,4,7,8-PeCDF	30	pg/g	0.603	J	0.702	J	15.17
2,3,7,8-TCDD	30	pg/g	0.0546	U	0.0455	U	NC
2,3,7,8-TCDF	30	pg/g	0.385	J	0.269	J	35.47
Total Heptachlorodibenzofuran	30	pg/g	3.67	J	8.52		79.57
Total Heptachlorodibenzo-p-dioxin	30	pg/g	141		141		0.00
Total Hexachlorodibenzofuran	30	pg/g	4.6		8.29		57.25
Total Hexachlorodibenzo-p-dioxin	30	pg/g	18.7		17.5		6.63
Total Pentachlorodibenzofuran	30	pg/g	5.15		5.53		7.12
Total Pentachlorodibenzo-p-dioxin	30	pg/g	2.7	J	1.93	J	33.26
Total Tetrachlorodibenzofuran	30	pg/g	8.06		4.19		63.18
Total Tetrachlorodibenzo-p-dioxin	30	pg/g	0.607	J	0.0455	U	NC
SW846 8330B							
2,4,6-Trinitrotoluene	30	mg/kg	0.15	UJ	0.099	UJ	NC
2,4-Dinitrotoluene	30	mg/kg	0.15	UJ	0.099	UJ	NC
2,6-Dinitrotoluene	30	mg/kg	0.073	UJ	0.05	UJ	NC
Nitroglycerin	30	mg/kg	0.37	UJ	0.25	UJ	NC
High Performance Liquid Chromatography							
Nitroguanidine	30	µg/kg	37	U	28	U	NC

Notes:
% - percent
µg/kg - micrograms per kilogram
FD - Field Duplicate
ft bgs - feet below ground surface
J - estimated value
mg/kg - milligrams per kilogram
NC - not calculated, one or more results are non-detect
pg/g - picograms per gram
QC - Quality Control
RPD - Relative Percent Difference
Shaded cells indicate RPD is outside of QC Limit
U - not detected
UJ - not detected result is estimated

Table E1-32. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Surface Water Samples at the Former Curtis Bay Ordnance Depot

		Location	EC-TRIB-2		EC-TRIB-2		
		Sample Name	EC-Trib-2-SW		EC-Trib-FD1-SW		
		Parent Sample Name			EC-TRIB-2-SW		
		Sample Date	28-Sep-15		28-Sep-15		
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
SW846 6020A							
Aluminum	30	mg/L	2.58	J	3.44	J	28.57
Antimony	30	mg/L	< 0.001	UJ	< 0.001	UJ	NC
Arsenic	30	mg/L	0.0768		0.0655		15.88
Cadmium	30	mg/L	< 0.001	UJ	< 0.001	UJ	NC
Chromium	30	mg/L	0.00305	J	0.00471	J	42.78
Cobalt	30	mg/L	0.0106	J	0.0105	J	0.95
Copper	30	mg/L	0.00262	J	0.00374	J	35.22
Lead	30	mg/L	0.00369	J	0.00522	J	34.34
Manganese	30	mg/L	1.39		1.38		0.72
Nickel	30	mg/L	0.0109	J	0.0111	J	1.82
Titanium	30	mg/L	0.034		0.0526		42.96
Zinc	30	mg/L	0.0256	J	0.0362	J	41.41
SW846 7196A							
Chromium, Hexavalent	30	µg/L	< 4	U	< 4	UJ	NC
SW846 7470A							
Mercury	30	mg/L	< 0.0001	U	< 0.0001	U	NC
SW846 8015C							
Ethanol	30	µg/L	< 1000	U	< 1000	U	NC
Methanol	30	µg/L	< 1000	U	< 1000	U	NC
SW846 8082A							
Aroclor 1016	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
Aroclor 1221	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
Aroclor 1232	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
Aroclor 1242	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
Aroclor 1248	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
Aroclor 1254	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
Aroclor 1260	30	µg/L	< 0.25	UJ	< 0.25	UJ	NC
SW846 8151A							
2,4,5-T	30	µg/L	< 0.1	U	< 0.1	U	NC
2,4,5-TP	30	µg/L	< 0.1	U	< 0.1	U	NC
2,4-D	30	µg/L	< 0.1	U	< 0.1	U	NC
2,4-DB	30	µg/L	< 0.1	U	< 0.1	U	NC
Dalapon	30	µg/L	< 0.1	U	< 0.1	U	NC
Dicamba	30	µg/L	< 0.1	U	< 0.1	U	NC
Dichloroprop	30	µg/L	< 0.1	U	< 0.1	U	NC
Dinoseb	30	µg/L	< 0.1	U	< 0.1	U	NC
MCPA	30	µg/L	< 10	U	< 10	U	NC
MCPP	30	µg/L	< 10	U	< 10	U	NC
SW846 8260C							
2-Butanone	30	µg/L	< 1	U	< 1	U	NC
Acetone	30	µg/L	< 2	U	< 2	U	NC
Benzene	30	µg/L	< 0.5	U	< 0.5	U	NC
Carbon tetrachloride	30	µg/L	< 0.5	U	< 0.5	U	NC
Ethylbenzene	30	µg/L	< 0.5	U	< 0.5	U	NC
Methylene chloride	30	µg/L	< 0.5	U	< 0.5	U	NC
mp-Xylene	30	µg/L	< 1.5	U	< 1.5	U	NC
Naphthalene	30	µg/L	< 0.5	U	< 0.5	U	NC
o-Xylene	30	µg/L	< 0.5	U	< 0.5	U	NC
Tetrachloroethene	30	µg/L	< 0.5	U	< 0.5	U	NC
Toluene	30	µg/L	0.54	J	0.5	J	7.41
Trichloroethene	30	µg/L	< 0.5	U	< 0.5	U	NC
SW846 8270D							
Acenaphthene	30	µg/L	< 0.05	U	< 0.05	U	NC
Acenaphthylene	30	µg/L	< 0.05	U	< 0.05	U	NC
Anthracene	30	µg/L	< 0.05	U	< 0.05	U	NC
Benzo(a)anthracene	30	µg/L	< 0.05	U	< 0.05	U	NC
Benzo(a)pyrene	30	µg/L	< 0.05	U	< 0.05	U	NC
Benzo(b)fluoranthene	30	µg/L	< 0.05	U	< 0.05	U	NC
Benzo(ghi)perylene	30	µg/L	< 0.05	U	< 0.05	U	NC
Benzo(k)fluoranthene	30	µg/L	< 0.05	U	< 0.05	U	NC
Chrysene	30	µg/L	< 0.05	U	< 0.05	U	NC
Dibenz(a,h)anthracene	30	µg/L	< 0.05	U	< 0.05	U	NC
Fluoranthene	30	µg/L	< 0.05	U	< 0.05	U	NC
Fluorene	30	µg/L	< 0.05	U	< 0.05	U	NC
Indeno(1,2,3-cd)pyrene	30	µg/L	< 0.05	U	< 0.05	U	NC
Naphthalene	30	µg/L	< 0.05	U	< 0.05	U	NC
Pentachlorophenol	30	µg/L					
Phenanthrene	30	µg/L	< 0.05	U	< 0.05	U	NC
Pyrene	30	µg/L	< 0.05	U	< 0.05	U	NC
SW846 8290							
1,2,3,4,6,7,8,9-OCDD	30	pg/L	655	J	1940	J	196.18
1,2,3,4,6,7,8,9-OCDF	30	pg/L	< 8.79	U	< 5.27	U	NC
1,2,3,4,6,7,8-HpCDD	30	pg/L	< 23.7	UJ	16.1	J	NC
1,2,3,4,6,7,8-HpCDF	30	pg/L	< 23.7	UJ	< 23.6	U	NC
1,2,3,4,7,8,9-HpCDF	30	pg/L	< 3.01	U	< 1.15	U	NC
1,2,3,4,7,8-HxCDD	30	pg/L	< 4.12	U	< 1.65	U	NC

Table E1-32. Parent/Field Duplicate Results and Relative Percent Difference Calculations for Surface Water Samples at the Former Curtis Bay Ordnance Depot

		Location	EC-TRIB-2		EC-TRIB-2		
		Sample Name	EC-Trib-2-SW		EC-Trib-FD1-SW		
		Parent Sample Name			EC-TRIB-2-SW		
		Sample Date	28-Sep-15		28-Sep-15		
Parameter Name	RPD QC Limit %	Unit	Result		Result		RPD
1,2,3,4,7,8-HxCDF	30	pg/L	< 2.24	U	< 1.02	U	NC
1,2,3,6,7,8-HxCDD	30	pg/L	< 4.1	U	< 1.65	U	NC
1,2,3,6,7,8-HxCDF	30	pg/L	< 2.03	U	< 0.961	U	NC
1,2,3,7,8,9-HxCDD	30	pg/L	< 3.88	U	< 1.56	U	NC
1,2,3,7,8,9-HxCDF	30	pg/L	< 3.01	U	< 1.22	U	NC
1,2,3,7,8-PeCDD	30	pg/L	< 6.42	U	< 2.65	U	NC
1,2,3,7,8-PeCDF	30	pg/L	< 4.36	U	< 1.95	U	NC
2,3,4,6,7,8-HxCDF	30	pg/L	< 2.28	U	< 0.996	U	NC
2,3,4,7,8-PeCDF	30	pg/L	< 4.33	U	< 1.97	U	NC
2,3,7,8-TCDD	30	pg/L	< 3.82	U	< 1.75	U	NC
2,3,7,8-TCDF	30	pg/L	< 5.07	U	< 3.09	U	NC
Total Heptachlorodibenzofuran	30	pg/L	< 2.65	U	2.97	J	NC
Total Heptachlorodibenzo-p-dioxin	30	pg/L	< 3.12	U	37.1		NC
Total Hexachlorodibenzofuran	30	pg/L	< 2.34	U	< 1.04	U	NC
Total Hexachlorodibenzo-p-dioxin	30	pg/L	< 4.03	U	< 1.62	U	NC
Total Pentachlorodibenzofuran	30	pg/L	< 4.34	U	< 1.96	U	NC
Total Pentachlorodibenzo-p-dioxin	30	pg/L	< 6.42	U	< 2.65	U	NC
Total Tetrachlorodibenzofuran	30	pg/L	< 5.07	U	< 3.09	U	NC
Total Tetrachlorodibenzo-p-dioxin	30	pg/L	< 3.82	U	< 1.75	U	NC
SW846 8330B							
2,4,6-Trinitrotoluene	30	µg/L	< 0.2	UJ	< 0.2	UJ	NC
2,4-Dinitrotoluene	30	µg/L	< 0.2	UJ	< 0.2	UJ	NC
2,6-Dinitrotoluene	30	µg/L	< 0.2	UJ	< 0.2	UJ	NC
Nitroglycerin	30	µg/L	< 1	UJ	< 1	UJ	NC
High Performance Liquid Chromatography							
Nitroguanidine	30	µg/L	< 25	UJ	< 25	UJ	NC

Notes:
% - percent
µg/L - micrograms per liter
FD - Field Duplicate
ft bgs - feet below ground surface
J - estimated value
mg/L - milligrams per liter
NC - not calculated, one or more results are non-detect
pg/L - picograms per liter
QC - Quality Control
RPD - Relative Percent Difference
Shaded cells indicate RPD is outside of QC Limit
U - not detected
UJ - not detected result is estimated

Table E1-33. Equipment Rinsate Blank Detections for Analytical Method SW846 6020A for Field Sampling Efforts at the Former Curtis Bay Ordnance Depot

sample_name		EC-21-SO-ERB2-092315		EC-28-GW-ERB1-100615		EC-33-GW-ERB1		EC-49-SO-ERB1		EC-57B-SO-ERB1		EC-57D-GW-ERB1*		EC-58C-GW-ERB1	
sample_date		23-Sep-15		6-Oct-15		3-Sep-13		16-Aug-13		28-Aug-13		21-Jan-16		30-Aug-13	
Analyte	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A (Total Fraction)															
Aluminum	mg/L			0.00498	J										
SW846 6020A (Dissolved Fraction)															
Copper	mg/L					0.0026	J			0.0022	J				
Manganese	mg/L	0.00209	J									0.002	J	0.0026	J
Zinc	mg/L					0.0076	B	0.015	L	0.0048	B			0.01	

* actually a soil equipment rinsate blank (ERB)
B possible blank contamination
blank cell indicates analyte was not detected in ERB
ERB Equipment Rinsate Blank
J estimated quantity
L estimated quantity, may be biased low.
mg/L milligrams per liter

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Table E1-34. Equipment Rinsate Blank Detections for Analytical Method SW846 8270 SIM for Field Sampling Efforts at the Former Curtis Bay Ordnance Depot

sample_name		EC-33-GW-ERB1		EC-49-SO-ERB1	
sample_date		3-Sep-13		16-Aug-13	
Analyte	Unit	Result		Result	
SW846 8270 SIM					
Naphthalene	µg/L	0.039	J	0.27	

µg/L micrograms per liter
blank cell indicates analyte was not detected in ERB
ERB Equipment Rinsate Blank
J estimated value

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Table E1-35. Equipment Rinsate Blank Detections for Analytical Method SW846 8270D for Field Sampling Efforts at the Former Curtis Bay Ordnance Depot

sample_name		EC-28-GW-ERB1-100615		EC-57B-GW-ERB1*		EC-57B-GW-ERB1*	
sample_date		6-Oct-15		22-Jan-16		10-Feb-16	
Analyte	Unit	Result		Result		Result	
SW846 8270D							
Benzo(a)anthracene	µg/L			0.025	J		
Benzo(a)pyrene	µg/L			0.021	J		
Benzo(b)fluoranthene	µg/L					0.022	J
Dibenz(a,h)anthracene	µg/L					0.044	J
Indeno(1,2,3-cd)pyrene	µg/L					0.048	J
Naphthalene	µg/L	0.025	J				

* actually a soil ERB
µg/L
blank cell indicates analyte was not detected in ERB
ERB
J

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Table E1-36. Equipment Rinsate Blank Detections for Analytical Method SW846 8290 for Field Sampling Efforts at the Former Curtis Bay Ordnance Depot

Sample Name		EC-21-SO-ERB1-092215		EC-21-SO-ERB2-092315		EC-36-GW-ERB1		EC-36-SO-ERB1-100515		EC-57B-SO-ERB1-092515	
Sample Date		22-Sep-15		23-Sep-15		8-Feb-16		5-Oct-15		25-Sep-15	
Analyte	Unit	Result		Result		Result		Result		Result	
SW846 8290											
1,2,3,4,6,7,8,9-OCDD	pg/L					516		203	J		
1,2,3,4,6,7,8,9-OCDF	pg/L							18.5	J	2.47	J
1,2,3,4,6,7,8-HpCDD	pg/L							55.3	J		
1,2,3,4,6,7,8-HpCDF	pg/L							12.9	J		
1,2,3,4,7,8-HxCDF	pg/L							4.65	J		
1,2,3,6,7,8-HxCDD	pg/L							5.78	J		
1,2,3,6,7,8-HxCDF	pg/L	0.308	J								
1,2,3,7,8,9-HxCDF	pg/L							2.15	J		
Total Heptachlorodibenzofuran	pg/L	0.834*	J			0.937	J	12.9	J	0.858	J
Total Heptachlorodibenzo-p-dioxin	pg/L					8.26	J	99.9			
Total Hexachlorodibenzofuran	pg/L			0.92*	J			7.9	J		
Total Hexachlorodibenzo-p-dioxin	pg/L							11.1	J		
Total Tetrachlorodibenzofuran	pg/L					26.6					
Total Hexachlorodibenzo-p-dioxin	pg/L							11.1	J		
Total Tetrachlorodibenzofuran	pg/L					26.6					

blank cell indicates analyte was not detected in ERB
ERB - Equipment Rinsate Blank
J estimated value
pg/L picograms per liter

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Table E1-37. Trip Blank Detections for the Field Sampling Efforts at the Former Curtis Bay Ordnance Depot

Sample Name		TB-07252013A		TB-07262013		TB-08212013		TB-08272013		TB-08282013		TB-09032013	
Sample Date		25-Jul-13		26-Jul-13		21-Aug-13		27-Aug-13		28-Aug-13		3-Sep-13	
Analyte	Unit	Result		Result		Result		Result		Result		Result	
SW846 8260B/8260C													
2-Butanone	µg/L												
Acetone	µg/L												
Chloromethane	µg/L							0.75		0.75	J		
Ethylbenzene	µg/L												
Methylene chloride	µg/L	0.38	B	0.43	B								
Tetrachloroethene	µg/L					0.35							
Toluene	µg/L											0.4	J

µg/L - micrograms per liter
J - estimated value
blank cell indicates analyte
was not detected

Table E1-37. Trip Blank Detections for the Field Sampling Efforts at the Former Curtis Bay Ordnance Depot

Sample Name		TB-09052013 TRIP BLANK		Trip-093015		Trip-100515		Trip-100615		Trip-100715	
Sample Date		6-Sep-13		30-Sep-15		5-Oct-15		6-Oct-15		7-Oct-15	
Analyte	Unit	Result		Result		Result		Result		Result	
SW846 8260B/8260C											
2-Butanone	µg/L									2.8	J
Acetone	µg/L	4.3	J								
Chloromethane	µg/L										
Ethylbenzene	µg/L			0.68	J						
Methylene chloride	µg/L					0.44	J	0.49	J		
Tetrachloroethene	µg/L										
Toluene	µg/L	0.45	J								

µg/L - micrograms per liter
J - estimated value
blank cell indicates analyte was not detected

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-21-01		EC-21-02		EC-21-04		EC-21-05		EC-21-06		EC-21-07		EC-21-09	
				Sample Name	EC-21-1-SO-06		EC-21-2-SO-06		EC-21-4-SO-06		EC-21-5-SO-06		EC-21-6-SO-06		EC-21-7-SO-06		EC-21-9-SO-06	
				Sample Date	15-Jul-13		15-Jul-13		16-Jul-13		16-Jul-13		15-Jul-13		16-Jul-13		16-Jul-13	
				Start Depth (ft bgs)	5		5		5		5		5		5		5	
				End Depth (ft bgs)	6		6		6		6		6		6		6	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.46	U	0.35	U	0.31	U	0.35	U	0.38	U	0.31	U	0.35	U
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg	1.5	UJ	1.2	UJ	1.1	U	1.1	U	1.1	UJ	1.1	U		
Benzo(b)fluoranthene	2900	100	1.1	µg/kg					1	U	1.1	U			1.1	U		
Chrysene	290000	100	1.1	µg/kg	1.5	UJ	1.2	UJ	1.1	U	1.1	U			1.1	U		
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg	1.2	UJ			0.83	U	0.86	U			0.86	U		
Pyrene	2300000	100	1.1	µg/kg					0.45	U	0.46	U						
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg														
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-21-11		EC-21-12		EC-21-13		EC-21-13		EC-21-30		EC-21-32		EC-21-33	
				Sample Name	EC-21-11-SO-06		EC-21-12-SO-06		EC-21-13-SO-0.5		EC-21-13-SO-06		EC-21-30-SO-03		EC-21-32-SO-6		EC-21-33-SO-9	
				Sample Date	15-Jul-13		15-Jul-13		16-Jul-13		16-Jul-13		27-Aug-13		22-Sep-15		22-Sep-15	
				Start Depth (ft bgs)	5		5		0		5		2		5		8	
				End Depth (ft bgs)	6		6		0.5		6		3		6		9	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.39	U	0.37	U	0.39	U	0.34	U	0.42	U	0.227	U	0.228	U
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg	1.2	UJ	1.2	UJ										
Benzo(b)fluoranthene	2900	100	1.1	µg/kg	1.2	UJ												
Chrysene	290000	100	1.1	µg/kg	1.2	UJ	1.2	UJ										
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg	0.93	UJ	0.94	UJ			0.89	U	0.98	UJ				
Pyrene	2300000	100	1.1	µg/kg														
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg											1.9	U		
Benzo(a)pyrene	290		1.1	µg/kg											1.2	U		
Benzo(b)fluoranthene	2900	100	1.1	µg/kg											1.4	U		
Dibenz(a,h)anthracene	290	100	1.1	µg/kg											1.9	U	2	U
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg											0.94	U		
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-21-34		EC-21-34		EC-21-35		EC-21-35		EC-21-36		EC-21-38		EC-21-40	
				Sample Name	EC-21-34-SO-6		EC-21-34-SO-9		EC-21-35-SO-6		EC-21-35-SO-9		EC-21-36-SO-2		EC-21-38-SO-2		EC-21-40-SO-0.5	
				Sample Date	22-Sep-15		22-Sep-15		22-Sep-15		22-Sep-15		23-Sep-15		23-Sep-15		23-Sep-15	
				Start Depth (ft bgs)	5		8		5		8		1		1		0	
				End Depth (ft bgs)	6		9		6		9		2		2		0.5	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.227	U	0.227	U	0.207	U	0.214	U	0.244	UJ	0.233	UJ		
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Chrysene	290000	100	1.1	µg/kg														
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pyrene	2300000	100	1.1	µg/kg														
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg	2	U	2	U	1.7	U	1.9	U						
Benzo(a)pyrene	290		1.1	µg/kg	1.2	U	1.2	U	1.1	U	1.2	U						
Benzo(b)fluoranthene	2900	100	1.1	µg/kg	1.5	U	1.5	U	1.3	U	1.4	U						
Dibenz(a,h)anthracene	290	100	1.1	µg/kg	2	U	2	U	1.7	U	1.9	U	2.1	U	2	U	1.9	U
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg	0.99	U	0.98	U	0.85	U	0.93	U						
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-21-40		EC-21-B		EC-22-01		EC-22-05		EC-25-17		EC-25-18		EC-25-19	
				Sample Name	EC-21-40-SO-2		EC-21-B-SO-04		EC-22-1-SO-02		EC-22-5-SO-02.5		EC-25-17-SO-05.5		EC-25-18-SO-0.5		EC-25-19-SO-0.5	
				Sample Date	23-Sep-15		23-Aug-13		19-Aug-13		19-Aug-13		21-Aug-13		6-Aug-13		5-Aug-13	
				Start Depth (ft bgs)	1		3		1		1.5		4.5		0		0	
				End Depth (ft bgs)	2		4		2		2.5		5.5		0.5		0.5	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.221	UJ	0.34	U	0.33	U	0.31	U	0.32	U	0.29	U	0.3	U
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg							1.1	U						
Benzo(b)fluoranthene	2900	100	1.1	µg/kg							1.1	U						
Chrysene	290000	100	1.1	µg/kg							1.1	U						
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg							0.87	U						
Pyrene	2300000	100	1.1	µg/kg														
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg	1.9	U												
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-25-21		EC-25-22SUB		EC-25-24		EC-25-25		EC-32-11		EC-32-12		EC-32-12	
				Sample Name	EC-25-21-SO-0.5		EC-25-22-SO-4		EC-25-24-SO-0.5		EC-25-25-SO-04		EC-32-11-SO-4		EC-32-12-SO-3		EC-32-12-SO-4	
				Sample Date	5-Aug-13		14-Aug-13		7-Aug-13		6-Aug-13		19-Jan-16		19-Jan-16		19-Jan-16	
				Start Depth (ft bgs)	0		3		0		3		4		3		4	
				End Depth (ft bgs)	0.5		4		0.5		4		4.5		4		6	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.28	U	0.31	UL	0.29	U	0.34	U						
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg							**0.82**	U						
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg							1	U						
Benzo(b)fluoranthene	2900	100	1.1	µg/kg							1	U						
Chrysene	290000	100	1.1	µg/kg							1	U						
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg							0.8	U						
Pyrene	2300000	100	1.1	µg/kg					0.43	U	0.43	U						
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg													1.8	U
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg									1.8	U	1.8	U	1.8	U
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-33-02		EC-33-02		EC-36-01		EC-49-01		EC-49-02		EC-49-03		EC-49-04	
				Sample Name	EC-33-2-SO-0.5		EC-33-2-SO-04		EC-36-1-SO-0.5		EC-49-1-SO-02		EC-49-2-SO-02		EC-49-3-SO-02		EC-49-4-SO-02	
				Sample Date	25-Jul-13		25-Jul-13		23-Jul-13		15-Aug-13		15-Aug-13		15-Aug-13		15-Aug-13	
				Start Depth (ft bgs)	0		3		0		1		1		1		1	
				End Depth (ft bgs)	0.5		4		0.5		2		2		2		2	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg							0.32	U	0.35	U	0.32	U	0.32	U
Cadmium	98	2.5	0.36	mg/kg					0.18	U								
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg			1.2	U	1.3	U			1.1	U	1	U	1.1	U
Benzo(b)fluoranthene	2900	100	1.1	µg/kg			1.1	UJ	1.2	U			1	U	1	U	1	U
Chrysene	290000	100	1.1	µg/kg			1.2	U	1.2	U			1.1	U	1	U	1	U
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg			0.92	UJ	0.98	U	0.88	U	0.84	U	0.81	U	0.82	U
Pyrene	2300000	100	1.1	µg/kg					0.53	U			0.45	U	0.44	U	0.44	U
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg														
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg	**275**	U	75.4	U										

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-49-05		EC-49-06		EC-49-06		EC-49-07		EC-49-07		EC-49-08		EC-49-11	
				Sample Name	EC-49-5-SO-02		EC-49-6-SO-0.5		EC-49-6-SO-02		EC-49-7-SO-0.5		EC-49-7-SO-02		EC-49-8-SO-02		EC-49-11-SO-02	
				Sample Date	16-Aug-13		16-Aug-13		16-Aug-13		15-Aug-13		15-Aug-13		15-Aug-13		15-Aug-13	
				Start Depth (ft bgs)	1		0		1		0		1		1		1	
				End Depth (ft bgs)	2		0.5		2		0.5		2		2		2	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.35	U			0.35	U	0.35	U	0.35	U	0.29	U	0.33	U
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg									1	U	1	U	1.1	U
Benzo(b)fluoranthene	2900	100	1.1	µg/kg											1	U	1	U
Chrysene	290000	100	1.1	µg/kg									1	U	1	U	1.1	U
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg									0.79	U	0.8	U	0.83	U
Pyrene	2300000	100	1.1	µg/kg											0.43	U	0.45	U
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg														
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-49-12		EC-49-12		EC-49-C-Sub		EC-49-D		EC-49-E-Sub		EC-49-G-SUB		EC-49-H-SUB	
				Sample Name	EC-49-12-SO-0.5		EC-49-12-SO-02		EC-49-C-SO-06		EC-49-D-SO-0.5		EC-49-E-SO-03		EC-49-G-SO-03.5		EC-49-H-SO-4	
				Sample Date	28-Aug-13		28-Aug-13		22-Aug-13		12-Aug-13		8-Aug-13		21-Aug-13		14-Aug-13	
				Start Depth (ft bgs)	0		1		5		0		2		2.5		3	
				End Depth (ft bgs)	0.5		2		6		0.5		3		3.5		4	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg	0.35	U	0.3	U	0.31	U	0.35	U	0.33	U	0.32	U	0.32	U
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg									**0.8**	U				
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg					1.1	U			1.1	U	1.1	U		
Benzo(b)fluoranthene	2900	100	1.1	µg/kg									1.1	U	1.1	U		
Chrysene	290000	100	1.1	µg/kg					1.1	U			1.1	U	1.1	U		
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg			0.82	U	0.84	U			0.85	U	0.86	U		
Pyrene	2300000	100	1.1	µg/kg									0.46	U	0.46	U		
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg														
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-50-01		EC-50-04		EC-50-05		EC-50-06		EC-52-14		EC-52-15		EC-52-A	
				Sample Name	EC-50-1-SO-04		EC-50-4-SO-04		EC-50-5-SO-04		EC-50-6-SO-04		EC-52-14-SO-03		EC-52-15-SO-02		EC-52-A-SO-0.5	
				Sample Date	25-Jul-13		25-Jul-13		25-Jul-13		25-Jul-13		19-Aug-13		27-Aug-13		22-Aug-13	
				Start Depth (ft bgs)	3		3		3		3		2		1		0	
				End Depth (ft bgs)	4		4		4		4		3		2		5	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																		
Antimony	47	0.48	0.27	mg/kg									0.36	UL	0.3	U	0.44	U
Cadmium	98	2.5	0.36	mg/kg														
Copper	4700	0.0075		mg/kg														
SW846 8270 SIM																		
Benzo(a)anthracene	2900		1.1	µg/kg	1.2	U	1.2	U	1.4	U	1.2	U						
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Chrysene	290000	100	1.1	µg/kg			1.2	U	1.4	U	1.2	U						
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg			0.94	U										
Pyrene	2300000	100	1.1	µg/kg	0.52	U	0.5	U			0.52	U						
SW846 8270D																		
Benzo(a)anthracene	2900		1.1	µg/kg														
Benzo(a)pyrene	290		1.1	µg/kg														
Benzo(b)fluoranthene	2900	100	1.1	µg/kg														
Dibenz(a,h)anthracene	290	100	1.1	µg/kg														
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg														
Pentachlorophenol	4000	100	2100	µg/kg														

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-38. Sensitivity Analysis for Soil Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-57B-05		EC-57B-25		EC-57B-26		EC-57D-01		EC-58C-01		EC-58C-01		EC-58C-ASub		EC-58C-CSub	
				Sample Name	EC-57B-5-SO-02		EC-57B-25-SO-1		EC-57B-26-SO-1		EC-57D-1-SO-02		EC-58C-1-SO-0.5		EC-58C-1-SO-04		EC-58C-A-SO-04		EC-58C-C-SO-04	
				Sample Date	29-Aug-13		10-Feb-16		10-Feb-16		26-Aug-13		29-Aug-13		29-Aug-13		20-Aug-13		20-Aug-13	
				Start Depth (ft bgs)	1		1		1		1		0		3		3		3	
				End Depth (ft bgs)	2		2		2		2		0.5		4		4		4	
Parameter Name	USEPA RSL	USEPA BTAG	USEPA ECO	Unit	Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																				
Antimony	47	0.48	0.27	mg/kg	0.34	U					0.32	UL			0.36	U	0.32	U	0.35	UL
Cadmium	98	2.5	0.36	mg/kg																
Copper	4700	0.0075		mg/kg																
SW846 8270 SIM																				
Benzo(a)anthracene	2900		1.1	µg/kg											1.1	U				
Benzo(b)fluoranthene	2900	100	1.1	µg/kg											1.1	U				
Chrysene	290000	100	1.1	µg/kg											1.1	U				
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg											0.85	U				
Pyrene	2300000	100	1.1	µg/kg											0.46	U				
SW846 8270D																				
Benzo(a)anthracene	2900		1.1	µg/kg					18	UJ										
Benzo(a)pyrene	290		1.1	µg/kg					11	UJ										
Benzo(b)fluoranthene	2900	100	1.1	µg/kg					14	UJ										
Dibenz(a,h)anthracene	290	100	1.1	µg/kg			1.8	UJ	18	UJ										
Indeno(1,2,3-cd)pyrene	2900	100	1.1	µg/kg					9.2	UJ										
Pentachlorophenol	4000	100	2100	µg/kg																

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)
Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA ECO are underlined

Table E1-39. Sensitivity Analysis for Groundwater Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-21-41		EC-33-02		EC-52-16		EC-52-17	
				Sample Name	EC-21-41-GW		EC-33-2-GW		EC-52-16-GW		EC-52-17-GW	
				Parent Sample Name								
				Sample Date	5-Oct-15		3-Sep-13		1-Oct-15		5-Oct-15	
				Start Depth (ft bgs)	15		7		19		15	
				End Depth (ft bgs)	20		11		24		20	
Parameter Name	CAS	Fraction	USEPA MCL	Unit	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW846 8260C												
1,2-Dibromo-3-chloropropane	96-12-8	N	0.2	µg/L	1	U			1	U	1	U
1,2-Dibromoethane	106-93-4	N	0.05	µg/L	0.2	U			0.2	U	0.2	U
SW846 8270D												
Pentachlorophenol	87-86-5	N	1	µg/L			2.5	U				

µg/L - milligrams per liter

U - not detected, method detection limit (MDL) shown

USEPA MCL - USEPA National Primary Drinking Water Standards. Maximum Contaminant Levels (MCLs) (USEPA, 2009, and as listed in the USEPA RSL table, November 2015)

USEPA WQ - USEPA Ambient Water Quality Criteria for Aquatic Life (chronic) (for screening of surface water samples only) (USEPA, 2012b)

Results exceeding the USEPA MCL are shaded gray

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Table E1-40. Sensitivity Analysis for Sediment Samples Collected at the Former Curtis Bay Ordnance Depot

					Location	EC-TRIB-1		EC-TRIB-2		EC-TRIB-3	
					Sample Name	EC-Trib-1-SD		EC-Trib-2-SD		EC-Trib-3-SD	
					Parent Sample Name						
					Sample Date	28-Sep-15		28-Sep-15		28-Sep-15	
Parameter Name	**USEPA RSL**	**USEPA BTAG**	**USEPA SED**	**USEPA ECO**	**Unit**	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW846 6020A											
Antimony	47	0.48	2	0.27	mg/kg	0.224	UJ	0.478	UJ		
SW846 8151A											
Dinoseb	82000		0.611		µg/kg	1.8	U	3.4	U	1.8	U
SW846 8330B											
2,4-Dinitrotoluene	7.4		0.0416		mg/kg	0.053	UJ	0.074	UJ	0.044	UJ

µg/kg - micrograms per kilogram
mg/kg - milligrams per kilogram
Only non-detected results are shown
U - not detected, method detection limit (MDL) shown
UJ - not detected, MDL is estimated
Q - validator qualifier
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, November 2015
USEPA BTAG - USEPA Region III BTAG Screening Benchmarks (USEPA, 1995)
USEPA SED - USEPA Region III Freshwater Sediment Screening Levels (for screening of sediment samples only) (USEPA, 2006b)
USEPA ECO - USEPA Ecological Soil Screening Levels (USEPA, 2007b)

Results exceeding the USEPA RSL are shaded gray
Results exceeding the USEPA BTAG are boldfaced
Results exceeding the USEPA SED are printed in red font
Results exceeding the USEPA ECO are underlined

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Table E1-41. Sensitivity Analysis for Surface Water Samples Collected at the Former Curtis Bay Ordnance Depot

				Location	EC-TRIB-1		EC-TRIB-2		EC-TRIB-3	
				Sample Name	EC-Trib-1-SW		EC-Trib-2-SW		EC-Trib-3-SW	
				Parent Sample Name						
				Sample Date	28-Sep-15		28-Sep-15		28-Sep-15	
Parameter Name	CAS	USEPA MCL	USEPA WQ	Unit	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW846 6020A										
Cadmium	7440-43-9	0.005	0.00025	mg/L	0.001	UJ	0.001	UJ	0.001	UJ

mg/L - milligrams per liter

U - not detected, method detection limit (MDL) shown

UJ - not detected, MDL is estimated

USEPA MCL - USEPA National Primary Drinking Water Standards. Maximum Contaminant Levels (MCLs) (USEPA, 2009, and as listed in the USEPA RSL table, November 2015)

USEPA WQ - USEPA Ambient Water Quality Criteria for Aquatic Life (chronic) (for screening of surface water samples only) (USEPA, 2012b)

Results exceeding the USEPA MCL are shaded gray

Results exceeding the USEPA WQ are printed in red font

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Table E2-1. Analytical Results Summary for Surface Soil Samples at EC-3

					Location	EC-03-01		EC-03-02		EC-03-03	
					Sample Name	EC-3-1-SO-0.5		EC-3-2-SO-0.5		EC-3-3-SO-0.5	
					Sample Date	7/22/13		7/22/13		7/22/13	
					Start Depth (ft bgs)	0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Aluminum	mg/kg	110000	14159	n	110000	23800		10300		22300	
Cadmium	mg/kg	98	0.17	n	98	0.54		1.4		3.5	
Chromium	mg/kg		24.9		24.9	25.3	K	22	K	30.8	K
Cobalt	mg/kg	35	10.2	n	35	2		4.6		3.5	
Lead	mg/kg	800	123.9		800	65.2	K	269	K	213	K
Titanium	mg/kg				NSL	533	K	74.4	K	500	K
Zinc	mg/kg	35000	83.92	n	35000	47		156		179	
SW846 8015C											
Ethanol	mg/kg				NSL	22.6	U	23.4	U	22.9	U
Methanol	mg/kg	120000		n	120000	22.6	U	23.4	U	22.9	U
SW846 8260B											
2-Butanone	µg/kg	1.9E+07		n	19000000	4.8	U	7.9		7.6	J
Acetone	µg/kg	6.7E+07		n	67000000	24		31.6		34.2	J
Benzene	µg/kg	5100			5100	0.97	U	1.2	U	1	UL
Carbon tetrachloride	µg/kg	2900			2900	0.97	U	1.2	U	1	UL
Ethylbenzene	µg/kg	25000			25000	0.97	U	1.2	U	1	UL
Methylene chloride	µg/kg	320000		n	320000	0.97	U	1.2	U	1	UL
Toluene	µg/kg	4700000		n	4700000	0.97	U	1.2	U	1	UL
Xylenes (total)	µg/kg	250000		n	250000	2.9	U	3.5	U	3.1	UL

Table E2-2. Analytical Results Summary for Subsurface Soil at EC-3

					Location	EC-03-01		EC-03-02		EC-03-03	
					Sample Name	EC-3-1-SO-04		EC-3-2-SO-04		EC-3-3-SO-04	
					Sample Date	7/22/13		7/22/13		7/22/13	
					Start Depth (ft bgs)	3		3		3	
					End Depth (ft bgs)	4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Aluminum	mg/kg	110000	18404	n	110000	7900		6450		7360	
Cadmium	mg/kg	98		n	98	0.32	U	0.36	U	0.31	U
Chromium	mg/kg		35.16		35.16	17.6	K	10.5	K	13.1	K
Cobalt	mg/kg	35	6.57	n	35	2.3		1.3		0.79	
Lead	mg/kg	800	13.96		800	7.4	K	5.5	K	5.4	K
Titanium	mg/kg				NSL	39.1	J	61.2	K	77	K
Zinc	mg/kg	35000	44.64	n	35000	15.4		10.5		5.9	B
SW846 8015C											
Ethanol	mg/kg				NSL	22.4	U	23	U	22	U
Methanol	mg/kg	120000		n	120000	22.4	U	23	U	22	U
SW846 8260B											
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	5.2	U	5.2	U	5	U
Acetone	µg/kg	6.7E+07		n	6.7E+07	5.2	U	8.6		25.9	
Benzene	µg/kg	5100			5100	1	U	1	U	1	U
Carbon tetrachloride	µg/kg	2900			2900	1	U	1	U	1	U
Ethylbenzene	µg/kg	25000			25000	1	U	1	U	1	U
Methylene chloride	µg/kg	320000		n	320000	1	U	1	U	2.9	K
Toluene	µg/kg	4700000		n	4700000	1	U	1	U	1	U
Xylenes (total)	µg/kg	250000		n	250000	3.1	U	3.1	U	3	U

Table E2-3. Analytical Results Summary for Surface Soil Samples at EC-16

						Location	EC-16-01		EC-16-02		EC-16-03		EC-16-04		EC-16-05	
						Sample Name	EC-16-1-SO-0.5		EC-16-2-SO-0.5		EC-16-3-SO-0.5		EC-16-4-SO-0.5		EC-16-5-SO-0.5	
						Sample Date	8/19/13		8/19/13		8/19/13		8/19/13		8/19/13	
						Start Depth (ft bgs)	0		0		0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result	
SW846 8082A																
Aroclor 1016	mg/kg	5.1		n	5.1		0.026	U	0.026	U	0.027	U	0.028	U	0.027	U
Aroclor 1221	mg/kg	0.8			0.83		0.026	U	0.026	U	0.027	U	0.028	U	0.027	U
Aroclor 1232	mg/kg	0.7			0.72		0.026	U	0.026	U	0.027	U	0.028	U	0.027	U
Aroclor 1242	mg/kg	1			0.95		0.026	U	0.026	U	0.027	U	0.028	U	0.027	U
Aroclor 1248	mg/kg	1			0.95		0.026	U	0.026	U	0.027	U	0.028	U	0.027	U
Aroclor 1254	mg/kg	1			0.97		0.026	U	0.026	U	0.027	U	0.028	U	0.027	U
Aroclor 1260	mg/kg	1			0.99		0.35		0.33		0.027	U	0.028	U	0.027	U

Table E2-3. Analytical Results Summary for Surface Soil Samples at EC-16

					Location	EC-16-06		EC-16-07		EC-16-08		EC-16-09		EC-16-10	
					Sample Name	EC-16-6-SO-0.5		EC-16-7-SO-0.5		EC-16-8-SO-0.5		EC-16-9-SO-0.5		EC-16-10-SO-0.5	
					Sample Date	8/19/13		8/19/13		8/19/13		8/19/13		8/19/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8082A															
Aroclor 1016	mg/kg	5.1		n	5.1	0.027	U	0.028	U	0.027	U	0.028	U	0.027	U
Aroclor 1221	mg/kg	0.8			0.83	0.027	U	0.028	U	0.027	U	0.028	U	0.027	U
Aroclor 1232	mg/kg	0.7			0.72	0.027	U	0.028	U	0.027	U	0.028	U	0.027	U
Aroclor 1242	mg/kg	1			0.95	0.027	U	0.028	U	0.027	U	0.028	U	0.027	U
Aroclor 1248	mg/kg	1			0.95	0.027	U	0.028	U	0.027	U	0.028	U	0.027	U
Aroclor 1254	mg/kg	1			0.97	0.027	U	0.028	U	0.027	U	0.028	U	0.027	U
Aroclor 1260	mg/kg	1			0.99	0.027	U	0.028	U	0.027	U	0.028	U	1.1	

Table E2-3. Analytical Results Summary for Surface Soil Samples at EC-16

						Location	EC-16-11		EC-16-12		EC-16-13		EC-16-14		EC-16-15	
						Sample Name	EC-16-11-SO-0.5		EC-16-12-SO-0.5		EC-16-13-SO-0.5		EC-16-14-SO-0.5		EC-16-15-SO-0.5	
						Sample Date	8/19/13		10/8/15		10/8/15		10/8/15		10/8/15	
						Start Depth (ft bgs)	0		0		0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result	
SW846 8082A																
Aroclor 1016	mg/kg	5.1		n	5.1		0.15	U								
Aroclor 1221	mg/kg	0.8			0.83		0.15	U								
Aroclor 1232	mg/kg	0.7			0.72		0.15	U								
Aroclor 1242	mg/kg	1			0.95		0.15	U								
Aroclor 1248	mg/kg	1			0.95		0.15	U								
Aroclor 1254	mg/kg	1			0.97		0.15	U								
Aroclor 1260	mg/kg	1			0.99		2.6		0.031		0.039		0.89		0.31	

Table E2-4. Analytical Results Summary for Subsurface Soil at EC-16

					Location	EC-16-12		EC-16-13		EC-16-14		EC-16-15	
					Sample Name	EC-16-12-SO-2		EC-16-13-SO-2		EC-16-14-SO-2		EC-16-15-SO-2	
					Sample Date	10/8/15		10/8/15		10/8/15		10/8/15	
					Start Depth (ft bgs)	1		1		1		1	
					End Depth (ft bgs)	2		2		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 8082A													
Aroclor 1260	mg/kg	1			1	0.015	J	0.0088	J	0.027		0.0096	U

Table E2-5. Analytical Results Summary for Surface Soil Samples at EC-27

					Location	EC-27-01		EC-27-02	
					Sample Name	EC-27-1-SO-0.5		EC-27-2-SO-0.5	
					Sample Date	7/23/13		7/23/13	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 6020A									
Aluminum	mg/kg	110000	14159	n	110000	5280		7530	
Cadmium	mg/kg	98	0.17	n	98	1.6		0.41	J
Chromium	mg/kg		24.9		24.9	20.4		14.9	
Cobalt	mg/kg	35	10.2	n	35	6.6		4.1	
Lead	mg/kg	800	123.9		800	188		48.9	
Titanium	mg/kg				NSL	175		79.2	
Zinc	mg/kg	35000	83.92	n	35000	143		103	
SW846 8015C									
Ethanol	mg/kg				NSL	23.5	U	23.5	U
Methanol	mg/kg	120000		n	120000	23.5	U	23.5	U
SW846 8260B									
2-Butanone	µg/kg	1.9E+07		n	19000000	13.9		12.6	
Acetone	µg/kg	6.7E+07		n	67000000	74		117	
Benzene	µg/kg	5100			5100	0.97	U	1.6	J
Carbon tetrachloride	µg/kg	2900			2900	0.97	U	1.2	U
Ethylbenzene	µg/kg	25000			25000	0.97	U	1.2	U
Methylene chloride	µg/kg	320000		n	320000	0.97	U	1.2	K
Naphthalene	µg/kg	17000	13.3		17000	0.97	UJ	1.2	U
Tetrachloroethene	µg/kg	39000		n	39000	0.97	U	1.2	U
Toluene	µg/kg	4700000		n	4700000	0.97	U	1.1	J
Trichloroethene	µg/kg	1900		n	1900	0.97	U	1.2	U
Xylenes (total)	µg/kg	250000		n	250000	2.9	U	3.5	U

Table E2-6. Analytical Results Summary for Subsurface Soil at EC-27

					Location	EC-27-01		EC-27-02	
					Sample Name	EC-27-1-SO-04		EC-27-2-SO-04.5	
					Sample Date	7/23/13		7/23/13	
					Start Depth (ft bgs)	3		3.5	
					End Depth (ft bgs)	4		4.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 6020A									
Aluminum	mg/kg	110000	18404	n	110000	6100		4260	
Cadmium	mg/kg	98		n	98	0.4	U	0.32	U
Chromium	mg/kg		35.16		35.16	17.7		7.1	
Cobalt	mg/kg	35	6.57	n	35	1.3	J	4	
Lead	mg/kg	800	13.96		800	8.9		4.8	
Titanium	mg/kg				NSL	24.8		29.2	
Zinc	mg/kg	35000	44.64	n	35000	14.7		9.8	
SW846 8015C									
Ethanol	mg/kg				NSL	24.5	U	22.3	U
Methanol	mg/kg	120000		n	120000	24.5	U	22.3	U
SW846 8260B									
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	6.1	U	8.6	J
Acetone	µg/kg	6.7E+07		n	6.7E+07	30.5		48.7	
Benzene	µg/kg	5100			5100	1.2	U	0.97	U
Carbon tetrachloride	µg/kg	2900			2900	1.2	U	0.97	U
Ethylbenzene	µg/kg	25000			25000	1.2	U	0.97	U
Methylene chloride	µg/kg	320000		n	320000	1.2	U	0.87	K
Naphthalene	µg/kg	17000	2.2		17000	1.2	U	0.97	U
Tetrachloroethene	µg/kg	39000		n	39000	1.2	U	0.97	U
Toluene	µg/kg	4700000		n	4700000	1.2	U	0.97	U
Trichloroethene	µg/kg	1900		n	1900	1.2	U	0.97	U
Xylenes (total)	µg/kg	250000		n	250000	3.7	U	2.9	U

Table E2-7. Analytical Results Summary for Surface Soil Samples at EC-28

					Location	EC-28-01		EC-28-02		EC-28-03		EC-28-04		EC-28-05		EC-28-06		EC-28-07		EC-28-08		EC-28-09		EC-28-10										
					Sample Name	EC-28-1-SO-0.5		EC-28-2-SO-0.5		EC-28-3-SO-0.5		EC-28-4-SO-0.5		EC-28-05-SO-0.5		EC-28-06-SO-0.5		EC-28-07-SO-0.5		EC-28-08-SO-0.5		EC-28-09-SO-0.5		EC-28-10-SO-0.5										
					Sample Date	7/24/13		7/23/13		7/23/13		7/24/13		10/7/15		10/7/15		10/7/15		10/7/15		10/7/15		10/7/15										
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0		0										
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5										
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result										
SW846 6020A																																	
Aluminum	mg/kg	110000	14159	n	110000	6660		4850		4720		10500																					
Arsenic	mg/kg	3	9.09		9.09	35.1	K	20.5	K	17.5	K	60.2	K	14.5	J	13.7	J	67.4	J	14.4	J	106	J	46.4	J								
Cadmium	mg/kg	98	0.17	n	98	0.66	K	1	K	2.1	K	0.68	K																				
Chromium	mg/kg		24.9		24.9	15.2	K	21.6	K	30.6	K	23.8	K																				
Cobalt	mg/kg	35	10.2	n	35	11.3	K	5.5	K	9	K	6.6	K																				
Copper	mg/kg	4700	32.83	n	4700	73.1	K	113	K	207	K	65.4	K																				
Lead	mg/kg	800	123.9		800	139	K	405	K	264	K	104	K																				
Nickel	mg/kg	2200	15.95	n	2200	17.6	K	18.1	K	18.4	K	16.3	K																				
Titanium	mg/kg				NSL	273		54.1		73.4		206																					
Zinc	mg/kg	35000	83.92	n	35000	104		365		341		159																					
SW846 7196A																																	
Chromium, Hexavalent	mg/kg	6.3	10		10	1.7	U	1.7	U	1.8	U	1.7	U																				
SW846 8015C																																	
Ethanol	mg/kg				NSL	22.5	UL	23.3	U	24.5	U	23	UL																				
Methanol	mg/kg	120000		n	120000	22.5	UL	23.3	U	24.5	U	23	UL																				
SW846 8082A																																	
Aroclor 1016	mg/kg	5.1		n	5.1	0.028	U	0.029	U	0.029	U	0.028	U																				
Aroclor 1221	mg/kg	0.83			0.83	0.028	U	0.029	U	0.029	U	0.028	U																				
Aroclor 1232	mg/kg	0.72			0.72	0.028	U	0.029	U	0.029	U	0.028	U																				
Aroclor 1242	mg/kg	0.95			0.95	0.028	U	0.029	U	0.029	U	0.028	U																				
Aroclor 1248	mg/kg	0.95			0.95	0.028	U	0.029	U	0.029	U	0.028	U																				
Aroclor 1254	mg/kg	0.97			0.97	0.028	U	0.029	U	0.029	U	0.028	U																				
Aroclor 1260*	mg/kg	0.99			0.99	0.45		0.051		1		0.053																					
SW846 8260B																																	
2-Butanone	µg/kg	1.9E+07		n	19000000	25.2		7.5	J	20		14.6																					
Acetone	µg/kg	6.7E+07		n	67000000	253		53.8		188		122																					
Benzene	µg/kg	5100			5100	1.1	U	1	U	1.6	U	1.1	U																				
Carbon tetrachloride	µg/kg	2900			2900	1.1	U	1	U	1.6	U	1.1	U																				
Ethylbenzene	µg/kg	25000			25000	1.1	U	1	U	1.6	U	1.1	U																				
Methylene chloride	µg/kg	320000		n	320000	1.1	U	1	U	1.6	U	1.1	U																				
Naphthalene	µg/kg	17000	13.3		17000	1.1	U	1	U	1.6	U	1.1	U																				
Toluene	µg/kg	4700000		n	4700000	1.1	U	1	U	1.6	U	1.1	U																				
Xylenes (total)	µg/kg	250000		n	250000	3.4	U	3.1	U	4.7	U	3.3	U																				
SW846 8270D																																	
Pentachlorophenol	µg/kg	4000			4000	110	U	114	U	122	U	115	U																				

* During the planning for additional sampling, the RSL for Aroclor 1260 was 1 mg/kg and the result for EC-28-3-SO-0.5 did not exceed this screening level. Therfore, no release of Aroclor was identified and no additional Aroclor 1260 sampling was planned at EC-28.

Table E2-8. Analytical Results Summary for Subsurface Soil at EC-28

					Location	EC-28-01		EC-28-02		EC-28-02		EC-28-03		EC-28-04		EC-28-05		EC-28-06		EC-28-07		EC-28-08	
					Sample Name	EC-28-1-SO-04		EC-28-02-SO-6		EC-28-2-SO-04		EC-28-3-SO-04		EC-28-4-SO-04		EC-28-05-SO-4		EC-28-06-SO-4		EC-28-07-SO-4		EC-28-08-SO-4	
					Sample Date	7/24/13		10/8/15		7/23/13		7/23/13		7/24/13		10/8/15		10/8/15		10/8/15		10/8/15	
					Start Depth (ft bgs)	3		4		3		3		3		3		3		3		3	
					End Depth (ft bgs)	4		6		4		4		4		4		4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000	5930				8460		7830		5740									
Arsenic	mg/kg	3	9.26		9.26	2.6	K	3.36	J	11.6	K	4.6	K	2.2	K	2.03	J	4.8	J	3.38	J	2.8	J
Cadmium	mg/kg	98		n	98	0.37	U			0.37	U	0.35	U	0.35	U								
Chromium	mg/kg		35.16		35.16	9.4	K			12	K	16.4	K	8.6	K								
Cobalt	mg/kg	35	6.57	n	35	1.6	K			2.7	K	3.7	K	1.3	K								
Copper	mg/kg	4700	14.44	n	4700	3.6	K			10.3	K	9	K	3.3	K								
Lead	mg/kg	800	13.96		800	4.9	K			6.2	K	11.3	K	4.4	K								
Nickel	mg/kg	2200	14	n	2200	3.2	K			4.6	K	5.9	K	3.4	K								
Titanium	mg/kg				NSL	55.3				79		125		58									
Zinc	mg/kg	35000	44.64	n	35000	9.8				41.3		22.3		52.8									
SW846 7196A																							
Chromium, Hexavalent	mg/kg	6.3	2.6		6.3	1.8	U			1.7	U	1.8	U	1.7	U								
SW846 8015C																							
Ethanol	mg/kg				NSL	23.2	U			22.8	U	23.1	U	22.4	U								
Methanol	mg/kg	120000		n	120000	23.2	U			22.8	U	23.1	U	22.4	U								
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.028	U			0.028	U	0.029	U	0.027	U								
Aroclor 1221	mg/kg	0.83			0.83	0.028	U			0.028	U	0.029	U	0.027	U								
Aroclor 1232	mg/kg	0.72			0.72	0.028	U			0.028	U	0.029	U	0.027	U								
Aroclor 1242	mg/kg	0.95			0.95	0.028	U			0.028	U	0.029	U	0.027	U								
Aroclor 1248	mg/kg	0.95			0.95	0.028	U			0.028	U	0.029	U	0.027	U								
Aroclor 1254	mg/kg	0.97			0.97	0.028	U			0.028	U	0.029	U	0.027	U								
Aroclor 1260	mg/kg	0.99			0.99	0.028	U			0.028	U	0.029	U	0.027	U								
SW846 8260B																							
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	5.5	U			7.2	J	5	U	5.7	U								
Acetone	µg/kg	6.7E+07		n	6.7E+07	22.5				47.3		10.3		11.9									
Benzene	µg/kg	5100			5100	1.1	U			1.1	U	0.99	U	1.1	U								
Carbon tetrachloride	µg/kg	2900			2900	1.1	U			1.1	U	0.99	U	1.1	U								
Ethylbenzene	µg/kg	25000			25000	1.1	U			1.1	U	0.99	U	1.1	U								
Methylene chloride	µg/kg	320000		n	320000	30.7				1.1	U	13.7		1.3	J								
Naphthalene	µg/kg	17000	2.2		17000	1.1	U			1.1	U	0.99	U	1.1	U								
Toluene	µg/kg	4700000		n	4700000	1.1	U			1.1	U	0.99	U	1.1	U								
Xylenes (total)	µg/kg	250000		n	250000	3.3	U			3.3	U	3	U	3.4	U								
SW846 8270D																							
Pentachlorophenol	µg/kg	4000			4000	115	U			113	U	112	U	111	U								

Table E2-8. Analytical Results Summary for Subsurface Soil at EC-28

					Location	EC-28-09		EC-28-09		EC-28-10		EC-28-10	
					Sample Name	EC-28-09-SO-4		EC-28-09-SO-6		EC-28-10-SO-4		EC-28-10-SO-6	
					Sample Date	10/8/15		10/8/15		10/8/15		10/8/15	
					Start Depth (ft bgs)	3		4		3		4	
					End Depth (ft bgs)	4		6		4		6	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Aluminum	mg/kg	110000	18404	n	110000								
Arsenic	mg/kg	3	9.26		9.26	2.83	J	3.38	J	4.83	J	7.52	J
Cadmium	mg/kg	98		n	98								
Chromium	mg/kg		35.16		35.16								
Cobalt	mg/kg	35	6.57	n	35								
Copper	mg/kg	4700	14.44	n	4700								
Lead	mg/kg	800	13.96		800								
Nickel	mg/kg	2200	14	n	2200								
Titanium	mg/kg				NSL								
Zinc	mg/kg	35000	44.64	n	35000								
SW846 7196A													
Chromium, Hexavalent	mg/kg	6.3	2.6		6.3								
SW846 8015C													
Ethanol	mg/kg				NSL								
Methanol	mg/kg	120000		n	120000								
SW846 8082A													
Aroclor 1016	mg/kg	5.1		n	5.1								
Aroclor 1221	mg/kg	0.83			0.83								
Aroclor 1232	mg/kg	0.72			0.72								
Aroclor 1242	mg/kg	0.95			0.95								
Aroclor 1248	mg/kg	0.95			0.95								
Aroclor 1254	mg/kg	0.97			0.97								
Aroclor 1260	mg/kg	0.99			0.99								
SW846 8260B													
2-Butanone	µg/kg	1.9E+07		n	1.9E+07								
Acetone	µg/kg	6.7E+07		n	6.7E+07								
Benzene	µg/kg	5100			5100								
Carbon tetrachloride	µg/kg	2900			2900								
Ethylbenzene	µg/kg	25000			25000								
Methylene chloride	µg/kg	320000		n	320000								
Naphthalene	µg/kg	17000	2.2		17000								
Toluene	µg/kg	4700000		n	4700000								
Xylenes (total)	µg/kg	250000		n	250000								
SW846 8270D													
Pentachlorophenol	µg/kg	4000			4000								

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Table E2-9. Analytical Results Summary for Surface Soil Samples at EC-29

					Location	EC-29-01		EC-29-02		EC-29-03		EC-29-04		EC-29-05	
					Sample Name	EC-29-1-SO-0.5		EC-29-2-SO-0.5		EC-29-3-SO-0.5		EC-29-4-SO-0.5		EC-29-O5-SO-0.5	
					Sample Date	7/24/13		7/24/13		7/24/13		7/24/13		10/9/15	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	110000	14159	n	110000	5460		6310		7020		12600			
Cadmium	mg/kg	98	0.17	n	98	0.4	J	0.71		0.3	J	11.8			
Chromium	mg/kg		24.9		24.9	12		16.9		12.7		102	J		
Cobalt	mg/kg	35	10.2	n	35	4.7		4.6		6		13			
Lead	mg/kg	800	123.9		800	69.2		142		99.7		559			
Titanium	mg/kg				NSL	38.3		55.2		49.6		591			
Zinc	mg/kg	35000	83.92	n	35000	54.4		115		74.3		266	J		
SW846 8015C															
Ethanol	mg/kg				NSL	21.9	U	22.4	U	22.8	U	35.6	U		
Methanol	mg/kg	120000		n	120000	21.9	U	22.4	U	22.8	U	35.6	U		
SW846 8082A															
Aroclor 1016	mg/kg	5.1		n	5.1	0.026	U	0.028	U	0.027	U	0.045	U		
Aroclor 1221	mg/kg	0.83			0.83	0.026	U	0.028	U	0.027	U	0.045	U		
Aroclor 1232	mg/kg	0.72			0.72	0.026	U	0.028	U	0.027	U	0.045	U		
Aroclor 1242	mg/kg	0.95			0.95	0.026	U	0.028	U	0.027	U	0.045	U		
Aroclor 1248	mg/kg	0.95			0.95	0.026	U	0.028	U	0.027	U	0.045	U		
Aroclor 1254	mg/kg	0.97			0.97	0.026	U	0.028	U	0.027	U	0.045	U		
Aroclor 1260	mg/kg	0.99			0.99	0.026	U	0.077		0.056		1.3			
Aroclor 1260	µg/kg	990			990									55	J

Table E2-9. Analytical Results Summary for Surface Soil Samples at EC-29

					Location	EC-29-01		EC-29-02		EC-29-03		EC-29-04		EC-29-05	
					Sample Name	EC-29-1-SO-0.5		EC-29-2-SO-0.5		EC-29-3-SO-0.5		EC-29-4-SO-0.5		EC-29-O5-SO-0.5	
					Sample Date	7/24/13		7/24/13		7/24/13		7/24/13		10/9/15	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8151A															
2,4,5-T	µg/kg	820000		n	820000	0.55	U	0.55	U	0.56	U	0.91	U		
2,4,5-TP	µg/kg	660000		n	660000	0.55	U	0.55	U	0.56	U	0.91	U		
2,4-D	µg/kg	960000		n	960000	0.55	U	0.55	U	0.56	U	0.91	U		
2,4-DB	µg/kg	660000		n	660000	0.55	U	0.55	U	0.56	U	0.91	U		
Dalapon	µg/kg	2500000		n	2500000	0.55	U	0.55	U	0.56	U	0.91	U		
Dicamba	µg/kg	2500000		n	2500000	0.55	U	0.55	U	0.56	U	0.91	U		
Dichloroprop	µg/kg				NSL	0.55	U	0.55	U	0.56	U	0.91	U		
Dinoseb	µg/kg	82000		n	82000	12.5	U	12.7	U	12.9	U	20.9	U		
MCPA	µg/kg	41000		n	41000	1690	U	1720	U	1740	U	2820	U		
MCPP	µg/kg	82000		n	82000	1690	U	1720	U	1740	U	2820	U		
Pentachlorophenol	µg/kg	4000			4000	0.55	U	0.55	U	0.56	U	0.91	U		
SW846 8260B															
2-Butanone	µg/kg	1.9E+07		n	19000000	12.2		12.1		13.1		120			
Acetone	µg/kg	6.7E+07		n	67000000	89.9		97.6		120		424			
Benzene	µg/kg	5100			5100	1.1	U	1	U	1.1	U	3.5	J		
Carbon tetrachloride	µg/kg	2900			2900	1.1	U	1	U	1.1	U	2.1	U		
Ethylbenzene	µg/kg	25000			25000	1.1	U	1	U	1.1	U	2.1	U		
Methylene chloride	µg/kg	320000		n	320000	4.9	B	1	U	15		8.1	B		
Naphthalene	µg/kg	17000	13.3		17000	1.1	U	1	U	1.1	U	2.1	U		
Tetrachloroethene	µg/kg	39000		n	39000	1.1	U	1	U	1.1	U	2.1	U		
Toluene	µg/kg	4700000		n	4700000	1.1	U	1	U	1.1	U	1.4	J		
Trichloroethene	µg/kg	1900		n	1900	1.1	U	1	U	1.1	U	2.1	U		
Xylenes (total)	µg/kg	250000		n	250000	3.2	U	3.1	U	3.4	U	6.2	U		

Table E2-9. Analytical Results Summary for Surface Soil Samples at EC-29

					Location	EC-29-06		EC-29-07		EC-29-08		EC-29-09		EC-29-10	
					Sample Name	EC-29-06-SO-0.5		EC-29-07-SO-0.5		EC-29-08-SO-0.5		EC-29-09-SO-0.5		EC-29-10-SO-0.5	
					Sample Date	10/7/15		10/7/15		10/7/15		10/7/15		10/7/15	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	110000	14159	n	110000										
Cadmium	mg/kg	98	0.17	n	98										
Chromium	mg/kg		24.9		24.9										
Cobalt	mg/kg	35	10.2	n	35										
Lead	mg/kg	800	123.9		800										
Titanium	mg/kg				NSL										
Zinc	mg/kg	35000	83.92	n	35000										
SW846 8015C															
Ethanol	mg/kg				NSL										
Methanol	mg/kg	120000		n	120000										
SW846 8082A															
Aroclor 1016	mg/kg	5.1		n	5.1										
Aroclor 1221	mg/kg	0.83			0.83										
Aroclor 1232	mg/kg	0.72			0.72										
Aroclor 1242	mg/kg	0.95			0.95										
Aroclor 1248	mg/kg	0.95			0.95										
Aroclor 1254	mg/kg	0.97			0.97										
Aroclor 1260	mg/kg	0.99			0.99										
Aroclor 1260	µg/kg	990			990	53	J	12	U	37		64		23	J

Table E2-9. Analytical Results Summary for Surface Soil Samples at EC-29

					Location	EC-29-06		EC-29-07		EC-29-08		EC-29-09		EC-29-10	
					Sample Name	EC-29-06-SO-0.5		EC-29-07-SO-0.5		EC-29-08-SO-0.5		EC-29-09-SO-0.5		EC-29-10-SO-0.5	
					Sample Date	10/7/15		10/7/15		10/7/15		10/7/15		10/7/15	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8151A															
2,4,5-T	µg/kg	820000		n	820000										
2,4,5-TP	µg/kg	660000		n	660000										
2,4-D	µg/kg	960000		n	960000										
2,4-DB	µg/kg	660000		n	660000										
Dalapon	µg/kg	2500000		n	2500000										
Dicamba	µg/kg	2500000		n	2500000										
Dichloroprop	µg/kg				NSL										
Dinoseb	µg/kg	82000		n	82000										
MCPA	µg/kg	41000		n	41000										
MCPP	µg/kg	82000		n	82000										
Pentachlorophenol	µg/kg	4000			4000										
SW846 8260B															
2-Butanone	µg/kg	1.9E+07		n	19000000										
Acetone	µg/kg	6.7E+07		n	67000000										
Benzene	µg/kg	5100			5100										
Carbon tetrachloride	µg/kg	2900			2900										
Ethylbenzene	µg/kg	25000			25000										
Methylene chloride	µg/kg	320000		n	320000										
Naphthalene	µg/kg	17000	13.3		17000										
Tetrachloroethene	µg/kg	39000		n	39000										
Toluene	µg/kg	4700000		n	4700000										
Trichloroethene	µg/kg	1900		n	1900										
Xylenes (total)	µg/kg	250000		n	250000										

Table E2-10. Analytical Results Summary for Subsurface Soil at EC-29

					Location	EC-29-01		EC-29-02		EC-29-03		EC-29-04	
					Sample Name	EC-29-1-SO-02.5		EC-29-2-SO-04		EC-29-3-SO-04		EC-29-4-SO-02	
					Sample Date	7/24/13		7/24/13		7/24/13		7/24/13	
					Start Depth (ft bgs)	1.5		3		3		1	
					End Depth (ft bgs)	2.5		4		4		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Aluminum	mg/kg	110000	18404	n	110000	7430		7130		6480		8690	
Cadmium	mg/kg	98		n	98	0.19	J	0.34	U	0.35	U	0.36	U
Chromium	mg/kg		35.16		35.16	8.9	J	9.8	J	13.5		12.3	J
Cobalt	mg/kg	35	6.57	n	35	5.8		2.4	J	8		3.6	
Lead	mg/kg	800	13.96		800	43.8		4.9		6.5		10.7	
Titanium	mg/kg				NSL	41		78.7		34		104	
Zinc	mg/kg	35000	44.64	n	35000	19.3	J	16.2	J	19.8		30.9	J
SW846 8015C													
Ethanol	mg/kg				NSL	20.9	U	22	U	23.1	U	21.8	U
Methanol	mg/kg	120000		n	120000	20.9	U	22	U	23.1	U	21.8	U
SW846 8082A													
Aroclor 1016	mg/kg	5.1		n	5.1	0.027	U	0.027	U	0.028	U	0.029	U
Aroclor 1221	mg/kg	0.83			0.83	0.027	U	0.027	U	0.028	U	0.029	U
Aroclor 1232	mg/kg	0.72			0.72	0.027	U	0.027	U	0.028	U	0.029	U
Aroclor 1242	mg/kg	0.95			0.95	0.027	U	0.027	U	0.028	U	0.029	U
Aroclor 1248	mg/kg	0.95			0.95	0.027	U	0.027	U	0.028	U	0.029	U
Aroclor 1254	mg/kg	0.97			0.97	0.027	U	0.027	U	0.028	U	0.029	U
Aroclor 1260	mg/kg	0.99			0.99	0.027	U	0.027	U	0.028	U	0.029	U
SW846 8151A													
2,4,5-T	µg/kg	820000		n	820000	0.56	U	0.56	U	0.56	U	0.6	U
2,4,5-TP	µg/kg	660000		n	660000	0.56	U	0.56	U	0.56	U	0.6	U
2,4-D	µg/kg	960000		n	960000	0.56	U	0.56	U	0.56	U	0.6	U
2,4-DB	µg/kg	660000		n	660000	0.56	U	0.56	U	0.56	U	0.6	U
Dalapon	µg/kg	2500000		n	2500000	0.56	U	0.56	U	0.56	U	0.6	U
Dicamba	µg/kg	2500000		n	2500000	0.56	U	0.56	U	0.56	U	0.6	U
Dichloroprop	µg/kg				NSL	0.56	U	0.56	UJ	0.56	U	0.6	U
Dinoseb	µg/kg	82000		n	82000	13	U	12.8	U	12.9	U	13.8	U
MCPA	µg/kg	41000		n	41000	1750	U	1730	U	1740	U	1860	U
MCPP	µg/kg	82000		n	82000	1750	U	1730	U	1740	U	1860	U

Table E2-10. Analytical Results Summary for Subsurface Soil at EC-29

					Location	EC-29-01		EC-29-02		EC-29-03		EC-29-04	
					Sample Name	EC-29-1-SO-02.5		EC-29-2-SO-04		EC-29-3-SO-04		EC-29-4-SO-02	
					Sample Date	7/24/13		7/24/13		7/24/13		7/24/13	
					Start Depth (ft bgs)	1.5		3		3		1	
					End Depth (ft bgs)	2.5		4		4		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
Pentachlorophenol	µg/kg	4000			4000	0.56	U	0.56	U	0.56	U	0.6	U
SW846 8260B													
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	4.6	U	5.3	U	8.5	J	5.7	U
Acetone	µg/kg	6.7E+07		n	6.7E+07	31		10.9		44.1		26.7	
Benzene	µg/kg	5100			5100	0.92	U	1.1	U	1.1	U	1.1	U
Carbon tetrachloride	µg/kg	2900			2900	0.92	U	1.1	U	1.1	U	1.1	U
Ethylbenzene	µg/kg	25000			25000	0.92	U	1.1	UJ	1.1	U	1.1	U
Methylene chloride	µg/kg	320000		n	320000	69.1	K	32.7	J	5.4		22.2	K
Naphthalene	µg/kg	17000	2.2		17000	0.92	U	1.1	U	1.1	U	24.1	
Tetrachloroethene	µg/kg	39000		n	39000	0.92	U	1.1	UJ	1.1	U	1.1	U
Toluene	µg/kg	4700000		n	4700000	0.92	U	1.1	UJ	1.1	U	1.1	U
Trichloroethene	µg/kg	1900		n	1900	0.92	U	1.1	UJ	1.1	U	1.1	U
Xylenes (total)	µg/kg	250000		n	250000	2.8	U	3.2	UJ	3.2	U	3.4	U

Table E2-11. Analytical Results Summary for Surface Soil Samples at EC-30

					Location	EC-30-01		EC-30-02		EC-30-03		EC-30-04	
					Sample Name	EC-30-1-SO-0.5		EC-30-2-SO-0.5		EC-30-3-SO-0.5		EC-30-4-SO-0.5	
					Sample Date	7/26/13		7/26/13		7/26/13		7/26/13	
					Start Depth (ft bgs)	0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Lead	mg/kg	800	124		800	28	K	191	K	76.2	K	489	
SW846 8015C													
Ethanol	mg/kg				NSL	21.7	U	22.4	U	22.1	UL	24	UL
Methanol	mg/kg	120000		n	120000	21.7	U	22.4	U	22.1	UL	24	UL
SW846 8260B													
2-Butanone	µg/kg	1.9E+07		n	19000000	33.4		25.7		6	U	38.3	
Acetone	µg/kg	6.7E+07		n	67000000	289		224		78		424	
Benzene	µg/kg	5100			5100	1.1	U	0.6	J	1.2	U	0.9	J
Carbon tetrachloride	µg/kg	2900			2900	1.1	U	1.2	U	1.2	U	1.7	U
Ethylbenzene	µg/kg	25000			25000	1.1	U	1.2	U	1.2	U	1.7	U
Methylene chloride	µg/kg	320000		n	320000	3.4		6		179		26.3	
Naphthalene	µg/kg	17000	13.3		17000	1.1	U	1.2	U	1.2	UJ	104	J
Tetrachloroethene	µg/kg	39000		n	39000	1.1	U	1.2	U	1.2	U	1.7	U
Toluene	µg/kg	4700000		n	4700000	1.1	U	1.2	U	1.5	J	4.7	
Trichloroethene	µg/kg	1900		n	1900	1.1	U	1.2	U	1.2	U	1.7	U
Xylenes (total)	µg/kg	250000		n	250000	3.3	U	3.6	U	3.6	U	3.5	J

Table E2-12. Analytical Results Summary for Subsurface Soil at EC-30

					Location	EC-30-01		EC-30-02		EC-30-03		EC-30-04	
					Sample Name	EC-30-1-SO-04		EC-30-2-SO-04		EC-30-3-SO-04		EC-30-4-SO-02	
					Sample Date	7/26/13		7/26/13		7/26/13		7/26/13	
					Start Depth (ft bgs)	3		3		3		1	
					End Depth (ft bgs)	4		4		4		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Lead	mg/kg	800	14		800	12.8	K	6.7	K	7.7	K	43.2	K
SW846 8015C													
Ethanol	mg/kg				NSL	25.2	U	24.7	UJ	23.8	U	23.2	U
Methanol	mg/kg	120000		n	120000	25.2	U	24.7	U	23.8	U	23.2	U
SW846 8260B													
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	5.9	U	6.1	U	5.9	U	9.2	J
Acetone	µg/kg	6.7E+07		n	6.7E+07	9.5	J	11.1	J	6.7	J	43.6	
Benzene	µg/kg	5100			5100	1.2	U	1.2	UJ	1.2	U	1.2	U
Carbon tetrachloride	µg/kg	2900			2900	1.2	U	1.2	U	1.2	U	1.2	U
Ethylbenzene	µg/kg	25000			25000	1.2	U	1.2	UJ	1.2	U	1.2	U
Methylene chloride	µg/kg	320000		n	320000	21.8		11.2	K	74.1		3.8	
Naphthalene	µg/kg	17000	2.2		17000	1.2	U	1.2	U	1.2	U	13.7	
Tetrachloroethene	µg/kg	39000		n	39000	1.2	U	1.2	U	1.2	U	1.2	J
Toluene	µg/kg	4700000		n	4700000	1.2	U	1.2	UJ	1.2	U	1.2	U
Trichloroethene	µg/kg	1900		n	1900	1.2	U	1.2	UJ	1.2	U	1.6	J
Xylenes (total)	µg/kg	250000		n	250000	3.5	U	3.7	UJ	3.5	U	3.5	U

Table E2-13. Analytical Results Summary for Surface Soil Samples at EC-31

					Location	EC-31-01		EC-31-02	
					Sample Name	EC-31-1-SO-0.5		EC-31-2-SO-0.5	
					Sample Date	7/25/13		7/25/13	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 6020A									
Aluminum	mg/kg	110000	14159	n	110000	4630		13000	
Arsenic	mg/kg	3	9.09		9.09	18.9		12	
Cadmium	mg/kg	98	0.17	n	98	0.37	J	0.53	
Chromium	mg/kg		24.9		24.9	51.3		19.1	
Cobalt	mg/kg	35	10.2	n	35	9.7		5.9	
Copper	mg/kg	4700	32.83	n	4700	47.7		71.2	
Lead	mg/kg	800	123.9		800	51.8		75.8	
Nickel	mg/kg	2200	15.95	n	2200	149		18.5	
Titanium	mg/kg				NSL	202		207	
Zinc	mg/kg	35000	83.92	n	35000	50.8		84.6	
SW846 7196A									
Chromium, Hexavalent	mg/kg	6.3	10		10	1.6	U	1.8	U
SW846 8015C									
Ethanol	mg/kg				NSL	21.7	U	23.7	U
Methanol	mg/kg	120000		n	120000	21.7	U	23.7	U
SW846 8082A									
Aroclor 1016	mg/kg	5.1		n	5.1	0.026	U	0.029	U
Aroclor 1221	mg/kg	0.83			0.83	0.026	U	0.029	U
Aroclor 1232	mg/kg	0.72			0.72	0.026	U	0.029	U
Aroclor 1242	mg/kg	0.95			0.95	0.026	U	0.029	U
Aroclor 1248	mg/kg	0.95			0.95	0.026	U	0.029	U
Aroclor 1254	mg/kg	0.97			0.97	0.026	U	0.029	U
Aroclor 1260	mg/kg	0.99			0.99	0.062		0.25	

Table E2-13. Analytical Results Summary for Surface Soil Samples at EC-31

					Location	EC-31-01		EC-31-02	
					Sample Name	EC-31-1-SO-0.5		EC-31-2-SO-0.5	
					Sample Date	7/25/13		7/25/13	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8260B									
2-Butanone	µg/kg	1.9E+07		n	19000000	4.1	U	14.7	
Acetone	µg/kg	6.7E+07		n	67000000	10		159	
Benzene	µg/kg	5100			5100	0.83	U	1.5	U
Carbon tetrachloride	µg/kg	2900			2900	0.83	U	1.5	U
Ethylbenzene	µg/kg	25000			25000	0.83	U	1.5	U
Methylene chloride	µg/kg	320000		n	320000	7.4	B	4.9	B
Naphthalene	µg/kg	17000	13.3		17000	7.3		1.5	U
Toluene	µg/kg	4700000		n	4700000	0.83	U	1.5	U
Xylenes (total)	µg/kg	250000		n	250000	2.5	U	4.4	U
SW846 8270D									
Pentachlorophenol	µg/kg	4000			4000	108	U	118	U

Table E2-14. Analytical Results Summary for Subsurface Soil at EC-31

					Location	EC-31-01		EC-31-02	
					Sample Name	EC-31-1-SO-02		EC-31-2-SO-04	
					Sample Date	7/25/13		7/25/13	
					Start Depth (ft bgs)	1		3	
					End Depth (ft bgs)	2		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 6020A									
Aluminum	mg/kg	110000	18404	n	110000	3080		12500	
Arsenic	mg/kg	3	9.26		9.26	4.8		5.3	
Cadmium	mg/kg	98		n	98	0.2	J	0.35	U
Chromium	mg/kg		35.16		35.16	7.3		12.6	
Cobalt	mg/kg	35	6.57	n	35	4.2		16.1	
Copper	mg/kg	4700	14.44	n	4700	31.3		11	
Lead	mg/kg	800	13.96		800	41.1		12.4	
Nickel	mg/kg	2200	14	n	2200	17.3		8.6	
Titanium	mg/kg				NSL	108		78.1	
Zinc	mg/kg	35000	44.64	n	35000	25.1		32.5	
SW846 7196A									
Chromium, Hexavalent	mg/kg	6.3	2.6		6.3	1.8	U	1.7	U
SW846 8015C									
Ethanol	mg/kg				NSL	24.5	U	22	U
Methanol	mg/kg	120000		n	120000	24.5	U	22	U
SW846 8082A									
Aroclor 1016	mg/kg	5.1		n	5.1	0.029	U	0.027	U
Aroclor 1221	mg/kg	0.83			0.83	0.029	U	0.027	U
Aroclor 1232	mg/kg	0.72			0.72	0.029	U	0.027	U
Aroclor 1242	mg/kg	0.95			0.95	0.029	U	0.027	U
Aroclor 1248	mg/kg	0.95			0.95	0.029	U	0.027	U
Aroclor 1254	mg/kg	0.97			0.97	0.38		0.027	U
Aroclor 1260	mg/kg	0.99			0.99	0.029	U	0.027	U
SW846 8260B									
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	6	J	6.8	J
Acetone	µg/kg	6.7E+07		n	6.7E+07	32.4		31.8	
Benzene	µg/kg	5100			5100	0.88	U	1.1	U
Carbon tetrachloride	µg/kg	2900			2900	0.88	U	1.1	U
Ethylbenzene	µg/kg	25000			25000	0.88	U	1.1	U
Methylene chloride	µg/kg	320000		n	320000	18.8	K	41.5	K
Naphthalene	µg/kg	17000	2.2		17000	6.9		1.1	U
Toluene	µg/kg	4700000		n	4700000	0.88	U	1.1	U
Xylenes (total)	µg/kg	250000		n	250000	2.6	U	3.3	U
SW846 8270D									
Pentachlorophenol	µg/kg	4000			4000	119	U	110	U

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Table E2-15. Analytical Results Summary for Surface Soil Samples at EC-32

					Location	EC-32-01		EC-32-02		EC-32-03		EC-32-04		EC-32-05		EC-32-06		EC-32-07		EC-32-08		EC-32-09	
					Sample Name	EC-32-1-SO-0.5		EC-32-2-SO-0.5		EC-32-03-SO-0.5		EC-32-04-SO-0.5		EC-32-05-SO-0.5		EC-32-06-SO-0.5		EC-32-07-SO-0.5		EC-32-08-SO-0.5		EC-32-09-SO-0.5	
					Sample Date	7/24/13		7/24/13		10/7/15		10/7/15		10/7/15		10/7/15		10/7/15		10/7/15		10/7/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Arsenic	mg/kg	3	9.09		9.09	24		44.6		36	J											23.2	J
Chromium	mg/kg		24.9		24.9	21.9		36.7															
Copper	mg/kg	4700	32.8	n	4700	70.4		66.4															
Nickel	mg/kg	2200	16	n	2200	21.2		171															
Zinc	mg/kg	35000	83.9	n	35000	87.6		78.5															
SW846 7196A																							
Chromium, Hexavalent	mg/kg	6.3	10		10	1.6	U	1.6	U														
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000			52.6															
Fluorene	µg/kg	3000000	40	n	3000000			73.9															
Naphthalene	µg/kg	17000	13.3		17000			28.4															
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	278																	
Acenaphthylene	µg/kg	2300000	363		2300000	147		776															
Anthracene	µg/kg	2.3E+07	154	n	23000000	802		763															
Benzo(a)anthracene	µg/kg	2900	1035		2900	3010		2090		2600		25000		3600		1000000		2100		870		2800	
Benzo(a)pyrene	µg/kg	290	1036		1036	2870		2610		2200		21000		3800		720000		2100		870		2900	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	4030		6070		3500		31000		6800		1300000		3600		1400		4800	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	721		1010															
Benzo(k)fluoranthene	µg/kg	29000	476		29000	1730		1730															
Chrysene	µg/kg	290000	842		290000	3380		3680															
Dibenz(a,h)anthracene	µg/kg	290	152		290	318		356		480		3300		1200		150000		380		250		620	
Fluoranthene	µg/kg	3000000	1488	n	3000000	5740		3670															
Fluorene	µg/kg	3000000	40	n	3000000	223																	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	970		1280															
Naphthalene	µg/kg	17000	13.3		17000	111																	
Pentachlorophenol	µg/kg	4000			4000	110	U	107	U														
Phenanthrene	µg/kg	2300000	500		2300000	3590		896															
Pyrene	µg/kg	2300000	1117	n	2300000	4800		3440															

Table E2-15. Analytical Results Summary for Surface Soil Samples at EC-32

					Location	EC-32-10		EC-32-11		EC-32-12		EC-32-13		EC-32-14		EC-32-15		EC-32-16		EC-32-17		EC-32-18	
					Sample Name	EC-32-10-SO-0.5		EC-32-11-SO-0.5		EC-32-12-SO-0.5		EC-32-13-SO-0.5		EC-32-14-SO-0.5		EC-32-15-SO-0.5		EC-32-16-SO-0.5		EC-32-17-SO-0.5		EC-32-18-SO-0.5	
					Sample Date	10/7/15		1/19/16		1/19/16		1/19/16		1/19/16		1/19/16		1/19/16		1/19/16		1/19/16	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Arsenic	mg/kg	3	9.09		9.09	16.7	J																
Chromium	mg/kg		24.9		24.9																		
Copper	mg/kg	4700	32.8	n	4700																		
Nickel	mg/kg	2200	16	n	2200																		
Zinc	mg/kg	35000	83.9	n	35000																		
SW846 7196A																							
Chromium, Hexavalent	mg/kg	6.3	10		10																		
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000																		
Fluorene	µg/kg	3000000	40	n	3000000																		
Naphthalene	µg/kg	17000	13.3		17000																		
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000																		
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000																		
Benzo(a)anthracene	µg/kg	2900	1035		2900	790	J	620		520		260		690		400		110		1400		590	
Benzo(a)pyrene	µg/kg	290	1036		1036	770	J	670		390		260		420		420		120		1300		650	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	1200		1200		900		420		890		710		180		1900		1000	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	476		29000																		
Chrysene	µg/kg	290000	842		290000																		
Dibenz(a,h)anthracene	µg/kg	290	152		290	130		140		81		50		69		81		25		200		130	
Fluoranthene	µg/kg	3000000	1488	n	3000000																		
Fluorene	µg/kg	3000000	40	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900																		
Naphthalene	µg/kg	17000	13.3		17000																		
Pentachlorophenol	µg/kg	4000			4000																		
Phenanthrene	µg/kg	2300000	500		2300000																		
Pyrene	µg/kg	2300000	1117	n	2300000																		

Table E2-15. Analytical Results Summary for Surface Soil Samples at EC-32

					Location	EC-32-19		EC-32-20		EC-32-24		EC-32-25	
					Sample Name	EC-32-19-SO-0.5		EC-32-20-SO-0.5		EC-32-24-SO-0.5		EC-32-25-SO-0.5	
					Sample Date	1/19/16		1/19/16		1/19/16		1/19/16	
					Start Depth (ft bgs)	0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Arsenic	mg/kg	3	9.09		9.09								
Chromium	mg/kg		24.9		24.9								
Copper	mg/kg	4700	32.8	n	4700								
Nickel	mg/kg	2200	16	n	2200								
Zinc	mg/kg	35000	83.9	n	35000								
SW846 7196A													
Chromium, Hexavalent	mg/kg	6.3	10		10								
SW846 8270 SIM													
Acenaphthene	µg/kg	4500000	41.5	n	4500000								
Fluorene	µg/kg	3000000	40	n	3000000								
Naphthalene	µg/kg	17000	13.3		17000								
SW846 8270D													
Acenaphthene	µg/kg	4500000	41.5	n	4500000								
Acenaphthylene	µg/kg	2300000	363		2300000								
Anthracene	µg/kg	2.3E+07	154	n	23000000								
Benzo(a)anthracene	µg/kg	2900	1035		2900	450		3400		310		520	
Benzo(a)pyrene	µg/kg	290	1036		1036	410		2500		340		610	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	690		3500		330		750	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000								
Benzo(k)fluoranthene	µg/kg	29000	476		29000								
Chrysene	µg/kg	290000	842		290000								
Dibenz(a,h)anthracene	µg/kg	290	152		290	72		410		95		130	
Fluoranthene	µg/kg	3000000	1488	n	3000000								
Fluorene	µg/kg	3000000	40	n	3000000								
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900								
Naphthalene	µg/kg	17000	13.3		17000								
Pentachlorophenol	µg/kg	4000			4000								
Phenanthrene	µg/kg	2300000	500		2300000								
Pyrene	µg/kg	2300000	1117	n	2300000								

Table E2-16. Analytical Results Summary for Subsurface Soil at EC-32

					Location	EC-32-01		EC-32-02		EC-32-03		EC-32-05		EC-32-05		EC-32-06		EC-32-09		EC-32-11		EC-32-11	
					Sample Name	EC-32-1-SO-03		EC-32-2-SO-04		EC-32-03-SO-4		EC-32-05-SO-4		EC-32-5-SO-4		EC-32-06-SO-4		EC-32-09-SO-4		EC-32-11-SO-3		EC-32-11-SO-4	
					Sample Date	7/24/13		7/24/13		10/7/15		10/7/15		1/19/16		10/7/15		10/7/15		1/19/16		1/19/16	
					Start Depth (ft bgs)	2		3		3		3		4		3		3		3		4	
					End Depth (ft bgs)	3		4		4		4		5		4		4		4		4.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Arsenic	mg/kg	3	9.26		9.26	13.4		4.1		3.2	J							2.42	J				
Chromium	mg/kg		35.2		35.16	22.3		10.3															
Copper	mg/kg	4700	14.4	n	4700	61.4		6.3															
Nickel	mg/kg	2200	14	n	2200	22.5		4.9															
Zinc	mg/kg	35000	44.6	n	35000	38.9		14.7															
SW846 7196A																							
Chromium, Hexavalent	mg/kg	6.3	2.6		6.3	1.7	U	1.8	U														
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000	8.3		1.5	U														
Acenaphthylene	µg/kg	2300000	2.38		2300000	1.5	U	1.5	U														
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	12.6		1.5	U														
Benzo(a)anthracene	µg/kg	2900	16.3		2900	103		1.5	U														
Benzo(a)pyrene	µg/kg	290	11.9		290			1.5	U														
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900			1.5	U														
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	58.4		1.5	U														
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	32.8		1.5	U														
Chrysene	µg/kg	290000	20.6		290000			1.5	U														
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	15.9		1.5	U														
Fluoranthene	µg/kg	3000000	25	n	3000000			1.5	U														
Fluorene	µg/kg	3000000	31.7	n	3000000	8.1		1.5	U														
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	43.2		1.5	U														
Naphthalene	µg/kg	17000	2.2		17000	12		1.5	U														
Phenanthrene	µg/kg	2300000	10.9		2300000			1.5	U														
Pyrene	µg/kg	2300000	20	n	2300000			1.5	U														
SW846 8270D																							
Benzo(a)anthracene	µg/kg	2900	16.3		2900					3.6	J	940		29		18000		14		15		2.8	J
Benzo(a)pyrene	µg/kg	290	11.9		290	84.3				6.9		870		36		14000		13		15		3.1	J
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	111				10		1300		51		25000		29		26		4.2	
Chrysene	µg/kg	290000	20.6		290000	125																	
Dibenz(a,h)anthracene	µg/kg	290	2.53		290					1.9	J	170		6.5		3100		4.5		4.1		1.9	U
Fluoranthene	µg/kg	3000000	25	n	3000000	122																	
Pentachlorophenol	µg/kg	4000			4000	111	U	112	U														
Phenanthrene	µg/kg	2300000	10.9		2300000	91																	
Pyrene	µg/kg	2300000	20	n	2300000	151																	

Table E2-16. Analytical Results Summary for Subsurface Soil at EC-32

					Location	EC-32-12		EC-32-12	
					Sample Name	EC-32-12-SO-3		EC-32-12-SO-4	
					Sample Date	1/19/16		1/19/16	
					Start Depth (ft bgs)	3		4	
					End Depth (ft bgs)	4		6	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 6020A									
Arsenic	mg/kg	3	9.26		9.26				
Chromium	mg/kg		35.2		35.16				
Copper	mg/kg	4700	14.4	n	4700				
Nickel	mg/kg	2200	14	n	2200				
Zinc	mg/kg	35000	44.6	n	35000				
SW846 7196A									
Chromium, Hexavalent	mg/kg	6.3	2.6		6.3				
SW846 8270 SIM									
Acenaphthene	µg/kg	4500000	0.92	n	4500000				
Acenaphthylene	µg/kg	2300000	2.38		2300000				
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07				
Benzo(a)anthracene	µg/kg	2900	16.3		2900				
Benzo(a)pyrene	µg/kg	290	11.9		290				
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000				
Chrysene	µg/kg	290000	20.6		290000				
Dibenz(a,h)anthracene	µg/kg	290	2.53		290				
Fluoranthene	µg/kg	3000000	25	n	3000000				
Fluorene	µg/kg	3000000	31.7	n	3000000				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900				
Naphthalene	µg/kg	17000	2.2		17000				
Phenanthrene	µg/kg	2300000	10.9		2300000				
Pyrene	µg/kg	2300000	20	n	2300000				
SW846 8270D									
Benzo(a)anthracene	µg/kg	2900	16.3		2900	3.3	J	1.9	U
Benzo(a)pyrene	µg/kg	290	11.9		290	3.1	J	1.8	J
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	5.1		3.3	J
Chrysene	µg/kg	290000	20.6		290000				
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.9	U	1.9	U
Fluoranthene	µg/kg	3000000	25	n	3000000				
Pentachlorophenol	µg/kg	4000			4000				
Phenanthrene	µg/kg	2300000	10.9		2300000				
Pyrene	µg/kg	2300000	20	n	2300000				

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Table E2-17. Analytical Results Summary for Surface Soil Samples at EC-33

						Location	EC-33-01		EC-33-02		EC-33-03	
						Sample Name	EC-33-1-SO-0.5		EC-33-2-SO-0.5		EC-33-3-SO-0.5	
						Sample Date	7/25/13		7/25/13		7/25/13	
						Start Depth (ft bgs)	0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result	
SW846 6020A												
Arsenic	mg/kg	3	9.09		9.09		3.8		4.2		38.7	
Copper	mg/kg	4700	32.8	n	4700		12		14.9		8.5	
Nickel	mg/kg	2200	16	n	2200		7		8		4.1	
Zinc	mg/kg	35000	83.9	n	35000		58		58.4		16.8	
SW846 7196A												
Chromium, Hexavalent	mg/kg	6.3	10		10		1.7	U	1.6	U	1.8	U
SW846 8270 SIM												
Acenaphthene	µg/kg	4500000	41.5	n	4500000		0.7		1.6		1.2	
Acenaphthylene	µg/kg	2300000	363		2300000		7.7				5.3	
Anthracene	µg/kg	2.3E+07	154	n	23000000		5.2		29.2		4.4	
Benzo(a)anthracene	µg/kg	2900	1035		2900						22.6	
Benzo(a)pyrene	µg/kg	290	1036		1036						28.8	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900						50.1	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000		25.8				27	
Benzo(k)fluoranthene	µg/kg	29000	476		29000						17.7	
Chrysene	µg/kg	290000	842		290000						31.3	
Dibenz(a,h)anthracene	µg/kg	290	152		290		8.6		29		6.7	
Fluorene	µg/kg	3000000	40	n	3000000		1.2		3.3		1.5	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900						23.4	
Naphthalene	µg/kg	17000	13.3		17000		1.7		2.8		1.3	
Phenanthrene	µg/kg	2300000	500		2300000				32.1		15.9	
SW846 8270D												
Acenaphthylene	µg/kg	2300000	363		2300000				109			
Benzo(a)anthracene	µg/kg	2900	1035		2900		47.6		272			
Benzo(a)pyrene	µg/kg	290	1036		1036		54.6		294			
Benzo(b)fluoranthene	µg/kg	2900	1116		2900		90.3		483			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000				134			
Benzo(k)fluoranthene	µg/kg	29000	476		29000		38.7		186			
Chrysene	µg/kg	290000	842		290000		61.3		342			
Fluoranthene	µg/kg	3000000	1488	n	3000000		74.1		476		40.5	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900		25		159			
Pentachlorophenol	µg/kg	4000			4000		105	U	429	U	118	U
Phenanthrene	µg/kg	2300000	500		2300000		22.7					
Pyrene	µg/kg	2300000	1117	n	2300000		77.7		444		30.5	

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Table E2-18. Analytical Results Summary for Subsurface Soil at EC-33

					Location	EC-33-01		EC-33-02		EC-33-03	
					Sample Name	EC-33-1-SO-04		EC-33-2-SO-04		EC-33-3-SO-04	
					Sample Date	7/25/13		7/25/13		7/25/13	
					Start Depth (ft bgs)	3		3		3	
					End Depth (ft bgs)	4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Arsenic	mg/kg	3	9.26		9.26	2		1.5		7.7	
Copper	mg/kg	4700	14.4	n	4700	2.8		1.4		7.4	
Nickel	mg/kg	2200	14	n	2200	2.3		1.1		3.2	
Zinc	mg/kg	35000	44.6	n	35000	12		4		13.4	
SW846 7196A											
Chromium, Hexavalent	mg/kg	6.3	2.6		6.3	1.7	U	1.8	U	1.7	U
SW846 8270 SIM											
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.5	U	1.6	U	1.5	U
Acenaphthylene	µg/kg	2300000	2.38		2300000	1.5	U	1.6		0.54	
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	1.5	U	0.54		0.7	
Benzo(a)anthracene	µg/kg	2900	16.3		2900	1.5	U	1.6	U	1.5	U
Benzo(a)pyrene	µg/kg	290	11.9		290	1.5	U	1.6	UJ	0.68	
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	1.5	U	1.6	UJ	1.6	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	1.5	U	1.6	UJ	0.84	
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	1.5	U	1.6	UJ	1.5	U
Chrysene	µg/kg	290000	20.6		290000	1.5	U	1.6	U	1.5	U
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.5	U	1.6	UJ	1.5	U
Fluoranthene	µg/kg	3000000	25	n	3000000	1.5	U	0.98		1.5	U
Fluorene	µg/kg	3000000	31.7	n	3000000	1.5	U	1.6	U	1.5	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	1.5	U	1.6	UJ	1.5	U
Naphthalene	µg/kg	17000	2.2		17000	0.61		1.6	U	1.5	U
Phenanthrene	µg/kg	2300000	10.9		2300000	1.5	U	1.6	U	0.62	
Pyrene	µg/kg	2300000	20	n	2300000	1.5	U	0.9		0.58	
SW846 8270D											
Pentachlorophenol	µg/kg	4000			4000	113	U	118	U	112	U

Table E2-19. Analytical Results Summary for Surface Soil Samples at EC-34

					Location	EC-34-01		EC-34-02		EC-34-03	
					Sample Name	EC-34-01-SO-0.5		EC-34-02-SO-0.5		EC-34-03-SO-0.5	
					Sample Date	7/22/13		7/22/13		7/22/13	
					Start Depth (ft bgs)	0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8260B											
Benzene	µg/kg	5100			5100	0.65	J	0.95	U	1.1	U
Ethylbenzene	µg/kg	25000			25000	1.1	U	0.95	U	1.1	U
Naphthalene	µg/kg	17000	13.3		17000	2.3	B	0.95	U	1.1	U
Toluene	µg/kg	5E+06		n	4700000	1.1	U	0.95	U	1.1	U
Xylenes (total)	µg/kg	250000		n	250000	3.3	U	2.8	U	3.4	U

Table E2-20. Analytical Results Summary for Subsurface Soil at EC-34

					Location	EC-34-01		EC-34-02		EC-34-03	
					Sample Name	EC-34-01-SO-04		EC-34-02-SO-05		EC-34-03-SO-04	
					Sample Date	7/22/13		7/22/13		7/22/13	
					Start Depth (ft bgs)	3		4		3	
					End Depth (ft bgs)	4		5		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8260B											
Benzene	µg/kg	5100			5100	0.94	U	1.1	UL	0.89	U
Ethylbenzene	µg/kg	25000			25000	0.94	U	105	J	0.89	U
Naphthalene	µg/kg	17000	2.2		17000	0.94	U	3420		0.89	U
Toluene	µg/kg	5E+06		n	5E+06	0.94	U	1.1	UL	0.89	U
Xylenes (total)	µg/kg	250000		n	250000	2.8	U	507	J	2.7	U

Table E2-21. Analytical Results Summary for Surface Soil Samples at EC-35

					Location	EC-35-01		EC-35-02	
					Sample Name	EC-35-01-SO-0.5		EC-35-02-SO-0.5	
					Sample Date	7/22/13		7/22/13	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8260B									
Benzene	µg/kg	5100			5100	0.93	U	1	U
Ethylbenzene	µg/kg	25000			25000	0.93	U	1	U
Naphthalene	µg/kg	17000	13.3		17000	0.93	U	1	U
Toluene	µg/kg	5E+06		n	4700000	0.93	U	1	U
Xylenes (total)	µg/kg	250000		n	250000	2.8	U	3	U

Table E2-22. Analytical Results Summary for Subsurface Soil at EC-35

					Location	EC-35-01		EC-35-02	
					Sample Name	EC-35-01-SO-06		EC-35-02-SO-04	
					Sample Date	7/22/13		7/22/13	
					Start Depth (ft bgs)	5		3	
					End Depth (ft bgs)	6		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8260B									
Benzene	µg/kg	5100			5100	1.1	U	1.1	U
Ethylbenzene	µg/kg	25000			25000	1.1	U	1.1	U
Naphthalene	µg/kg	17000	2.2		17000	1.1	U	1.1	U
Toluene	µg/kg	5E+06		n	5E+06	1.1	U	1.1	U
Xylenes (total)	µg/kg	250000		n	250000	3.3	U	3.4	U

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Table E2-23. Analytical Results Summary for Surface Soil Samples at EC-36

					Location	EC-36-01		EC-36-02		EC-36-03		EC-36-04		EC-36-05		EC-36-06		EC-36-07		EC-36-08		EC-36-09	
					Sample Name	EC-36-1-SO-0.5		EC-36-2-SO-0.5		EC-36-3-SO-0.5		EC-36-4-SO-0.5		EC-36-5-SO-0.5		EC-36-6-SO-0.5		EC-36-7-SO-0.5		EC-36-08-SO-0.5		EC-36-09-SO-0.5	
					Sample Date	7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		9/29/15		9/29/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Arsenic	mg/kg	3	9.09		9.09	0.88		7.3		3.8		7.6		5.1		8.1		5.8					
Cadmium	mg/kg	98	0.17	n	98	0.36	U	1.1		0.37		0.46		10.2		2.6		1.6					
Chromium	mg/kg		24.9		24.9	3.9		21.1		13.6		16.2		12.1		16.5		17.7					
Copper	mg/kg	4700	32.8	n	4700	2		46.4		14.4		22.8		14		121		21.7					
Lead	mg/kg	800	124		800	3.5		358		62.4		191		56.3		1150		109					
Zinc	mg/kg	35000	83.9	n	35000	6	B	184		38.3		57.2		55.7		622		422					
SW846 7471B																							
Mercury	mg/kg	4.6	0.11	n	4.6	0.17	U	0.24		0.13	U	0.14		0.14	U	0.18		0.071					
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	1.7	U			0.58		1.1				16.8		0.39					
Acenaphthylene	µg/kg	2300000	363		2300000	0.9		106		3.9		13.1				52.5		29.7					
Anthracene	µg/kg	2.3E+07	154	n	23000000	1.7	U			1.9		6.5											
Benzo(a)anthracene	µg/kg	2900	1035		2900	1.7	U			17	K	60.4											
Benzo(a)pyrene	µg/kg	290	1036		1036	1.7	U																
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	1.7	U																
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	1.7	U			13.9		38.2						76.3					
Benzo(k)fluoranthene	µg/kg	29000	476		29000	1.7	U			8.3													
Chrysene	µg/kg	290000	842		290000	1.7	U																
Dibenz(a,h)anthracene	µg/kg	290	152		290	1.7	U			3.6		10.9		78.5	J	59.5		21.8					
Fluoranthene	µg/kg	3000000	1488	n	3000000	1.7	U																
Fluorene	µg/kg	3000000	40	n	3000000	1.7	U	67.7		0.76		1.8		80.5	J	22.2		2.3					
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	1.7	U			12.8		37.8						74.8					
Naphthalene	µg/kg	17000	13.3		17000	1.7	U	9.8		0.89		2.9		6.6	J	6.2		1.4					
Phenanthrene	µg/kg	2300000	500		2300000	1.7	U			9.3													
Pyrene	µg/kg	2300000	1117	n	2300000	1.7	U																
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000			51.3						41.8	J								
Acenaphthylene	µg/kg	2300000	363		2300000									77.5	J								
Anthracene	µg/kg	2.3E+07	154	n	23000000			166						156	J	77.8		16					
Benzo(a)anthracene	µg/kg	2900	1035		2900			460						523	J	326		128					
Benzo(a)pyrene	µg/kg	290	1036		1036			534		18.7		58.8		490	J	334		108					
Benzo(b)fluoranthene	µg/kg	2900	1116		2900			767		27.7		96.2		540	J	480		157	J				
Benzo(ghi)perylene	µg/kg	2300000	708		2300000			367						169	J	136							
Benzo(k)fluoranthene	µg/kg	29000	476		29000			291				41.1		221	J	205		71.7					
Chrysene	µg/kg	290000	842		290000			561		24.3		75.3		656	J	392		139					
Dibenz(a,h)anthracene	µg/kg	290	152		290			86.6															
Fluoranthene	µg/kg	3000000	1488	n	3000000			1030		33.4		111		975	J	652		194					
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900			327						178	J	158							
Phenanthrene	µg/kg	2300000	500		2300000			834				45.8		821	J	368		37.7					
Pyrene	µg/kg	2300000	1117	n	2300000			906		30.3		93.3		1290	J	588		169					

Table E2-23. Analytical Results Summary for Surface Soil Samples at EC-36

					Location	EC-36-01		EC-36-02		EC-36-03		EC-36-04		EC-36-05		EC-36-06		EC-36-07		EC-36-08		EC-36-09	
					Sample Name	EC-36-1-SO-0.5		EC-36-2-SO-0.5		EC-36-3-SO-0.5		EC-36-4-SO-0.5		EC-36-5-SO-0.5		EC-36-6-SO-0.5		EC-36-7-SO-0.5		EC-36-08-SO-0.5		EC-36-09-SO-0.5	
					Sample Date	7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		9/29/15		9/29/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	184		7520	J	4960	J	8820	J	2710		1710		7130	J	6080	J	4670	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.9	U	21.3		18.1		186		6.38	J	38.8		9.4	J	28.7	J	48.3	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	4.4	J	127		46		165		26.3		38.3		43.5		88.9	J	99.6	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.96	U	22.9		19.2		59.3		8.32		57.4		14.5		18.3	J	46.3	J
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.96	U	2.44	J	3.66	U	4.02	J	3.65	U	4.85	J	3.35	U	2.01	J	4.44	
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.96	U	3	J	3.66	U	1.99	J	3.65	U	2.53	J	3.35	U	1.86	J	2.98	
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.96	U	5.54	J	2.97	J	6.23		2.29	J	16.3		3.09	J	4.04		12.3	
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.96	U	6.09		2.11	J	5.87		3.65	U	3.53	J	3.35	U	4.11		4.29	
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.96	U	4.96	J	3.29	J	5.45	J	2.04	J	15.8		2.69	J	3		9.99	
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.96	U	5.79		2.05	J	4.28	J	3.65	U	3.74	J	3.35	U	4.25		3.79	
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.96	U	3.79	U	3.66	U	3.84	U	3.65	U	4.42	J	3.35	U	0.9	J	2.65	J
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.96	U	2.21	J	3.66	U	3.84	U	3.65	U	3	J	3.35	U	1.66	J	2.24	J
1,2,3,7,8-PeCDF	pg/g	744			744	3.96	U	3.02	J	2.01	J	3.06	J	3.65	U	16.6		3.35	U	1.75	J	7.62	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.96	U	5.75		3.31	J	6.76		2.39	J	14.6		2.77	J	3.93		12.8	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.96	U	6.96		3.67	J	7.96		2.4	J	21.7		3.43	J	4.69	J	16.4	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.79	U	0.756	U	0.729	U	0.766	U	0.728	U	1.39		0.669	U	0.289	J	0.669	J
2,3,7,8-TCDF	pg/g	219			219	0.79	U	8.78		6.94		5.88		3.06		28.3		2.27		2.1	J	10.4	
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.96	U	38.5		32.1		159		10.5		81		21.5		34.3		74.5	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	13.9		287		105		403		61.9		87.1		96		196		220	
Total Hexachlorodibenzofuran	pg/g	223			223	3.96	U	75.6		45.9		93.2		19.6		162		30.8		40.9		114	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.23	J	77.2		21.8		52.9		8.13		46.5		11.3		46.9		57.1	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.96	U	152	J	94.2	J	119	J	28.1		317	J	42.3	J	52.4		167	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.96	U	18.7		3.01	J	11.1		3.65	U	32.9	J	1.86	J	13.1		31.4	
Total Tetrachlorodibenzofuran	pg/g	219			219	0.79	U	113	J	74.2	J	85.3	J	48.2		576	J	37	J	16.3		211	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.79	U	16.1		2.68		13.9		1.72		35.8		1.51		6.72		22	

Table E2-23. Analytical Results Summary for Surface Soil Samples at EC-36

					Location	EC-36-10		EC-36-11		EC-36-12		EC-36-13		EC-36-14		EC-36-15		EC-36-16		EC-36-17		EC-36-18	
					Sample Name	EC-36-10-SO-0.5		EC-36-11-SO-0.5		EC-36-12-SO-0.5		EC-36-13-SO-0.5		EC-36-14-SO-0.5		EC-36-15-SO-0.5		EC-36-16-SO-0.5		EC-36-17-SO-0.5		EC-36-18-SO-0.5	
					Sample Date	9/29/15		9/29/15		9/29/15		10/5/15		10/5/15		10/5/15		2/8/16		2/8/16		2/8/16	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Arsenic	mg/kg	3	9.09		9.09																		
Cadmium	mg/kg	98	0.17	n	98																		
Chromium	mg/kg		24.9		24.9																		
Copper	mg/kg	4700	32.8	n	4700																		
Lead	mg/kg	800	124		800							628		100		352							
Zinc	mg/kg	35000	83.9	n	35000																		
SW846 7471B																							
Mercury	mg/kg	4.6	0.11	n	4.6																		
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000																		
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000																		
Benzo(a)anthracene	µg/kg	2900	1035		2900																		
Benzo(a)pyrene	µg/kg	290	1036		1036																		
Benzo(b)fluoranthene	µg/kg	2900	1116		2900																		
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	476		29000																		
Chrysene	µg/kg	290000	842		290000																		
Dibenz(a,h)anthracene	µg/kg	290	152		290																		
Fluoranthene	µg/kg	3000000	1488	n	3000000																		
Fluorene	µg/kg	3000000	40	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900																		
Naphthalene	µg/kg	17000	13.3		17000																		
Phenanthrene	µg/kg	2300000	500		2300000																		
Pyrene	µg/kg	2300000	1117	n	2300000																		
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000																		
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000																		
Benzo(a)anthracene	µg/kg	2900	1035		2900																		
Benzo(a)pyrene	µg/kg	290	1036		1036																		
Benzo(b)fluoranthene	µg/kg	2900	1116		2900																		
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	476		29000																		
Chrysene	µg/kg	290000	842		290000																		
Dibenz(a,h)anthracene	µg/kg	290	152		290																		
Fluoranthene	µg/kg	3000000	1488	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900																		
Phenanthrene	µg/kg	2300000	500		2300000																		
Pyrene	µg/kg	2300000	1117	n	2300000																		

Table E2-23. Analytical Results Summary for Surface Soil Samples at EC-36

					Location	EC-36-10		EC-36-11		EC-36-12		EC-36-13		EC-36-14		EC-36-15		EC-36-16		EC-36-17		EC-36-18	
					Sample Name	EC-36-10-SO-0.5		EC-36-11-SO-0.5		EC-36-12-SO-0.5		EC-36-13-SO-0.5		EC-36-14-SO-0.5		EC-36-15-SO-0.5		EC-36-16-SO-0.5		EC-36-17-SO-0.5		EC-36-18-SO-0.5	
					Sample Date	9/29/15		9/29/15		9/29/15		10/5/15		10/5/15		10/5/15		2/8/16		2/8/16		2/8/16	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	4520	J	2790		2570		2070	J	8140	J	3440	J	2880		1160		1730	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	18.3		22.5		20		24.1	J	29.5	J	21.9	J	24.4		17.5		15	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	82.2		59.8		54.2		43.5	J	67.5	J	55.3	J	72.9		29.2		33	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	11.6		15.5		12.6		22.9	J	13.8	J	14.3	J	20.1	J	8.86		6.71	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	1.31	U	1.72	J	1.24	U	2.03	J	1.6	J	1.56	J	2.01	J	0.923	U	0.637	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	1.4	J	1.5	J	1.2	J	1.92	J	1.28	J	1.33	J	1.19	J	0.8	J	0.862	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	2.58		3.93		3.01		6.72	J	2.92	J	2.76	J	4.42		2.09	J	1.5	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	1.97	J	2.25	J	2.01	J	2.67	J	2.44	J	2.65	J	1.78	J	1.53	J	1.26	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	2.06	J	2.28	J	2.15	J	5.48	J	1.87	J	2.02	J	3.15	J	1.34	J	0.944	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	1.89	J	2.07	J	1.69	J	2.46	J	1.85	J	2.22	J	2	J	1.32	J	1.21	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	1.23	UJ	0.999	UJ	0.738	U	1.6	J	2.18	J	0.842	J	0.955	J	0.5	U	0.249	UJ
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.772	J	0.754	J	1.12	J	2.28	J	0.972	J	1.02	J	0.786	J	0.555	J	0.518	J
1,2,3,7,8-PeCDF	pg/g	744			744	1.13	J	1.42	J	1.32	J	6.76	J	1.33	J	1.17	J	1.68	J	0.832	J	0.648	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.07		3.27	J	2.69	J	6.02	J	2.89	J	3.08	J	3.77		2.12	J	1.45	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.05		4.38	J	3.53		10	J	3.55	J	3.91	J	4.38		2.59	J	1.77	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.242	J	0.349	U	0.149	U	1.36	J	0.213	UJ	0.253	UJ	0.282	J	0.257	J	0.191	J
2,3,7,8-TCDF	pg/g	219			219	1.61		2.13		2.32		12.2	J	2.06	J	1.98	J	2.4		1.78		1.27	
Total Heptachlorodibenzofuran	pg/g	2210			2210	14.4		26.3		23.3		43.6		33.3		30.2		34.6		18.3		13.8	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	183		139		117		89.1		143		116		165		62		66.5	
Total Hexachlorodibenzofuran	pg/g	223			223	24.8		24.4		29.5		52.6		32.4		29.8		41.8		20.1		14.4	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	21.8		22.5		23.6		28.9		23.4		20.7		24.5		17.7		15.3	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	24.6		29.2		37.5		103		25.7		32.2		46		28.4		18.1	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	5.44		7.15		11.4		16.6		8.53		6.62		7.95		7.27		5.16	
Total Tetrachlorodibenzofuran	pg/g	219			219	13.2		19.4		26.2		188		19.3		14.4		35.4		13.3		9.41	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.145	J	4.71		3.01		7.44		1.42		2.15		4.24		4.68		2.62	

Table E2-23. Analytical Results Summary for Surface Soil Samples at EC-36

					Location	EC-36-19		EC-36-20		EC-36-21		
					Sample Name	EC-36-19-SO-0.5		EC-36-20-SO-0.5		EC-36-21-SO-0.5		
					Sample Date	2/8/16		2/8/16		2/8/16		
					Start Depth (ft bgs)	0		0		0		
					End Depth (ft bgs)	0.5		0.5		0.5		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		
SW846 6020A												
Arsenic	mg/kg	3	9.09		9.09							
Cadmium	mg/kg	98	0.17	n	98							
Chromium	mg/kg		24.9		24.9							
Copper	mg/kg	4700	32.8	n	4700							
Lead	mg/kg	800	124		800							
Zinc	mg/kg	35000	83.9	n	35000							
SW846 7471B												
Mercury	mg/kg	4.6	0.11	n	4.6							
SW846 8270 SIM												
Acenaphthene	µg/kg	4500000	41.5	n	4500000							
Acenaphthylene	µg/kg	2300000	363		2300000							
Anthracene	µg/kg	2.3E+07	154	n	23000000							
Benzo(a)anthracene	µg/kg	2900	1035		2900							
Benzo(a)pyrene	µg/kg	290	1036		1036							
Benzo(b)fluoranthene	µg/kg	2900	1116		2900							
Benzo(ghi)perylene	µg/kg	2300000	708		2300000							
Benzo(k)fluoranthene	µg/kg	29000	476		29000							
Chrysene	µg/kg	290000	842		290000							
Dibenz(a,h)anthracene	µg/kg	290	152		290							
Fluoranthene	µg/kg	3000000	1488	n	3000000							
Fluorene	µg/kg	3000000	40	n	3000000							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900							
Naphthalene	µg/kg	17000	13.3		17000							
Phenanthrene	µg/kg	2300000	500		2300000							
Pyrene	µg/kg	2300000	1117	n	2300000							
SW846 8270D												
Acenaphthene	µg/kg	4500000	41.5	n	4500000							
Acenaphthylene	µg/kg	2300000	363		2300000							
Anthracene	µg/kg	2.3E+07	154	n	23000000							
Benzo(a)anthracene	µg/kg	2900	1035		2900							
Benzo(a)pyrene	µg/kg	290	1036		1036							
Benzo(b)fluoranthene	µg/kg	2900	1116		2900							
Benzo(ghi)perylene	µg/kg	2300000	708		2300000							
Benzo(k)fluoranthene	µg/kg	29000	476		29000							
Chrysene	µg/kg	290000	842		290000							
Dibenz(a,h)anthracene	µg/kg	290	152		290							
Fluoranthene	µg/kg	3000000	1488	n	3000000							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900							
Phenanthrene	µg/kg	2300000	500		2300000							
Pyrene	µg/kg	2300000	1117	n	2300000							

Table E2-23. Analytical Results Summary for Surface Soil Samples at EC-36

					Location	EC-36-19		EC-36-20		EC-36-21		
					Sample Name	EC-36-19-SO-0.5		EC-36-20-SO-0.5		EC-36-21-SO-0.5		
					Sample Date	2/8/16		2/8/16		2/8/16		
					Start Depth (ft bgs)	0		0		0		
					End Depth (ft bgs)	0.5		0.5		0.5		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	7610	J	2830		4390		
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	19.9		7.76		14.2		
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	64.9		44.1		49.1		
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	8.88		4.86		8.56		
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.768	U	0.548	U	1.17	J	
1,2,3,4,7,8-HxCDD	pg/g	223			223	1.19	J	0.943	J	0.957	J	
1,2,3,4,7,8-HxCDF	pg/g	219			219	1.92	J	1.17	J	1.88	J	
1,2,3,6,7,8-HxCDD	pg/g	223			223	1.77	J	1.83	J	1.19	J	
1,2,3,6,7,8-HxCDF	pg/g	219			219	1.18	J	0.895	J	1.44	J	
1,2,3,7,8,9-HxCDD	pg/g	223			223	1.59	J	2.03	J	1.3	J	
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.341	U	0.362	U	0.665	J	
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.59	J	0.557	J	0.736	J	
1,2,3,7,8-PeCDF	pg/g	744			744	0.736	J	0.555	U	0.795	J	
2,3,4,6,7,8-HxCDF	pg/g	223			223	1.67	J	0.894	J	1.92	J	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	1.67	J	1.04	J	2.12	J	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.309	J	0.113	U	0.229	J	
2,3,7,8-TCDF	pg/g	219			219	1.43		0.562	J	1.38	J	
Total Heptachlorodibenzofuran	pg/g	2210			2210	18.5		8.89		15.7		
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	144		102		104		
Total Hexachlorodibenzofuran	pg/g	223			223	18		9.06		17.8		
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	23.5		22.2		11.2		
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	18.5		9.63		18.9		
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	6.78		2.34	J	4.41		
Total Tetrachlorodibenzofuran	pg/g	219			219	14.9		8.21		17.2		
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	3.7		1.52		1.51		

Table E2-24. Analytical Results Summary for Subsurface Soil at EC-36

					Location	EC-36-01		EC-36-02		EC-36-03		EC-36-04		EC-36-05		EC-36-06		EC-36-07		EC-36-08		EC-36-09	
					Sample Name	EC-36-1-SO-04		EC-36-2-SO-04		EC-36-3-SO-04		EC-36-4-SO-04		EC-36-5-SO-03		EC-36-6-SO-04		EC-36-7-SO-04		EC-36-08-SO-2		EC-36-09-SO-2	
					Sample Date	7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		9/29/15		9/29/15	
					Start Depth (ft bgs)	3		3		3		3		2		3		3		1		1	
					End Depth (ft bgs)	4		4		4		4		3		4		4		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Arsenic	mg/kg	3	9.26		9.26	0.66		4.6		7.4		0.95		3		0.8		3.3					
Cadmium	mg/kg	98		n	98	0.33	U	0.37	U	0.31	U	0.3	U	0.91		0.33	U	0.32	U				
Chromium	mg/kg		35.2		35.16	8.9		20.1		16.3		7		9.4		3.3		9.1					
Copper	mg/kg	4700	14.4	n	4700	1.4		8.1		7.5		2.1		9.7		0.84		3.7					
Lead	mg/kg	800	14		800	0.79		7.7		9.8		2.1		58.3		1.1		5.6					
Zinc	mg/kg	35000	44.6	n	35000	1.1	B	14.6		8		7.4		110		1.6	B	34.4					
SW846 7471B																							
Mercury	mg/kg	4.6	0.09	n	4.6	0.12	U	0.14	U	0.13	U	0.12	U	0.14	UL	0.13	U	0.13	U				
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.4	U	1.4	U	1.5	U	1.4	U	1.4		1.4	U	1.4	U				
Acenaphthylene	µg/kg	2300000	2.38		2300000	0.51		0.5		0.58		1.4	U	9.3		1.2		0.51					
Anthracene	µg/kg	2.3E+07	2.6	n	23000000	1.4	U	1.4	U	1.5	U	1.4	U	8		1.4	U	1.4	U				
Benzo(a)anthracene	µg/kg	2900	16.3		2900	1.4	U	1.4	U	1.5	U	1.4	U	57.8		1.4	U	1.4	U				
Benzo(a)pyrene	µg/kg	290	11.9		290	1.4	U	0.72		1.5	U	1.4	U			1.4	U	1.4	U				
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	1.4	U	1.1		1.5	U	1.4	U			1.4	U	1.4	U				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	1.4	U	1.6		1.5	U	1.4	U	30.7		1.4	U	1.4	U				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	1.4	U	1.4	U	1.5	U	1.4	U			1.4	U	1.4	U				
Chrysene	µg/kg	290000	20.6		290000	1.4	U	1.4	U	1.5	U	1.4	U			1.4	U	1.4	U				
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.4	U	1.4	U	1.5	U	1.4	U	8.4		1.4	U	1.4	U				
Fluoranthene	µg/kg	3000000	25	n	3000000	1.4	U	0.75		1.5	U	1.4	U			1.4	U	1.4	U				
Fluorene	µg/kg	3000000	31.7	n	3000000	1.4	U	1.4	U	1.5	U	1.4	U	2.6		1.4	U	1.4	U				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	1.4	U	1		1.5	U	1.4	U	29.3		1.4	U	1.4	U				
Naphthalene	µg/kg	17000	2.2		17000	1.4	U	1.4	U	1.5	U	1.4	U	3		1.4	U	1.4	U				
Phenanthrene	µg/kg	2300000	10.9		2300000	1.4	U	1.4	U	1.5	U	1.4	U			1.4	U	1.4	U				
Pyrene	µg/kg	2300000	20	n	2300000	1.4	U	0.74		1.5	U	1.4	U			1.4	U	1.4	U				
SW846 8270D																							
Benzo(a)pyrene	µg/kg	290	11.9		290									51.5									
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900									72.8									
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000									29.3									
Chrysene	µg/kg	290000	20.6		290000									65.9									
Fluoranthene	µg/kg	3000000	25	n	3000000									98.2									
Phenanthrene	µg/kg	2300000	10.9		2300000									51									
Pyrene	µg/kg	2300000	20	n	2300000									90.4									

Table E2-24. Analytical Results Summary for Subsurface Soil at EC-36

					Location	EC-36-01		EC-36-02		EC-36-03		EC-36-04		EC-36-05		EC-36-06		EC-36-07		EC-36-08		EC-36-09	
					Sample Name	EC-36-1-SO-04		EC-36-2-SO-04		EC-36-3-SO-04		EC-36-4-SO-04		EC-36-5-SO-03		EC-36-6-SO-04		EC-36-7-SO-04		EC-36-08-SO-2		EC-36-09-SO-2	
					Sample Date	7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		7/23/13		9/29/15		9/29/15	
					Start Depth (ft bgs)	3		3		3		3		2		3		3		1		1	
					End Depth (ft bgs)	4		4		4		4		3		4		4		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	1230		2810		31600	J	415		1580		693		1500		12700	J	707	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	6.99	U	7.17	U	7.32	U	6.71	U	6.79	U	6.7	U	6.4	U	0.983	U	134	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	10		11.9		315		7.45		20.6		14.7		9.74		36		128	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.51	U	3.6	U	3.67	U	3.37	U	4.41	J	3.36	U	3.21	U	0.414	UJ	753	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.0624	U	35.6	
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.17	U	20.2	
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.105	UJ	210	
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.51	U	3.6	U	2.41	J	3.37	U	3.4	U	3.36	U	3.21	U	0.215	UJ	27.3	
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.069	UJ	204	
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.51	U	3.6	U	4.53	J	3.37	U	3.4	U	3.36	U	3.21	U	0.276	J	23.1	
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.0617	U	38.7	
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.145	J	26.4	
1,2,3,7,8-PeCDF	pg/g	744			744	3.51	U	3.6	U	3.67	U	3.37	U	1.93	J	3.36	U	3.21	U	0.0658	J	109	
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.51	U	3.6	U	3.67	U	3.37	U	3.4	U	3.36	U	3.21	U	0.0715	U	300	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.51	U	3.6	U	3.67	U	3.37	U	2.09	J	3.36	U	3.21	U	0.0912	J	305	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.699	U	0.717	U	0.732	U	0.671	U	0.679	U	0.67	U	0.64	U	0.0305	U	6.9	
2,3,7,8-TCDF	pg/g	219			219	0.699	U	0.717	U	0.732	U	0.671	U	7.08		0.67	U	0.64	U	0.0398	J	108	
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.51	U	3.6	U	3.67	U	3.37	U	4.41	J	3.36	U	3.21	U	0.785	J	932	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	25.7		23.8		755		22.2		52.1		38		25.9		70.5		261	
Total Hexachlorodibenzofuran	pg/g	223			223	3.51	U	3.6	U	3.67	U	3.37	U	5.43		3.36	U	3.21	U	0.432	J	2010	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.6	J	3.6	U	86.2		3.89	J	7.29		9.28		3.76	J	2.42	J	301	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.51	U	3.6	U	3.67	U	3.37	U	17		3.36	U	3.21	U	0.516	J	2830	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.51	U	3.6	U	5.31	J	3.37	U	3.4	U	3.36	U	3.21	U	0.402	J	265	
Total Tetrachlorodibenzofuran	pg/g	219			219	0.699	U	0.717	U	0.732	U	0.671	U	63.8		0.67	U	0.64	U	0.25	J	2660	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.699	U	0.717	U	1.51		0.671	U	0.88	J	0.67	U	0.64	U	0.0305	U	193	

Table E2-24. Analytical Results Summary for Subsurface Soil at EC-36

					Location	EC-36-09		EC-36-10		EC-36-11		EC-36-12		EC-36-13		EC-36-13		EC-36-14		EC-36-15		EC-36-16										
					Sample Name	EC-36-09-SO-4		EC-36-10-SO-2		EC-36-11-SO-2		EC-36-12-SO-2		EC-36-13-SO-4		EC-36-13-SO-4		EC-36-14-SO-4		EC-36-15-SO-4		EC-36-16-SO-2										
					Sample Date	2/8/16		9/29/15		9/29/15		9/29/15		10/5/15		2/8/16		10/5/15		10/5/15		2/8/16										
					Start Depth (ft bgs)	4		1		1		1		4		4		4		4		2										
					End Depth (ft bgs)	6		2		2		2		4.5		6		4.5		4.5		4										
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result									
SW846 6020A																															
Arsenic	mg/kg	3	9.26		9.26																										
Cadmium	mg/kg	98		n	98																										
Chromium	mg/kg		35.2		35.16																										
Copper	mg/kg	4700	14.4	n	4700																										
Lead	mg/kg	800	14		800									296				79.8		794											
Zinc	mg/kg	35000	44.6	n	35000																										
SW846 7471B																															
Mercury	mg/kg	4.6	0.09	n	4.6																										
SW846 8270 SIM																															
Acenaphthene	µg/kg	4500000	0.92	n	4500000																										
Acenaphthylene	µg/kg	2300000	2.38		2300000																										
Anthracene	µg/kg	2.3E+07	2.6	n	23000000																										
Benzo(a)anthracene	µg/kg	2900	16.3		2900																										
Benzo(a)pyrene	µg/kg	290	11.9		290																										
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900																										
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																										
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																										
Chrysene	µg/kg	290000	20.6		290000																										
Dibenz(a,h)anthracene	µg/kg	290	2.53		290																										
Fluoranthene	µg/kg	3000000	25	n	3000000																										
Fluorene	µg/kg	3000000	31.7	n	3000000																										
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900																										
Naphthalene	µg/kg	17000	2.2		17000																										
Phenanthrene	µg/kg	2300000	10.9		2300000																										
Pyrene	µg/kg	2300000	20	n	2300000																										
SW846 8270D																															
Benzo(a)pyrene	µg/kg	290	11.9		290																										
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900																										
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																										
Chrysene	µg/kg	290000	20.6		290000																										
Fluoranthene	µg/kg	3000000	25	n	3000000																										
Phenanthrene	µg/kg	2300000	10.9		2300000																										
Pyrene	µg/kg	2300000	20	n	2300000																										

Table E2-24. Analytical Results Summary for Subsurface Soil at EC-36

					Location	EC-36-09		EC-36-10		EC-36-11		EC-36-12		EC-36-13		EC-36-13		EC-36-14		EC-36-15		EC-36-16	
					Sample Name	EC-36-09-SO-4		EC-36-10-SO-2		EC-36-11-SO-2		EC-36-12-SO-2		EC-36-13-SO-4		EC-36-13-SO-4		EC-36-14-SO-4		EC-36-15-SO-4		EC-36-16-SO-2	
					Sample Date	2/8/16		9/29/15		9/29/15		9/29/15		10/5/15		2/8/16		10/5/15		10/5/15		2/8/16	
					Start Depth (ft bgs)	4		1		1		1		4		4		4		4		2	
					End Depth (ft bgs)	6		2		2		2		4.5		6		4.5		4.5		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	25700	D	483		23400	J	11700	J	408	J	764		1780	J	1170	J	4330	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	0.877	U	0.814	U	1.21	U	0.816	U	16.7	J	1.63	U	7.24	J	6.79	J	3.85	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	54.4		3.54	B	159		76.7		20.7	J	37.4		18.2	J	13.1	J	22.7	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	0.321	UJ	0.338	UJ	0.539	U	0.37	UJ	29.8	J	1.78	J	3.13	J	4.08	J	2.12	J
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.0664	UJ	0.198	UJ	0.115	UJ	0.118	U	2.32	J	0.19	UJ	0.505	UJ	0.561	UJ	0.351	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.273	J	0.188	J	1.12	J	0.677	J	1.54	J	0.683	J	0.381	J	0.343	J	0.367	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.11	J	0.194	U	0.2	UJ	0.158	U	9.41	J	0.535	J	0.648	J	0.804	J	0.524	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	0.389	J	0.215	J	1.45	J	1.07	J	2.45	J	1.46	J	0.862	J	0.631	J	0.507	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.096	UJ	0.154	U	0.107	UJ	0.0847	UJ	8.57	J	0.536	J	0.456	J	0.762	J	0.373	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	0.354	J	0.23	U	2.3	J	1.64	J	2.03	J	1.8	J	0.369	J	0.541	J	0.601	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.0649	UJ	0.159	UJ	0.102	U	0.0949	U	1.79	J	0.157	UJ	0.24	UJ	0.351	UJ	0.197	UJ
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.2	J	0.106	U	0.379	J	0.428	J	2.8	J	0.42	J	0.156	UJ	0.388	J	0.338	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.0879	UJ	0.124	U	0.153	U	0.127	U	7.81	J	0.497	UJ	0.21	UJ	0.51	J	0.294	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.119	U	0.204	U	0.141	UJ	0.14	U	8.2	J	0.579	U	0.507	J	0.839	J	0.417	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.112	UJ	0.121	U	0.154	U	0.129	U	11.4	J	0.823	J	0.663	J	0.862	J	0.443	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.0547	U	0.14	U	0.134	U	0.0894	U	0.921	J	0.139	J	0.196	UJ	0.136	UJ	0.133	J
2,3,7,8-TCDF	pg/g	219			219	0.226	J	0.198	U	0.165	U	0.184	U	8.88	J	1.28		0.368	UJ	1.28	J	0.312	J
Total Heptachlorodibenzofuran	pg/g	2210			2210	0.101	J	0.0799	U	0.798	J	0.201	J	47.4		2.32	J	10.4		9.99		3.15	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	105		7.04		381		199		51		140		33.4		25.8		47.7	
Total Hexachlorodibenzofuran	pg/g	223			223	0.361	J	0.664	J	0.771	J	0.463	J	83.3		3.97		3.19		6.93		2.99	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	3.95		0.477	J	37.1		23.4		23.8		46.8		4.63		3.09		5.24	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	0.107	J	0.122	U	0.154	U	0.162	J	131		8.48		1.15	J	5.66		4.37	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	0.545	J	0.106	U	1.78	J	3.27		22.4		5.56		0.156	U	0.115	U	1.29	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.983		0.198	U	0.165	U	0.184	U	129		20.7		0.368	U	2.24		2.46	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.0547	U	0.14	U	0.134	U	0.319	J	7.18		1.55		0.196	U	0.136	U	0.258	J

Table E2-24. Analytical Results Summary for Subsurface Soil at EC-36

					Location	EC-36-17		EC-36-18		EC-36-19		EC-36-20		EC-36-21	
					Sample Name	EC-36-17-SO-2		EC-36-18-SO-2		EC-36-19-SO-2		EC-36-20-SO-2		EC-36-21-SO-2	
					Sample Date	2/8/16		2/8/16		2/8/16		2/8/16		2/8/16	
					Start Depth (ft bgs)	2		2		2		2		2	
					End Depth (ft bgs)	4		4		4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Arsenic	mg/kg	3	9.26		9.26										
Cadmium	mg/kg	98		n	98										
Chromium	mg/kg		35.2		35.16										
Copper	mg/kg	4700	14.4	n	4700										
Lead	mg/kg	800	14		800										
Zinc	mg/kg	35000	44.6	n	35000										
SW846 7471B															
Mercury	mg/kg	4.6	0.09	n	4.6										
SW846 8270 SIM															
Acenaphthene	µg/kg	4500000	0.92	n	4500000										
Acenaphthylene	µg/kg	2300000	2.38		2300000										
Anthracene	µg/kg	2.3E+07	2.6	n	23000000										
Benzo(a)anthracene	µg/kg	2900	16.3		2900										
Benzo(a)pyrene	µg/kg	290	11.9		290										
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900										
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000										
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000										
Chrysene	µg/kg	290000	20.6		290000										
Dibenz(a,h)anthracene	µg/kg	290	2.53		290										
Fluoranthene	µg/kg	3000000	25	n	3000000										
Fluorene	µg/kg	3000000	31.7	n	3000000										
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900										
Naphthalene	µg/kg	17000	2.2		17000										
Phenanthrene	µg/kg	2300000	10.9		2300000										
Pyrene	µg/kg	2300000	20	n	2300000										
SW846 8270D															
Benzo(a)pyrene	µg/kg	290	11.9		290										
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900										
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000										
Chrysene	µg/kg	290000	20.6		290000										
Fluoranthene	µg/kg	3000000	25	n	3000000										
Phenanthrene	µg/kg	2300000	10.9		2300000										
Pyrene	µg/kg	2300000	20	n	2300000										

Table E2-24. Analytical Results Summary for Subsurface Soil at EC-36

					Location	EC-36-17		EC-36-18		EC-36-19		EC-36-20		EC-36-21	
					Sample Name	EC-36-17-SO-2		EC-36-18-SO-2		EC-36-19-SO-2		EC-36-20-SO-2		EC-36-21-SO-2	
					Sample Date	2/8/16		2/8/16		2/8/16		2/8/16		2/8/16	
					Start Depth (ft bgs)	2		2		2		2		2	
					End Depth (ft bgs)	4		4		4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8290															
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	2250		1380		5000	J	24200	J	7810	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	0.976	U	0.431	UJ	0.479	UJ	0.81	U	0.538	UJ
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	10.3		6.03		24.1		78.1		27.6	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	0.445	U	0.268	U	0.207	U	0.288	UJ	0.289	UJ
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.0897	U	0.123	UJ	0.0614	UJ	0.0532	U	0.0724	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.133	J	0.129	J	0.371	J	0.663	J	0.379	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.15	J	0.107	J	0.0869	J	0.094	J	0.0838	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	0.147	J	0.155	J	0.514	J	0.771	J	0.434	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.1	U	0.117	UJ	0.0948	U	0.0464	U	0.0388	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	0.148	J	0.204	J	0.711	J	0.988	J	0.58	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.0796	UJ	0.0971	UJ	0.109	U	0.0501	U	0.0447	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.0915	J	0.083	U	0.188	J	0.412	J	0.393	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.0634	U	0.0933	U	0.0749	U	0.0796	U	0.0788	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.102	UJ	0.123	U	0.0416	U	0.0776	UJ	0.0393	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.136	UJ	0.0933	U	0.0734	U	0.076	U	0.079	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.0705	U	0.0722	U	0.0808	U	0.0877	U	0.0876	U
2,3,7,8-TCDF	pg/g	219			219	0.157	J	0.0809	U	0.0888	U	0.0811	U	0.114	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	0.863	J	0.388	J	0.284	J	0.0525	U	0.0696	U
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	17.4		11.6		45.7		142		51.1	
Total Hexachlorodibenzofuran	pg/g	223			223	0.671	J	0.173	J	0.204	J	0.0894	J	0.04	U
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	0.64	J	0.575	J	6.67		10.1		4.64	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	0.783	J	0.0933	U	0.0741	U	0.0778	U	0.0788	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	0.0915	J	0.083	U	0.244	J	1.13	J	0.393	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.209	J	0.0809	U	0.0888	U	0.0811	U	0.458	J
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.0705	U	0.0722	U	0.0808	U	0.0877	U	0.0876	U

Table E2-25. Analytical Results Summary for Surface Soil Samples at EC-50

					Location	EC-50-01		EC-50-02		EC-50-03		EC-50-04		EC-50-05		EC-50-06	
					Sample Name	EC-50-1-SO-0.5		EC-50-2-SO-0.5		EC-50-3-SO-0.5		EC-50-4-SO-0.5		EC-50-5-SO-0.5		EC-50-6-SO-0.5	
					Sample Date	7/25/13		7/26/13		7/26/13		7/25/13		7/25/13		7/25/13	
					Start Depth (ft bgs)	0		0		0		0		0		0	
					End Depth (ft bgs)	5		5		5		5		5		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result	
SW846 8015C																	
Ethanol	mg/kg				NSL	24.8	U	22.6	U	22.3	U	21.3	U	22.2	U	23.1	U
Methanol	mg/kg	120000		n	120000	24.8	U	22.6	U	22.3	U	21.3	U	22.2	U	23.1	U
SW846 8082A																	
Aroclor 1016	mg/kg	5.1		n	5.1	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.028	U
Aroclor 1221	mg/kg	0.83			0.83	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.028	U
Aroclor 1232	mg/kg	0.72			0.72	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.028	U
Aroclor 1242	mg/kg	0.95			0.95	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.028	U
Aroclor 1248	mg/kg	0.95			0.95	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.028	U
Aroclor 1254	mg/kg	0.97			0.97	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.028	U
Aroclor 1260	mg/kg	0.99			0.99	0.03	U	0.028	U	0.026	U	0.025	U	0.027	U	0.058	
SW846 8260B																	
2-Butanone	µg/kg	1.9E+07		n	19000000	15.6		7.4	J	5.5	U	7.9	J	5.2	U	7.4	U
Acetone	µg/kg	6.7E+07		n	67000000	157		94.8		34.5		52.7		48.2		7.4	U
Benzene	µg/kg	5100			5100	1.4	U	0.97	U	1.1	U	1	U	1	U	1.5	U
Carbon tetrachloride	µg/kg	2900			2900	1.4	U	0.97	U	1.1	U	1	U	1	U	1.5	U
Ethylbenzene	µg/kg	25000			25000	1.4	U	0.97	U	1.1	U	1	U	1	U	1.5	U
Methylene chloride	µg/kg	320000		n	320000	76.1	K	6.7	B	80	K	12	B	16	B	33.9	K
Tetrachloroethene	µg/kg	39000		n	39000	1.4	U	0.97	U	1.1	U	1	U	1	U	1.5	U
Toluene	µg/kg	4700000		n	4700000	1.4	U	0.97	U	1.1	U	1	U	1	U	1.5	U
Trichloroethene	µg/kg	1900		n	1900	1.4	U	0.97	U	1.1	U	1	U	1	U	1.5	U
Xylenes (total)	µg/kg	250000		n	250000	4.3	U	2.9	U	3.3	U	3.1	U	3.1	U	4.4	U
SW846 8270 SIM																	
Acenaphthene	µg/kg	4500000	41.5	n	4500000	1.1	J	0.78	J	1.1	J	0.6	J	1.7	J	22.7	
Acenaphthylene	µg/kg	2300000	363		2300000	2.7		2.9		1.4	J	1.5	J	7.6		10.9	
Anthracene	µg/kg	2.3E+07	154	n	23000000	4.5		4.4		3.1		2.2		10.6			
Benzo(a)anthracene	µg/kg	2900	1035		2900	23.3		26.2		11.6		13.8		42.6			
Benzo(a)pyrene	µg/kg	290	1036		1036	28.9		28		11.4		16.6		61.7			
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	46.2		60.3		17.8		25.6		99.7			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	30.4		30.7		8.3		12.8		55.5			
Benzo(k)fluoranthene	µg/kg	29000	476		29000	17.5		19.9		6.7		9.5		38.3			
Chrysene	µg/kg	290000	842		290000	35.9		45.1		14.9		21.9		65.1			
Dibenz(a,h)anthracene	µg/kg	290	152		290	7.5		10.4		2.4		3.6		15.8		54.3	
Fluoranthene	µg/kg	3000000	1488	n	3000000	36.6		32.3		17.5		21.3		55.1			
Fluorene	µg/kg	3000000	40	n	3000000	1.2	J	1.4	J	0.99	J	0.75	J	2.6		21.4	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	24.8		29.1		8.3		11.2		50.1			
Naphthalene	µg/kg	17000	13.3		17000	1.8	J	2.8		0.98	J	1.7		21.9		8.7	
Phenanthrene	µg/kg	2300000	500		2300000	18.1		18.4		11.9		10.6		35.5			
Pyrene	µg/kg	2300000	1117	n	2300000	31.7		28.2		15		19.5		53.3			

Table E2-25. Analytical Results Summary for Surface Soil Samples at EC-50

						Location	EC-50-01		EC-50-02		EC-50-03		EC-50-04		EC-50-05		EC-50-06	
						Sample Name	EC-50-1-SO-0.5		EC-50-2-SO-0.5		EC-50-3-SO-0.5		EC-50-4-SO-0.5		EC-50-5-SO-0.5		EC-50-6-SO-0.5	
						Sample Date	7/25/13		7/26/13		7/26/13		7/25/13		7/25/13		7/25/13	
						Start Depth (ft bgs)	0		0		0		0		0		0	
						End Depth (ft bgs)	5		5		5		5		5		5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result		Result	
SW846 8270D																		
Anthracene	µg/kg	2.3E+07	154	n	23000000												94.6	
Benzo(a)anthracene	µg/kg	2900	1035		2900												229	
Benzo(a)pyrene	µg/kg	290	1036		1036												245	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900												438	J
Benzo(ghi)perylene	µg/kg	2300000	708		2300000												84.6	J
Benzo(k)fluoranthene	µg/kg	29000	476		29000												179	J
Chrysene	µg/kg	290000	842		290000												261	
Fluoranthene	µg/kg	3000000	1488	n	3000000												552	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900												97.7	J
Phenanthrene	µg/kg	2300000	500		2300000												354	
Pyrene	µg/kg	2300000	1117	n	2300000												487	

Table E2-26. Analytical Results Summary for Subsurface Soil at EC-50

					Location	EC-50-01		EC-50-02		EC-50-03		EC-50-04		EC-50-05		EC-50-06			
					Sample Name	EC-50-1-SO-04		EC-50-2-SO-02		EC-50-3-SO-04		EC-50-4-SO-04		EC-50-5-SO-04		EC-50-6-SO-04			
					Sample Date	7/25/13		7/26/13		7/26/13		7/25/13		7/25/13		7/25/13			
					Start Depth (ft bgs)	3		1		3		3		3		3			
					End Depth (ft bgs)	4		2		4		4		4		4			
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result			
SW846 8015C																			
Ethanol	mg/kg				NSL	24.9	U	23	U	23	U	24.4	U	28.1	UL	25.2	U		
Methanol	mg/kg	120000		n	120000	24.9	U	23	U	23	U	24.4	U	28.1	UL	25.2	U		
SW846 8082A																			
Aroclor 1016	mg/kg	5.1		n	5.1	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
Aroclor 1221	mg/kg	0.83			0.83	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
Aroclor 1232	mg/kg	0.72			0.72	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
Aroclor 1242	mg/kg	0.95			0.95	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
Aroclor 1248	mg/kg	0.95			0.95	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
Aroclor 1254	mg/kg	0.97			0.97	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
Aroclor 1260	mg/kg	0.99			0.99	0.03	U	0.028	U	0.029	U	0.03	U	0.034	U	0.03	U		
SW846 8260B																			
2-Butanone	µg/kg	1.9E+07		n	1.9E+07	5.1	U	5.5	U	5.4	U	5.8	U	6.7	U	5.1	U		
Acetone	µg/kg	6.7E+07		n	6.7E+07	18.2		37.5		24.8		10.5	J	7.4	J	7.6	J		
Benzene	µg/kg	5100			5100	1	U	1.1	U	1.1	U	1.2	U	1.3	U	1	U		
Carbon tetrachloride	µg/kg	2900			2900	1	U	1.1	U	1.1	U	1.2	U	1.3	U	1	U		
Ethylbenzene	µg/kg	25000			25000	1	U	1.1	U	1.1	U	1.2	U	1.3	UJ	1	U		
Methylene chloride	µg/kg	320000		n	320000	55.9	K	60.4		70.6	K	18.4	K	30.9	K	14.3	B		
Tetrachloroethene	µg/kg	39000		n	39000	1	U	1.1	U	1.1	U	1.2	U	1.3	U	1	U		
Toluene	µg/kg	4700000		n	4700000	1	U	1.1	U	1.1	U	1.2	U	1.3	U	1	U		
Trichloroethene	µg/kg	1900		n	1900	1	U	1.1	U	1.1	U	1.2	U	1.3	U	1	U		
Xylenes (total)	µg/kg	250000		n	250000	3.1	U	3.3	U	3.2	U	3.5	U	4	UJ	3.1	U		
SW846 8270 SIM																			
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.6	U	0.98	J	1.5	U	1.6	U	1.8	U	1.7	U		
Acenaphthylene	µg/kg	2300000	2.38		2300000	1.2	J	2.7		1.5	U	0.57	J	3.4		0.48	J		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	1.6	U	5.3		1.5	U	1.6	U	1.6	J	1.7	U		
Benzo(a)anthracene	µg/kg	2900	16.3		2900	1.6	U	28.9		1.5	U	1.6	U	1.8	U	1.7	U		
Benzo(a)pyrene	µg/kg	290	11.9		290	1.9	J	27		1.5	U	1.6	U	4		0.87	J		
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	4.9	J	55.2		1.5	U	1.4	J	5.5		1.3	J		
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	1.7	J	31.2		1.5	U	1.6	U	5.6	L	1.2	J		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	2.2	J	11.4		1.5	U	1.6	U	2	J	1.7	U		
Chrysene	µg/kg	290000	20.6		290000	1.6	J	67.9		1.5	U	1.6	U	1.8	U	1.7	U		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.6	UJ	17.7		1.5	U	1.6	U	1.7	J	1.7	U		
Fluoranthene	µg/kg	3000000	25	n	3000000	1.6	U	26.9		1.5	U	1.6	U	0.89	J	1.7	U		
Fluorene	µg/kg	3000000	31.7	n	3000000	1.6	U	3.9		1.5	U	1.6	U	1.8	U	1.7	U		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	1.6	J	23		1.5	U	1.6	U	5.6	L	0.99	J		
Naphthalene	µg/kg	17000	2.2		17000	0.67	J	10.4		1.1	U	1.2	U	1.3	U	1	U		
Phenanthrene	µg/kg	2300000	10.9		2300000	1.6	U	46		0.47	J	0.51	J	0.58	J	0.56	J		
Pyrene	µg/kg	2300000	20	n	2300000	1.6	U	25		1.5	U	1.6	U	0.82	J	1.7	U		

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Table E2-27. Analytical Results Summary for Surface Soil Samples at EC-21 Propellant Grain Dump Area

					Location	EC-21-14		EC-21-15		EC-21-16		EC-21-17		EC-21-18	
					Sample Name	EC-21-14-SO-0.5		EC-21-15-SO-0.5		EC-21-16-SO-0.5		EC-21-17-SO-0.5		EC-21-18-SO-0.5	
					Sample Date	7/17/13		7/18/13		7/18/13		7/17/13		7/17/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8330B															
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.19	J	0.059	U	0.06	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.06	U	0.059	U	0.06	U	0.06	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
HPLC															
Nitroguanidine	mg/kg	8200		n	8200	0.098	U	0.092	U	0.092	U	0.096	U	0.099	U

Table E2-27. Analytical Results Summary for Surface Soil Samples at EC-21 Propellant Grain Dump Area

					Location	EC-21-19		EC-21-20		EC-21-21		EC-21-22		EC-21-23	
					Sample Name	EC-21-19-SO-0.5		EC-21-20-SO-0.5		EC-21-21-SO-0.5		EC-21-22-SO-0.5		EC-21-23-SO-0.5	
					Sample Date	7/17/13		7/17/13		7/17/13		7/17/13		7/17/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8330B															
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.06	U	0.06	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.06	U	0.06	U	0.06	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
HPLC															
Nitroguanidine	mg/kg	8200		n	8200	0.094	U	0.096	U	0.099	U	0.094	U	0.093	U

Table E2-27. Analytical Results Summary for Surface Soil Samples at EC-21 Propellant Grain Dump Area

					Location	EC-21-24		EC-21-25		EC-21-26		EC-21-27		EC-21-28	
					Sample Name	EC-21-24-SO-0.5		EC-21-25-SO-0.5		EC-21-26-SO-0.5		EC-21-27-SO-0.5		EC-21-28-SO-0.5	
					Sample Date	7/18/13		7/18/13		7/18/13		7/18/13		7/16/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8330B															
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.058	U	0.059	U	0.06	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.058	U	0.059	U	0.06	U	0.059	U	0.059	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.49	U	0.49	U	0.5	U	0.5	U	0.5	U
HPLC															
Nitroguanidine	mg/kg	8200		n	8200	0.098	U	0.095	U	0.096	U	0.1	U	0.09	U

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Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

					Location	EC-21-01		EC-21-02		EC-21-03		EC-21-04		EC-21-05		EC-21-06		EC-21-07		EC-21-08		EC-21-09	
					Sample Name	EC-21-1-SO-0.5		EC-21-2-SO-0.5		EC-21-3-SO-0.5		EC-21-4-SO-0.5		EC-21-5-SO-0.5		EC-21-6-SO-0.5		EC-21-7-SO-0.5		EC-21-8-SO-0.5		EC-21-9-SO-0.5	
					Sample Date	7/15/13		7/15/13		7/16/13		7/16/13		7/16/13		7/15/13		7/16/13		7/15/13		7/16/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	4530		3300		6220		4090		2400		5600		5690		4140		5470	
Antimony	mg/kg	47	0.95	n	47	1.6		5.3		1.1		0.6	J	1.5		5.5		1.9		25.4		0.52	J
Copper	mg/kg	4700	32.83	n	4700	16.4		86		13.9		11.7		12.8		79.4		19.6		395		9.5	
Lead	mg/kg	800	123.9		800	92.8		316		46.4		35.4		80.5		334		88		1630		26.1	
Manganese	mg/kg	2600	699.8	n	2600	257		258		290	K	206		68.7		425		183		635		133	K
Zinc	mg/kg	35000	83.92	n	35000	48.4		105		41.4		21.6		22.3		95.5		39.6		561		25.1	
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
Aroclor 1221	mg/kg	0.83			0.83	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
Aroclor 1232	mg/kg	0.72			0.72	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
Aroclor 1242	mg/kg	0.95			0.95	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
Aroclor 1248	mg/kg	0.95			0.95	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
Aroclor 1254	mg/kg	0.97			0.97	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
Aroclor 1260	mg/kg	0.99			0.99	0.03	UJ	0.029	UJ	0.029	U	0.028	U	0.028	U	0.036	UJ	0.034	U	0.03	UJ	0.028	U
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	4.2	J	1.8	J	1.5	J	0.56	J	4.3		6.2	J	0.76	J			0.42	J
Acenaphthylene	µg/kg	2300000	363		2300000	3.9	J	5.2	J	4.2		1.4	J	3.9		13.7	J	4.5		10.7	J	13.9	
Anthracene	µg/kg	2.3E+07	154	n	23000000	12.4	J	6.1	J	4.6		1.6	J	10.1		22.2	J	3.5				1.4	J
Benzo(a)anthracene	µg/kg	2900	1035		2900			51	J	42.7		13.3		50		135	J	36.9				15.3	
Benzo(a)pyrene	µg/kg	290	1036		1036					34.1		11.9		37.8		121	J	33.7				15.9	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900					58.4		22.3		66.3				59.3				29.6	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	38.6	J			32		10.9		35.6		101	J	33.6				17.3	
Benzo(k)fluoranthene	µg/kg	29000	476		29000					20.4		7.7		22.7				21.2				9.7	
Chrysene	µg/kg	290000	842		290000					51.7		18.4		57.4				47.7				23.7	
Dibenz(a,h)anthracene	µg/kg	290	152		290	11.1	J	8.1	J	7.5		2.4		9.9		23.8	J	7.6				3.8	
Fluoranthene	µg/kg	3000000	1488	n	3000000							19.2						52.7				25.3	
Fluorene	µg/kg	3000000	40	n	3000000	4.3	J	3.3	J	1.4	J	0.47	J	5.3		7.9	J	0.99	J			1.5	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	54.7	J	36.9	J	29.5		10.1		32.3		96.6	J	31.2				16.3	
Naphthalene	µg/kg	17000	13.3		17000	3.2	J	1.9	J	2.2		0.93	J	3.9		6.4	J	2.3		14.3	J	1.4	J
Phenanthrene	µg/kg	2300000	500		2300000					28		8.2		62.9				17.7				11.7	
Pyrene	µg/kg	2300000	1117	n	2300000					52.5		17.4						47.2				21.8	
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000															61.8	J		
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000															146	J		
Benzo(a)anthracene	µg/kg	2900	1035		2900	79.7	J													406	J		
Benzo(a)pyrene	µg/kg	290	1036		1036	77.5	J	62.1	J											399	J		
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	121	J	115	J							220	J			611	J		
Benzo(ghi)perylene	µg/kg	2300000	708		2300000			36.5	J											198	J		
Benzo(k)fluoranthene	µg/kg	29000	476		29000	50.2	J	39.8	J							87.9	J			230	J		
Chrysene	µg/kg	290000	842		290000	104	J	76.8	J							159	J			459	J		
Dibenz(a,h)anthracene	µg/kg	290	152		290															59.6	J		

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

						Location	EC-21-01		EC-21-02		EC-21-03		EC-21-04		EC-21-05		EC-21-06		EC-21-07		EC-21-08		EC-21-09	
						Sample Name	EC-21-1-SO-0.5		EC-21-2-SO-0.5		EC-21-3-SO-0.5		EC-21-4-SO-0.5		EC-21-5-SO-0.5		EC-21-6-SO-0.5		EC-21-7-SO-0.5		EC-21-8-SO-0.5		EC-21-9-SO-0.5	
						Sample Date	7/15/13		7/15/13		7/16/13		7/16/13		7/16/13		7/15/13		7/16/13		7/15/13		7/16/13	
						Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	1488	n	3000000		165	J	119	J	81.5				91.8		283	J			915	J		
Fluorene	µg/kg	3000000	40	n	3000000																60.2	J		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900																192	J		
Naphthalene	µg/kg	17000	13.3		17000																			
Phenanthrene	µg/kg	2300000	500		2300000		90	J	53.4	J							149	J			707	J		
Pyrene	µg/kg	2300000	1117	n	2300000		133	J	100	J					78.5		226	J			738	J		
SW846 8290																								
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400		2750		3880		1420		636		595		6420	J	1740		1360		2680	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400		13		18.8		15		4.86	J	20.3		18.7		12.3		9.13	J	25.3	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460		59.4		54.2		38.9		11.9		44.2		122		37.2		34.3		89.1	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210		11.8		12.4		12.4		3.33	J	13.7		17.9		8.38		5.99	J	15.1	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210		3.94	U	3.7	U	3.9	U	3.71	U	3.81	U	4.23	U	3.9	U	4.55	U	3.75	U
1,2,3,4,7,8-HxCDD	pg/g	223			223		3.94	U	3.7	U	3.9	U	3.71	U	3.81	U	4.23	U	3.9	U	4.55	U	3.75	U
1,2,3,4,7,8-HxCDF	pg/g	219			219		2.32	J	2.67	J	4.55	J	3.71	U	3.74	J	4.15	J	2.11	J	4.55	U	3.55	J
1,2,3,6,7,8-HxCDD	pg/g	223			223		2.34	J	1.97	J	1.99	J	3.71	U	2.02	J	4.31	J	3.9	U	4.55	U	3.19	J
1,2,3,6,7,8-HxCDF	pg/g	219			219		2.45	J	2.26	J	2.08	J	3.71	U	2.02	J	4.21	J	3.9	U	4.55	U	3.75	U
1,2,3,7,8,9-HxCDD	pg/g	223			223		2.24	J	3.7	U	1.97	J	3.71	U	2.67	J	4.29	J	3.9	U	4.55	U	4.05	J
1,2,3,7,8,9-HxCDF	pg/g	223			223		3.94	U	3.7	U	3.9	U	3.71	U	3.81	U	4.23	U	3.9	U	4.55	U	3.75	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3		3.94	U	3.7	U	3.9	U	3.71	U	3.81	U	4.23	U	3.9	U	4.55	U	3.75	U
1,2,3,7,8-PeCDF	pg/g	744			744		3.94	U	3.7	U	3.9	U	3.71	U	3.81	U	2.25	J	3.9	U	4.55	U	3.75	U
2,3,4,6,7,8-HxCDF	pg/g	223			223		2.69	J	2.54	J	2.44	J	3.71	U	2.6	J	4.38	J	3.9	U	4.55	U	3.75	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4		2.59	J	3.07	J	3.9	U	3.71	U	2.27	J	5.05	J	3.9	U	4.55	U	3.75	U
2,3,7,8-TCDD	pg/g	21.6			21.6		0.786	U	0.739	U	0.778	U	0.739	U	0.759	U	0.844	U	0.777	U	0.907	U	0.748	U
2,3,7,8-TCDF	pg/g	219			219		10.1		1.6		1.46		0.606	J	2.59		5.49		0.856	J	1	J	0.808	J
Total Heptachlorodibenzofuran	pg/g	2210			2210		16.9		20.6		18.1		3.33	J	22.7		24.9		13.3		12.2		30.2	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170		145		138		95.5		27		88.5		315		84.9		80.9		183	
Total Hexachlorodibenzofuran	pg/g	223			223		24.3		27		24.3		2.46	J	26.2		43.2		6.12		4.63	J	16	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223		27.7		21.9		21.4		2.02	J	21.5		59.3		12.3		16.4		30.7	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4		25.6		28.8		12.9		3.71	U	19.9		52.4	J	6.83		6.01	J	2.15	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3		3.97	J	2.6	J	3.9	U	3.71	U	3	J	9.3		3.9	U	4.55	U	3.75	U
Total Tetrachlorodibenzofuran	pg/g	219			219		21.8		24.4		12.3		1.84		19.4		47.7		4.84		10.4		4.15	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6		5.21		2.84		0.818	J	0.739	U	3.21		9.24		0.777	U	2.08		0.748	U
SW846 8330B																								
2,4,6-Trinitrotoluene	mg/kg	51		n	51		0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.08	J	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4		0.058	U	0.069	J	0.06	U	0.06	U	0.059	U	0.059	U	0.059	U	13.7		0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5		0.058	U	0.06	U	0.06	U	0.06	U	0.059	U	0.059	U	0.059	U	0.99		0.059	U

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

					Location	EC-21-10		EC-21-11		EC-21-12		EC-21-13		EC-21-29		EC-21-30		EC-21-32		EC-21-33		EC-21-34	
					Sample Name	EC-21-10-SO-0.5		EC-21-11-SO-0.5		EC-21-12-SO-0.5		EC-21-13-SO-0.5		EC-21-29-SO-0.5		EC-21-30-SO-0.5		EC-21-32-SO-0.5		EC-21-33-SO-0.5		EC-21-34-SO-0.5	
					Sample Date	7/15/13		7/15/13		7/15/13		7/16/13		8/19/13		8/27/13		9/22/15		9/22/15		9/22/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	8830		9590		10400		25100		7220		35700							
Antimony	mg/kg	47	0.95	n	47	4.5		1.1	J	5.7		0.78	U	3.3		5.8		1.61		1.44		0.535	J
Copper	mg/kg	4700	32.83	n	4700	48.8		14.3		75.3		14		82.6		68.9							
Lead	mg/kg	800	123.9		800	305		71.2		366		23.5		188		307		222		168		62	
Manganese	mg/kg	2600	699.8	n	2600	2410		509		3830		55.9	K	562		163		289		870		230	
Zinc	mg/kg	35000	83.92	n	35000	117		59		191		24.9		116		158							
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.033	UJ	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
Aroclor 1221	mg/kg	0.83			0.83	0.033	UJ	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
Aroclor 1232	mg/kg	0.72			0.72	0.033	UJ	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
Aroclor 1242	mg/kg	0.95			0.95	0.033	UJ	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
Aroclor 1248	mg/kg	0.95			0.95	0.033	UJ	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
Aroclor 1254	mg/kg	0.97			0.97	0.033	UJ	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
Aroclor 1260	mg/kg	0.99			0.99	0.11	J	0.031	UJ	0.038	UJ	0.033	U	0.028	U	0.037	U						
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000			8.7	J	2.8	J	0.93	J	0.97	J	1.8							
Acenaphthylene	µg/kg	2300000	363		2300000			8.7	J	3.1	J	2.9		4.1		8.7							
Anthracene	µg/kg	2.3E+07	154	n	23000000					7.3	J	2.1		3.7		5.9							
Benzo(a)anthracene	µg/kg	2900	1035		2900			113	J	61.5	J	21.7		23.5		13.7							
Benzo(a)pyrene	µg/kg	290	1036		1036					70.3	J	21.1		25.5		15.3							
Benzo(b)fluoranthene	µg/kg	2900	1116		2900					124	J	39.6		47.1		32.1							
Benzo(ghi)perylene	µg/kg	2300000	708		2300000			59.3	J			19.2		21.9		4.1							
Benzo(k)fluoranthene	µg/kg	29000	476		29000					44	J	13.7		17.7		12.6							
Chrysene	µg/kg	290000	842		290000					77.1	J	32.2		30.2		18.7							
Dibenz(a,h)anthracene	µg/kg	290	152		290			14.4	J	7.9	J	4.2		6.7		1.5							
Fluoranthene	µg/kg	3000000	1488	n	3000000					131	J	37		40.7		22.4							
Fluorene	µg/kg	3000000	40	n	3000000			8.6	J	3.2	J	1.1	J	0.97	J	3.3							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900			59.5	J	49.9	J	19.8		21.8		4.6							
Naphthalene	µg/kg	17000	13.3		17000			2.3	J	3.4	J	0.95	J	1.5	J	1							
Phenanthrene	µg/kg	2300000	500		2300000							12.9		13.5		12.3							
Pyrene	µg/kg	2300000	1117	n	2300000					118	J	32		35.3		20.9							
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	2230	J																
Acenaphthylene	µg/kg	2300000	363		2300000	717	J																
Anthracene	µg/kg	2.3E+07	154	n	23000000	5530	J	31.7	J														
Benzo(a)anthracene	µg/kg	2900	1035		2900	20000	J											61		36000		30	
Benzo(a)pyrene	µg/kg	290	1036		1036	20100	J	110	J									78		33000		33	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	32500	J	162	J									130		50000		54	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	6340	J			43.4	J												
Benzo(k)fluoranthene	µg/kg	29000	476		29000	18900	J	66.2	J														
Chrysene	µg/kg	290000	842		290000	25200	J	132	J														
Dibenz(a,h)anthracene	µg/kg	290	152		290	2430	J											25		6600		8.1	

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

						Location	EC-21-10		EC-21-11		EC-21-12		EC-21-13		EC-21-29		EC-21-30		EC-21-32		EC-21-33		EC-21-34	
						Sample Name	EC-21-10-SO-0.5		EC-21-11-SO-0.5		EC-21-12-SO-0.5		EC-21-13-SO-0.5		EC-21-29-SO-0.5		EC-21-30-SO-0.5		EC-21-32-SO-0.5		EC-21-33-SO-0.5		EC-21-34-SO-0.5	
						Sample Date	7/15/13		7/15/13		7/15/13		7/16/13		8/19/13		8/27/13		9/22/15		9/22/15		9/22/15	
						Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	1488	n	3000000		38000	J	237	J														
Fluorene	µg/kg	3000000	40	n	3000000		1990	J																
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900		7080	J											87		30000		36	
Naphthalene	µg/kg	17000	13.3		17000		782	J																
Phenanthrene	µg/kg	2300000	500		2300000		19800	J	144	J	60.8	J												
Pyrene	µg/kg	2300000	1117	n	2300000		29600	J	191	J														
SW846 8290																								
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400		3440		4510		5060		3450		2820		13000	J	7380	J	4130		1660	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400		58.7	J	5.34	J	39.6		6.43	J	11.6		79.1		51.6	J	133	J	13.6	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460		121		47.2		115		58.8		38.5		246		128		299		32.5	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210		20.6	J	3.97	J	36		4.99	J	5.83		63.5		34.6		71		9.53	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210		39.1	U	3.92	U	3.23	J	4.49	U	3.67	U	3.76	J	3.35		5.25		0.834	J
1,2,3,4,7,8-HxCDD	pg/g	223			223		39.1	U	3.92	U	4.77	U	4.49	U	3.67	U	4.41	J	2.63	J	5.19	J	0.812	J
1,2,3,4,7,8-HxCDF	pg/g	219			219		39.1	U	3.92	U	7.55		4.49	U	1.87	J	12.9		7.85		10.7		1.86	J
1,2,3,6,7,8-HxCDD	pg/g	223			223		39.1	U	3.92	U	4.84	J	4.49	U	3.67	U	9.01		5.06		13.2		1.42	J
1,2,3,6,7,8-HxCDF	pg/g	219			219		39.1	U	3.92	U	6.67	J	4.49	U	3.67	U	11.7		5.76		8.34		1.38	J
1,2,3,7,8,9-HxCDD	pg/g	223			223		39.1	UJ	3.92	U	5.24	J	2.43	J	3.67	U	9.3		4.16		5.52		1.27	J
1,2,3,7,8,9-HxCDF	pg/g	223			223		39.1	UJ	3.92	U	2.47	J	4.49	U	3.67	U	3.52	J	2.19	J	2.26	J	0.42	J
1,2,3,7,8-PeCDD	pg/g	22.3			22.3		39.1	U	3.92	U	4.77	U	4.49	U	3.67	U	4.22	J	1.85	J	6.75		0.59	J
1,2,3,7,8-PeCDF	pg/g	744			744		39.1	U	3.92	U	3.4	J	4.49	U	3.67	U	6.19	J	3.63		5.49	J	0.914	J
2,3,4,6,7,8-HxCDF	pg/g	223			223		39.1	U	3.92	U	7.69		4.49	U	3.67	U	17.8		6.65		10.4		2.01	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4		39.1	U	3.92	U	7.21		4.49	U	3.67	U	14.1		7.1		10.1		2.41	J
2,3,7,8-TCDD	pg/g	21.6			21.6		7.81	U	0.782	U	0.952	U	0.896	U	0.731	U	0.812	J	0.693		0.518	J	0.181	J
2,3,7,8-TCDF	pg/g	219			219		7.81	U	0.437	J	2.19		0.896	U	1.1		7.02		3.36	J	3.97	J	1.22	J
Total Heptachlorodibenzofuran	pg/g	2210			2210		69		7.02		58.4		8.07		10.3		127		55.8		184		15.9	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170		270		111		290		174		91.3		581		317		650		67.7	
Total Hexachlorodibenzofuran	pg/g	223			223		39.1	U	2.66	J	74		6.25	J	5.77		133		67.1		136		20.4	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223		39.1	U	13.1		66.4		39.9		15.2		261		59.3		133		15.7	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4		39.1	U	3.92	U	79.3		5.83	J	5.13	J	156		71.5		52.5		23.3	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3		39.1	UJ	3.92	U	16.8		4.49	U	3.67	U	96.4		15.9		35		6.92	
Total Tetrachlorodibenzofuran	pg/g	219			219		4.66	J	2.28		65.6		0.457	J	8.66		133		28.3		38.4		18.5	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6		7.81	U	0.526	J	13.4		0.473	J	1.03	J	36.7		9.23		6.81		3.24	
SW846 8330B																								
2,4,6-Trinitrotoluene	mg/kg	51		n	51		0.16	J	0.12	U	0.12	U	0.12	U	0.03	J	0.12	U						
2,4-Dinitrotoluene	mg/kg	7.4			7.4		0.06	U	0.059	U	0.059	U	0.06	U	14.3		0.06	U						
2,6-Dinitrotoluene	mg/kg	1.5			1.5		0.06	U	0.059	U	0.059	U	0.06	U	0.91		0.06	U						

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

						Location	EC-21-35		EC-21-36		EC-21-37		EC-21-38		EC-21-39		EC-21-40		EC-21-41		EC-21-42		EC-21-43	
						Sample Name	EC-21-35-SO-0.5		EC-21-36-SO-0.5		EC-21-37-SO-0.5		EC-21-38-SO-0.5		EC-21-39-SO-0.5		EC-21-40-SO-0.5		EC-21-41-SO-0.5		EC-21-42-SO-0.5		EC-21-43-SO-0.5	
						Sample Date	9/22/15		9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		9/21/15		9/21/15	
						Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																								
Aluminum	mg/kg	110000	14159	n	110000																			
Antimony	mg/kg	47	0.95	n	47		0.28	J	0.694	J	1.02	J	0.739	J	4.01	J	0.397	J	8.11	J	0.337	J	1.18	
Copper	mg/kg	4700	32.83	n	4700																			
Lead	mg/kg	800	123.9		800		28.1		59.4		104		1600		294		54.3		954		26.2		200	
Manganese	mg/kg	2600	699.8	n	2600		94.6		736	J	2030	J	61600	J	6440	J	196	J	1260	J				
Zinc	mg/kg	35000	83.92	n	35000																			
SW846 8082A																								
Aroclor 1016	mg/kg	5.1		n	5.1																			
Aroclor 1221	mg/kg	0.83			0.83																			
Aroclor 1232	mg/kg	0.72			0.72																			
Aroclor 1242	mg/kg	0.95			0.95																			
Aroclor 1248	mg/kg	0.95			0.95																			
Aroclor 1254	mg/kg	0.97			0.97																			
Aroclor 1260	mg/kg	0.99			0.99																			
SW846 8270 SIM																								
Acenaphthene	µg/kg	4500000	41.5	n	4500000																			
Acenaphthylene	µg/kg	2300000	363		2300000																			
Anthracene	µg/kg	2.3E+07	154	n	23000000																			
Benzo(a)anthracene	µg/kg	2900	1035		2900																			
Benzo(a)pyrene	µg/kg	290	1036		1036																			
Benzo(b)fluoranthene	µg/kg	2900	1116		2900																			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																			
Benzo(k)fluoranthene	µg/kg	29000	476		29000																			
Chrysene	µg/kg	290000	842		290000																			
Dibenz(a,h)anthracene	µg/kg	290	152		290																			
Fluoranthene	µg/kg	3000000	1488	n	3000000																			
Fluorene	µg/kg	3000000	40	n	3000000																			
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900																			
Naphthalene	µg/kg	17000	13.3		17000																			
Phenanthrene	µg/kg	2300000	500		2300000																			
Pyrene	µg/kg	2300000	1117	n	2300000																			
SW846 8270D																								
Acenaphthene	µg/kg	4500000	41.5	n	4500000																			
Acenaphthylene	µg/kg	2300000	363		2300000																			
Anthracene	µg/kg	2.3E+07	154	n	23000000																			
Benzo(a)anthracene	µg/kg	2900	1035		2900		31		240		2200		14000		11000		47		7700		14		9.1	
Benzo(a)pyrene	µg/kg	290	1036		1036		33		200		2200		13000		11000		55		10000		14		19	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900		53		320		3500		20000		17000		86		20000		29		49	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																			
Benzo(k)fluoranthene	µg/kg	29000	476		29000																			
Chrysene	µg/kg	290000	842		290000																			
Dibenz(a,h)anthracene	µg/kg	290	152		290		13		38		300		1800		1600		2	U	1700		6.9		9.2	

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

					Location	EC-21-35		EC-21-36		EC-21-37		EC-21-38		EC-21-39		EC-21-40		EC-21-41		EC-21-42		EC-21-43	
					Sample Name	EC-21-35-SO-0.5		EC-21-36-SO-0.5		EC-21-37-SO-0.5		EC-21-38-SO-0.5		EC-21-39-SO-0.5		EC-21-40-SO-0.5		EC-21-41-SO-0.5		EC-21-42-SO-0.5		EC-21-43-SO-0.5	
					Sample Date	9/22/15		9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		9/21/15		9/21/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	1488	n	3000000																		
Fluorene	µg/kg	3000000	40	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	33		200		2100		11000		9200		56		9400		18		38	
Naphthalene	µg/kg	17000	13.3		17000																		
Phenanthrene	µg/kg	2300000	500		2300000																		
Pyrene	µg/kg	2300000	1117	n	2300000																		
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	7540	J	7530	J	18200	J	5340	J	3320		4990	J	7270	J	7340	J	7700	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	13.7	J	188		1400		285		107		11.3		896		3.45	J	3.33	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	87.5		273		1510		282		154		100		783		49.3		68	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	8.17		60.1	J	298	J	70.8		27.9		9.8		243		1.25	U	0.906	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.77	J	3.65		18.8		4.15		1.93	J	0.812	J	13.3		0.178	J	0.198	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	1.49	J	2.51	J	7.97		2.21	J	1.32	J	1.63	J	6.57		0.573	J	0.968	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	1.42	J	3.45		13.8		4.82		2.26	J	2.14	J	10.1		0.171	J	0.189	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	2.47	J	7.93		43.2		8.09		4.35		3.01		28		0.805	J	1.39	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	1.49	J	2.67	J	6.95		2.89	J	1.54	J	1.51	J	7.78		0.149	J	0.141	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	2.28	J	4.92		17		3.55		2.64		2.94	J	13		1.05	J	2.37	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.484	J	0.829	J	2.52	J	1.19	J	0.598	J	0.584	J	2.21	J	0.114	J	0.14	J
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.832	J	1.4	J	4.48	J	1.41	J	0.975	J	1.06	J	5.46		0.242	J	0.445	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.819	J	1.43	J	1.65	J	1.63	J	1.09	J	1.61	J	4.81		0.0925	J	0.107	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	1.59	J	3.98		10.7		3.92		2.02	J	2.16	J	10.6		0.159	J	0.128	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	1.58	J	2.89	J	4.6		4.07		2.26	J	2.94	J	8.78		0.142	J	0.135	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.176	J	0.351	J	0.569	J	1.44	J	0.335	J	0.32	J	1.54		0.112	J	0.147	J
2,3,7,8-TCDF	pg/g	219			219	1.19	J	2.19		1.97		3.07	J	1.82		3.57		8.49		0.0911	J	0.106	J
Total Heptachlorodibenzofuran	pg/g	2210			2210	15.6		202		1230		272		104		18.8		845		2.73		2.32	J
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	208		526		4070		1000		433		235		1590		117		176	
Total Hexachlorodibenzofuran	pg/g	223			223	13.2		44		285		88.7		36.7		20.7		114		1.1	J	1.04	J
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	32.3		63.8		306		82.8		46.1		48.6		202		12.5		28.3	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	14.4		35.2		59.6		48.8		25.7		20		109		1.06	J	0.888	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	8.66		15.8		24		18.3		13.5		19.4		41.8		1.36	J	3.23	
Total Tetrachlorodibenzofuran	pg/g	219			219	13.3		31.6		16.2		32.7		26.8		34.2		131		0.609		0.753	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	3.58		6.58		2.55		6.9		5.95		12		29.6		0.0315	J	0.237	J
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51																		
2,4-Dinitrotoluene	mg/kg	7.4			7.4																		
2,6-Dinitrotoluene	mg/kg	1.5			1.5																		

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

					Location	EC-21-44		EC-21-45		EC-21-46		EC-21-47		EC-21-A		EC-21-B		EC-21-C	
					Sample Name	EC-21-44-SO-0.5		EC-21-45-SO-0.5		EC-21-46-SO-0.5		EC-21-47-SO-0.5		EC-21-A-SO-0.5		EC-21-B-SO-0.5		EC-21-C-SO-0.5	
					Sample Date	9/21/15		9/21/15		9/21/15		9/21/15		8/22/13		8/22/13		8/23/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																			
Aluminum	mg/kg	110000	14159	n	110000									12000		11100		5240	
Antimony	mg/kg	47	0.95	n	47	4.68		0.709		0.276	J	1.23		80		47.7		0.37	B
Copper	mg/kg	4700	32.83	n	4700									3530		495		8	
Lead	mg/kg	800	123.9		800	420		48.8		33.3		71.1		3230		3220		7.8	
Manganese	mg/kg	2600	699.8	n	2600									411		293		379	
Zinc	mg/kg	35000	83.92	n	35000									1020		717		16.9	
SW846 8082A																			
Aroclor 1016	mg/kg	5.1		n	5.1									0.028	U	0.028	U	0.028	U
Aroclor 1221	mg/kg	0.83			0.83									0.028	U	0.028	U	0.028	U
Aroclor 1232	mg/kg	0.72			0.72									0.028	U	0.028	U	0.028	U
Aroclor 1242	mg/kg	0.95			0.95									0.028	U	0.028	U	0.028	U
Aroclor 1248	mg/kg	0.95			0.95									0.028	U	0.028	U	0.028	U
Aroclor 1254	mg/kg	0.97			0.97									0.028	U	0.028	U	0.028	U
Aroclor 1260	mg/kg	0.99			0.99									0.028	U	0.028	U	0.067	
SW846 8270 SIM																			
Acenaphthene	µg/kg	4500000	41.5	n	4500000									2.9					
Acenaphthylene	µg/kg	2300000	363		2300000									1.5	U	7.3			
Anthracene	µg/kg	2.3E+07	154	n	23000000									7.3					
Benzo(a)anthracene	µg/kg	2900	1035		2900									13.1					
Benzo(a)pyrene	µg/kg	290	1036		1036									15.8					
Benzo(b)fluoranthene	µg/kg	2900	1116		2900									32.9					
Benzo(ghi)perylene	µg/kg	2300000	708		2300000									20.4					
Benzo(k)fluoranthene	µg/kg	29000	476		29000									11.5					
Chrysene	µg/kg	290000	842		290000									30.7					
Dibenz(a,h)anthracene	µg/kg	290	152		290									4.5		68.7			
Fluoranthene	µg/kg	3000000	1488	n	3000000									35.1					
Fluorene	µg/kg	3000000	40	n	3000000									9.2					
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900									14.3					
Naphthalene	µg/kg	17000	13.3		17000									36.7		13.2			
Phenanthrene	µg/kg	2300000	500		2300000														
Pyrene	µg/kg	2300000	1117	n	2300000														
SW846 8270D																			
Acenaphthene	µg/kg	4500000	41.5	n	4500000											104		2230	
Acenaphthylene	µg/kg	2300000	363		2300000													682	J
Anthracene	µg/kg	2.3E+07	154	n	23000000											166		6020	
Benzo(a)anthracene	µg/kg	2900	1035		2900	27		13		54		55				358		19600	
Benzo(a)pyrene	µg/kg	290	1036		1036	30		18		41		42				371		17300	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	74		35		84		68				658		21500	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000											139		9540	
Benzo(k)fluoranthene	µg/kg	29000	476		29000											298		10100	
Chrysene	µg/kg	290000	842		290000											385		21000	
Dibenz(a,h)anthracene	µg/kg	290	152		290	13		6.8		9		9.1						3300	

Table E2-28. Analytical Results Summary for Surface Soil Samples at EC-21

					Location	EC-21-44		EC-21-45		EC-21-46		EC-21-47		EC-21-A		EC-21-B		EC-21-C	
					Sample Name	EC-21-44-SO-0.5		EC-21-45-SO-0.5		EC-21-46-SO-0.5		EC-21-47-SO-0.5		EC-21-A-SO-0.5		EC-21-B-SO-0.5		EC-21-C-SO-0.5	
					Sample Date	9/21/15		9/21/15		9/21/15		9/21/15		8/22/13		8/22/13		8/23/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	1488	n	3000000											956		37600	
Fluorene	µg/kg	3000000	40	n	3000000											77		2530	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	40		22		39		36				140		9500	
Naphthalene	µg/kg	17000	13.3		17000													1260	
Phenanthrene	µg/kg	2300000	500		2300000									82.6		832		25800	
Pyrene	µg/kg	2300000	1117	n	2300000									92.5		651		35200	
SW846 8290																			
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	2460		1890		1460		1130		8090		1970		7660	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	36	J	8.88	J	9.81	J	5.08	J	990		18.5		221	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	57.9		46		31.5		21.7		1830		54.7		497	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	7.81		5.53		3.38		2.37	J	3670		11.1		102	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.66	J	0.673	J	0.309	J	0.224	J	272		3.69	U	8.1	
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.666	J	1.07	J	0.473	J	0.362	J	175		3.69	U	9.04	
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.762	J	1.01	J	0.538	J	0.295	J	892		2.62	J	15.4	
1,2,3,6,7,8-HxCDD	pg/g	223			223	1.43	J	1.52	J	0.852	J	0.663	J	336		2.53	J	25.9	
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.471	J	0.815	J	0.382	J	0.26	J	817		3.69	U	10.8	
1,2,3,7,8,9-HxCDD	pg/g	223			223	1.35	J	1.56	J	0.899	J	0.696	J	255		2.57	J	16.2	
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.208	J	0.412	J	0.181	J	0.108	J	289		3.69	U	3.65	UJ
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.427	J	0.67	J	0.295	J	0.303	J	164	K	3.69	U	10.8	
1,2,3,7,8-PeCDF	pg/g	744			744	0.286	J	0.451	J	0.258	J	0.163	J	432		3.16	J	6.8	
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.65	J	1.15	J	0.563	J	0.345	J	1330		2.09	J	13.4	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.458	J	1.06	J	0.533	J	0.18	J	852		1.99	J	9.29	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.125	J	0.135	J	0.109	J	0.0952	J	38.2		0.736	U	1.92	
2,3,7,8-TCDF	pg/g	219			219	0.252	J	0.459	J	0.303	J	0.135	J	466		1.09	J	25	
Total Heptachlorodibenzofuran	pg/g	2210			2210	32.5		10		9.15		5.16		4850		21.1		290	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	237		114		91		49.8		4250		119		970	
Total Hexachlorodibenzofuran	pg/g	223			223	11		8.86		6.45		3.87		9010		16.2		162	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	22.4		17		10.7		7.49		9180		29.3		251	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	6.39		8.62		6.21		2.43	J	10300		13.7		120	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.38		4.47		2.22	J	0.805	J	5430		3.24	J	66	J
Total Tetrachlorodibenzofuran	pg/g	219			219	2.91		6.78		4.05		1.72		13100	J	17		203	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.818		1.05		0.734		0.428	J	3760	J	4.32		30.3	
SW846 8330B																			
2,4,6-Trinitrotoluene	mg/kg	51		n	51									0.12	U	0.026	J	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4									0.026	J	19.8		0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5									0.06	U	1.3		0.059	U

Table E2-29. Analytical Results Summary for Subsurface Soil at EC-21
Propellant Grain Area

Location						EC-21-14		EC-21-15		EC-21-16		EC-21-17		EC-21-18		EC-21-19		EC-21-20		EC-21-21		EC-21-22		EC-21-23	
Sample Name						EC-21-14-SO-1.5		EC-21-15-SO-03		EC-21-16-SO-01.5		EC-21-17-SO-05		EC-21-18-SO-03		EC-21-19-SO-04		EC-21-20-SO-1.5		EC-21-21-SO-02.5		EC-21-22-SO-1.5		EC-21-23-SO-1.5	
Sample Date						7/17/13		7/18/13		7/18/13		7/17/13		7/17/13		7/17/13		7/17/13		7/17/13		7/17/13		7/17/13	
Start Depth (ft bgs)						0.5		2		0.5		4		2		3		0.5		1.5		0.5		0.5	
End Depth (ft bgs)						1.5		3		1.5		5		3		4		1.5		2.5		1.5		1.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8330B																									
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.059	U	0.06	U	0.06	U	0.058	U	0.06	U	0.058	U	0.058	U	0.06	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.059	U	0.06	U	0.06	U	0.058	U	0.06	U	0.058	U	0.058	U	0.06	U	0.059	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.49	U	0.5	U	0.5	U	0.49	U	0.5	U	0.49	U	0.49	U	0.5	U	0.5	U
HPLC																									
Nitroguanidine	mg/kg	8200		n	8200	0.097	U	0.092	U	0.093	U	0.097	U	0.098	U	0.099	U	0.091	U	0.094	U	0.098	U	0.091	U

Table E2-29. Analytical Results Summary for Subsurface Soil at EC-21 Propellant Grain Area

					Location	EC-21-24		EC-21-25		EC-21-26		EC-21-27		EC-21-28	
					Sample Name	EC-21-24-SO-01.5		EC-21-25-SO-01.5		EC-21-26-SO-01.5		EC-21-27-SO-02.5		EC-21-28-SO-1.5	
					Sample Date	7/18/13		7/18/13		7/18/13		7/18/13		7/16/13	
					Start Depth (ft bgs)	0.5		0.5		0.5		1.5		0.5	
					End Depth (ft bgs)	1.5		1.5		1.5		2.5		1.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8330B															
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.058	U	0.059	U	0.059	U	0.059	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.058	U	0.059	U	0.059	U	0.059	U	0.06	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.49	U	0.49	U	0.5	U	0.49	U	0.5	U
HPLC															
Nitroguanidine	mg/kg	8200		n	8200	0.091	U	0.094	U	0.1	U	0.099	U	0.093	U

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-01		EC-21-02		EC-21-03		EC-21-04		EC-21-05		EC-21-06		EC-21-07		EC-21-08	
					Sample Name	EC-21-1-SO-06		EC-21-2-SO-06		EC-21-3-SO-06		EC-21-4-SO-06		EC-21-5-SO-06		EC-21-6-SO-06		EC-21-7-SO-06		EC-21-8-SO-06	
					Sample Date	7/15/13		7/15/13		7/16/13		7/16/13		7/16/13		7/15/13		7/16/13		7/15/13	
					Start Depth (ft bgs)	5		5		5		5		5		5		5		5	
					End Depth (ft bgs)	6		6		6		6		6		6		6		6	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																					
Aluminum	mg/kg	110000	18404	n	110000	7340		10300		12700		2930		3420		6110		9810		1630	
Antimony	mg/kg	47	0.68	n	47	0.9	U	0.68	U	0.4	J	0.61	U	0.69	U	0.74	U	0.6	U	0.6	J
Copper	mg/kg	4700	14.44	n	4700	6.6		9.5		5.4		2.6		2.4	J	7.7		3.9		7.7	
Lead	mg/kg	800	13.96		800	6.6		11.5		7.2		3.8		3.7		10.8		5.3		21.2	
Manganese	mg/kg	2600	681.6	n	2600	140		75.7		83.5	K	90.4		52.5		69.8		40.5	K	13.1	
Zinc	mg/kg	35000	44.64	n	35000	24.5		24.9		20.6		12.8		12.2		20.5		21.5		16	
SW846 8082A																					
Aroclor 1016	mg/kg	5.1		n	5.1	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
Aroclor 1221	mg/kg	0.83			0.83	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
Aroclor 1232	mg/kg	0.72			0.72	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
Aroclor 1242	mg/kg	0.95			0.95	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
Aroclor 1248	mg/kg	0.95			0.95	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
Aroclor 1254	mg/kg	0.97			0.97	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
Aroclor 1260	mg/kg	0.99			0.99	0.037	UJ	0.029	UJ	0.027	U	0.027	U	0.028	U	0.028	UJ	0.027	U	0.029	UJ
SW846 8270 SIM																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	UJ	1.5	U	1.5	UJ
Acenaphthylene	µg/kg	2300000	2.38		2300000	2	UJ	0.34	J	1.4	U	0.49	J	0.42	J	1.5	UJ	1.5	U	1.5	UJ
Anthracene	µg/kg	2.3E+07	2.6	n	23000000	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	UJ	1.5	U	1.5	UJ
Benzo(a)anthracene	µg/kg	2900	16.31		2900	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	UJ	1.5	U	1.2	J
Benzo(a)pyrene	µg/kg	290	11.91		290	2	UJ	0.92	J	1.4	U	1.4	U	1.5	U	0.95	J	1.5	U	1.1	J
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	1.5	J	1.8	J	1.4	U	1.4	U	1.5	U	2.2	K	1.5	U	1.9	J
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	2	UJ	1.7	J	1.4	U	1.4	U	1.5	U	0.98	J	1.5	U	1.5	UJ
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	0.95	K	1.5	U	0.87	J
Chrysene	µg/kg	290000	20.56		290000	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.4	J	1.5	U	1.4	J
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	UJ	1.5	U	1.5	UJ
Fluoranthene	µg/kg	3000000	24.95	n	3000000	1.5	J	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	J	0.69	J	2.1	J
Fluorene	µg/kg	3000000	31.7	n	3000000	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	UJ	1.5	U	1.5	UJ
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	2	UJ	2.1	J	1.4	U	1.4	U	1.5	U	1.4	J	1.5	U	1.5	UJ
Naphthalene	µg/kg	17000	2.2		17000	2	UJ	1.5	UJ	1.4	U	1.4	U	1.5	U	1.5	UJ	1.5	U	1.5	UJ
Phenanthrene	µg/kg	2300000	10.85		2300000	0.76	J	0.69	J	1.4	U	1.4	U	1.5	U	0.91	J	1.5	U	1.1	J
Pyrene	µg/kg	2300000	19.95	n	2300000	1.3	J	0.53	J	1.4	U	1.4	U	1.5	U	1.3	J	0.54	J	2	J
SW846 8270D																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000																
Anthracene	µg/kg	2.3E+07	2.6	n	23000000																
Benzo(a)anthracene	µg/kg	2900	16.31		2900																
Benzo(a)pyrene	µg/kg	290	11.91		290																
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900																
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																
Chrysene	µg/kg	290000	20.56		290000																
Dibenz(a,h)anthracene	µg/kg	290	2.53		290																
Fluoranthene	µg/kg	3000000	24.95	n	3000000																

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-01		EC-21-02		EC-21-03		EC-21-04		EC-21-05		EC-21-06		EC-21-07		EC-21-08	
					Sample Name	EC-21-1-SO-06		EC-21-2-SO-06		EC-21-3-SO-06		EC-21-4-SO-06		EC-21-5-SO-06		EC-21-6-SO-06		EC-21-7-SO-06		EC-21-8-SO-06	
					Sample Date	7/15/13		7/15/13		7/16/13		7/16/13		7/16/13		7/15/13		7/16/13		7/15/13	
					Start Depth (ft bgs)	5		5		5		5		5		5		5		5	
					End Depth (ft bgs)	6		6		6		6		6		6		6		6	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900																
Naphthalene	µg/kg	17000	2.2		17000																
Phenanthrene	µg/kg	2300000	10.85		2300000																
Pyrene	µg/kg	2300000	19.95	n	2300000																
SW846 8290																					
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	3980		7470	J	1650		367	L	133		23300	J	6520	J	726	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.22	U	7.72	U	7.2	U	7.17	UL	7.43	U	7.93	U	7.28	U	7.45	U
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	23.7		87.9		10.7		6.34	L	2.17	J	111		30		5.25	J
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.62	U	3.87	U	3.61	U	1.86	L	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.62	U	2.08	J	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.62	U	4.67	J	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.722	U	0.772	U	0.72	U	0.717	UL	0.743	U	0.793	U	0.728	U	0.745	U
2,3,7,8-TCDF	pg/g	219			219	0.722	U	0.772	U	0.72	U	0.717	UL	0.743	U	0.793	U	0.728	U	0.745	U
TEQ WHO2005 ND=0	pg/g				NSL																
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.62	U	3.87	U	3.61	U	1.86	L	3.72	U	3.98	U	3.65	U	3.74	U
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	51.3		228		24.2		17.1	L	5.59		243		61.9		11.2	
Total Hexachlorodibenzofuran	pg/g	223			223	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.23	J	46.4		1.99	J	2.36	L	3.72	U	8.48		3.65	U	3.74	U
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.62	U	3.87	U	3.61	U	3.6	UL	3.72	U	3.98	U	3.65	U	3.74	U
Total Tetrachlorodibenzofuran	pg/g	219			219	0.722	U	0.772	U	0.72	U	0.717	UL	0.743	U	0.793	U	0.728	U	0.745	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.722	U	0.772	U	0.72	U	0.717	UL	0.743	U	0.793	U	0.728	U	0.745	U
SW846 8330B																					
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.06	U	0.06	U	0.06	U	0.059	U	0.058	U	0.06	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.06	U	0.06	U	0.06	U	0.059	U	0.058	U	0.06	U	0.059	U

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-09		EC-21-10		EC-21-10		EC-21-11		EC-21-12		EC-21-13		EC-21-29		EC-21-30	
					Sample Name	EC-21-9-SO-06		EC-21-10-SO-06		EC-21-10-SO-9		EC-21-11-SO-06		EC-21-12-SO-06		EC-21-13-SO-06		EC-21-29-SO-02		EC-21-30-SO-03	
					Sample Date	7/16/13		7/15/13		9/23/15		7/15/13		7/15/13		7/16/13		8/19/13		8/27/13	
					Start Depth (ft bgs)	5		5		7		5		5		5		1		2	
					End Depth (ft bgs)	6		6		9		6		6		6		2		3	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																					
Aluminum	mg/kg	110000	18404	n	110000	7570		5280				6600		7530		23700		4990		7360	
Antimony	mg/kg	47	0.68	n	47	0.69	U	0.68	J	0.268	UJ	0.78	U	0.73	U	0.67	U	0.46	B	0.83	U
Copper	mg/kg	4700	14.44	n	4700	5.9		16.5				8.9		7.2		14.8		12.2		10.2	
Lead	mg/kg	800	13.96		800	9.4		41.4		3.38		14.4		12.4		28.7		21.1		16.8	
Manganese	mg/kg	2600	681.6	n	2600	35.8	K	61.7		12.9	J	300		287		66.5	K	362		30.2	
Zinc	mg/kg	35000	44.64	n	35000	17.5		25.2				16.4		20.4		28.3		111		20.5	
SW846 8082A																					
Aroclor 1016	mg/kg	5.1		n	5.1	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
Aroclor 1221	mg/kg	0.83			0.83	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
Aroclor 1232	mg/kg	0.72			0.72	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
Aroclor 1242	mg/kg	0.95			0.95	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
Aroclor 1248	mg/kg	0.95			0.95	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
Aroclor 1254	mg/kg	0.97			0.97	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
Aroclor 1260	mg/kg	0.99			0.99	0.029	U	0.03	UJ			0.029	UJ	0.031	UJ	0.03	U	0.027	U	0.031	U
SW846 8270 SIM																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.6	U					1.6	UJ	1.6	UJ	0.66	J	1.3	J	1.7	U
Acenaphthylene	µg/kg	2300000	2.38		2300000	0.77	J	3.3	J			0.33	J	1.6	UJ	1.8	J	0.95	J	1.7	U
Anthracene	µg/kg	2.3E+07	2.6	n	23000000	1.6	U					1.6	UJ	1.6	UJ	1.1	J	5.8		0.36	
Benzo(a)anthracene	µg/kg	2900	16.31		2900	2.5						1.6	UJ	1.6	UJ	5.4	J	11.3		1.8	
Benzo(a)pyrene	µg/kg	290	11.91		290	1.9	J					1.6	UJ	0.95	J	4.5		10.5		3.8	J
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	4.6						1.6	UJ	1.9	J	10.5	J	15.1		11.3	J
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	2.5						1.6	UJ	0.74	J	9.7	J	6		2.4	J
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	1.5	J					1.6	UJ	1.6	UJ	2.9		5.9		3.2	J
Chrysene	µg/kg	290000	20.56		290000	3.2						1.6	UJ	1.6	UJ	8.7	J	11.9		2.3	
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	0.85	J					1.6	UJ	1.6	UJ	1.6	J	2.3		1.7	UJ
Fluoranthene	µg/kg	3000000	24.95	n	3000000	3.3						1.6	UJ	1.2	J	11.7		18.5		2.2	
Fluorene	µg/kg	3000000	31.7	n	3000000	1.6	U	89.5	J			1.6	UJ	1.6	UJ	0.97	J	1.8		1.7	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	2.2						1.6	UJ	1.6	UJ	1.5	U	6.3		1.7	UJ
Naphthalene	µg/kg	17000	2.2		17000	1.6	U					1.6	UJ	1.6	UJ	1.6	J	1.1	J	1.7	U
Phenanthrene	µg/kg	2300000	10.85		2300000	1.9	J					1.6	UJ	0.63	J	6.2		15.7		0.73	
Pyrene	µg/kg	2300000	19.95	n	2300000	3.1						0.64	J	1.2	J	9.5		15.5		2.3	
SW846 8270D																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000			117	J												
Anthracene	µg/kg	2.3E+07	2.6	n	23000000			205	J												
Benzo(a)anthracene	µg/kg	2900	16.31		2900			386	J	310											
Benzo(a)pyrene	µg/kg	290	11.91		290			321	J	290											
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900			433	J	640											
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000			166	J												
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000			168	J												
Chrysene	µg/kg	290000	20.56		290000			427	J												
Dibenz(a,h)anthracene	µg/kg	290	2.53		290			54.2	J	40											
Fluoranthene	µg/kg	3000000	24.95	n	3000000			953	J												

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-09		EC-21-10		EC-21-10		EC-21-11		EC-21-12		EC-21-13		EC-21-29		EC-21-30	
					Sample Name	EC-21-9-SO-06		EC-21-10-SO-06		EC-21-10-SO-9		EC-21-11-SO-06		EC-21-12-SO-06		EC-21-13-SO-06		EC-21-29-SO-02		EC-21-30-SO-03	
					Sample Date	7/16/13		7/15/13		9/23/15		7/15/13		7/15/13		7/16/13		8/19/13		8/27/13	
					Start Depth (ft bgs)	5		5		7		5		5		5		1		2	
					End Depth (ft bgs)	6		6		9		6		6		6		2		3	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900			178	J	240											
Naphthalene	µg/kg	17000	2.2		17000			65.8	J												
Phenanthrene	µg/kg	2300000	10.85		2300000			850	J												
Pyrene	µg/kg	2300000	19.95	n	2300000			765	J												
SW846 8290																					
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	1300		10500	J	1460		4240		9040	J	13200	J	4290		2470	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.5	U	8.28	U	3.78	J	7.42	U	7.5	U	7.56	U	7.38	U	7.73	U
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	22.6		65.6		9.74		63		61.5		64.6		43.4		79.9	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.76	U	4.15	U	1.13	J	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.76	U	4.15	U	0.202	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.76	U	4.15	U	0.172	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.76	U	4.15	U	0.188	UJ	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.76	U	4.15	U	0.18	U	3.72	U	3.76	U	3.79	U	3.7	U	2.48	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.76	U	4.15	U	0.107	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.76	U	4.15	U	0.375	J	3.22	J	3.76	U	3.79	U	3.7	U	4.37	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.76	U	4.15	U	0.116	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.76	U	4.15	U	0.433	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.76	U	4.15	U	0.331	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.76	U	4.15	U	0.109	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.76	U	4.15	U	0.33	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.75	U	0.828	U	0.317	U	0.742	U	0.75	U	0.756	U	0.738	U	0.773	U
2,3,7,8-TCDF	pg/g	219			219	0.75	U	0.828	U	0.33	U	0.742	U	0.75	U	0.756	U	0.738	U	0.773	U
TEQ WHO2005 ND=0	pg/g				NSL					0.604											
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.76	U	4.15	U	2.24	J	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	64.1		144		22.5		188		149		143		111		239	
Total Hexachlorodibenzofuran	pg/g	223			223	3.76	U	4.15	U	0.488	J	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	15.5		12.8		2.35	J	43.6		15.7		9.71		13.8		63.7	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.76	U	4.15	U	0.331	U	3.72	U	3.76	U	3.79	U	3.7	U	3.87	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.76	U	4.15	U	0.433	U	3.72	U	3.76	U	3.79	U	3.7	U	1.97	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.75	U	0.828	U	0.33	U	0.742	U	0.75	U	1.93		0.946	J	0.773	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.75	U	0.828	U	0.317	U	0.742	U	0.75	U	0.756	U	0.738	U	0.773	U
SW846 8330B																					
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U			0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.06	U			0.06	U	0.059	U	0.059	U	0.87		0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.06	U			0.06	U	0.059	U	0.059	U	0.052	J	0.059	U

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-32		EC-21-33		EC-21-33		EC-21-34		EC-21-34		EC-21-35		EC-21-35		EC-21-36	
					Sample Name	EC-21-32-SO-6		EC-21-33-SO-6		EC-21-33-SO-9		EC-21-34-SO-6		EC-21-34-SO-9		EC-21-35-SO-6		EC-21-35-SO-9		EC-21-36-SO-2	
					Sample Date	9/22/15		9/22/15		9/22/15		9/22/15		9/22/15		9/22/15		9/22/15		9/23/15	
					Start Depth (ft bgs)	5		5		8		5		8		5		8		1	
					End Depth (ft bgs)	6		6		9		6		9		6		9		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																					
Aluminum	mg/kg	110000	18404	n	110000																
Antimony	mg/kg	47	0.68	n	47	0.283	U	0.296	U	0.285	U	0.283	U	0.284	U	0.259	U	0.268	U	0.306	UJ
Copper	mg/kg	4700	14.44	n	4700																
Lead	mg/kg	800	13.96		800	9.77		10.4		8.27		13		15.3		1.9		0.661		29.3	
Manganese	mg/kg	2600	681.6	n	2600	105		13.5		7.35		33		15.6		5.06		0.759		52.8	J
Zinc	mg/kg	35000	44.64	n	35000																
SW846 8082A																					
Aroclor 1016	mg/kg	5.1		n	5.1																
Aroclor 1221	mg/kg	0.83			0.83																
Aroclor 1232	mg/kg	0.72			0.72																
Aroclor 1242	mg/kg	0.95			0.95																
Aroclor 1248	mg/kg	0.95			0.95																
Aroclor 1254	mg/kg	0.97			0.97																
Aroclor 1260	mg/kg	0.99			0.99																
SW846 8270 SIM																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000																
Acenaphthylene	µg/kg	2300000	2.38		2300000																
Anthracene	µg/kg	2.3E+07	2.6	n	23000000																
Benzo(a)anthracene	µg/kg	2900	16.31		2900																
Benzo(a)pyrene	µg/kg	290	11.91		290																
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900																
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																
Chrysene	µg/kg	290000	20.56		290000																
Dibenz(a,h)anthracene	µg/kg	290	2.53		290																
Fluoranthene	µg/kg	3000000	24.95	n	3000000																
Fluorene	µg/kg	3000000	31.7	n	3000000																
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900																
Naphthalene	µg/kg	17000	2.2		17000																
Phenanthrene	µg/kg	2300000	10.85		2300000																
Pyrene	µg/kg	2300000	19.95	n	2300000																
SW846 8270D																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000																
Anthracene	µg/kg	2.3E+07	2.6	n	23000000																
Benzo(a)anthracene	µg/kg	2900	16.31		2900	2	U	16		2.7	J	2.1	U	2.1	U	1.8	U	2	U	11	
Benzo(a)pyrene	µg/kg	290	11.91		290	2	U	33		15		2.1	U	2.1	U	1.8	U	2	U	12	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	2	U	49		16		2.1	U	2.1	U	1.8	U	2	U	19	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																
Chrysene	µg/kg	290000	20.56		290000																
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	2	U	5.4		2.1	U	2.1	U	2.1	U	1.8	U	2	U	2.2	U
Fluoranthene	µg/kg	3000000	24.95	n	3000000																

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-32		EC-21-33		EC-21-33		EC-21-34		EC-21-34		EC-21-35		EC-21-35		EC-21-36	
					Sample Name	EC-21-32-SO-6		EC-21-33-SO-6		EC-21-33-SO-9		EC-21-34-SO-6		EC-21-34-SO-9		EC-21-35-SO-6		EC-21-35-SO-9		EC-21-36-SO-2	
					Sample Date	9/22/15		9/22/15		9/22/15		9/22/15		9/22/15		9/22/15		9/22/15		9/23/15	
					Start Depth (ft bgs)	5		5		8		5		8		5		8		1	
					End Depth (ft bgs)	6		6		9		6		9		6		9		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	2	U	26		12		2.1	U	2.1	U	1.8	U	2	U	15	
Naphthalene	µg/kg	17000	2.2		17000																
Phenanthrene	µg/kg	2300000	10.85		2300000																
Pyrene	µg/kg	2300000	19.95	n	2300000																
SW846 8290																					
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	5750	J	3800		3580		3620		1370		2070		138		2940	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	8.82	J	1.4	J	0.863	J	1.14	J	0.38	J	1.79	J	1.14	J	8.35	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	59.3		36.1		37.3		38.7		22		16.9		1.22	J	40	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	1.54	J	0.654	U	0.311	UJ	0.325	U	0.144	U	0.639	U	0.167	UJ	4.8	J
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.455	J	0.228	J	0.13	J	0.0879	J	0.0408	J	0.472	J	0.0677	J	0.547	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.38	J	0.313	J	0.367	J	0.586	J	0.334	J	0.482	J	0.0736	J	0.335	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.261	J	0.158	J	0.106	J	0.086	J	0.0497	J	0.294	J	0.0425	J	0.811	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	0.633	J	0.631	J	0.674	J	0.966	J	0.6	J	0.518	J	0.0699	J	0.74	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.218	J	0.126	J	0.0857	J	0.0622	J	0.0323	J	0.373	J	0.0514	J	0.576	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	8.48		3.33		0.994	J	1.8	J	0.961	J	0.745	J	0.118	J	0.925	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.104	J	0.187	J	0.161	J	0.0419	J	0.0444	J	0.318	J	0.0484	J	0.287	UJ
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.206	J	0.174	J	0.192	J	0.284	J	0.173	J	0.405	J	0.0395	J	0.198	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.123	J	0.0918	J	0.0901	J	0.0313	U	0.0432	J	0.283	U	0.0239	U	0.164	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.124	J	0.159	J	0.0717	J	0.0618	J	0.0345	J	0.331	J	0.038	J	0.742	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.0459	U	0.126	J	0.0473	U	0.0309	U	0.0257	U	0.288	U	0.0265	U	0.392	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.0372	U	0.171	J	0.0909	U	0.0684	U	0.0483	U	0.198	U	0.0316	U	0.0477	U
2,3,7,8-TCDF	pg/g	219			219	0.0306	U	0.0536	U	0.0414	U	0.0282	U	0.0263	U	0.238	U	0.0246	U	0.107	J
TEQ WHO2005 ND=0	pg/g				NSL	3.58		2.39		1.89		2.13		1.01		1.51		0.14		2.11	
Total Heptachlorodibenzofuran	pg/g	2210			2210	2.8		1.42	J	0.13	J	0.479	J	0.182	J	0.639	J	0.0172	U	9.6	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	105		99.8		121		105		58.9		33.1		2.97		91.4	
Total Hexachlorodibenzofuran	pg/g	223			223	1.21	J	1.09	J	0.391	J	0.491	J	0.114	J	0.815	J	0.0425	J	6.61	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	19.9		34.6		45.8		20.1		11.8		1.49	J	1.01	J	15.1	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	0.218	J	0.0918	J	0.0791	J	0.031	U	0.0367	J	0.285	U	0.0252	U	1.92	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	1.31	J	4.64		3.76		1.62	J	1.82	J	0.283	U	0.0243	U	2.1	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.0748	J	0.0536	U	0.222	J	0.0282	U	0.0263	U	0.238	U	0.0246	U	0.413	J
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.0372	U	0.381	J	1.22		0.0684	U	0.278	J	0.198	U	0.0316	U	0.234	J
SW846 8330B																					
2,4,6-Trinitrotoluene	mg/kg	51		n	51																
2,4-Dinitrotoluene	mg/kg	7.4			7.4																
2,6-Dinitrotoluene	mg/kg	1.5			1.5																

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-37		EC-21-38		EC-21-39		EC-21-40		EC-21-41		EC-21-41		EC-21-B		EC-21-C	
					Sample Name	EC-21-37-SO-4		EC-21-38-SO-2		EC-21-39-SO-2		EC-21-40-SO-2		EC-21-41-SO-6		EC-21-41-SO-9		EC-21-B-SO-04		EC-21-C-SO-05	
					Sample Date	9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		8/23/13		8/23/13	
					Start Depth (ft bgs)	3		1		1		1		5		8		3		4	
					End Depth (ft bgs)	4		2		2		2		6		9		4		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																					
Aluminum	mg/kg	110000	18404	n	110000													5330		5440	
Antimony	mg/kg	47	0.68	n	47	0.265	UJ	0.291	UJ	1.23	J	0.277	UJ	0.283	UJ	0.291	UJ	0.66	U	0.69	J
Copper	mg/kg	4700	14.44	n	4700													6.6		10.6	
Lead	mg/kg	800	13.96		800	2.8		24.1		137		18.9		11.8		10.3		6.4		10.2	
Manganese	mg/kg	2600	681.6	n	2600	15.7	J	126	J	577	J	27.2	J	19.5	J	13	J	20.7		119	
Zinc	mg/kg	35000	44.64	n	35000													13.2		29.6	
SW846 8082A																					
Aroclor 1016	mg/kg	5.1		n	5.1													0.028	U	0.027	U
Aroclor 1221	mg/kg	0.83			0.83													0.028	U	0.027	U
Aroclor 1232	mg/kg	0.72			0.72													0.028	U	0.027	U
Aroclor 1242	mg/kg	0.95			0.95													0.028	U	0.027	U
Aroclor 1248	mg/kg	0.95			0.95													0.028	U	0.027	U
Aroclor 1254	mg/kg	0.97			0.97													0.028	U	0.027	U
Aroclor 1260	mg/kg	0.99			0.99													0.028	U	0.027	U
SW846 8270 SIM																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000													1.5	U		
Acenaphthylene	µg/kg	2300000	2.38		2300000													1.5	U	35.8	
Anthracene	µg/kg	2.3E+07	2.6	n	23000000													0.43	J		
Benzo(a)anthracene	µg/kg	2900	16.31		2900													2.5			
Benzo(a)pyrene	µg/kg	290	11.91		290													2.5			
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900													4.2			
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000													1.9			
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000													1.6	J		
Chrysene	µg/kg	290000	20.56		290000													3			
Dibenz(a,h)anthracene	µg/kg	290	2.53		290													0.71	J		
Fluoranthene	µg/kg	3000000	24.95	n	3000000													4.3			
Fluorene	µg/kg	3000000	31.7	n	3000000													1.5	U	103	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900													1.8	J		
Naphthalene	µg/kg	17000	2.2		17000													0.62	J	34.9	
Phenanthrene	µg/kg	2300000	10.85		2300000													2.2			
Pyrene	µg/kg	2300000	19.95	n	2300000													3.8			
SW846 8270D																					
Acenaphthene	µg/kg	4500000	0.92	n	4500000															95.4	
Anthracene	µg/kg	2.3E+07	2.6	n	23000000															266	
Benzo(a)anthracene	µg/kg	2900	16.31		2900	12		12		130		7.4		42		33				788	
Benzo(a)pyrene	µg/kg	290	11.91		290	12		11		130		10		37		46				878	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	19		17		190		15		58		76				1390	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000															284	
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000															576	
Chrysene	µg/kg	290000	20.56		290000															926	
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	2.8	J	2.2	U	27		2.1	U	6.6		9.2				103	
Fluoranthene	µg/kg	3000000	24.95	n	3000000															1760	

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-37		EC-21-38		EC-21-39		EC-21-40		EC-21-41		EC-21-41		EC-21-B		EC-21-C	
					Sample Name	EC-21-37-SO-4		EC-21-38-SO-2		EC-21-39-SO-2		EC-21-40-SO-2		EC-21-41-SO-6		EC-21-41-SO-9		EC-21-B-SO-04		EC-21-C-SO-05	
					Sample Date	9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		9/23/15		8/23/13		8/23/13	
					Start Depth (ft bgs)	3		1		1		1		5		8		3		4	
					End Depth (ft bgs)	4		2		2		2		6		9		4		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	12		15		150		16		33		37				305	
Naphthalene	µg/kg	17000	2.2		17000																
Phenanthrene	µg/kg	2300000	10.85		2300000															1150	
Pyrene	µg/kg	2300000	19.95	n	2300000															1300	
SW846 8290																					
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	2680		7880	J	8560	J	3170		1460		1480		10400	J	4200	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	2.51	J	2.23	J	4.85	J	0.865	U	1.16	U	1.45	U	7.75	U	48.2	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	15.1		48.9		147		18.9		15.3		30.4		89		128	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	0.795	J	1.79	J	3.16	J	0.526	U	0.599	UJ	0.738	U	2.27	J	26.8	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.229	U	0.188	UJ	0.39	U	0.0538	U	0.101	U	0.104	UJ	3.89	U	2.38	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.256	U	0.365	J	1.27	J	0.206	J	0.343	U	0.361	UJ	3.89	U	3.08	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.191	U	0.424	J	0.633	J	0.114	U	0.187	UJ	0.118	U	3.89	U	5.47	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	0.282	J	0.766	J	2.24	J	0.325	J	0.547	U	0.716	J	3.89	U	7.02	
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.187	U	0.39	J	0.517	J	0.092	UJ	0.0962	U	0.0937	U	3.89	U	3.52	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	0.242	U	1.23	J	2.72	J	0.452	J	0.651	J	1.25	J	3.89	U	8.42	
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.202	U	0.133	UJ	0.234	UJ	0.0344	U	0.16	UJ	0.0905	UJ	3.89	U	3.66	UJ
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.365	U	0.159	J	0.524	J	0.105	J	0.177	U	0.195	U	3.89	U	3.39	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.295	U	0.187	J	0.347	J	0.0616	U	0.144	U	0.0749	U	3.89	U	2.56	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.186	U	0.422	J	0.618	J	0.107	U	0.164	U	0.12	U	3.89	U	5.08	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.29	U	0.546	J	0.591	J	0.129	J	0.149	U	0.0755	U	3.89	U	4.3	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.441	U	0.103	U	0.0819	U	0.0853	U	0.181	U	0.0992	U	0.775	U	0.731	U
2,3,7,8-TCDF	pg/g	219			219	0.392	U	0.146	J	0.346	J	0.0648	U	0.26	U	0.0969	U	0.775	U	2.98	
TEQ WHO2005 ND=0	pg/g				NSL	0.992		3.59		5.65		1.42		0.803		1.23					
Total Heptachlorodibenzofuran	pg/g	2210			2210	1.48	J	2.34	J	4.84		0.58	J	0.0889	U	0.806	J	2.27	J	59.8	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	40.7		115		342		42.3		44.4		121		199		256	
Total Hexachlorodibenzofuran	pg/g	223			223	0.191	U	3.72	J	4.66		0.612	J	0.452	J	1.01	J	3.89	U	61.4	J
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.53	J	14.4		43.7		4.44		10.3		29.2		13.3		82.9	J
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	0.293	U	4.28		4.21		0.346	J	0.147	U	0.161	J	3.89	U	47.8	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	0.365	U	0.519	J	7.73		0.368	J	0.629	J	2.48	J	3.89	U	20.9	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.392	U	1.31		4.62		0.202	J	0.26	U	0.0969	U	0.728	J	47.9	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.441	U	0.276	J	1.45		0.0853	U	0.181	U	0.0992	U	0.775	U	5.46	
SW846 8330B																					
2,4,6-Trinitrotoluene	mg/kg	51		n	51													0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4													0.059	U	0.058	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5													0.059	U	0.058	U

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-C	
					Sample Name	EC-21C-SO-9	
					Sample Date	9/23/15	
					Start Depth (ft bgs)	7	
					End Depth (ft bgs)	9	
Analyte	Unit	RSL	BTV		PSL	Result	
SW846 6020A							
Aluminum	mg/kg	110000	18404	n	110000		
Antimony	mg/kg	47	0.68	n	47	0.261	UJ
Copper	mg/kg	4700	14.44	n	4700		
Lead	mg/kg	800	13.96		800	6.77	
Manganese	mg/kg	2600	681.6	n	2600		
Zinc	mg/kg	35000	44.64	n	35000		
SW846 8082A							
Aroclor 1016	mg/kg	5.1		n	5.1		
Aroclor 1221	mg/kg	0.83			0.83		
Aroclor 1232	mg/kg	0.72			0.72		
Aroclor 1242	mg/kg	0.95			0.95		
Aroclor 1248	mg/kg	0.95			0.95		
Aroclor 1254	mg/kg	0.97			0.97		
Aroclor 1260	mg/kg	0.99			0.99		
SW846 8270 SIM							
Acenaphthene	µg/kg	4500000	0.92	n	4500000		
Acenaphthylene	µg/kg	2300000	2.38		2300000		
Anthracene	µg/kg	2.3E+07	2.6	n	23000000		
Benzo(a)anthracene	µg/kg	2900	16.31		2900		
Benzo(a)pyrene	µg/kg	290	11.91		290		
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900		
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000		
Chrysene	µg/kg	290000	20.56		290000		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290		
Fluoranthene	µg/kg	3000000	24.95	n	3000000		
Fluorene	µg/kg	3000000	31.7	n	3000000		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900		
Naphthalene	µg/kg	17000	2.2		17000		
Phenanthrene	µg/kg	2300000	10.85		2300000		
Pyrene	µg/kg	2300000	19.95	n	2300000		
SW846 8270D							
Acenaphthene	µg/kg	4500000	0.92	n	4500000		
Anthracene	µg/kg	2.3E+07	2.6	n	23000000		
Benzo(a)anthracene	µg/kg	2900	16.31		2900	210	
Benzo(a)pyrene	µg/kg	290	11.91		290	180	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	270	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000		
Chrysene	µg/kg	290000	20.56		290000		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	26	
Fluoranthene	µg/kg	3000000	24.95	n	3000000		

Table E2-30. Analytical Results Summary for Subsurface Soil at EC-21

					Location	EC-21-C	
					Sample Name	EC-21C-SO-9	
					Sample Date	9/23/15	
					Start Depth (ft bgs)	7	
					End Depth (ft bgs)	9	
Analyte	Unit	RSL	BTV		PSL	Result	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	180	
Naphthalene	µg/kg	17000	2.2		17000		
Phenanthrene	µg/kg	2300000	10.85		2300000		
Pyrene	µg/kg	2300000	19.95	n	2300000		
SW846 8290							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	2050	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	18	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	32.1	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	5.31	J
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.39	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.309	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.468	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	1.08	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.277	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	0.542	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.123	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.238	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.127	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.39	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.335	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.0838	U
2,3,7,8-TCDF	pg/g	219			219	0.144	J
TEQ WHO2005 ND=0	pg/g				NSL	1.67	
Total Heptachlorodibenzofuran	pg/g	2210			2210	18.9	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	71.2	
Total Hexachlorodibenzofuran	pg/g	223			223	6.1	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	7.28	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.2	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	0.966	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.775	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.0838	U
SW846 8330B							
2,4,6-Trinitrotoluene	mg/kg	51		n	51		
2,4-Dinitrotoluene	mg/kg	7.4			7.4		
2,6-Dinitrotoluene	mg/kg	1.5			1.5		

Table E2-31. Analytical Results Summary for Surface Soil Samples at EC-22

					Location	EC-22-01		EC-22-02		EC-22-03		EC-22-04		EC-22-05	
					Sample Name	EC-22-1-SO-0.5		EC-22-2-SO-0.5		EC-22-3-SO-0.5		EC-22-4-SO-0.5		EC-22-5-SO-0.5	
					Sample Date	8/19/13		8/26/13		8/19/13		8/19/13		8/19/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	110000	14159	n	110000	9450		10700		23500		4120		9490	
Antimony	mg/kg	47	0.95	n	47	0.6	B	0.52	J	1.2	B	0.61	B	0.95	J
Copper	mg/kg	4700	32.83	n	4700	10.7		14.8		16.9		4.3		17.2	
Lead	mg/kg	800	123.9		800	38.2		32.2		165		161		48	
Manganese	mg/kg	2600	699.8	n	2600	448		154		284		37		349	
Zinc	mg/kg	35000	83.92	n	35000	55.3		37.7		202		169		65.7	
SW846 8082A															
Aroclor 1016	mg/kg	5.1		n	5.1	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
Aroclor 1221	mg/kg	0.83			0.83	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
Aroclor 1232	mg/kg	0.72			0.72	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
Aroclor 1242	mg/kg	0.95			0.95	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
Aroclor 1248	mg/kg	0.95			0.95	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
Aroclor 1254	mg/kg	0.97			0.97	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
Aroclor 1260	mg/kg	0.99			0.99	0.028	U	0.026	U	0.026	U	0.026	U	0.031	U
SW846 8270 SIM															
Acenaphthene	µg/kg	4500000	41.5	n	4500000	1.3	J	0.54	J	1.8		1.4	U	1.1	J
Acenaphthylene	µg/kg	2300000	363		2300000	11.2		7.5		30.8		2.4		2.4	
Anthracene	µg/kg	2.3E+07	154	n	23000000	8.7		16.7		22.2		1.6	J	3.9	
Benzo(a)anthracene	µg/kg	2900	1035		2900	62.6				53.9		7.5		23.6	
Benzo(a)pyrene	µg/kg	290	1036		1036	39.7				50.9		6.4		26.1	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900							14.1		39.6	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	25.2		79.8		32		8		27.6	
Benzo(k)fluoranthene	µg/kg	29000	476		29000	31.7				39.1		5		13.7	
Chrysene	µg/kg	290000	842		290000	81.2		103		85.6		11.2		33.2	
Dibenz(a,h)anthracene	µg/kg	290	152		290	7.5		22.4		9.2		1.8		5.9	
Fluoranthene	µg/kg	3000000	1488	n	3000000					82.7		11.2		44.5	
Fluorene	µg/kg	3000000	40	n	3000000	1.5	J	1.1	J	2.7		1.4	U	0.6	J
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	27.3		76.2		28.8		6.5		22.1	
Naphthalene	µg/kg	17000	13.3		17000	2.2		0.79	J	3.5		0.82	J	1.2	J
Phenanthrene	µg/kg	2300000	500		2300000	20.7		9.8		20		2.1		16.6	
Pyrene	µg/kg	2300000	1117	n	2300000	95.8				92.8		11.4		39.9	
SW846 8270D															
Benzo(a)anthracene	µg/kg	2900	1035		2900			69.7							
Benzo(a)pyrene	µg/kg	290	1036		1036			91.6							
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	115		249		125	J				
Benzo(k)fluoranthene	µg/kg	29000	476		29000			109							
Fluoranthene	µg/kg	3000000	1488	n	3000000	113		88							
Pyrene	µg/kg	2300000	1117	n	2300000			120							
SW846 8290															
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	2310		5050	J	6850	J	1360		7110	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	9.96	J	10.5	J	41.2		7.44	U	9.06	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	44.4		40.2		145		22		84.5	

Table E2-31. Analytical Results Summary for Surface Soil Samples at EC-22

1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	6.28		10		14.5		3.73	U	7.55	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.72	U	3.85	U	3.62	U	3.73	U	4.43	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.72	U	3.85	U	2.51	J	3.73	U	4.43	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.72	U	2.26	J	2.75	J	3.73	U	3.68	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.72	U	3.85	U	5.24	J	3.73	U	2.33	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.72	U	3.85	U	1.97	J	3.73	U	4.43	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.72	U	3.85	U	5.59		3.73	U	2.29	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.72	U	3.85	U	3.62	U	3.73	U	4.43	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.72	U	3.85	U	3.62	U	3.73	U	4.43	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.72	U	3.85	U	2.21	J	3.73	U	3.24	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.72	U	2.47	J	2.32	J	3.73	U	4.43	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.72	U	3.85	U	2.5	J	3.73	U	4.43	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.742	U	0.768	U	0.502	J	0.744	U	0.883	U
2,3,7,8-TCDF	pg/g	219			219	0.65	J	0.72	J	1.41		0.744	U	1.03	J
Total Heptachlorodibenzofuran	pg/g	2210			2210	12.1		12		40.2		2.66	J	11.6	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	150		96.8		462		55.7		201	
Total Hexachlorodibenzofuran	pg/g	223			223	4.19	J	15		26		3.73	U	14.2	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	17.2		12.8		72.2		7.48		27	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	5.24	J	16.7		28.1		3.73	U	19	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.72	U	3.85	U	5.91		3.73	U	2.57	J
Total Tetrachlorodibenzofuran	pg/g	219			219	5.93		13.4		24.3		0.744	U	10.4	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.742	U	0.388	J	3.72		0.744	U	2.2	
SW846 8330B															
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.06	U	0.06	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.06	U	0.06	U	0.059	U

Table E2-32. Analytical Results Summary for Subsurface Soil at EC-22

					Location	EC-22-01		EC-22-02		EC-22-05	
					Sample Name	EC-22-1-SO-02		EC-22-2-SO-02		EC-22-5-SO-02.5	
					Sample Date	8/19/13		8/26/13		8/19/13	
					Start Depth (ft bgs)	1		1		1.5	
					End Depth (ft bgs)	2		2		2.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Aluminum	mg/kg	110000	18404	n	110000	8380		9840		3290	
Antimony	mg/kg	47	0.68	n	47	0.66	U	0.64	J	0.61	U
Copper	mg/kg	4700	14.44	n	4700	8.7		13.3		1.6	J
Lead	mg/kg	800	13.96		800	14.5		40		4.5	
Manganese	mg/kg	2600	681.6	n	2600	220		109		16	
Zinc	mg/kg	35000	44.64	n	35000	29.6		34.6		7.1	
SW846 8082A											
Aroclor 1016	mg/kg	5.1		n	5.1	0.028	U	0.026	U	0.028	U
Aroclor 1221	mg/kg	0.83			0.83	0.028	U	0.026	U	0.028	U
Aroclor 1232	mg/kg	0.72			0.72	0.028	U	0.026	U	0.028	U
Aroclor 1242	mg/kg	0.95			0.95	0.028	U	0.026	U	0.028	U
Aroclor 1248	mg/kg	0.95			0.95	0.028	U	0.026	U	0.028	U
Aroclor 1254	mg/kg	0.97			0.97	0.028	U	0.026	U	0.028	U
Aroclor 1260	mg/kg	0.99			0.99	0.028	U	0.026	U	0.028	U
SW846 8270 SIM											
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.5	U	0.5	J	1.5	U
Acenaphthylene	µg/kg	2300000	2.38		2300000	0.96	J	7.1		1.5	U
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	0.85	J	3.1		1.5	U
Benzo(a)anthracene	µg/kg	2900	16.31		2900	5.4		26.8		1.5	U
Benzo(a)pyrene	µg/kg	290	11.91		290	4.4		24.9		1.5	U
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	6.5		31.2		1.5	U
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	2.6		20.1		1.5	U
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	2.3		11.2		1.5	U
Chrysene	µg/kg	290000	20.56		290000	6.1		29.5		1.5	U
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	0.87	J	5.7		1.5	U
Fluoranthene	µg/kg	3000000	24.95	n	3000000	8.3		42.4		0.73	J
Fluorene	µg/kg	3000000	31.7	n	3000000	1.5	U	0.54	J	1.5	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	2.5		18.9		1.5	U
Naphthalene	µg/kg	17000	2.2		17000	1.1	J	0.92	J	1.5	U

Table E2-32. Analytical Results Summary for Subsurface Soil at EC-22

					Location	EC-22-01		EC-22-02		EC-22-05	
					Sample Name	EC-22-1-SO-02		EC-22-2-SO-02		EC-22-5-SO-02.5	
					Sample Date	8/19/13		8/26/13		8/19/13	
					Start Depth (ft bgs)	1		1		1.5	
					End Depth (ft bgs)	2		2		2.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
Phenanthrene	µg/kg	2300000	10.85		2300000	3		6.8		1.5	U
Pyrene	µg/kg	2300000	19.95	n	2300000	8.1		45.9		0.59	J
SW846 8290											
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	2730		4980	J	275	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.33	U	7.92	J	7.2	U
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	39.2		48.3		6.04	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.67	U	6.88		3.61	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.67	U	3.42	U	3.61	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.67	U	3.42	U	3.61	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.67	U	3.42	U	3.61	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.67	U	3.42	U	3.61	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.67	U	3.42	U	3.61	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.67	U	3.42	U	3.61	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.67	U	3.42	U	3.61	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.67	U	3.42	U	3.61	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.67	U	3.42	U	3.61	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.67	U	3.42	U	3.61	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.67	U	3.42	U	3.61	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.733	U	0.682	U	0.72	U
2,3,7,8-TCDF	pg/g	219			219	0.733	U	0.682	U	0.72	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.67	U	6.88		3.61	U
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	110		123		14.4	
Total Hexachlorodibenzofuran	pg/g	223			223	3.67	U	6.55		3.61	U
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	12.6		15.5		3.61	U
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.67	U	3.23	J	3.61	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.67	U	3.42	U	3.61	U
Total Tetrachlorodibenzofuran	pg/g	219			219	0.904	J	2.73		0.72	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.733	U	0.682	U	0.72	U

Table E2-32. Analytical Results Summary for Subsurface Soil at EC-22

					Location	EC-22-01		EC-22-02		EC-22-05	
					Sample Name	EC-22-1-SO-02		EC-22-2-SO-02		EC-22-5-SO-02.5	
					Sample Date	8/19/13		8/26/13		8/19/13	
					Start Depth (ft bgs)	1		1		1.5	
					End Depth (ft bgs)	2		2		2.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8330B											
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.058	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.058	U	0.059	U

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Table E2-33. Analytical Results Summary for Surface Soil Samples at EC-25

					Location	EC-25-01		EC-25-02		EC-25-03		EC-25-05		EC-25-06		EC-25-07		EC-25-08		EC-25-09		EC-25-10	
					Sample Name	EC-25-1-SO-0.5		EC-25-2-SO-0.5		EC-25-3-SO-0.5		EC-25-5-SO-0.5		EC-25-6-SO-0.5		EC-25-7-SO-0.5		EC-25-8-SO-0.5		EC-25-9-SO-0.5		EC-25-10-SO-0.5	
					Sample Date	8/1/13		8/1/13		7/31/13		7/31/13		8/1/13		8/8/13		8/5/13		8/14/13		8/5/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000	16	U	18	U					13	U								
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	3220		2320		3500		3600		4270		5920		5350		4480		761	
Antimony	mg/kg	47	0.95	n	47	11.4		0.98	J	16.8		4.3		13.5		3		14.5		2.4	L	1.2	
Copper	mg/kg	4700	32.83	n	4700	278		17.8		325	J	80.9	J	445		129		1700		17.1		28.2	
Lead	mg/kg	800	123.9		800	464		61.4		576		213		739		258		851		68.5		105	
Manganese	mg/kg	2600	699.8	n	2600	415		21.5		566		745		241		1010		3110		13700		46.2	
Zinc	mg/kg	35000	83.92	n	35000	1120		13.9		2350		837		856		747		2840		161		40.3	
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.042	U	0.033	U	0.062	U	0.045	U	0.035	U	0.031	U	0.027	U	0.028	U	0.028	U
Aroclor 1221	mg/kg	0.83			0.83	0.042	U	0.033	U	0.062	U	0.045	U	0.035	U	0.031	U	0.027	U	0.028	U	0.028	U
Aroclor 1232	mg/kg	0.72			0.72	0.042	U	0.033	U	0.062	U	0.045	U	0.035	U	0.031	U	0.027	U	0.028	U	0.028	U
Aroclor 1242	mg/kg	0.95			0.95	0.042	U	0.033	U	0.062	U	0.045	U	0.035	U	0.031	U	0.027	U	0.028	U	0.028	U
Aroclor 1248	mg/kg	0.95			0.95	0.042	U	0.033	U	0.062	U	0.045	U	0.035	U	0.031	U	0.027	U	0.028	U	0.028	U
Aroclor 1254	mg/kg	0.97			0.97	0.042	U	0.033	U	0.062	U	0.045	U	0.035	U	0.031	U	0.027	U	0.028	U	0.028	U
Aroclor 1260	mg/kg	0.99			0.99	0.042	U	0.033	U	0.059	J	0.045	U	0.21		0.031	U	0.027	U	0.028	U	0.028	U
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	35.1		63.3		27.1		5.1		97.5		6.5		13.8		1.4	J	2.4	
Acenaphthylene	µg/kg	2300000	363		2300000	43.1		67		87		18.6						110	J	14.6		10	
Anthracene	µg/kg	2.3E+07	154	n	23000000							38.4								10.8		10.7	
Benzo(a)anthracene	µg/kg	2900	1035		2900															50.4		70.9	
Benzo(a)pyrene	µg/kg	290	1036		1036															49.5		76.4	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900																		
Benzo(ghi)perylene	µg/kg	2300000	708		2300000							173								44.3		72	
Benzo(k)fluoranthene	µg/kg	29000	476		29000															24.1		39	
Chrysene	µg/kg	290000	842		290000															72.5		89.1	
Dibenz(a,h)anthracene	µg/kg	290	152		290	136						48.7						101		10.8		19	
Fluoranthene	µg/kg	3000000	1488	n	3000000															77.5			
Fluorene	µg/kg	3000000	40	n	3000000	47.5				47.9		6.6		134		20.7		23.8		2		3.3	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900							157								34.8		67.7	
Naphthalene	µg/kg	17000	13.3		17000	16		31.9		16.3		5.5		29.3		9.9		7.5		1.8		1.9	
Phenanthrene	µg/kg	2300000	500		2300000							142				120				29.1		49.4	
Pyrene	µg/kg	2300000	1117	n	2300000															90.3			
SW846 8270D																							
Acenaphthylene	µg/kg	2300000	363		2300000									185		213	J						
Anthracene	µg/kg	2.3E+07	154	n	23000000	212		419		243				463		286	J	129	J				
Benzo(a)anthracene	µg/kg	2900	1035		2900	856		1170		952		178		1510		902		605	J				
Benzo(a)pyrene	µg/kg	290	1036		1036	877	J	1030		1090		210		1590	J	1560		578	J				
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	1370	J	1620		2020		298		2920	J	4310		789	J	78.5		109	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	231	J	247		233				437	J	999		225					
Benzo(k)fluoranthene	µg/kg	29000	476		29000	623	J	663		840		133		1120	J	1580		370	J				
Chrysene	µg/kg	290000	842		290000	1000		1280		1250		216		1920		1700		737	J				

Table E2-33. Analytical Results Summary for Surface Soil Samples at EC-25

					Location	EC-25-01		EC-25-02		EC-25-03		EC-25-05		EC-25-06		EC-25-07		EC-25-08		EC-25-09		EC-25-10												
					Sample Name	EC-25-1-SO-0.5		EC-25-2-SO-0.5		EC-25-3-SO-0.5		EC-25-5-SO-0.5		EC-25-6-SO-0.5		EC-25-7-SO-0.5		EC-25-8-SO-0.5		EC-25-9-SO-0.5		EC-25-10-SO-0.5												
					Sample Date	8/1/13		8/1/13		7/31/13		7/31/13		8/1/13		8/8/13		8/5/13		8/14/13		8/5/13												
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0												
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5												
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result												
Dibenz(a,h)anthracene	µg/kg	290	152		290			96.5		104	J			164	J	375																		
Fluoranthene	µg/kg	3000000	1488	n	3000000	1710		2680		1760		316		3080		1090		997	J			137												
Fluorene	µg/kg	3000000	40	n	3000000			125																										
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	255	J	329		304				523	J	1180		261																
Phenanthrene	µg/kg	2300000	500		2300000	847		1580		683				1800				425	J															
Pyrene	µg/kg	2300000	1117	n	2300000	1600		2150		1700		292		3110		1460		1100	J			114												
SW846 8290																																		
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	1680		8220	J	2220		1740		5300	J	16500	J	2010		2820		436												
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	92.3		12.7	J	102		47.1		341		923		271		17.3		25.6												
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	311		198		321		161		423		1810		321		50.4		60.8												
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	128		15.8		105		50.5		388		250		167		10.6		26.3												
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	6.86	J	6.18	U	5.52	J	6.76	U	13.7		15.7		13.1		3.78	U	3.33	U											
1,2,3,4,7,8-HxCDD	pg/g	223			223	9.65		3.23	J	8.36	J	4.46	J	6.55		15.1		11.1		3.78	U	1.72	J											
1,2,3,4,7,8-HxCDF	pg/g	219			219	23.9		3.78	J	20.4		14.3		21.5		39.6		49.4		3.78	U	3.26	J											
1,2,3,6,7,8-HxCDD	pg/g	223			223	25.8		6.45	J	23.1		11.1		36.7		42.4		24.3		3.78	U	5												
1,2,3,6,7,8-HxCDF	pg/g	219			219	22.5		6.18	U	19.1		6.42	J	20.9		8.98		52		3.78	U	2.25	J											
1,2,3,7,8,9-HxCDD	pg/g	223			223	23.4		9.79		18.6		9.93	J	19		28.1		23.1		3.78	U	3.75	J											
1,2,3,7,8,9-HxCDF	pg/g	223			223	6.07	J	6.18	U	6.33	J	6.76	U	4.43	J	4.15	J	20.2		3.78	U	3.33	U											
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	10.8		6.18	U	7.76	J	4.27	J	5.12	J	6.61		12.2		3.78	U	3.33	U											
1,2,3,7,8-PeCDF	pg/g	744			744	28.6		6.18	U	14.9		4.73	J	4.16	U	4.52	J	52		3.78	U	3.09	J											
2,3,4,6,7,8-HxCDF	pg/g	223			223	24.2		6.18	U	21.3		7.02	J	31.4		16.1		57.9		3.78	U	3.26	J											
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	35.6		3.52	J	30		9.29	J	19.8		11.9		71.1		3.78	U	3.62	J											
2,3,7,8-TCDD	pg/g	21.6			21.6	4.58		1.23	U	3.41		1.25	J	1.8		2.09		4.32		0.753	U	0.393	J											
2,3,7,8-TCDF	pg/g	219			219	45.3		1.74	J	32.7		8.12		22.8		7.62		46.3		0.577	J	2.63												
Total Heptachlorodibenzofuran	pg/g	2210			2210	228		22.7		185		90.4		1060		1220		377		20.6		45.3												
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	666		687		816		362		978		17600	J	659		120		132												
Total Hexachlorodibenzofuran	pg/g	223			223	244		27.1		232		66.6		743		645		523		10.1		40.7												
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	275		197		268		125		269		974		267		14.4		47.2												
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	407		34.7		331	J	101		295	J	121	J	783		6.07		40.2												
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	113		18.7		95.3	J	18.5		62.5	J	42.4		135		3.78	U	8.05												
Total Tetrachlorodibenzofuran	pg/g	219			219	875	J	32.3		592		112		450		69.1		1230	J	3.78		45.2												
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	92.4		12.5		46.2		8.67		38.8		9.74	J	98		1.31		4.93												
SW846 8330B																																		
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.098	J	0.12	U	0.12	U	0.12	U	0.12	U											
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.059	U	0.06	U	0.06	U	5.4		0.06	U	0.074	J	0.058	U	0.059	U											
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.059	U	0.06	U	0.06	U	0.45		0.06	U	0.06	U	0.058	U	0.059	U											

Table E2-33. Analytical Results Summary for Surface Soil Samples at EC-25

					Location	EC-25-11		EC-25-12		EC-25-13		EC-25-14		EC-25-15		EC-25-16		EC-25-17		EC-25-18		EC-25-19	
					Sample Name	EC-25-11-SO-0.5		EC-25-12-SO-0.5		EC-25-13-SO-0.5		EC-25-14-SO-0.5		EC-25-15-SO-0.5		EC-25-16-SO-0.5		EC-25-17-SO-0.5		EC-25-18-SO-0.5		EC-25-19-SO-0.5	
					Sample Date	7/30/13		7/30/13		8/14/13		8/1/13		8/14/13		8/5/13		8/7/13		8/6/13		8/5/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000							16	U										
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	5310		4870		5020		3100		4230		1460		6510		391	K	254	
Antimony	mg/kg	47	0.95	n	47	6.5		11.7		1.7		5.9		0.5	L	1.6		94.8		0.58	U	0.6	U
Copper	mg/kg	4700	32.83	n	4700	246		278		40.7		138		8.8		446		401		3.1		0.97	J
Lead	mg/kg	800	123.9		800	688		501		153		871		19.9		1380		4200		20.2	K	2.7	
Manganese	mg/kg	2600	699.8	n	2600	2250		521		681		3900		218		554		15700		89.8		5.7	
Zinc	mg/kg	35000	83.92	n	35000	727		404		420		771		38.1		325		1780		6.5		1.6	J
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.027	U	0.033	U	0.031	U	0.038	U	0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
Aroclor 1221	mg/kg	0.83			0.83	0.027	U	0.033	U	0.031	U	0.038	U	0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
Aroclor 1232	mg/kg	0.72			0.72	0.027	U	0.033	U	0.031	U	0.038	U	0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
Aroclor 1242	mg/kg	0.95			0.95	0.027	U	0.033	U	0.031	U	0.038	U	0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
Aroclor 1248	mg/kg	0.95			0.95	0.027	U	0.033	U	0.031	U	0.038	U	0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
Aroclor 1254	mg/kg	0.97			0.97	0.027	U	0.033	U	0.031	U	0.038	U	0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
Aroclor 1260	mg/kg	0.99			0.99	0.027	U	0.04	J	0.031	U	0.058		0.031	U	0.027	U	0.034	U	0.026	U	0.025	U
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	58.9		9.6		2.1	J	11.5		1.2	J	1.4	J	54.6		2.6		1.3	U
Acenaphthylene	µg/kg	2300000	363		2300000	40.4		30.2		14		100		5.4		11.8		26.3		8.7		0.74	J
Anthracene	µg/kg	2.3E+07	154	n	23000000			43.7		12.7	J	122		5.2		10.3		136		12.4		1.1	J
Benzo(a)anthracene	µg/kg	2900	1035		2900					56				31.7		56.1				69.9		2.6	
Benzo(a)pyrene	µg/kg	290	1036		1036					62.5				32.4		72.8				64.4		4.9	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900									43.5								11.5	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000					56.4				28.6		58.2				48.3		5.4	
Benzo(k)fluoranthene	µg/kg	29000	476		29000					30.2				16.8		47.9				35.1		4.4	
Chrysene	µg/kg	290000	842		290000					78.8				43.3		91.2						6.5	
Dibenz(a,h)anthracene	µg/kg	290	152		290	108		38.3		14.2				6.9		17.5		103		13		1.2	J
Fluoranthene	µg/kg	3000000	1488	n	3000000					102				57.4								9.7	
Fluorene	µg/kg	3000000	40	n	3000000	50.7		10.7		3.1	J	14.3		1.4	J	3		51.3		2.3		1.3	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900					50.3				25.5		59.1				47.7		4.7	
Naphthalene	µg/kg	17000	13.3		17000	36.5		10.3		2.7		6		3		1.9		17.5		1.9		1.3	U
Phenanthrene	µg/kg	2300000	500		2300000									24.5		35.5				46.3		3.5	
Pyrene	µg/kg	2300000	1117	n	2300000					105				56.8								8.4	
SW846 8270D																							
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000	198																	
Benzo(a)anthracene	µg/kg	2900	1035		2900	1560	L	231				665						420					
Benzo(a)pyrene	µg/kg	290	1036		1036	1550	L	291				922						421					
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	2230		427		103		1700				125		663		105			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	413	L	216				404						183					
Benzo(k)fluoranthene	µg/kg	29000	476		29000	937		176	J			641						277					
Chrysene	µg/kg	290000	842		290000	1700	L	292				782						521		80			

Table E2-33. Analytical Results Summary for Surface Soil Samples at EC-25

					Location	EC-25-11		EC-25-12		EC-25-13		EC-25-14		EC-25-15		EC-25-16		EC-25-17		EC-25-18		EC-25-19	
					Sample Name	EC-25-11-SO-0.5		EC-25-12-SO-0.5		EC-25-13-SO-0.5		EC-25-14-SO-0.5		EC-25-15-SO-0.5		EC-25-16-SO-0.5		EC-25-17-SO-0.5		EC-25-18-SO-0.5		EC-25-19-SO-0.5	
					Sample Date	7/30/13		7/30/13		8/14/13		8/1/13		8/14/13		8/5/13		8/7/13		8/6/13		8/5/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
Dibenz(a,h)anthracene	µg/kg	290	152		290							154											
Fluoranthene	µg/kg	3000000	1488	n	3000000	2030		502				603				108		952		154			
Fluorene	µg/kg	3000000	40	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	532	L	193				467						211					
Phenanthrene	µg/kg	2300000	500		2300000	775	K	224		42.2	J	212						525					
Pyrene	µg/kg	2300000	1117	n	2300000	1950		417				752				94.3		737		123			
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	565		765		5740	L	2900		3650		785		8040	J	100		52.7	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	62.3		45		38.9		272		10.1	J	50.5		380		6.39	J	6.89	U
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	56.7		54.1		97		437		43		201		1650		10.3		5.4	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	46.8		23.4		22.7		106		5.8	J	73.5		264		3.53	J	3.45	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.62	U	3.2	U	4.11	U	8.05		3.91	U	3.51	J	17.7		3.5	U	3.45	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.62	U	3.2	U	2.1	J	11.2		3.91	U	6.3	J	39.3		3.5	U	3.45	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	4.33	J	2.84	J	3.38	J	14.6		2.17	J	13.1		56.7		3.5	U	3.45	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	4.06	J	2.9	J	3.87	J	27.2		3.91	U	19.6		143		3.5	U	3.45	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.55	J	2.69	J	2.73	J	12.1		3.91	U	13.2		46.1		3.5	U	3.45	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.41	J	2.44	J	3.36	J	20.7		3.91	U	17.9		133		3.5	U	3.45	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.62	U	3.2	U	4.11	U	5.31	J	3.91	U	2.94	J	12.9		3.5	U	3.45	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.62	U	3.2	U	4.11	U	9.09		3.91	U	6.67		42.6		3.5	U	3.45	U
1,2,3,7,8-PeCDF	pg/g	744			744	2.1	J	3.2	U	2.07	J	6.16	J	3.91	U	9.2		59.6		3.5	U	3.45	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.85	J	3.27	J	5.34	J	17.7		3.91	U	14.9		51.4		3.5	U	3.45	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	4.72	J	3.2	J	3.45	J	15.9		3.91	U	14.7		52.6		3.5	U	3.45	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.722	U	0.639	U	0.82	U	1.28	J	0.779	U	1.97		8.36		0.698	U	0.689	U
2,3,7,8-TCDF	pg/g	219			219	7.85		4.02		2.8		27		1.09	J	11.5		49		0.698	U	0.689	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	81		51.7		45.6		295		10.3		120		575		3.88	J	3.45	U
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	145		147		280		1140		134		383		3020	J	45.8		22.9	
Total Hexachlorodibenzofuran	pg/g	223			223	54.6		39.7		34.2		254		2.17	J	152		544		1.8	J	3.45	U
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	49.5	J	30.2		38.6		292		6.82		186		1440		3.5	U	3.45	U
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	73	J	47.8	J	36.6		232		2.54	J	191		702	J	3.5	U	3.45	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	14.6		7.35		4.46	J	65.7		3.91	U	87.4		445	J	3.5	U	3.45	U
Total Tetrachlorodibenzofuran	pg/g	219			219	81.1	J	56.1	J	29.8		346		4.18		317		1020	J	0.698	U	0.689	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	14.8		8.36		4.75		20.3		1.09	J	61.9		234		0.698	U	0.689	U
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	4.4		0.059	U	0.06	U	0.059	U	0.06	U	0.06	U	0.059	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.22		0.059	U	0.06	U	0.059	U	0.06	U	0.06	U	0.059	U	0.06	U

Table E2-33. Analytical Results Summary for Surface Soil Samples at EC-25

					Location	EC-25-20		EC-25-21		EC-25-22		EC-25-23		EC-25-24		EC-25-25		EC-25-26		EC-25-27		EC-25-28	
					Sample Name	EC-25-20-SO-0.5		EC-25-21-SO-0.5		EC-25-22-SO-0.5		EC-25-23-SO-0.5		EC-25-24-SO-0.5		EC-25-25-SO-0.5		EC-25-26-SO-0.5		EC-25-27-SO-0.5		EC-25-28-SO-0.5	
					Sample Date	8/6/13		8/5/13		8/14/13		8/7/13		8/7/13		8/6/13		7/30/13		8/7/13		7/29/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000																		
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	350	K	186		3770		606		202		532	K	9410		596		7190	
Antimony	mg/kg	47	0.95	n	47	0.46	J	0.55	U	0.86	L	1.1		0.57	U	0.34	J	6.7		0.6	J	1.4	
Copper	mg/kg	4700	32.83	n	4700	3.8		1.3	J	25		23.8		1.7	J	3.9		10		5		34.8	
Lead	mg/kg	800	123.9		800	24	K	6.8		32.2		180		12.1		17.8	K	11.7		36.9		102	
Manganese	mg/kg	2600	699.8	n	2600	65		19.8		653		357		69.9		203		1440		846		1040	
Zinc	mg/kg	35000	83.92	n	35000	8.8		5.4		51.4		108		4.7		9		32.5		39		166	
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.025	U
Aroclor 1221	mg/kg	0.83			0.83	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.025	U
Aroclor 1232	mg/kg	0.72			0.72	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.025	U
Aroclor 1242	mg/kg	0.95			0.95	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.025	U
Aroclor 1248	mg/kg	0.95			0.95	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.025	U
Aroclor 1254	mg/kg	0.97			0.97	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.025	U
Aroclor 1260	mg/kg	0.99			0.99	0.025	U	0.025	U	0.029	U	0.026	U	0.025	U	0.026	U	0.026	U	0.026	U	0.028	J
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	1.4	U	1.4	U	2		0.84	J	1.3	U	0.44	J	1.4	U	1.2	J	5.2	
Acenaphthylene	µg/kg	2300000	363		2300000	2.3		0.98	J	11.8		14.6	J	0.93	J	3		7.4		5			
Anthracene	µg/kg	2.3E+07	154	n	23000000	2.6		0.77	J	8.8				0.68	J	3.3		7.2		4.2			
Benzo(a)anthracene	µg/kg	2900	1035		2900	9.7		6.5		50.5				3.2		13.7		31.2		25.8			
Benzo(a)pyrene	µg/kg	290	1036		1036	14.8		9		53.8				4.9		19				30			
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	36.7		16.9		70.6				10.3		53.6				59			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	15.1		8.7		54.1				6.5		25.6				31.7			
Benzo(k)fluoranthene	µg/kg	29000	476		29000	11.8		5.5		23				3.7		16.4		55.9		20			
Chrysene	µg/kg	290000	842		290000	18.4		10.7		69.3				6.9		26.8		61.9		39.6			
Dibenz(a,h)anthracene	µg/kg	290	152		290	4		1.9		11.8		57.4	J	1.3	J	6.3		28.6		7.6			
Fluoranthene	µg/kg	3000000	1488	n	3000000	19.2		16.6		89.3				9.5				18.6		63.7			
Fluorene	µg/kg	3000000	40	n	3000000	1.4	U	1.4	U	2.8		1.3	J	1.3	U	1.4	U	1.4	U	1.4	J	19.2	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	13.4		7.3		40.4				5.1		22.6				27.8			
Naphthalene	µg/kg	17000	13.3		17000	1.2	J	0.78	J	2.6		1.9		0.55	J	0.99	J	0.68	J	1.6	J	9.4	
Phenanthrene	µg/kg	2300000	500		2300000	6.2		4.1		37.1		19.9		2.5		8.7		4.6		20.2		98.8	
Pyrene	µg/kg	2300000	1117	n	2300000	18.3		14.9		95.5				1.3	U	26.2		32.3		57.1			
SW846 8270D																							
Acenaphthylene	µg/kg	2300000	363		2300000																	288	
Anthracene	µg/kg	2.3E+07	154	n	23000000							20.8	J									356	
Benzo(a)anthracene	µg/kg	2900	1035		2900							172	J									1520	
Benzo(a)pyrene	µg/kg	290	1036		1036							124	J					96.8				3410	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900							561	J					198				6430	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000							105	J					81.1				2260	
Benzo(k)fluoranthene	µg/kg	29000	476		29000							232	J									2510	
Chrysene	µg/kg	290000	842		290000							352	J									1540	

Table E2-33. Analytical Results Summary for Surface Soil Samples at EC-25

						Location	EC-25-20		EC-25-21		EC-25-22		EC-25-23		EC-25-24		EC-25-25		EC-25-26		EC-25-27		EC-25-28	
						Sample Name	EC-25-20-SO-0.5		EC-25-21-SO-0.5		EC-25-22-SO-0.5		EC-25-23-SO-0.5		EC-25-24-SO-0.5		EC-25-25-SO-0.5		EC-25-26-SO-0.5		EC-25-27-SO-0.5		EC-25-28-SO-0.5	
						Sample Date	8/6/13		8/5/13		8/14/13		8/7/13		8/7/13		8/6/13		7/30/13		8/7/13		7/29/13	
						Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
						End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Dibenz(a,h)anthracene	µg/kg	290	152		290																		786	
Fluoranthene	µg/kg	3000000	1488	n	3000000								240	J			25.1	J					993	
Fluorene	µg/kg	3000000	40	n	3000000																			
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900								133	J					77.7				2390	
Phenanthrene	µg/kg	2300000	500		2300000																			
Pyrene	µg/kg	2300000	1117	n	2300000								203	J									2010	
SW846 8290																								
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400		184		101		2700		380		537		277		5610	J	355		4390	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400		12.7		7.19	J	17.5		16.1		27.4		19.4		7.57	J	38.5		51.8	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460		21.2		11		49		96.5		41.3		24.6		47		35.8		71	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210		6.85		2.39	J	24.2		12.6		26.4		7.94		5.71		16.8		23.5	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210		3.18	U	3.4	U	3.73	U	3.44	U	3.44	U	3.39	U	3.49	U	3.43	U	3.52	U
1,2,3,4,7,8-HxCDD	pg/g	223			223		3.18	U	3.4	U	3.73	U	2.19	J	3.44	U	3.39	U	3.49	U	3.43	U	3.52	U
1,2,3,4,7,8-HxCDF	pg/g	219			219		3.18	U	3.4	U	3.73	U	1.78	J	3.44	U	3.39	U	3.49	U	1.81	J	1.96	J
1,2,3,6,7,8-HxCDD	pg/g	223			223		1.61	J	3.4	U	1.87	J	8.27		3.44	U	3.39	U	3.49	U	1.78	J	2.06	J
1,2,3,6,7,8-HxCDF	pg/g	219			219		3.18	U	3.4	U	3.73	U	3.44	U	3.44	U	3.39	U	3.49	U	3.43	U	3.52	U
1,2,3,7,8,9-HxCDD	pg/g	223			223		3.18	U	3.4	U	1.92	J	7.52		3.44	U	3.39	U	3.49	U	3.43	U	1.95	J
1,2,3,7,8,9-HxCDF	pg/g	223			223		3.18	U	3.4	U	3.73	U	3.44	U	3.44	U	3.39	U	3.49	U	3.43	U	3.52	UJ
1,2,3,7,8-PeCDD	pg/g	22.3			22.3		3.18	U	3.4	U	3.73	U	1.96	J	3.44	U	3.39	U	3.49	U	3.43	U	3.52	U
1,2,3,7,8-PeCDF	pg/g	744			744		3.18	U	3.4	U	3.73	U	3.44	U	3.44	U	3.39	U	3.49	U	3.43	U	3.52	U
2,3,4,6,7,8-HxCDF	pg/g	223			223		3.18	U	3.4	U	3.73	U	3.44	U	3.44	U	3.39	U	3.49	U	3.43	U	1.76	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4		3.18	U	3.4	U	3.73	U	3.44	U	3.44	U	3.39	U	3.49	U	3.43	U	2.35	J
2,3,7,8-TCDD	pg/g	21.6			21.6		0.634	U	0.677	U	0.743	U	0.49	J	0.686	U	0.675	U	0.697	U	0.685	U	0.768	J
2,3,7,8-TCDF	pg/g	219			219		0.699	J	0.677	U	0.928	J	1.29		0.686	U	0.491	J	0.697	U	0.539	J		
Total Heptachlorodibenzofuran	pg/g	2210			2210		15		5.69		39.9		23.7		54.3		21.3		12.6		39.5		51.5	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170		117		66.1		123		190		115		64		109		72.6		177	
Total Hexachlorodibenzofuran	pg/g	223			223		3.18	U	3.4	U	12.1		13.6		16.6		6.52		4.51	J	14		32.8	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223		9.93		2.89	J	10.6		76.7		5.68		10.2		6.43		12.9		24.5	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4		3.18	U	3.4	U	2.84	J	8.73		1.91	J	3.39	U	3.49	U	4.95	J	34.2	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3		3.18	U	3.4	U	3.73	U	16.3		3.44	U	3.39	U	3.49	U	3.43	U	5.74	J
Total Tetrachlorodibenzofuran	pg/g	219			219		1.22		0.677	U	2.66		22.2		1.5		1.88		0.697	U	1.88		30.2	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6		0.387	J	0.677	U	0.919	J	11		0.348	J	0.43	J	0.697	U	0.631	J	4	
SW846 8330B																								
2,4,6-Trinitrotoluene	mg/kg	51		n	51		0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4		0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5		0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U

Table E2-34. Analytical Results Summary for Subsurface Soil at EC-25

						Location	EC-25-02		EC-25-08SUB		EC-25-11SUB		EC-25-12		EC-25-17		EC-25-22SUB		EC-25-23SUB		EC-25-25		EC-25-27SUB	
						Sample Name	EC-25-2-SO-02		EC-25-8-SO-03		EC-25-11-SO-05.5		EC-25-12-SO-03		EC-25-17-SO-05.5		EC-25-22-SO-4		EC-25-23-SO-04		EC-25-25-SO-04		EC-25-27-SO-04	
						Sample Date	8/1/13		8/5/13		7/31/13		7/30/13		8/21/13		8/14/13		8/7/13		8/6/13		8/7/13	
						Start Depth (ft bgs)	1		2		4.5		2		4.5		3		3		3		3	
						End Depth (ft bgs)	2		3		5.5		3		5.5		4		4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000	14	U							22	J								
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000	8510		845		3250		2050		923		4220		1070		202	K	355	
Antimony	mg/kg	47	0.68	n	47	12.2		0.67	J	8.8		0.83	J	0.63	U	0.62	UL	0.82	J	0.67	U	0.63	J
Copper	mg/kg	4700	14.44	n	4700	433		81.8		186	J	6.6		2.9		31.3		33.7		1.7	U	29	
Lead	mg/kg	800	13.96		800	774		60.5		458		34.2		9.9		14.7		39		1.2	K	13.7	
Manganese	mg/kg	2600	681.6	n	2600	1090		39.4		1570		38.8		8.5		157		49.8		1.7	U	5.4	
Zinc	mg/kg	35000	44.64	n	35000	1370		56.2		747		65		7.4		18.9		58		1.7	U	17.3	
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.032	U	0.029	U	0.034	U	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
Aroclor 1221	mg/kg	0.83			0.83	0.032	U	0.029	U	0.034	U	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
Aroclor 1232	mg/kg	0.72			0.72	0.032	U	0.029	U	0.034	U	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
Aroclor 1242	mg/kg	0.95			0.95	0.032	U	0.029	U	0.034	U	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
Aroclor 1248	mg/kg	0.95			0.95	0.032	U	0.029	U	0.034	U	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
Aroclor 1254	mg/kg	0.97			0.97	0.032	U	0.029	U	0.034	U	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
Aroclor 1260	mg/kg	0.99			0.99	0.032	U	0.029	U	0.031	J	0.026	U	0.026	U	0.024	U	0.027	U	0.025	U	0.025	U
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000			1.6	U	12.4		0.51	J	0.51	J	2.1		1.5	U	1.4	U	2.1	
Acenaphthylene	µg/kg	2300000	2.38		2300000			1.6	U	126		0.89	J	0.27	J	3.5		0.67	J	1.4	U	1.8	
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07			1.6	U			3.1		2.4		13.7		0.52	J	1.4	U	5.1	
Benzo(a)anthracene	µg/kg	2900	16.31		2900			1.3	J			7		19.4		61.2		2.5		1.4	U	19.9	
Benzo(a)pyrene	µg/kg	290	11.91		290			1.1	J			6.6		16.2		40.4		2.8		1.4	U	14.8	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900			2.2				11.2		20.5		47.5		5.5		1.4	U	21.5	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000			1.3	J			6		11.7		25		3.9	B	1.4	U	10.3	
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000			1.6	U			4.4		8.2		19.6		1.8	J	1.4	U	8.3	
Chrysene	µg/kg	290000	20.56		290000			1.7	J			8.2		19.3		66.2		3.5		1.4	U	21.6	
Dibenz(a,h)anthracene	µg/kg	290	2.53		290			1.6	U			1.5	J	3.2		8.3		1	J	1.4	U	3.8	
Fluoranthene	µg/kg	3000000	24.95	n	3000000			2.6				14.2		27.3		95.7		1.1	J	1.4	U	39.5	
Fluorene	µg/kg	3000000	31.7	n	3000000			1.6	U	25.3	K	2.4		1.4	U	2.4		0.61	J	1.4	U	1.9	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900			0.94	J			5.3		11.4		23		3.2	B	1.4	U	9.8	
Naphthalene	µg/kg	17000	2.2		17000			0.67	J	84.3		1.4	U	1.4	U	1.5	J	1.6	J	1.4	U	0.61	J
Phenanthrene	µg/kg	2300000	10.85		2300000			1.1	J			11.1		8.5		55.9		1	J	1.4	U	28.4	
Pyrene	µg/kg	2300000	19.95	n	2300000			2.2				12.2		24.8		85.3		1.2	J	1.4	U	34.9	
SW846 8270D																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000	511	J																
Acenaphthylene	µg/kg	2300000	2.38		2300000	226	J																
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	2950				114													
Benzo(a)anthracene	µg/kg	2900	16.31		2900	10900				435													
Benzo(a)pyrene	µg/kg	290	11.91		290	9670	J			519													
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	12500	J			889													
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	4110	J			187													
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	5460	J			340													

Table E2-34. Analytical Results Summary for Subsurface Soil at EC-25

						Location	EC-25-02		EC-25-08SUB		EC-25-11SUB		EC-25-12		EC-25-17		EC-25-22SUB		EC-25-23SUB		EC-25-25		EC-25-27SUB	
						Sample Name	EC-25-2-SO-02		EC-25-8-SO-03		EC-25-11-SO-05.5		EC-25-12-SO-03		EC-25-17-SO-05.5		EC-25-22-SO-4		EC-25-23-SO-04		EC-25-25-SO-04		EC-25-27-SO-04	
						Sample Date	8/1/13		8/5/13		7/31/13		7/30/13		8/21/13		8/14/13		8/7/13		8/6/13		8/7/13	
						Start Depth (ft bgs)	1		2		4.5		2		4.5		3		3		3		3	
						End Depth (ft bgs)	2		3		5.5		3		5.5		4		4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
Chrysene	µg/kg	290000	20.56		290000	12100	J			554													
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1480	J			65.3	J												
Fluoranthene	µg/kg	3000000	24.95	n	3000000	19800				728													
Fluorene	µg/kg	3000000	31.7	n	3000000	686	J																
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	4910	J			219													
Naphthalene	µg/kg	17000	2.2		17000	461	J																
Phenanthrene	µg/kg	2300000	10.85		2300000	12600				394													
Pyrene	µg/kg	2300000	19.95	n	2300000	18000				682													
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	3170		24.1		212		26.2		17.7		98.2		77.2		14.7	B	102	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	129		7.3	U	66.7		7.36	U	7.58	U	6.61	U	7.14	U	6.4	U	11.3	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	753		3.66	U	20.8		2.6	J	2.3	J	2.66	J	12		3.21	U	6.22	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	123		3.66	U	78.8		2.96	J	3.8	U	3.31	U	3.58	U	3.21	U	7.81	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	21.2	U	3.66	U	2.24	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	20.1	J	3.66	U	4.43	U	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	23	J	3.66	U	9.61		3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	57.8		3.66	U	4.83	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	16.5	J	3.66	U	4.27	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	64		3.66	U	2.77	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	21.2	UJ	3.66	U	2.49	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	19.7	J	3.66	U	4.43	U	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
1,2,3,7,8-PeCDF	pg/g	744			744	13	J	3.66	U	7.61		3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	21.4	J	3.66	U	4.36	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	22.2	J	3.66	U	10.2		3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
2,3,7,8-TCDD	pg/g	21.6			21.6	4.22	U	0.73	U	0.884	U	0.736	U	0.758	U	0.661	U	0.714	U	0.64	U	0.718	U
2,3,7,8-TCDF	pg/g	219			219	20.5		0.73	U	8.83		0.736	U	0.758	U	0.661	U	0.714	U	0.64	U	0.505	J
Total Heptachlorodibenzofuran	pg/g	2210			2210	235		3.66	U	127		5.9		3.8	U	3.31	U	3.58	U	3.21	U	11	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	1390		3.66	U	43.2		5.36	J	2.58	J	7.14		23.8		3.21	U	14	
Total Hexachlorodibenzofuran	pg/g	223			223	222	J	3.66	U	69		3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	4.17	J
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	618	J	3.66	U	40.6		3.69	U	3.8	U	3.31	U	6.36		3.21	U	3.6	U
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	223	J	3.66	U	62.9	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	4.99	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	187	J	3.66	U	14.6	J	3.69	U	3.8	U	3.31	U	3.58	U	3.21	U	3.6	U
Total Tetrachlorodibenzofuran	pg/g	219			219	367		0.73	U	44.7	J	0.736	U	1.79		0.661	U	0.714	U	0.64	U	8.32	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	48.7		0.73	U	5.56		0.736	U	0.758	U	0.661	U	0.714	U	0.64	U	0.453	J
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	UJ	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.06	U	0.059	U	0.059	U	0.06	UJ	0.059	U	0.06	U	0.059	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.06	U	0.059	U	0.059	U	0.06	UJ	0.059	U	0.06	U	0.059	U	0.06	U

Table E2-35. Analytical Results Summary for Surface Soil Samples at EC-49

					Location	EC-49-01		EC-49-02		EC-49-03		EC-49-04		EC-49-05		EC-49-06		EC-49-07		EC-49-08		EC-49-09	
					Sample Name	EC-49-1-SO-0.5		EC-49-2-SO-0.5		EC-49-3-SO-0.5		EC-49-4-SO-0.5		EC-49-5-SO-0.5		EC-49-6-SO-0.5		EC-49-7-SO-0.5		EC-49-8-SO-0.5		EC-49-9-SO-0.5	
					Sample Date	8/15/13		8/15/13		8/15/13		8/15/13		8/16/13		8/16/13		8/15/13		8/15/13		8/15/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000	12	U	11	U	11	U	11	U	12	U	12	U	11	U	11	U	25	U
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	5450		3570		2260		2470		10100		4420		2790		3870		2540	
Antimony	mg/kg	47	0.95	n	47	1.3		0.99	J	0.69	J	0.44	J	1.4	B	0.85	B	0.68	U	0.45	J	6.8	
Copper	mg/kg	4700	32.83	n	4700	15.6		25		13.5		8.3		28		22.1		7.9		7		83.9	
Lead	mg/kg	800	123.9		800	83.5		109		58.1		30.4		133		69.2		10.9		14.3		429	
Manganese	mg/kg	2600	699.8	n	2600	375		380		43.6		14.4		939		308		55.8		66.9		179	K
Zinc	mg/kg	35000	83.92	n	35000	39.8		39.1		32.1		16.7		64.1		46.5		11.6		15.2		56.5	
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	2.2		1.8		1.2	J	0.44	J	2.4		2.4		0.38	J	1.4	U	1.6	J
Acenaphthylene	µg/kg	2300000	363		2300000	10.8		3		2.4		2		11.6		8		4.2		2.2		12.4	
Anthracene	µg/kg	2.3E+07	154	n	23000000	10.5	K	5.4		3.1		2.3		9.4		7.3		2.1		1.3	J	10.6	
Benzo(a)anthracene	µg/kg	2900	1035		2900	44		44.5		26		22.3		50.4		42.5		15		7.8		66.3	
Benzo(a)pyrene	µg/kg	290	1036		1036	50.6		48.6		30		19.7		63.3		45.7		18.7		12.2			
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	78		82.1		50.4		52.5				62.7		51.3		32.1			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	21.8		21.8		14.4		7.6		51.6		38.3		8.7		6.2			
Benzo(k)fluoranthene	µg/kg	29000	476		29000	27.5		30.9		18.6		18.1		35.2		24.1		17.3		10.2			
Chrysene	µg/kg	290000	842		290000	60.4		55.6		35.6		28		71.3		56.4		25.4		13.7		133	
Dibenz(a,h)anthracene	µg/kg	290	152		290	6.5		7.2		4.7		2.9		14.8		10.3		3.4		2.3		17.4	J
Fluoranthene	µg/kg	3000000	1488	n	3000000					58.6		39.7						42		17.2		128	
Fluorene	µg/kg	3000000	40	n	3000000	2.3		2.2		1.4	J	1.1	J	3.6		2.1		1.4	U	1.4	U	6.1	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	22.5		20.2		13.6		8.8		50.1		37.8		10		6.7			
Naphthalene	µg/kg	17000	13.3		17000	2.3		2.6		2.2		1.9		3		3		1.4	U	1.4	U	4.3	
Phenanthrene	µg/kg	2300000	500		2300000	34.4		38.4		22.1		9		38.3		38.8		9.8		3.2		32.4	
Pyrene	µg/kg	2300000	1117	n	2300000	80.5				53.6		35.6				84.6		37.5		16.8		120	
SW846 8270D																							
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000																		
Benzo(a)anthracene	µg/kg	2900	1035		2900																		
Benzo(a)pyrene	µg/kg	290	1036		1036																	112	J
Benzo(b)fluoranthene	µg/kg	2900	1116		2900									126								307	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																	80.7	J
Benzo(k)fluoranthene	µg/kg	29000	476		29000																	111	J
Chrysene	µg/kg	290000	842		290000																		
Dibenz(a,h)anthracene	µg/kg	290	152		290																		
Fluoranthene	µg/kg	3000000	1488	n	3000000	92.1		101						101		95.4							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900																	89.3	J
Phenanthrene	µg/kg	2300000	500		2300000																		
Pyrene	µg/kg	2300000	1117	n	2300000			90						94.9									

Table E2-35. Analytical Results Summary for Surface Soil Samples at EC-49

					Location	EC-49-01		EC-49-02		EC-49-03		EC-49-04		EC-49-05		EC-49-06		EC-49-07		EC-49-08		EC-49-09	
					Sample Name	EC-49-1-SO-0.5		EC-49-2-SO-0.5		EC-49-3-SO-0.5		EC-49-4-SO-0.5		EC-49-5-SO-0.5		EC-49-6-SO-0.5		EC-49-7-SO-0.5		EC-49-8-SO-0.5		EC-49-9-SO-0.5	
					Sample Date	8/15/13		8/15/13		8/15/13		8/15/13		8/16/13		8/16/13		8/15/13		8/15/13		8/15/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	1720		1870		347		340		1830		1400		63.5		166		849	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	31.4		44.4		36.2		14.5		17.3		26.1		6.75	U	7.35	U	65	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	59.3		78.9		35.1		22.6		57.2		55.4		2.99	J	5.02	J	79.3	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	13.7		22.5		19.2		6.01		12.5		17.9		3.38	U	3.68	U	28.2	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.74	U	2	J	3.38	U	3.45	U	4.02	U	3.81	U	3.38	U	3.68	U	6.43	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.74	U	3.41	U	3.38	U	3.45	U	4.02	U	2.06	J	3.38	U	3.68	U	6.43	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	2.54	J	5.01	J	4.66	J	3.45	U	3.45	J	3.77	J	3.38	U	3.68	U	8.08	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	2.7	J	3.36	J	2.27	J	3.45	U	2.57	J	2.85	J	3.38	U	3.68	U	4.96	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	2.07	J	3.46	J	3.45	J	3.45	U	2.32	J	2.6	J	3.38	U	3.68	U	8.28	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	2.12	J	3.63	J	2.04	J	3.45	U	3.01	J	2.87	J	3.38	U	3.68	U	4.61	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.74	U	3.41	U	3.38	U	3.45	U	4.02	U	3.81	U	3.38	U	3.68	U	6.43	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.74	U	3.41	U	3.38	U	3.45	U	4.02	U	3.81	U	3.38	U	3.68	U	6.43	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.74	U	2.16	J	2.74	J	1.78	J	4.02	U	2.21	J	3.38	U	3.68	U	5.84	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	2.67	J	4.28	J	3.84	J	3.45	U	2.54	J	3.8	J	3.38	U	3.68	U	15.8	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	2.21	J	4	J	4.29	J	3.45	U	3.55	J	3.9	J	3.38	U	3.68	U	27.7	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.746	U	0.681	U	0.675	U	0.688	U	0.802	U	0.76	U	0.675	U	0.735	U	0.689	J
2,3,7,8-TCDF	pg/g	219			219	1.4		2.23		2.06		0.993	J	2.44		3.05		0.675	U	0.735	U	3.69	
Total Heptachlorodibenzofuran	pg/g	2210			2210	27.5		43.9		33.9		13.8		17.9		30.4		3.38	U	3.68	U	67.9	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	276		334		175		119		181		207		11.4		22.1		372	
Total Hexachlorodibenzofuran	pg/g	223			223	25.4		42.7		37.2		5.83		25.1		33.2		3.38	U	3.68	U	210	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	37.2		47		28.7		17.1		37.8		41.9		3.38	U	3.68	U	59.9	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	16.5		40.5		35.4		6.2		29.3		34.4		3.38	U	3.68	U	408	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	2.87	J	3.41	U	3.71	J	1.93	J	3.93	J	4.03	J	3.38	U	3.68	U	6.89	J
Total Tetrachlorodibenzofuran	pg/g	219			219	19		35.2		31.8		6.21		35.2		33.1		0.675	U	0.735	U	154	J
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	2.03		4.14		2.51		1.46		2.38		6.26		0.675	U	0.735	U	7.65	
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.059	U	0.058	U	0.059	U	0.06	U	0.059	U	0.059	U	0.059	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.059	U	0.058	U	0.059	U	0.06	U	0.059	U	0.059	U	0.059	U	0.06	U

Table E2-35. Analytical Results Summary for Surface Soil Samples at EC-49

					Location	EC-49-10		EC-49-11		EC-49-12		EC-49-13		EC-49-A		EC-49-B		EC-49-C-Surf		EC-49-D		EC-49-E-Surf	
					Sample Name	EC-49-10-SO-0.5		EC-49-11-SO-0.5		EC-49-12-SO-0.5		EC-49-13-SO-0.5		EC-49-A-SO-0.5		EC-49-B-SO-0.5		EC-49-C-SO-0.5		EC-49-D-SO-0.5		EC-49-E-SO-0.5	
					Sample Date	8/15/13		8/15/13		8/28/13		8/15/13		8/12/13		8/12/13		8/12/13		8/12/13		8/8/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000	11	U	12	U			12	U	11	U	12	U	11	U	11	U		
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	19200		2560		4520		8680		2480		1990		2880		1920		9110	
Antimony	mg/kg	47	0.95	n	47	32.6		5.2		0.7	U	1.9		0.42	J	0.91	J	4.9		0.68	U	8.2	
Copper	mg/kg	4700	32.83	n	4700	56.7		77.8		5.7		25.3		7.7		7.7		43.2		6.8		185	
Lead	mg/kg	800	123.9		800	593		355		15.3		109		15.7		31.2		275		26.5		1320	
Manganese	mg/kg	2600	699.8	n	2600	3640	K	88.7	K	511		1010		38.9		42.3		217		47.6		574	
Zinc	mg/kg	35000	83.92	n	35000	121		53.5		26.5		545		72.2		21.9		49		20.9		112	
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	5.9		1.1	J	0.37	J	59.9		0.43	J	0.49	J	1.9	J	0.69	J	2.6	
Acenaphthylene	µg/kg	2300000	363		2300000			4.4		2				4.2		8.3		71.2		4.5		22.7	
Anthracene	µg/kg	2.3E+07	154	n	23000000			4.1		1.4	J			3		5.3	J	42.4		12.5		21.1	
Benzo(a)anthracene	µg/kg	2900	1035		2900			39.3		7.6				13						33.5		77.5	
Benzo(a)pyrene	µg/kg	290	1036		1036			50.4		7.2				15.7		24.8	J			36.5		106	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900			106		11				34.5		58.4							
Benzo(ghi)perylene	µg/kg	2300000	708		2300000			17		4.3				13.8		26.9				47.5		86.9	
Benzo(k)fluoranthene	µg/kg	29000	476		29000			36.1		3.7				10.6		19.2				42.6		70	
Chrysene	µg/kg	290000	842		290000			55.7		9				16.9		32.9	J			63.9			
Dibenz(a,h)anthracene	µg/kg	290	152		290			6.3		1.4	J	95.5		3.8		6.4	J	78.7		15		23.3	
Fluoranthene	µg/kg	3000000	1488	n	3000000			77		11.9				21.3		36.8	J			60.3			
Fluorene	µg/kg	3000000	40	n	3000000	28.9		1.4	J	1.4	U	62.5		1.5	J	0.55	J	5		1.4	U	2.8	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900			18.3		4.1				12.9		25.4				46.2		86.2	
Naphthalene	µg/kg	17000	13.3		17000	10.8		2.5		0.78	B	25.9		0.84	B	0.71	B	2.4	B	0.66	B	5.8	
Phenanthrene	µg/kg	2300000	500		2300000	108		27.1		7.4				6.4		7.3	J	28.5		6.8		54	
Pyrene	µg/kg	2300000	1117	n	2300000			74.7		11.1				20.9		38.7	J			51.2			
SW846 8270D																							
Acenaphthylene	µg/kg	2300000	363		2300000	441						83.2											
Anthracene	µg/kg	2.3E+07	154	n	23000000	577						177											
Benzo(a)anthracene	µg/kg	2900	1035		2900	2220						589				24.4	J	136					
Benzo(a)pyrene	µg/kg	290	1036		1036	7140						597	J					244					
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	14700						1040	J					507		123		204	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	5050						207	J					171					
Benzo(k)fluoranthene	µg/kg	29000	476		29000	5320						410	J					211					
Chrysene	µg/kg	290000	842		290000	5000						733						157				115	
Dibenz(a,h)anthracene	µg/kg	290	152		290	1800																	
Fluoranthene	µg/kg	3000000	1488	n	3000000	1160						1320						156				145	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	4740						244	J					196					
Phenanthrene	µg/kg	2300000	500		2300000							784											
Pyrene	µg/kg	2300000	1117	n	2300000	2290						1130						174				145	

Table E2-35. Analytical Results Summary for Surface Soil Samples at EC-49

					Location	EC-49-10		EC-49-11		EC-49-12		EC-49-13		EC-49-A		EC-49-B		EC-49-C-Surf		EC-49-D		EC-49-E-Surf	
					Sample Name	EC-49-10-SO-0.5		EC-49-11-SO-0.5		EC-49-12-SO-0.5		EC-49-13-SO-0.5		EC-49-A-SO-0.5		EC-49-B-SO-0.5		EC-49-C-SO-0.5		EC-49-D-SO-0.5		EC-49-E-SO-0.5	
					Sample Date	8/15/13		8/15/13		8/28/13		8/15/13		8/12/13		8/12/13		8/12/13		8/12/13		8/8/13	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	1360		315		1520		3900		137		122		863		65.5		3530	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	137		21.3		8.41	J	110		7.93	U	6.64	U	30.5		3.5	J	218	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	141		24.1		45.5		181		3.45	J	5.87		56.8		5.99		259	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	35.9		13.5		5.64	J	40		3.98	U	3.33	U	8.77		1.76	J	58.1	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.16	J	3.76	U	3.44	U	2.53	J	3.98	U	3.33	U	3.54	U	3.28	U	3.79	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	1.94	J	3.76	U	3.44	U	3.95	U	3.98	U	3.33	U	3.54	U	3.28	U	4.02	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	7.5		2.9	J	3.44	U	4.18	J	3.98	U	3.33	U	3.54	U	3.28	U	8.63	
1,2,3,6,7,8-HxCDD	pg/g	223			223	6.08		3.76	U	3.44	U	5.98		3.98	U	3.33	U	3.54	U	3.28	U	7.64	
1,2,3,6,7,8-HxCDF	pg/g	219			219	10.1		2.4	J	3.44	U	3.49	J	3.98	U	3.33	U	3.54	U	3.28	U	8.07	
1,2,3,7,8,9-HxCDD	pg/g	223			223	4.19	J	3.76	U	1.84	J	4.64	J	3.98	U	3.33	U	3.54	U	3.28	U	6.23	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.55	UJ	3.76	U	3.44	U	3.95	U	3.98	U	3.33	U	3.54	UJ	3.28	U	2.69	J
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	4.5	J	3.76	U	3.44	U	3.95	U	3.98	U	3.33	U	3.54	U	3.28	U	2.28	J
1,2,3,7,8-PeCDF	pg/g	744			744	2.64	J	3.76	U	3.44	U	4.07	J	3.98	U	3.33	U	3.54	U	3.28	U	3.65	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	22.6		2.56	J	3.44	U	4.5	J	3.98	U	3.33	U	3.54	U	3.28	U	11.6	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	28.9		2.57	J	3.44	U	5.03	J	3.98	U	3.33	U	3.54	U	3.28	U	15.6	
2,3,7,8-TCDD	pg/g	21.6			21.6	8.01		0.749	U	0.686	U	0.624	J	0.793	U	0.664	U	0.705	U	0.487	J	0.86	U
2,3,7,8-TCDF	pg/g	219			219	5.98		1.22		1.04		3.64		0.793	U	0.664	U	0.718	J	0.499	J	9.86	
Total Heptachlorodibenzofuran	pg/g	2210			2210	115		20.6		3.44	U	110		3.98	U	3.33	U	25.7		1.76	J	186	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	825		97.4		141		498		12.1		25.1		356		29.8		1870	
Total Hexachlorodibenzofuran	pg/g	223			223	300	J	29.8		4.01	J	64.6		3.98	U	3.33	U	10.3		3.28	U	156	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	89.1	J	15.9		4.06	J	65		3.98	U	1.74	J	38		3.6	J	153	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	279	J	28.1		3.44	U	52.1	J	3.98	U	3.33	U	13.6	J	3.28	U	217	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	18.5	J	1.93	J	2.03	J	10.5	J	3.98	U	3.33	U	3.54	U	3.28	U	16.5	J
Total Tetrachlorodibenzofuran	pg/g	219			219	248	J	19.7		4.2		47		0.793	U	0.664	U	10.4		4.24		101	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	18.7	J	0.607	J	0.686	U	7.85		0.793	U	0.664	U	0.517	J	1.01		8.13	
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.058	U	0.059	U	0.059	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.058	U	0.059	U	0.059	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U

Table E2-35. Analytical Results Summary for Surface Soil Samples at EC-49

					Location	EC-49-F-SURF		EC-49-G-SURF		EC-49-H-SURF	
					Sample Name	EC-49-F-SO-0.5		EC-49-G-SO-0.5		EC-49-H-SO-0.5	
					Sample Date	8/8/13		8/8/13		8/12/13	
					Start Depth (ft bgs)	0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
EPA 6850											
Perchlorate	µg/kg	82000		n	82000					12	U
SW846 6020A											
Aluminum	mg/kg	110000	14159	n	110000	4460	K	4500	K	4100	
Antimony	mg/kg	47	0.95	n	47	1.2	J	1.7		0.47	J
Copper	mg/kg	4700	32.83	n	4700	22.2		25.7		21.7	
Lead	mg/kg	800	123.9		800	52.2		117		36.1	
Manganese	mg/kg	2600	699.8	n	2600	565		500		436	
Zinc	mg/kg	35000	83.92	n	35000	66.1		56		51.6	
SW846 8270 SIM											
Acenaphthene	µg/kg	4500000	41.5	n	4500000	6.6		2.2		4.4	
Acenaphthylene	µg/kg	2300000	363		2300000	18.4		7.8		45.4	
Anthracene	µg/kg	2.3E+07	154	n	23000000	26.6		10.5			
Benzo(a)anthracene	µg/kg	2900	1035		2900	111		51.2			
Benzo(a)pyrene	µg/kg	290	1036		1036	126		58.7			
Benzo(b)fluoranthene	µg/kg	2900	1116		2900						
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	117		55.9		92.7	
Benzo(k)fluoranthene	µg/kg	29000	476		29000	66		27.9			
Chrysene	µg/kg	290000	842		290000	136		71.6			
Dibenz(a,h)anthracene	µg/kg	290	152		290	31.5		13.6		25.9	
Fluoranthene	µg/kg	3000000	1488	n	3000000			112			
Fluorene	µg/kg	3000000	40	n	3000000	8.6		2.4		9.9	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	105		49.4		83.6	
Naphthalene	µg/kg	17000	13.3		17000	6.2		3.2	B	1.2	B
Phenanthrene	µg/kg	2300000	500		2300000	98.8		43		51.8	
Pyrene	µg/kg	2300000	1117	n	2300000			109			
SW846 8270D											
Acenaphthylene	µg/kg	2300000	363		2300000						
Anthracene	µg/kg	2.3E+07	154	n	23000000					99.5	
Benzo(a)anthracene	µg/kg	2900	1035		2900					164	
Benzo(a)pyrene	µg/kg	290	1036		1036					117	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	191		87.2		327	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000						
Benzo(k)fluoranthene	µg/kg	29000	476		29000					135	
Chrysene	µg/kg	290000	842		290000					325	
Dibenz(a,h)anthracene	µg/kg	290	152		290						
Fluoranthene	µg/kg	3000000	1488	n	3000000	180				147	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900						
Phenanthrene	µg/kg	2300000	500		2300000						
Pyrene	µg/kg	2300000	1117	n	2300000	162				138	

Table E2-35. Analytical Results Summary for Surface Soil Samples at EC-49

					Location	EC-49-F-SURF		EC-49-G-SURF		EC-49-H-SURF		
					Sample Name	EC-49-F-SO-0.5		EC-49-G-SO-0.5		EC-49-H-SO-0.5		
					Sample Date	8/8/13		8/8/13		8/12/13		
					Start Depth (ft bgs)	0		0		0		
					End Depth (ft bgs)	0.5		0.5		0.5		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	4890		2340		1090		
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	95.4		88.5		25.8		
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	120		155		53.4		
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	28.5		53.7		8.66		
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	4.15	U	2.03	J	3.55	U	
1,2,3,4,7,8-HxCDD	pg/g	223			223	2.57	J	2.5	J	3.55	U	
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.25	J	6.06		3.55	U	
1,2,3,6,7,8-HxCDD	pg/g	223			223	4.35	J	5.84		3.55	U	
1,2,3,6,7,8-HxCDF	pg/g	219			219	4.15	U	3.07	J	3.55	U	
1,2,3,7,8,9-HxCDD	pg/g	223			223	4.62	J	4.39	J	3.55	U	
1,2,3,7,8,9-HxCDF	pg/g	223			223	4.15	U	3.88	U	3.55	U	
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	4.15	U	3.88	U	3.55	U	
1,2,3,7,8-PeCDF	pg/g	744			744	3.4	J	3.88	U	1.88	J	
2,3,4,6,7,8-HxCDF	pg/g	223			223	2.46	J	4.03	J	3.55	U	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	4.15	U	3.77	J	3.55	U	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.828	U	0.774	U	0.708	U	
2,3,7,8-TCDF	pg/g	219			219	1.52		2.47		0.772	J	
Total Heptachlorodibenzofuran	pg/g	2210			2210	88.6		128		24		
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	370		1030		220		
Total Hexachlorodibenzofuran	pg/g	223			223	33.2		66.3		8.64		
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	48		97.7		25.5		
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	24.3		36.6		8.42	J	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.64	J	3.8	J	3.55	U	
Total Tetrachlorodibenzofuran	pg/g	219			219	25.3		26.2		9.04		
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	3.58		3.92		1.66		
SW846 8330B												
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.06	U	0.06	U	
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.06	U	0.06	U	

Table E2-36. Analytical Results Summary for Subsurface Soil at EC-49

					Location	EC-49-01		EC-49-02		EC-49-03		EC-49-04		EC-49-05		EC-49-06		EC-49-07		EC-49-08		EC-49-09	
					Sample Name	EC-49-1-SO-02		EC-49-2-SO-02		EC-49-3-SO-02		EC-49-4-SO-02		EC-49-5-SO-02		EC-49-6-SO-02		EC-49-7-SO-02		EC-49-8-SO-02		EC-49-9-SO-02	
					Sample Date	8/15/13		8/15/13		8/15/13		8/15/13		8/16/13		8/16/13		8/15/13		8/15/13		8/15/13	
					Start Depth (ft bgs)	1		1		1		1		1		1		1		1		1	
					End Depth (ft bgs)	2		2		2		2		2		2		2		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000	11	U	11	U	10	U	10	U	15	U	13	U	10	U	11	U	13	U
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000	8750		7980		1700		1610		11100		5760		1880		2440		2940	
Antimony	mg/kg	47	0.68	n	47	0.63	U	0.68	U	0.64	U	0.64	U	0.69	U	0.68	U	0.69	U	0.57	U	1.6	B
Copper	mg/kg	4700	14.44	n	4700	4.8		5.7		2.1	J	1.5	J	10.4		6		2.7		1.3	J	12.7	
Lead	mg/kg	800	13.96		800	6.4		7		2		1.8		20.1		9.4		1.7		1.6		79.7	
Manganese	mg/kg	2600	681.6	n	2600	124		346		28.5		4.2		1040		516		12.4		8.6	K	29	K
Zinc	mg/kg	35000	44.64	n	35000	28.3		30.8		5.4		3.9		36.3		23.3		8		4.7		29.6	
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000	0.39	J	1.4	U	1.4	U	1.4	U	1.5	U	1.5	U	1.3	U	1.4	U	1.6	U
Acenaphthylene	µg/kg	2300000	2.38		2300000	1.8	J	1.4	U	1.4	U	1.4	U	1.1	J	0.87	J	1.3	U	1.4	U	2.3	
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	8.7	K	1.4	U	1.4	U	1.4	U	0.74	J	0.74	J	1.3	U	1.4	U	1.4	J
Benzo(a)anthracene	µg/kg	2900	16.31		2900	5.1		1.4	U	1.4	U	1.4	U	4.5		4.1		1.3	U	1.4	U	35.5	
Benzo(a)pyrene	µg/kg	290	11.91		290	1.7	J	1.4	U	1.4	U	1.4	U	4.5		3.7		1.3	U	1.4	U	25.9	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	3.7		1.4	U	1.4	U	1.4	U	6.4		5.3		1.2	J	1.4	U	62.6	J
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	0.77	J	1.4	U	1.4	U	1.4	U	3.4		2.7		1.3	U	1.4	UJ	5.7	J
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	2.3		1.4	U	1.4	U	1.4	U	2.4		1.9		1.3	U	1.4	U		
Chrysene	µg/kg	290000	20.56		290000	22.8		1.4	U	1.4	U	1.4	U	5		4.7		1.3	U	1.4	U	31	
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.5	U	1.4	U	1.4	U	1.4	U	1.1	J	0.86	J	1.3	U	1.4	U	2.9	J
Fluoranthene	µg/kg	3000000	24.95	n	3000000	3.4		1.4	U	1.4	U	1.4	U	7.3		6.9		1.3	U	1.4	U	38.9	
Fluorene	µg/kg	3000000	31.7	n	3000000	0.54	J	1.4	U	1.4	U	1.4	U	1.5	U	1.5	U	1.3	U	1.4	U	0.64	J
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	1.5	U	1.4	U	1.4	U	1.4	U	3.3		2.7		1.3	U	1.4	U	7.8	J
Naphthalene	µg/kg	17000	2.2		17000	1.5	U	1.4	U	1.4	U	1.4	U	0.98	B	0.88	B	1.3	U	1.4	U	0.9	B
Phenanthrene	µg/kg	2300000	10.85		2300000	3		1.4	U	1.4	U	1.4	U	4.1		3.8		1.3	U	1.4	U	4.4	
Pyrene	µg/kg	2300000	19.95	n	2300000	2.7		1.4	U	1.4	U	1.4	U	6.7		5.9		0.57	J	1.4	U	40.3	
SW846 8270D																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000																		
Acenaphthylene	µg/kg	2300000	2.38		2300000																		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07																		
Benzo(a)anthracene	µg/kg	2900	16.31		2900																		
Benzo(a)pyrene	µg/kg	290	11.91		290																		
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900																		
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																	28.1	J
Chrysene	µg/kg	290000	20.56		290000																		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290																		
Fluoranthene	µg/kg	3000000	24.95	n	3000000																		
Fluorene	µg/kg	3000000	31.7	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900																		
Naphthalene	µg/kg	17000	2.2		17000																		
Phenanthrene	µg/kg	2300000	10.85		2300000																		
Pyrene	µg/kg	2300000	19.95	n	2300000																		

Table E2-36. Analytical Results Summary for Subsurface Soil at EC-49

					Location	EC-49-01		EC-49-02		EC-49-03		EC-49-04		EC-49-05		EC-49-06		EC-49-07		EC-49-08		EC-49-09	
					Sample Name	EC-49-1-SO-02		EC-49-2-SO-02		EC-49-3-SO-02		EC-49-4-SO-02		EC-49-5-SO-02		EC-49-6-SO-02		EC-49-7-SO-02		EC-49-8-SO-02		EC-49-9-SO-02	
					Sample Date	8/15/13		8/15/13		8/15/13		8/15/13		8/16/13		8/16/13		8/15/13		8/15/13		8/15/13	
					Start Depth (ft bgs)	1		1		1		1		1		1		1		1		1	
					End Depth (ft bgs)	2		2		2		2		2		2		2		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	13300	J	1110		7.64	J	68.8		2060		502		76.9		91.9		899	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.17	U	7.37	U	6.48	U	6.58	U	7.9	U	8.26	U	6.43	U	6.98	U	16.4	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	67		17.3		3.25	U	3.3	U	51.9		12		3.22	U	3.5	U	19	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	8.27	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	3.11	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.59	U	3.69	U	3.25	U	3.3	U	2.25	J	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	3.38	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	5.33	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.717	U	0.737	U	0.648	U	0.658	U	0.79	U	0.826	U	0.643	U	0.698	U	0.839	U
2,3,7,8-TCDF	pg/g	219			219	0.717	U	0.737	U	0.648	U	0.658	U	0.79	U	0.826	U	0.643	U	0.698	U	1.57	
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	16.2	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	137		43.4		3.25	U	1.66	J	154		36.6		3.22	U	3.5	U	71.5	
Total Hexachlorodibenzofuran	pg/g	223			223	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	38.6	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	3.59	U	2.63	J	3.25	U	3.3	U	27.5		5.49	J	3.22	U	3.5	U	9.24	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	73.3	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.59	U	3.69	U	3.25	U	3.3	U	3.96	U	4.14	U	3.22	U	3.5	U	4.21	U
Total Tetrachlorodibenzofuran	pg/g	219			219	0.717	U	0.737	U	0.648	U	0.658	U	0.593	J	0.826	U	0.643	U	0.698	U	33.8	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.717	U	0.737	U	0.648	U	0.658	U	0.79	U	0.826	U	0.643	U	0.698	U	2.88	
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.058	U	0.058	U	0.059	U	0.06	U	0.059	U	0.06	U	0.059	U	0.06	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.058	U	0.058	U	0.059	U	0.06	U	0.059	U	0.06	U	0.059	U	0.06	U	0.059	U

Table E2-36. Analytical Results Summary for Subsurface Soil at EC-49

					Location	EC-49-10		EC-49-11		EC-49-12		EC-49-13		EC-49-C-Sub		EC-49-E-Sub		EC-49-F-SUB		EC-49-G-SUB		EC-49-H-SUB	
					Sample Name	EC-49-10-SO-02		EC-49-11-SO-02		EC-49-12-SO-02		EC-49-13-SO-02		EC-49-C-SO-06		EC-49-E-SO-03		EC-49-F-SO-03		EC-49-G-SO-03.5		EC-49-H-SO-4	
					Sample Date	8/15/13		8/15/13		8/28/13		8/15/13		8/22/13		8/8/13		8/8/13		8/21/13		8/14/13	
					Start Depth (ft bgs)	1		1		1		1		5		2		2		2.5		3	
					End Depth (ft bgs)	2		2		2		2		6		3		3		3.5		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
EPA 6850																							
Perchlorate	µg/kg	82000		n	82000	11	U	11	U			12	U							15	U	11	U
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000	2820		1470		3200		5280		4800		1730	K	4270	K	11100		4920	
Antimony	mg/kg	47	0.68	n	47	1.2	B	0.65	U	0.6	U	1.4		0.62	U	0.65	U	1.6		0.63	U	0.62	U
Copper	mg/kg	4700	14.44	n	4700	5		3		3.4		28.3		4.4		1.7	U	25		6.2		6.2	
Lead	mg/kg	800	13.96		800	11.9		3		4.4		116		6.5		2.3		66.9		6.7		15.3	
Manganese	mg/kg	2600	681.6	n	2600	158	K	50.1	K	113		1710		182		43.8		1410		50.3		358	
Zinc	mg/kg	35000	44.64	n	35000	10.2		6.2		14.8		108		12.3		7.1		91		21.4		25.6	
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.4	U	1.4	U	1.4	U			1.4	U	0.66	J	1.9	J	1.5	U	1.4	U
Acenaphthylene	µg/kg	2300000	2.38		2300000	17.5		1.4	U	0.36	J			0.39	J	1.5	U	15.1		1.5	U	0.53	J
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	21.9		1.4	U	1.4	U			1.4	U	1.5	U	10.5		1.5	U	0.7	K
Benzo(a)anthracene	µg/kg	2900	16.31		2900			1.4	U	1.1	J			1.4	U	1.5	U	55.7		1.5	U	2.8	
Benzo(a)pyrene	µg/kg	290	11.91		290			1.4	U	1.3	J			0.7	J	1.5	U	65.5		1.5	U	2.5	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900			1.4	U	2.1				1.7	J	1.5	U			1.5	U	4.9	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	79.5		1.4	U	0.8	J			1.4	U	1.5	U	61.7		1.5	U	1.8	
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000			1.4	U	0.87	J			1.4	U	1.5	U	35.1		1.5	U	2.2	
Chrysene	µg/kg	290000	20.56		290000			1.4	U	1.5	J			1.4	U	1.5	U	74.4		1.5	U	4.2	
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	32.3		1.4	U	1.4	U			1.4	U	1.5	U	16.2		1.5	U	0.66	J
Fluoranthene	µg/kg	3000000	24.95	n	3000000			1.4	U	1.5	J			0.89	J	1.5	U	102		1.5	U	4.4	
Fluorene	µg/kg	3000000	31.7	n	3000000	0.88	J	1.4	U	1.4	U			1.4	U	1.5	U	2.2		1.5	U	1.4	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	85.1		1.4	U	1.4	U			1.4	U	1.5	U	54.4		1.5	U	1.5	J
Naphthalene	µg/kg	17000	2.2		17000	1.2	B	1.4	U	1.4	U			0.61	B	0.72	B	4		1.5	U	0.7	B
Phenanthrene	µg/kg	2300000	10.85		2300000	4.4		1.4	U	0.75	J			0.47	J	1.5	U	33.4		1.5	U	2	
Pyrene	µg/kg	2300000	19.95	n	2300000			1.4	U	1.5	J			0.82	J	1.5	U	107		1.5	U	3.9	
SW846 8270D																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000							1000											
Acenaphthylene	µg/kg	2300000	2.38		2300000							529											
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07							2290											
Benzo(a)anthracene	µg/kg	2900	16.31		2900	115						5500											
Benzo(a)pyrene	µg/kg	290	11.91		290	282	J					5220											
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	715	J					7990						107					
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000							2310											
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	261	J					2990											
Chrysene	µg/kg	290000	20.56		290000	225						5860											
Dibenz(a,h)anthracene	µg/kg	290	2.53		290							746											
Fluoranthene	µg/kg	3000000	24.95	n	3000000	80						11500											
Fluorene	µg/kg	3000000	31.7	n	3000000							1030											
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900							2640											
Naphthalene	µg/kg	17000	2.2		17000							551											
Phenanthrene	µg/kg	2300000	10.85		2300000							8960											
Pyrene	µg/kg	2300000	19.95	n	2300000	171						9880											

Table E2-36. Analytical Results Summary for Subsurface Soil at EC-49

					Location	EC-49-10		EC-49-11		EC-49-12		EC-49-13		EC-49-C-Sub		EC-49-E-Sub		EC-49-F-SUB		EC-49-G-SUB		EC-49-H-SUB	
					Sample Name	EC-49-10-SO-02		EC-49-11-SO-02		EC-49-12-SO-02		EC-49-13-SO-02		EC-49-C-SO-06		EC-49-E-SO-03		EC-49-F-SO-03		EC-49-G-SO-03.5		EC-49-H-SO-4	
					Sample Date	8/15/13		8/15/13		8/28/13		8/15/13		8/22/13		8/8/13		8/8/13		8/21/13		8/14/13	
					Start Depth (ft bgs)	1		1		1		1		5		2		2		2.5		3	
					End Depth (ft bgs)	2		2		2		2		6		3		3		3.5		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	102		306		101		2980		12.3		853	K	4130		9480	J	1760	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	4.06	J	7.18	U	6.81	U	157		6.93	U	7.02	U	65.7		7.77	U	7.7	U
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	5.75		2.88	J	1.88	J	215		3.48	U	9.29		97.7		40.3		14.2	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.41	U	3.6	U	3.42	U	60.7		3.48	U	3.52	U	22.7		3.9	U	3.86	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.41	U	3.6	U	3.42	U	2.87	J	3.48	U	3.52	U	3.97	U	3.9	U	3.86	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.41	U	3.6	U	3.42	U	2.24	J	3.48	U	3.52	U	2.24	J	3.9	U	3.86	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.41	U	3.6	U	3.42	U	3.85	J	3.48	U	3.52	U	3.8	J	3.9	U	3.86	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.41	U	3.6	U	3.42	U	7.14		3.48	U	3.52	U	3.91	J	3.9	U	3.86	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.41	U	3.6	U	3.42	U	3.84	J	3.48	U	3.52	U	2.51	J	3.9	U	3.86	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.41	U	3.6	U	3.42	U	5.29		3.48	U	3.52	U	3.96	J	3.9	U	3.86	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.41	U	3.6	U	3.42	U	3.49	UJ	3.48	U	3.52	U	3.97	U	3.9	U	3.86	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.41	U	3.6	U	3.42	U	3.49	U	3.48	U	3.52	U	3.97	U	3.9	U	3.86	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.41	U	3.6	U	3.42	U	3.01	J	3.48	U	3.52	U	3.84	J	3.9	U	3.86	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.41	U	3.6	U	3.42	U	5.21	J	3.48	U	3.52	U	2.99	J	3.9	U	3.86	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.41	U	3.6	U	3.42	U	7.58		3.48	U	3.52	U	2.17	J	3.9	U	3.86	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.679	U	0.718	U	0.681	U	1.18		0.693	U	0.702	U	0.792	U	0.777	U	0.77	U
2,3,7,8-TCDF	pg/g	219			219	0.679	U	0.718	U	0.681	U	2.8		0.693	U	0.702	U	1.92		0.777	U	0.77	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	2.27	J	3.6	U	3.42	U	164		3.48	U	3.52	U	58.6		3.9	U	3.86	U
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	29.9		6.87		1.88	J	487		3.48	U	28.3		315		80.1		33.4	
Total Hexachlorodibenzofuran	pg/g	223			223	6.55		3.6	U	3.42	U	102		3.48	U	3.52	U	36.3		3.9	U	3.86	U
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.36	J	3.6	U	3.42	U	76		3.48	U	3.52	U	47.2		3.9	U	3.86	U
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	12.7	J	3.6	U	3.42	U	94.8	J	3.48	U	3.52	U	30.9		3.9	U	3.86	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.41	UJ	3.6	U	3.42	U	7.77	J	3.48	U	3.52	U	3.52	J	3.9	U	3.86	U
Total Tetrachlorodibenzofuran	pg/g	219			219	5.03		0.718	U	0.681	U	51.8		0.693	U	0.702	U	23.7		0.777	U	0.77	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.679	U	0.718	U	0.681	U	2.7		0.693	U	0.702	U	3.45		0.777	U	0.77	U
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U	0.12	UJ	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.058	U	0.06	U	0.059	U	0.059	U	0.06	U	0.06	U	0.06	UJ	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.058	U	0.06	U	0.059	U	0.059	U	0.06	U	0.06	U	0.06	UJ	0.059	U

Table E2-37. Analytical Results Summary for Surface Soil Samples at EC-52 Propellant Grain Area

					Location	EC-52-01		EC-52-02		EC-52-03		EC-52-04		EC-52-05	
					Sample Name	EC-52-1-SO-0.5		EC-52-2-SO-0.5		EC-52-3-SO-0.5		EC-52-4-SO-0.5		EC-52-5-SO-0.5	
					Sample Date	8/16/13		8/16/13		8/16/13		8/16/13		8/16/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	5		5		5		5		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8330B															
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.059	U	0.06	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.059	U	0.06	U	0.059	U	0.059	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.49	U	0.49	U	0.5	U	0.5	U	0.5	U
HPLC															
Nitroguanidine	mg/kg	8200		n	8200	0.1	U	0.095	U	0.091	U	0.1	U	0.091	U

Table E2-37. Analytical Results Summary for Surface Soil Samples at EC-52 Propellant Grain Area

					Location	EC-52-06		EC-52-07		EC-52-08		EC-52-09		EC-52-10	
					Sample Name	EC-52-6-SO-0.5		EC-52-7-SO-0.5		EC-52-8-SO-0.5		EC-52-9-SO-0.5		EC-52-10-SO-0.5	
					Sample Date	8/16/13		8/16/13		8/16/13		8/16/13		8/16/13	
					Start Depth (ft bgs)	0		0		0		0		0	
					End Depth (ft bgs)	5		5		5		5		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 8330B															
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.058	U	0.059	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.058	U	0.059	U	0.059	U	0.059	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.49	U	0.5	U	0.49	U	0.49	U
HPLC															
Nitroguanidine	mg/kg	8200		n	8200	0.091	U	0.1	U	0.091	U	0.1	U	0.091	U

Table E2-37. Analytical Results Summary for Surface Soil Samples at EC-52 Propellant Grain Area

					Location	EC-52-11		EC-52-12		EC-52-13	
					Sample Name	EC-52-11-SO-0.5		EC-52-12-SO-0.5		EC-52-13-SO-0.5	
					Sample Date	8/16/13		8/16/13		8/19/13	
					Start Depth (ft bgs)	0		0		0	
					End Depth (ft bgs)	5		5		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8330B											
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.059	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.5	U	0.5	U
HPLC											
Nitroguanidine	mg/kg	8200		n	8200	0.1	U	0.091	U	0.091	U

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Table E2-38. Analytical Results Summary for Subsurface Soil at EC-52 Propellant Grain Area

					Location	EC-52-01		EC-52-02		EC-52-03		EC-52-04		EC-52-05		EC-52-06		EC-52-07		EC-52-08		EC-52-09		EC-52-10	
					Sample Name	EC-52-1-SO-03		EC-52-2-SO-03		EC-52-3-SO-1.5		EC-52-4-SO-1.5		EC-52-5-SO-1.5		EC-52-6-SO-05		EC-52-7-SO-5.5		EC-52-8-SO-1.5		EC-52-9-SO-1.5		EC-52-10-SO-3.5	
					Sample Date	8/16/13		8/16/13		8/16/13		8/16/13		8/16/13		8/16/13		8/16/13		8/16/13		8/16/13		8/16/13	
					Start Depth (ft bgs)	2		2		0.5		0.5		0.5		4		4.5		0.5		0.5		0.5	
					End Depth (ft bgs)	3		3		1.5		1.5		1.5		5		5.5		1.5		1.5		1.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8330B																									
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.058	U	0.06	U	0.059	U	0.059	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.058	U	0.06	U	0.059	U	0.059	U	0.06	U	0.06	U	0.06	U	0.06	U	0.06	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.49	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
HPLC																									
Nitroguanidine	mg/kg	8200		n	8200	0.095	U	0.1	U	0.091	U	0.095	U	0.091	U	0.095	U	0.1	U	0.091	U	0.091	U	0.091	U

Table E2-38. Analytical Results Summary for Subsurface Soil at EC-52 Propellant Grain Area

					Location	EC-52-11		EC-52-12		EC-52-13	
					Sample Name	EC-52-11-SO-04		EC-52-12-SO-1.5		EC-52-13-SO-02.5	
					Sample Date	8/16/13		8/16/13		8/19/13	
					Start Depth (ft bgs)	3		0.5		1.5	
					End Depth (ft bgs)	4		1.5		2.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8330B											
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.059	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.5	U	0.5	U
HPLC											
Nitroguanidine	mg/kg	8200		n	8200	0.095	U	0.095	U	0.091	U

Table E2-39. Analytical Results Summary for Surface Soil Samples at EC-52

					Location	EC-52-14		EC-52-15		EC-52-A	
					Sample Name	EC-52-14-SO-0.5		EC-52-15-SO-0.5		EC-52-A-SO-0.5	
					Sample Date	8/19/13		8/27/13		8/22/13	
					Start Depth (ft bgs)	0		0		0	
					End Depth (ft bgs)	5		5		5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Aluminum	mg/kg	1E+05	14159	n	110000	12400		5570		4010	
Antimony	mg/kg	47	0.95	n	47	2.6		0.83	J	0.87	U
Copper	mg/kg	4700	32.83	n	4700	14.2		16.7		9.9	
Lead	mg/kg	800	123.9		800	37.4		46.5		14.5	
Manganese	mg/kg	2600	699.8	n	2600	1820		89.2		367	
Zinc	mg/kg	35000	83.92	n	35000	58.2		49.2		28.1	
SW846 8330B											
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.058	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.058	U	0.06	U

Table E2-40. Analytical Results Summary for Subsurface Soil at EC-52

					Location	EC-52-14		EC-52-15		EC-52-A	
					Sample Name	EC-52-14-SO-03		EC-52-15-SO-02		EC-52-A-SO-03	
					Sample Date	8/19/13		8/27/13		8/22/13	
					Start Depth (ft bgs)	2		1		2	
					End Depth (ft bgs)	3		2		3	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Aluminum	mg/kg	1E+05	18404	n	1E+05	4270		9770		6180	
Antimony	mg/kg	47	0.68	n	47	0.7	UL	0.6	U	0.39	B
Copper	mg/kg	4700	14.44	n	4700	5.1	L	5.9		7.9	
Lead	mg/kg	800	13.96		800	4.4	J	10.9		7.5	
Manganese	mg/kg	2600	681.6	n	2600	485		102		24.7	
Zinc	mg/kg	35000	44.64	n	35000	7.9		34.4		15.7	
SW846 8330B											
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.059	U

Table E2-41. Analytical Results Summary for Surface Soil Samples at EC-57B

					Location	EC-57B-01		EC-57B-02		EC-57B-03		EC-57B-04		EC-57B-05		EC-57B-06		EC-57B-07		EC-57B-08		EC-57B-09	
					Sample Name	EC-57B-1-SO-0.5		EC-57B-2-SO-0.5		EC-57B-3-SO-0.5		EC-57B-4-SO-0.5		EC-57B-5-SO-0.5		EC-57B-06-SO-0.5		EC-57B-07-SO-0.5		EC-57B-08-SO-0.5		EC-57B-09-SO-0.5	
					Sample Date	8/28/13		8/28/13		8/28/13		8/28/13		8/29/13		9/25/15		9/24/15		9/24/15		9/24/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000	9680		1690		7420		7490		14200									
Antimony	mg/kg	47	0.95	n	47	33.1	L	5.3	L	7.2	L	4.3	L	16.3									
Copper	mg/kg	4700	32.83	n	4700	32	K	49.2	K	87.4	K	34.6	K	77.2									
Lead	mg/kg	800	123.9		800	215		320		238		243		434									
Manganese	mg/kg	2600	699.8	n	2600	1720		902		2110		20400		59900		2490		1320		1170		1410	
Zinc	mg/kg	35000	83.92	n	35000	158		3210		762		412		915									
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.026	U	0.027	U	0.025	U	0.026	U	0.026	U								
Aroclor 1221	mg/kg	0.83			0.83	0.026	U	0.027	U	0.025	U	0.026	U	0.026	U								
Aroclor 1232	mg/kg	0.72			0.72	0.026	U	0.027	U	0.025	U	0.026	U	0.026	U								
Aroclor 1242	mg/kg	0.95			0.95	0.026	U	0.027	U	0.025	U	0.026	U	0.026	U								
Aroclor 1248	mg/kg	0.95			0.95	0.026	U	0.027	U	0.025	U	0.026	U	0.026	U								
Aroclor 1254	mg/kg	0.97			0.97	0.026	U	0.027	U	0.025	U	0.026	U	0.026	U								
Aroclor 1260	mg/kg	0.99			0.99	0.18		0.053		0.13		0.067		0.15									
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000			38						65.5									
Acenaphthylene	µg/kg	2300000	363		2300000			90.2															
Fluorene	µg/kg	3000000	40	n	3000000			52.7						108									
Naphthalene	µg/kg	17000	13.3		17000			42.1		21.2		191		28.2									
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000	356				377		713											
Acenaphthylene	µg/kg	2300000	363		2300000	436				662		499		259	J								
Anthracene	µg/kg	2.3E+07	154	n	23000000	1250		168		1460		2080		589									
Benzo(a)anthracene	µg/kg	2900	1035		2900	4920		651		7940		9710		1620		280		320		260	J	410	
Benzo(a)pyrene	µg/kg	290	1036		1036	5490		749		9570		7800		2190		290		300		270	J	470	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	8800		1560		13600		13400		5110		510		430		430		780	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	1870		270		4220		7180		1220									
Benzo(k)fluoranthene	µg/kg	29000	476		29000	3410		675		5590		5550		1770									
Chrysene	µg/kg	290000	842		290000	6640		824		11000		14000		2630									
Dibenz(a,h)anthracene	µg/kg	290	152		290	629		85.6		1380		2000		382		68		69		59	J	120	
Fluoranthene	µg/kg	3000000	1488	n	3000000	8340		1250		12200		17000		3130									
Fluorene	µg/kg	3000000	40	n	3000000	353				379		747											
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	1880		275		4080		5810		1130		320		310		280	J	530	
Naphthalene	µg/kg	17000	13.3		17000	170																	
Phenanthrene	µg/kg	2300000	500		2300000	5350		823		6640		9300		2040									
Pyrene	µg/kg	2300000	1117	n	2300000	8950		989		11100		15700		2730									

Table E2-41. Analytical Results Summary for Surface Soil Samples at EC-57B

					Location	EC-57B-01		EC-57B-02		EC-57B-03		EC-57B-04		EC-57B-05		EC-57B-06		EC-57B-07		EC-57B-08		EC-57B-09	
					Sample Name	EC-57B-1-SO-0.5		EC-57B-2-SO-0.5		EC-57B-3-SO-0.5		EC-57B-4-SO-0.5		EC-57B-5-SO-0.5		EC-57B-06-SO-0.5		EC-57B-07-SO-0.5		EC-57B-08-SO-0.5		EC-57B-09-SO-0.5	
					Sample Date	8/28/13		8/28/13		8/28/13		8/28/13		8/29/13		9/25/15		9/24/15		9/24/15		9/24/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	1040		541		1410		4150		2010		2870	J	8940	J	1980		1470	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	113		56.8		122		451		245		197		60.3		137	J	45.9	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	127		70.6		140		451		206		227		137		172	J	59	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	62.3		37.7		62.3		241		131		92.8	J	33.6		47.9	J	25.2	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.14	J	1.79	J	70.9		35	U	5.9		4.21		1.58	J	2.56	J	1.45	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.29	U	3.45	U	33.7	U	35	U	2.11	J	2.79	J	2.07	J	2.74		1.14	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	4.65	J	4.29	J	33.7	U	19.9	J	10.3		5.22		2.37	J	3.83	J	2.5	
1,2,3,6,7,8-HxCDD	pg/g	223			223	4.52	J	2.91	J	33.7	U	21.1	J	7.93		8.39		4.08		5.82		2.44	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.64	J	3.28	J	33.7	U	35	U	8.63		4.85	J	2.39	J	3.15		2.9	
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.47	J	2.26	J	33.7	U	35	U	4.18	J	5.7		3.59		4.32	J	2.08	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.29	UJ	3.45	UJ	33.7	U	35	U	2.04	J	1.03	J	0.599	J	0.815	J	0.855	J
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.29	U	3.45	U	33.7	U	35	U	3.5	J	1.79	J	1.41	J	2.05	J	0.959	J
1,2,3,7,8-PeCDF	pg/g	744			744	6.59		2.11	J	33.7	U	25.8	J	12.1		1.85	J	1.13	J	1.55	J	0.924	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	7.25		5.51		33.7	U	19.9	J	14.3		6.74		2.91		4.47		5.43	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	7.88		8.62		33.7	U	20.3	J	18		5.28		2.78		2.47	J	8.2	
2,3,7,8-TCDD	pg/g	21.6			21.6	1.24		0.579	J	6.72	U	3.67	J	2.72		0.336	J	0.276	J	0.385	J	0.259	J
2,3,7,8-TCDF	pg/g	219			219	7.32		3.08		6.72	U	24.2		7.29		1.98		1.48		2.39		1.21	
Total Heptachlorodibenzofuran	pg/g	2210			2210	143		70.5		133		508		291		210		72.5		126		55	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	250		156		309		943		484		748		345		831		183	
Total Hexachlorodibenzofuran	pg/g	223			223	103		78		51.1		225		211		108		43.8		61.4		71.2	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	43.5		24.5		25.7	J	133		138		100		44		80		28.9	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	96		108	J	71		172		216	J	67.3		35.1		51.3		122	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	7.92	J	2.89	J	33.7	U	35	U	122	J	17.7		13		17.4		9.43	
Total Tetrachlorodibenzofuran	pg/g	219			219	58.1		54.1	J	25.6		124		103	J	25.3		18.1		25.5		43.2	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	8.92		4.14		8.55	J	6.98	U	67.3		4.84		5.58		6.13		2.1	
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.099	J	0.12	U	0.12	U	0.099	J	0.15	J								
2,4-Dinitrotoluene	mg/kg	7.4			7.4	1.5	J	0.06	U	0.058	U	0.058	U	0.058	U								
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.07	J	0.06	U	0.058	U	0.058	U	0.058	U								

Table E2-41. Analytical Results Summary for Surface Soil Samples at EC-57B

					Location	EC-57B-10		EC-57B-11		EC-57B-12		EC-57B-13		EC-57B-14		EC-57B-15		EC-57B-16		EC-57B-17		EC-57B-18	
					Sample Name	EC-57B-10-SO-0.5		EC-57B-11-SO-0.5		EC-57B-12-SO-0.5		EC-57B-13-SO-0.5		EC-57B-14-SO-0.5		EC-57B-15-SO-0.5		EC-57B-16-SO-0.5		EC-57B-17-SO-0.5		EC-57B-18-SO-0.5	
					Sample Date	9/24/15		9/24/15		9/24/15		1/21/16		1/21/16		1/21/16		1/22/16		1/22/16		1/22/16	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	14159	n	110000																		
Antimony	mg/kg	47	0.95	n	47																		
Copper	mg/kg	4700	32.83	n	4700																		
Lead	mg/kg	800	123.9		800																		
Manganese	mg/kg	2600	699.8	n	2600	586		485		1480													
Zinc	mg/kg	35000	83.92	n	35000																		
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1																		
Aroclor 1221	mg/kg	0.83			0.83																		
Aroclor 1232	mg/kg	0.72			0.72																		
Aroclor 1242	mg/kg	0.95			0.95																		
Aroclor 1248	mg/kg	0.95			0.95																		
Aroclor 1254	mg/kg	0.97			0.97																		
Aroclor 1260	mg/kg	0.99			0.99																		
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000																		
Acenaphthylene	µg/kg	2300000	363		2300000																		
Fluorene	µg/kg	3000000	40	n	3000000																		
Naphthalene	µg/kg	17000	13.3		17000																		
SW846 8270D																							
Acenaphthene	µg/kg	4500000	41.5	n	4500000																		
Acenaphthylene	µg/kg	2300000	363		2300000																		
Anthracene	µg/kg	2.3E+07	154	n	23000000																		
Benzo(a)anthracene	µg/kg	2900	1035		2900	1200		1400		820		63		130		370		920					
Benzo(a)pyrene	µg/kg	290	1036		1036	1100		1200		1000		62		160		370		980					
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	1600		2000		1600		87		290		640	J	1400					
Benzo(ghi)perylene	µg/kg	2300000	708		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	476		29000																		
Chrysene	µg/kg	290000	842		290000																		
Dibenz(a,h)anthracene	µg/kg	290	152		290	170		200		160		12		37		64		170					
Fluoranthene	µg/kg	3000000	1488	n	3000000																		
Fluorene	µg/kg	3000000	40	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	990		1000		840		51		160		320		960					
Naphthalene	µg/kg	17000	13.3		17000																		
Phenanthrene	µg/kg	2300000	500		2300000																		
Pyrene	µg/kg	2300000	1117	n	2300000																		

Table E2-41. Analytical Results Summary for Surface Soil Samples at EC-57B

					Location	EC-57B-10		EC-57B-11		EC-57B-12		EC-57B-13		EC-57B-14		EC-57B-15		EC-57B-16		EC-57B-17		EC-57B-18	
					Sample Name	EC-57B-10-SO-0.5		EC-57B-11-SO-0.5		EC-57B-12-SO-0.5		EC-57B-13-SO-0.5		EC-57B-14-SO-0.5		EC-57B-15-SO-0.5		EC-57B-16-SO-0.5		EC-57B-17-SO-0.5		EC-57B-18-SO-0.5	
					Sample Date	9/24/15		9/24/15		9/24/15		1/21/16		1/21/16		1/21/16		1/22/16		1/22/16		1/22/16	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	253		561		4410	J	5860	J	1490		1200		2240		2190	J	1130	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	21.3		20.9		48.4		46.4		70.4		19.7		162		56	J	72.6	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	29.1		30.4		73.4		111	J	72.1		34.6		158		104	J	62.1	J
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	12.7		12.5		24.8		18.9		21.4		8.01		62.5		21.8	J	26	J
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.96	J	0.862	J	1.32	J	1.46	J	1.76	J	0.567	J	4.77		2.28	J	2.02	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.76	J	0.798	J	1.42	J	1.91	J	1.17	J	0.604	J	3.18	J	1.3	J	1.28	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	2.03	J	1.66	J	2.23	J	2.63	J	2.12	J	0.965	J	8.55		2.73	J	3.17	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	1.67	J	1.49	J	2.91		3.56		3.01	J	1.36	J	7.52		2.82	J	2.96	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	1.42	J	1.3	J	1.99	J	2.2	J	1.84	J	0.866	J	6.78		2.34	J	2.57	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	1.32	J	1.16	J	2.45	J	2.96	J	1.99	J	1.18	J	5.98		2.43	J	2.17	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.451	U	0.392	U	0.54	U	0.732	J	0.58	J	0.214	U	2.26	J	1.02	J	0.802	J
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.613	J	0.603	J	1.24	J	1.18	J	0.907	J	0.487	J	3.18	J	1.1	J	0.959	J
1,2,3,7,8-PeCDF	pg/g	744			744	1	J	0.764	J	1.11	J	1.18	J	1.08	J	0.508	J	4.57	J	1.35	J	1.53	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	2.1	J	1.86	J	2.5	J	3.38		2.2	J	1.08	J	8.59		3.17	J	3.38	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	2.33	J	1.98	J	2.86		2.47	J	1.52	J	0.743	J	6.48		2.98	J	3.31	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.0566	U	0.16	J	0.327	J	0.476	J	0.29	J	0.128	U	0.733	J	0.246	J	0.295	J
2,3,7,8-TCDF	pg/g	219			219	1.36		0.992		1.44		1.99		1.67		1.16		6.58		1.56	J	1.84	J
Total Heptachlorodibenzofuran	pg/g	2210			2210	25.3		23.9		53.7		44.8		65.5		20.6		146		61.1		74.6	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	74.1		76		180		255		160		126		377		470		135	
Total Hexachlorodibenzofuran	pg/g	223			223	23		19.1		32.6		38.2		26.5		12.5		98.5		37.5		43.3	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	19.2		16.2		34.2		40.3		25.5		16.1		81.1		33.5		29.2	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	26.1		22.8		33.7		52.7		20.6		11.8		98.7		33.5		38.9	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	7.75		5.33		12		10.4		9.35		4.78		36		7.07		10.2	
Total Tetrachlorodibenzofuran	pg/g	219			219	14.9		9.01		21.4		20.9		11.3		7.44		66.6		21.6		29.6	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	2.48		2.22		4.52		5.59		2.29		0.441	J	19.9		2.45		4.52	
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51																		
2,4-Dinitrotoluene	mg/kg	7.4			7.4																		
2,6-Dinitrotoluene	mg/kg	1.5			1.5																		

Table E2-41. Analytical Results Summary for Surface Soil Samples at EC-57B

					Location	EC-57B-19		EC-57B-21	
					Sample Name	EC-57B-19-SO-0.5		EC-57B-21-SO-0.5	
					Sample Date	1/22/16		2/9/16	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 6020A									
Aluminum	mg/kg	110000	14159	n	110000				
Antimony	mg/kg	47	0.95	n	47				
Copper	mg/kg	4700	32.83	n	4700				
Lead	mg/kg	800	123.9		800				
Manganese	mg/kg	2600	699.8	n	2600				
Zinc	mg/kg	35000	83.92	n	35000				
SW846 8082A									
Aroclor 1016	mg/kg	5.1		n	5.1				
Aroclor 1221	mg/kg	0.83			0.83				
Aroclor 1232	mg/kg	0.72			0.72				
Aroclor 1242	mg/kg	0.95			0.95				
Aroclor 1248	mg/kg	0.95			0.95				
Aroclor 1254	mg/kg	0.97			0.97				
Aroclor 1260	mg/kg	0.99			0.99				
SW846 8270 SIM									
Acenaphthene	µg/kg	4500000	41.5	n	4500000				
Acenaphthylene	µg/kg	2300000	363		2300000				
Fluorene	µg/kg	3000000	40	n	3000000				
Naphthalene	µg/kg	17000	13.3		17000				
SW846 8270D									
Acenaphthene	µg/kg	4500000	41.5	n	4500000				
Acenaphthylene	µg/kg	2300000	363		2300000				
Anthracene	µg/kg	2.3E+07	154	n	23000000				
Benzo(a)anthracene	µg/kg	2900	1035		2900			170	
Benzo(a)pyrene	µg/kg	290	1036		1036			160	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900			210	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000				
Benzo(k)fluoranthene	µg/kg	29000	476		29000				
Chrysene	µg/kg	290000	842		290000				
Dibenz(a,h)anthracene	µg/kg	290	152		290			9.4	
Fluoranthene	µg/kg	3000000	1488	n	3000000				
Fluorene	µg/kg	3000000	40	n	3000000				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900			130	
Naphthalene	µg/kg	17000	13.3		17000				
Phenanthrene	µg/kg	2300000	500		2300000				
Pyrene	µg/kg	2300000	1117	n	2300000				

Table E2-41. Analytical Results Summary for Surface Soil Samples at EC-57B

					Location	EC-57B-19		EC-57B-21	
					Sample Name	EC-57B-19-SO-0.5		EC-57B-21-SO-0.5	
					Sample Date	1/22/16		2/9/16	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8290									
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	439	J	2330	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	46.5	J	56.4	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	39.7	J	62.8	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	12	J	41.1	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.909	J	1.63	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.661	J	1.27	J
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.844	J	2.78	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	1.54	J	3.07	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.638	J	2.47	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	1.04	J	1.84	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.356	UJ	0.815	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.433	J	0.861	J
1,2,3,7,8-PeCDF	pg/g	744			744	0.408	J	1.38	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	1.01	J	3.82	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.75	J	1.8	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.117	J	0.214	J
2,3,7,8-TCDF	pg/g	219			219	0.484	J	2.12	
Total Heptachlorodibenzofuran	pg/g	2210			2210	43.3		78.3	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	82.7		261	
Total Hexachlorodibenzofuran	pg/g	223			223	13.8		47.7	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	15.1		33.5	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	9.51		33.6	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	6.21		4.39	
Total Tetrachlorodibenzofuran	pg/g	219			219	5.27		36.3	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	2.29		5	
SW846 8330B									
2,4,6-Trinitrotoluene	mg/kg	51		n	51				
2,4-Dinitrotoluene	mg/kg	7.4			7.4				
2,6-Dinitrotoluene	mg/kg	1.5			1.5				

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-01		EC-57B-02		EC-57B-03		EC-57B-04		EC-57B-05		EC-57B-06		EC-57B-06		EC-57B-07		EC-57B-08	
					Sample Name	EC-57B-1-SO-02		EC-57B-2-SO-02		EC-57B-3-SO-02		EC-57B-4-SO-02		EC-57B-5-SO-02		EC-57B-06-SO-2		EC-57B-06-SO-2		EC-57B-07-SO-2		EC-57B-08-SO-2	
					Sample Date	8/28/13		8/28/13		8/28/13		8/28/13		8/29/13		9/25/15		2/9/16		9/24/15		9/24/15	
					Start Depth (ft bgs)	1		1		1		1		1		1		2		1		1	
					End Depth (ft bgs)	2		2		2		2		2		2		3		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000	1590		1920		1520		2940		1750									
Antimony	mg/kg	47	0.68	n	47	2.3	L	25.1	L	1.2	L	1.1	L	0.67	U								
Copper	mg/kg	4700	14.44	n	4700	2.4	K	53.2	K	14.2	K	13.3	K	3.6									
Lead	mg/kg	800	13.96		800	3.6		101		76.9		58.1		6.2									
Manganese	mg/kg	2600	681.6	n	2600	35.2		69.2		191		418		39.4		581				357		44.2	
Zinc	mg/kg	35000	44.64	n	35000	6.4		258		76.7		205		6									
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
Aroclor 1221	mg/kg	0.83			0.83	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
Aroclor 1232	mg/kg	0.72			0.72	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
Aroclor 1242	mg/kg	0.95			0.95	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
Aroclor 1248	mg/kg	0.95			0.95	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
Aroclor 1254	mg/kg	0.97			0.97	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
Aroclor 1260	mg/kg	0.99			0.99	0.026	U	0.026	U	0.025	U	0.026	U	0.026	U								
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000	0.94	J	40.9						1.4	U								
Acenaphthylene	µg/kg	2300000	2.38		2300000	12.9								2									
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	11.1								1.1	J								
Benzo(a)anthracene	µg/kg	2900	16.31		2900	33.5								7.7									
Benzo(a)pyrene	µg/kg	290	11.91		290									9.4									
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900									12.8									
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	32.3	J							6									
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000									4.9									
Chrysene	µg/kg	290000	20.56		290000	44.5								8.9									
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	10	J							1.4	J								
Fluoranthene	µg/kg	3000000	24.95	n	3000000	53.1								10.9									
Fluorene	µg/kg	3000000	31.7	n	3000000	2.1		53.4						1.4	U								
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	30.4	J							6									
Naphthalene	µg/kg	17000	2.2		17000	1.2	J	12.1		63.1		55.8		0.62	J								
Phenanthrene	µg/kg	2300000	10.85		2300000	17								4.4									
Pyrene	µg/kg	2300000	19.95	n	2300000	55.1								10.5									
SW846 8270D																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000					134		156											
Acenaphthylene	µg/kg	2300000	2.38		2300000			83.2		159		157											
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07			337		398	K	617											
Benzo(a)anthracene	µg/kg	2900	16.31		2900			1520		1730	K	2950				35000		4800		520		5.5	
Benzo(a)pyrene	µg/kg	290	11.91		290	42.2	J	1390		1630	K	2910				27000		3900		520		4.9	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	103		2730		2350	K	4160				38000		5200		780		7.9	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000			347		610		994											
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	38.5	J	1150		830		1910											
Chrysene	µg/kg	290000	20.56		290000			1720		2050	K	3530											
Dibenz(a,h)anthracene	µg/kg	290	2.53		290			130		215		330				4700		490		97		1.9	U

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-01		EC-57B-02		EC-57B-03		EC-57B-04		EC-57B-05		EC-57B-06		EC-57B-06		EC-57B-07		EC-57B-08	
					Sample Name	EC-57B-1-SO-02		EC-57B-2-SO-02		EC-57B-3-SO-02		EC-57B-4-SO-02		EC-57B-5-SO-02		EC-57B-06-SO-2		EC-57B-06-SO-2		EC-57B-07-SO-2		EC-57B-08-SO-2	
					Sample Date	8/28/13		8/28/13		8/28/13		8/28/13		8/29/13		9/25/15		2/9/16		9/24/15		9/24/15	
					Start Depth (ft bgs)	1		1		1		1		1		1		2		1		1	
					End Depth (ft bgs)	2		2		2		2		2		2		3		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	24.95	n	3000000			2750		3000	K	5380											
Fluorene	µg/kg	3000000	31.7	n	3000000					142		209											
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900			377		628		1000				22000		2100		500		5.7	
Phenanthrene	µg/kg	2300000	10.85		2300000			1590		1860	K	2690											
Pyrene	µg/kg	2300000	19.95	n	2300000			2150		2670		6220											
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	94.7		237		642	L	621		52.9		4180	J	531		13600	J	5310	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	5.4	J	12.2		16.2		36.8		7.04	U	354		5.37	J	8.11		0.931	U
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	8.46		9.51		13.1		54.1		3.53	U	1770		6.66		89.8		27.6	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.16	J	8.53		8.78		32		3.53	U	328		2.45	J	4.69		0.438	U
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.67	U	3.5	U	3.24	U	3.53	U	3.53	U	42.5		0.395	UJ	0.35	U	0.148	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.67	U	3.5	U	3.24	U	3.53	U	3.53	U	19.6	J	0.308	J	0.82	J	0.249	UJ
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.67	U	2.46	J	3.24	U	2.3	J	3.53	U	62.9		0.605	J	0.506	J	0.141	UJ
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.67	U	3.5	U	3.24	U	2.44	J	3.53	U	121		0.517	J	1.14	J	0.282	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.67	U	3.5	U	3.24	U	1.87	J	3.53	U	22		0.564	U	0.37	U	0.107	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.67	U	3.5	U	3.24	U	2.4	J	3.53	U	25.5		0.582	J	1.4	J	0.267	UJ
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.67	U	3.5	U	3.24	U	3.53	U	3.53	U	26.1	J	0.516	U	0.179	U	0.115	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.67	U	3.5	U	3.24	U	3.53	U	3.53	U	13.1		0.321	J	0.425	U	0.16	UJ
1,2,3,7,8-PeCDF	pg/g	744			744	3.67	U	1.88	J	3.24	U	3.53	U	3.53	U	22.4	J	0.286	J	0.247	J	0.0819	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.67	U	3.5	U	3.24	U	2.22	J	3.53	U	24.7		0.682	U	0.59	J	0.116	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.67	U	2.98	J	3.24	U	2.4	J	3.53	U	26.8		0.493	J	0.359	UJ	0.109	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.733	U	0.698	U	0.52	J	0.561	J	0.704	U	0.772	U	0.114	U	0.081	U	0.0753	U
2,3,7,8-TCDF	pg/g	219			219	0.733	U	0.698	U	0.606	J	0.704	U	0.704	U	2.77	U	0.208	J	0.338	J	0.0768	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	6.92		14.2		13.6		54.2		3.53	U	1140		4.04		9.53		0.899	J
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	13.8		19.3		26.3		124		1.79	J	2840		16.5		202		55.5	
Total Hexachlorodibenzofuran	pg/g	223			223	3.67	U	19.7	J	5.54		36.4		3.53	U	1060		4.34		6.4		0.475	J
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	3.67	U	6.23		8.3		44.7		3.53	U	434		2.4	J	18.3		1.88	J
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	2.23	J	35.4	J	10.4		33	J	3.53	U	85.7		2	J	5.27		0.109	J
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.67	U	5.11	J	5.58		22.4		3.53	U	38.9		0.271	J	3.49		0.137	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.552	J	11.9	J	2.42		10		0.704	U	5.9		0.61		2.98		0.0768	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.733	U	3.79		2.36		12.4		0.704	U	0.772	U	0.404	J	0.447	J	0.0753	U
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	0.12	U								
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.058	U	0.059	U	0.059	U	0.059	U	0.059	U								
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.058	U	0.059	U	0.059	U	0.059	U	0.059	U								

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-09		EC-57B-10		EC-57B-11		EC-57B-12		EC-57B-13		EC-57B-13		EC-57B-14		EC-57B-15		EC-57B-15	
					Sample Name	EC-57B-09-SO-2		EC-57B-10-SO-2		EC-57B-11-SO-2		EC-57B-12-SO-2		EC-57B-13-SO-1		EC-57B-13-SO-2		EC-57B-14-SO-1		EC-57B-15-SO-1		EC-57B-15-SO-2	
					Sample Date	9/24/15		9/24/15		9/24/15		9/24/15		1/22/16		1/22/16		1/22/16		1/22/16		1/22/16	
					Start Depth (ft bgs)	1		1		1		1		1		2		1		1		2	
					End Depth (ft bgs)	2		2		2		2		2		4		2		2		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000																		
Antimony	mg/kg	47	0.68	n	47																		
Copper	mg/kg	4700	14.44	n	4700																		
Lead	mg/kg	800	13.96		800																		
Manganese	mg/kg	2600	681.6	n	2600	28.2		19.7		106		253											
Zinc	mg/kg	35000	44.64	n	35000																		
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1																		
Aroclor 1221	mg/kg	0.83			0.83																		
Aroclor 1232	mg/kg	0.72			0.72																		
Aroclor 1242	mg/kg	0.95			0.95																		
Aroclor 1248	mg/kg	0.95			0.95																		
Aroclor 1254	mg/kg	0.97			0.97																		
Aroclor 1260	mg/kg	0.99			0.99																		
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000																		
Acenaphthylene	µg/kg	2300000	2.38		2300000																		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07																		
Benzo(a)anthracene	µg/kg	2900	16.31		2900																		
Benzo(a)pyrene	µg/kg	290	11.91		290																		
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900																		
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																		
Chrysene	µg/kg	290000	20.56		290000																		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290																		
Fluoranthene	µg/kg	3000000	24.95	n	3000000																		
Fluorene	µg/kg	3000000	31.7	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900																		
Naphthalene	µg/kg	17000	2.2		17000																		
Phenanthrene	µg/kg	2300000	10.85		2300000																		
Pyrene	µg/kg	2300000	19.95	n	2300000																		
SW846 8270D																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000																		
Acenaphthylene	µg/kg	2300000	2.38		2300000																		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07																		
Benzo(a)anthracene	µg/kg	2900	16.31		2900	4.3		15		77		56		2000		7.9		100		3700		8700	
Benzo(a)pyrene	µg/kg	290	11.91		290	4.2		11		69		52		1900		7.8		69		3300		4800	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	9.4		26		110		63		3000		15		120		4800		10000	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																		
Chrysene	µg/kg	290000	20.56		290000																		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.8	U	4		17		8.8		410		1.9	J	29		540	J	1300	

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-09		EC-57B-10		EC-57B-11		EC-57B-12		EC-57B-13		EC-57B-13		EC-57B-14		EC-57B-15		EC-57B-15	
					Sample Name	EC-57B-09-SO-2		EC-57B-10-SO-2		EC-57B-11-SO-2		EC-57B-12-SO-2		EC-57B-13-SO-1		EC-57B-13-SO-2		EC-57B-14-SO-1		EC-57B-15-SO-1		EC-57B-15-SO-2	
					Sample Date	9/24/15		9/24/15		9/24/15		9/24/15		1/22/16		1/22/16		1/22/16		1/22/16		1/22/16	
					Start Depth (ft bgs)	1		1		1		1		1		2		1		1		2	
					End Depth (ft bgs)	2		2		2		2		2		4		2		2		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	24.95	n	3000000																		
Fluorene	µg/kg	3000000	31.7	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	6.5		17		69		41		1700		7.5		52		3000		6100	
Phenanthrene	µg/kg	2300000	10.85		2300000																		
Pyrene	µg/kg	2300000	19.95	n	2300000																		
SW846 8290																							
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	122		85.1		66.2		14900	J	1000				763		1270			
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	0.916	U	0.63	U	1.97	U	2.02	U	20.4				16.5		10.5			
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	1.83	J	1.5	J	3.45		54.2		17.5				13.6		14.2			
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	0.507	U	0.398	UJ	1.57	J	1.39	J	18.9				11.6		5.94			
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.0913	UJ	0.159	UJ	0.184	U	0.197	UJ	1.78	J			1.24	U	0.625	U		
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.0715	UJ	0.0979	U	0.146	U	0.655	J	0.871	U			0.872	U	0.316	UJ		
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.0751	UJ	0.0879	U	0.349	U	0.302	UJ	3.34				2.46	J	1.17	J		
1,2,3,6,7,8-HxCDD	pg/g	223			223	0.113	UJ	0.101	UJ	0.222	U	0.855	J	1.53	U			1.87	J	0.682	U		
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.0791	UJ	0.0694	U	0.287	U	0.233	U	2.73	J			2.08	J	1.07	U		
1,2,3,7,8,9-HxCDD	pg/g	223			223	0.0998	UJ	0.0977	U	0.225	U	0.925	J	1.1	U			1.64	U	0.602	U		
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.0573	UJ	0.133	UJ	0.11	U	0.127	UJ	0.951	U			0.732	U	0.361	U		
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.0739	UJ	0.0903	UJ	0.158	U	0.436	U	0.959	U			1.14	U	0.359	U		
1,2,3,7,8-PeCDF	pg/g	744			744	0.0418	U	0.0511	U	0.18	J	0.168	J	1.28	J			1.21	J	0.6	U		
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.0975	U	0.0848	U	0.265	U	0.258	U	3.22				2.36	J	1.28	U		
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.127	UJ	0.0518	U	0.334	UJ	0.275	UJ	2.22	J			1.87	J	0.815	UJ		
2,3,7,8-TCDD	pg/g	21.6			21.6	0.06	U	0.0712	U	0.0667	U	0.0778	U	0.22	J			0.592	J	0.146	J		
2,3,7,8-TCDF	pg/g	219			219	0.0576	U	0.0726	U	0.196	J	0.106	U	1.15				1.62		0.957			
Total Heptachlorodibenzofuran	pg/g	2210			2210	0.938	J	0.0208	U	2.68	J	1.96	J	28.7				18.1		10.5			
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	4.87		3.18		8.38		106		38.8				28		32.8			
Total Hexachlorodibenzofuran	pg/g	223			223	0.196	J	0.393	J	2.6	J	1.56	J	28.8				23.4		12.5			
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	0.269	J	0.719	J	1.71	J	11.4		17.3				24.8		5.61			
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	0.805	J	0.158	J	3.2		2.56	J	30.4				26.6		13.7			
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	0.0474	U	0.097	J	0.604	J	2.08	J	11.5				29.4		2.18	J		
Total Tetrachlorodibenzofuran	pg/g	219			219	0.298	J	0.0726	U	1.99		0.43	J	16.7				11		8.52			
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.06	U	0.0712	U	0.0667	U	0.374	J	3.92				24.6		0.468	J		
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51																		
2,4-Dinitrotoluene	mg/kg	7.4			7.4																		
2,6-Dinitrotoluene	mg/kg	1.5			1.5																		

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-16		EC-57B-17		EC-57B-17		EC-57B-19		EC-57B-20		EC-57B-20		EC-57B-21		EC-57B-22		EC-57B-23	
					Sample Name	EC-57B-16-SO-1		EC-57B-17-SO-1		EC-57B-17-SO-2		EC-57B-19-SO-1		EC-57B-20-SO-1		EC-57B-20-SO-2		EC-57B-21-SO-1		EC-57B-22-SO-1		EC-57B-23-SO-1	
					Sample Date	1/22/16		1/22/16		1/22/16		1/22/16		1/22/16		1/22/16		2/9/16		2/10/16		2/10/16	
					Start Depth (ft bgs)	1		1		2		1		1		2		1		1		0.5	
					End Depth (ft bgs)	2		2		4		2		2		4		1.5		2		1	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	110000	18404	n	110000																		
Antimony	mg/kg	47	0.68	n	47																		
Copper	mg/kg	4700	14.44	n	4700																		
Lead	mg/kg	800	13.96		800																		
Manganese	mg/kg	2600	681.6	n	2600																		
Zinc	mg/kg	35000	44.64	n	35000																		
SW846 8082A																							
Aroclor 1016	mg/kg	5.1		n	5.1																		
Aroclor 1221	mg/kg	0.83			0.83																		
Aroclor 1232	mg/kg	0.72			0.72																		
Aroclor 1242	mg/kg	0.95			0.95																		
Aroclor 1248	mg/kg	0.95			0.95																		
Aroclor 1254	mg/kg	0.97			0.97																		
Aroclor 1260	mg/kg	0.99			0.99																		
SW846 8270 SIM																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000																		
Acenaphthylene	µg/kg	2300000	2.38		2300000																		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07																		
Benzo(a)anthracene	µg/kg	2900	16.31		2900																		
Benzo(a)pyrene	µg/kg	290	11.91		290																		
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900																		
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																		
Chrysene	µg/kg	290000	20.56		290000																		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290																		
Fluoranthene	µg/kg	3000000	24.95	n	3000000																		
Fluorene	µg/kg	3000000	31.7	n	3000000																		
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900																		
Naphthalene	µg/kg	17000	2.2		17000																		
Phenanthrene	µg/kg	2300000	10.85		2300000																		
Pyrene	µg/kg	2300000	19.95	n	2300000																		
SW846 8270D																							
Acenaphthene	µg/kg	4500000	0.92	n	4500000																		
Acenaphthylene	µg/kg	2300000	2.38		2300000																		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07																		
Benzo(a)anthracene	µg/kg	2900	16.31		2900	310		560		450				13		5.5		120		120	J	900	J
Benzo(a)pyrene	µg/kg	290	11.91		290	250		810		390				20		5.8		110		110	J	830	J
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	380		1100		620				26		50	J	150		170	J	1300	J
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000																		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000																		
Chrysene	µg/kg	290000	20.56		290000																		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	59		220		28	J			4.9		2.6	J	20		25	J	140	J

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-16		EC-57B-17		EC-57B-17		EC-57B-19		EC-57B-20		EC-57B-20		EC-57B-21		EC-57B-22		EC-57B-23							
					Sample Name	EC-57B-16-SO-1		EC-57B-17-SO-1		EC-57B-17-SO-2		EC-57B-19-SO-1		EC-57B-20-SO-1		EC-57B-20-SO-2		EC-57B-21-SO-1		EC-57B-22-SO-1		EC-57B-23-SO-1							
					Sample Date	1/22/16		1/22/16		1/22/16		1/22/16		1/22/16		1/22/16		2/9/16		2/10/16		2/10/16							
					Start Depth (ft bgs)	1		1		2		1		1		2		1		1		0.5							
					End Depth (ft bgs)	2		2		4		2		2		4		1.5		2		1							
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
Fluoranthene	µg/kg	3000000	24.95	n	3000000																						
Fluorene	µg/kg	3000000	31.7	n	3000000																						
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	240		1000		400				18		5.9		86		110	J	770	J				
Phenanthrene	µg/kg	2300000	10.85		2300000																						
Pyrene	µg/kg	2300000	19.95	n	2300000																						
SW846 8290																											
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	196						3880	J					932									
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	8.4						4.5	J					16.9									
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	3.8						33.3	J					18.1									
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.64						2.94	J					12.6									
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	0.356	U					0.226	UJ					0.876	J								
1,2,3,4,7,8-HxCDD	pg/g	223			223	0.175	UJ					0.372	J					0.362	J								
1,2,3,4,7,8-HxCDF	pg/g	219			219	0.721	U					0.455	J					1.67	J								
1,2,3,6,7,8-HxCDD	pg/g	223			223	0.319	U					0.629	J					1.25	J								
1,2,3,6,7,8-HxCDF	pg/g	219			219	0.623	U					0.408	J					1.44	J								
1,2,3,7,8,9-HxCDD	pg/g	223			223	0.291	U					0.669	J					0.741	J								
1,2,3,7,8,9-HxCDF	pg/g	223			223	0.228	U					0.153	UJ					0.541	U								
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	0.183	UJ					0.256	UJ					0.379	J								
1,2,3,7,8-PeCDF	pg/g	744			744	0.441	U					0.241	J					0.878	J								
2,3,4,6,7,8-HxCDF	pg/g	223			223	0.618	UJ					0.515	J					1.98	J								
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	0.527	U					0.539	J					1.32	J								
2,3,7,8-TCDD	pg/g	21.6			21.6	0.255	J					0.0508	UJ					0.179	U								
2,3,7,8-TCDF	pg/g	219			219	0.681	J					0.268	J					1.06									
Total Heptachlorodibenzofuran	pg/g	2210			2210	5.43						5.17						21.9									
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	8.33						68.7						54.8									
Total Hexachlorodibenzofuran	pg/g	223			223	4.92						5.06						19.7									
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.11	J					11.7						6.39									
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	5.3						6.02						23.7									
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	0.719	J					7.95						2.26	J								
Total Tetrachlorodibenzofuran	pg/g	219			219	2.57						5.5						17.4									
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.904						6.06						1.6									
SW846 8330B																											
2,4,6-Trinitrotoluene	mg/kg	51		n	51																						
2,4-Dinitrotoluene	mg/kg	7.4			7.4																						
2,6-Dinitrotoluene	mg/kg	1.5			1.5																						

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-24		EC-57B-25		EC-57B-26		
					Sample Name	EC-57B-24-SO-1		EC-57B-25-SO-1		EC-57B-26-SO-1		
					Sample Date	2/9/16		2/10/16		2/10/16		
					Start Depth (ft bgs)	1		1		1		
					End Depth (ft bgs)	1.5		2		2		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		
SW846 6020A												
Aluminum	mg/kg	110000	18404	n	110000							
Antimony	mg/kg	47	0.68	n	47							
Copper	mg/kg	4700	14.44	n	4700							
Lead	mg/kg	800	13.96		800							
Manganese	mg/kg	2600	681.6	n	2600							
Zinc	mg/kg	35000	44.64	n	35000							
SW846 8082A												
Aroclor 1016	mg/kg	5.1		n	5.1							
Aroclor 1221	mg/kg	0.83			0.83							
Aroclor 1232	mg/kg	0.72			0.72							
Aroclor 1242	mg/kg	0.95			0.95							
Aroclor 1248	mg/kg	0.95			0.95							
Aroclor 1254	mg/kg	0.97			0.97							
Aroclor 1260	mg/kg	0.99			0.99							
SW846 8270 SIM												
Acenaphthene	µg/kg	4500000	0.92	n	4500000							
Acenaphthylene	µg/kg	2300000	2.38		2300000							
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07							
Benzo(a)anthracene	µg/kg	2900	16.31		2900							
Benzo(a)pyrene	µg/kg	290	11.91		290							
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900							
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000							
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000							
Chrysene	µg/kg	290000	20.56		290000							
Dibenz(a,h)anthracene	µg/kg	290	2.53		290							
Fluoranthene	µg/kg	3000000	24.95	n	3000000							
Fluorene	µg/kg	3000000	31.7	n	3000000							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900							
Naphthalene	µg/kg	17000	2.2		17000							
Phenanthrene	µg/kg	2300000	10.85		2300000							
Pyrene	µg/kg	2300000	19.95	n	2300000							
SW846 8270D												
Acenaphthene	µg/kg	4500000	0.92	n	4500000							
Acenaphthylene	µg/kg	2300000	2.38		2300000							
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07							
Benzo(a)anthracene	µg/kg	2900	16.31		2900	28000		67	J	19	UJ	
Benzo(a)pyrene	µg/kg	290	11.91		290	22000		17	J	19	UJ	
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	30000		47	J	19	UJ	
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000							
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000							
Chrysene	µg/kg	290000	20.56		290000							
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	2800		1.9	UJ	19	UJ	

Table E2-42. Analytical Results Summary for Subsurface Soil at EC-57B

					Location	EC-57B-24		EC-57B-25		EC-57B-26		
					Sample Name	EC-57B-24-SO-1		EC-57B-25-SO-1		EC-57B-26-SO-1		
					Sample Date	2/9/16		2/10/16		2/10/16		
					Start Depth (ft bgs)	1		1		1		
					End Depth (ft bgs)	1.5		2		2		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		
Fluoranthene	µg/kg	3000000	24.95	n	3000000							
Fluorene	µg/kg	3000000	31.7	n	3000000							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	17000		48	J	19	UJ	
Phenanthrene	µg/kg	2300000	10.85		2300000							
Pyrene	µg/kg	2300000	19.95	n	2300000							
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400							
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400							
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460							
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210							
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210							
1,2,3,4,7,8-HxCDD	pg/g	223			223							
1,2,3,4,7,8-HxCDF	pg/g	219			219							
1,2,3,6,7,8-HxCDD	pg/g	223			223							
1,2,3,6,7,8-HxCDF	pg/g	219			219							
1,2,3,7,8,9-HxCDD	pg/g	223			223							
1,2,3,7,8,9-HxCDF	pg/g	223			223							
1,2,3,7,8-PeCDD	pg/g	22.3			22.3							
1,2,3,7,8-PeCDF	pg/g	744			744							
2,3,4,6,7,8-HxCDF	pg/g	223			223							
2,3,4,7,8-PeCDF	pg/g	74.4			74.4							
2,3,7,8-TCDD	pg/g	21.6			21.6							
2,3,7,8-TCDF	pg/g	219			219							
Total Heptachlorodibenzofuran	pg/g	2210			2210							
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170							
Total Hexachlorodibenzofuran	pg/g	223			223							
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223							
Total Pentachlorodibenzofuran	pg/g	74.4			74.4							
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3							
Total Tetrachlorodibenzofuran	pg/g	219			219							
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6							
SW846 8330B												
2,4,6-Trinitrotoluene	mg/kg	51		n	51							
2,4-Dinitrotoluene	mg/kg	7.4			7.4							
2,6-Dinitrotoluene	mg/kg	1.5			1.5							

Table E2-43. Analytical Results Summary for Surface Soil Samples at EC-57C

					Location	EC-57C-01		EC-57C-02		EC-57C-03		EC-57C-04	
					Sample Name	EC-57C-1-SO-0.5		EC-57C-2-SO-0.5		EC-57C-3-SO-0.5		EC-57C-4-SO-0.5	
					Sample Date	8/26/13		8/29/13		8/26/13		8/26/13	
					Start Depth (ft bgs)	0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 8270 SIM													
Acenaphthene	µg/kg	4500000	41.5	n	4500000	3.7		6.8		4.6		2.5	
Acenaphthylene	µg/kg	2300000	363		2300000	5.4		7		19.7		4.5	
Anthracene	µg/kg	2.3E+07	154	n	23000000	83.4		22.6		23.5		12.4	
Benzo(a)anthracene	µg/kg	2900	1035		2900							78.9	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000							62.8	
Benzo(k)fluoranthene	µg/kg	29000	476		29000							33.6	
Chrysene	µg/kg	290000	842		290000							99.5	
Dibenz(a,h)anthracene	µg/kg	290	152		290			18.8	J	30.9	K	18.7	
Fluorene	µg/kg	3000000	40	n	3000000	3.7		7.3		5.5		3	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900							59.3	
Naphthalene	µg/kg	17000	13.3		17000	2.9		4.2		3.1		2.3	
Phenanthrene	µg/kg	2300000	500		2300000							60	
SW846 8270D													
Benzo(a)anthracene	µg/kg	2900	1035		2900	522		118		132			
Benzo(a)pyrene	µg/kg	290	1036		1036	573		131		169		78.4	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	671		191		334		131	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	341		95.8		62.7	J		
Benzo(k)fluoranthene	µg/kg	29000	476		29000	259		71.8	J	133			
Chrysene	µg/kg	290000	842		290000	616		160		191			
Dibenz(a,h)anthracene	µg/kg	290	152		290	108							
Fluoranthene	µg/kg	3000000	1488	n	3000000	686		237		255		130	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	316		100		67.4	J		
Phenanthrene	µg/kg	2300000	500		2300000	329		136		109			
Pyrene	µg/kg	2300000	1117	n	2300000	903		220		314		145	
SW846 8290													
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	292		5630	J	4100		14100	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	16		77		28.3		3.71	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	14.2		128		59.9		64.2	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	12.7		32.4		12.9		4.15	J
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.39	U	2.57	J	3.61	U	3.54	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.39	U	2.26	J	3.61	U	3.54	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.01	J	6.28		2.21	J	3.54	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.39	U	4.46	J	3.61	U	3.54	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.15	J	3.72	J	2.39	J	3.54	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.39	U	4.09	J	2.26	J	3.54	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.39	U	4.13	U	3.61	U	3.54	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.39	U	4.13	U	3.61	U	3.54	U
1,2,3,7,8-PeCDF	pg/g	744			744	2.84	J	3.69	J	3.61	U	3.54	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	2.92	J	5.09	J	3.01	J	3.54	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.4	J	4.61	J	3.53	J	3.54	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.676	U	0.48	J	0.376	J	0.707	U
2,3,7,8-TCDF	pg/g	219			219	1.52		4.27		1.61		0.707	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	12.7		79.2		28.5		4.15	J
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	31.7		285		135		146	
Total Hexachlorodibenzofuran	pg/g	223			223	29.2		52.5		29.2		2.77	J
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	9.34		44.1		10		3.8	J
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	26.7		54.3		36.2		3.54	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	1.73	J	7.3		3.61	U	3.54	U
Total Tetrachlorodibenzofuran	pg/g	219			219	13.6		35.8		12		2.28	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	1.25		6.41		1.91		0.499	J
SW846 8330B													
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.06	U	0.058	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.06	U	0.058	U	0.06	U
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.5	U	0.49	U	0.5	U
HPLC													
Nitroguanidine	mg/kg	8200		n	8200	0.095	U	0.1	U	0.1	U	0.1	U

Table E2-44. Analytical Results Summary for Subsurface Soil at EC-57C

					Location	EC-57C-01		EC-57C-02		EC-57C-03		EC-57C-04		
					Sample Name	EC-57C-1-SO-02		EC-57C-2-SO-02		EC-57C-3-SO-02		EC-57C-4-SO-02		
					Sample Date	8/26/13		8/29/13		8/26/13		8/26/13		
					Start Depth (ft bgs)	1		1		1		1		
					End Depth (ft bgs)	2		2		2		2		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		
SW846 8270 SIM														
Acenaphthene	µg/kg	4500000	0.92	n	4500000	0.48	J	1.6	U	12.1	J	1.4	J	
Acenaphthylene	µg/kg	2300000	2.38		2300000	2		1.2	J	7.9	J	3.4		
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	6.4		1	J			5.4		
Benzo(a)anthracene	µg/kg	2900	16.3		2900	58.2		7.3				28.1		
Benzo(a)pyrene	µg/kg	290	11.9		290	56.1		8.7				22		
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	60.6		12.5	J			28		
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	48.5		5.2	L			18.4		
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	22.2		4.3	J			9.5		
Chrysene	µg/kg	290000	20.6		290000	67.8		9.5				34.1		
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	12.8		1.8	L	77.7		5		
Fluoranthene	µg/kg	3000000	25	n	3000000	69.9		9.5				47.2		
Fluorene	µg/kg	3000000	31.7	n	3000000	0.84	J	1.6	U	17.9	J	1.4	J	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	43.5		5.6	L			17.5		
Naphthalene	µg/kg	17000	2.2		17000	0.92	J	0.93	J	7.1	J	1.5	J	
Phenanthrene	µg/kg	2300000	10.9		2300000	30.5		4.5				29.9		
Pyrene	µg/kg	2300000	20	n	2300000			9.2				51.5		
SW846 8270D														
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07					111				
Benzo(a)anthracene	µg/kg	2900	16.3		2900					408				
Benzo(a)pyrene	µg/kg	290	11.9		290					399				
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900					578				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000					112				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000					260				
Chrysene	µg/kg	290000	20.6		290000					436				
Fluoranthene	µg/kg	3000000	25	n	3000000					633				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900					120				
Phenanthrene	µg/kg	2300000	10.9		2300000					420				
Pyrene	µg/kg	2300000	20	n	2300000	91.3				854				
SW846 8290														
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	5070	J	9470	K	9900	J	10100	J	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.58	U	6.85	J	18.3		5.34	J	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	25.9		131		121		66.4		
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.8	U	4.51	J	9.46		5.32	J	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.8	U	4.32	U	4.35	U	3.62	U	
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.8	U	4.32	U	2.59	J	3.62	U	
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.8	U	4.32	U	2.32	J	3.62	U	
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.8	U	3.66	J	3.2	J	3.62	U	
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.8	U	4.32	U	4.35	U	3.62	U	
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.8	U	4.39	J	4.45	J	3.62	U	
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.8	U	4.32	U	4.35	U	3.62	U	
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.8	U	4.32	U	4.35	U	3.62	U	
1,2,3,7,8-PeCDF	pg/g	744			744	3.8	U	4.32	U	4.35	U	3.62	U	
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.8	U	4.32	U	4.35	U	3.62	U	
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.8	U	4.32	U	4.35	U	3.62	U	
2,3,7,8-TCDD	pg/g	21.6			21.6	0.758	U	0.862	U	0.868	U	0.721	U	
2,3,7,8-TCDF	pg/g	219			219	0.758	U	0.678	J	1.18	J	0.721	U	
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.8	U	4.51	J	9.46		5.32	J	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	59.5		333		302		156		
Total Hexachlorodibenzofuran	pg/g	223			223	3.8	U	4.32	U	2.32	J	4.59	J	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	2.39	J	43.4		48.1		3.53	J	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.8	U	4.32	U	4.94	J	5.33	J	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.8	U	4.32	U	3.46	J	3.62	U	
Total Tetrachlorodibenzofuran	pg/g	219			219	0.758	U	4.85		6.81		3.17		
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.758	U	0.862	U	0.868	U	0.721	U	
SW846 8330B														
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U	
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.058	U	0.058	U	
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.058	U	0.058	U	
Nitroglycerin	mg/kg	8.2		n	8.2	0.5	U	0.5	U	0.49	U	0.49	U	
HPLC														
Nitroguanidine	mg/kg	8200		n	8200	0.091	U	0.1	U	0.095	U	0.091	U	

Table E2-44. Analytical Results Summary for Subsurface Soil at EC-57C

					Location	EC-57C-05		EC-57C-06		EC-57C-07		EC-57C-08		
					Sample Name	EC-57C-05-SO-2		EC-57C-06-SO-2		EC-57C-07-SO-2		EC-57C-08-SO-2		
					Sample Date	9/25/15		9/25/15		9/25/15		9/25/15		
					Start Depth (ft bgs)	1		1		1		1		
					End Depth (ft bgs)	2		2		2		2		
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		
SW846 8270 SIM														
Acenaphthene	µg/kg	4500000	0.92	n	4500000									
Acenaphthylene	µg/kg	2300000	2.38		2300000									
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07									
Benzo(a)anthracene	µg/kg	2900	16.3		2900									
Benzo(a)pyrene	µg/kg	290	11.9		290									
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900									
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000									
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000									
Chrysene	µg/kg	290000	20.6		290000									
Dibenz(a,h)anthracene	µg/kg	290	2.53		290									
Fluoranthene	µg/kg	3000000	25	n	3000000									
Fluorene	µg/kg	3000000	31.7	n	3000000									
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900									
Naphthalene	µg/kg	17000	2.2		17000									
Phenanthrene	µg/kg	2300000	10.9		2300000									
Pyrene	µg/kg	2300000	20	n	2300000									
SW846 8270D														
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07									
Benzo(a)anthracene	µg/kg	2900	16.3		2900									
Benzo(a)pyrene	µg/kg	290	11.9		290	5.2		6.8		6		3.1	J	
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900									
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000									
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000									
Chrysene	µg/kg	290000	20.6		290000									
Fluoranthene	µg/kg	3000000	25	n	3000000									
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900									
Phenanthrene	µg/kg	2300000	10.9		2300000									
Pyrene	µg/kg	2300000	20	n	2300000									
SW846 8290														
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400									
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400									
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460									
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210									
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210									
1,2,3,4,7,8-HxCDD	pg/g	223			223									
1,2,3,4,7,8-HxCDF	pg/g	219			219									
1,2,3,6,7,8-HxCDD	pg/g	223			223									
1,2,3,6,7,8-HxCDF	pg/g	219			219									
1,2,3,7,8,9-HxCDD	pg/g	223			223									
1,2,3,7,8,9-HxCDF	pg/g	223			223									
1,2,3,7,8-PeCDD	pg/g	22.3			22.3									
1,2,3,7,8-PeCDF	pg/g	744			744									
2,3,4,6,7,8-HxCDF	pg/g	223			223									
2,3,4,7,8-PeCDF	pg/g	74.4			74.4									
2,3,7,8-TCDD	pg/g	21.6			21.6									
2,3,7,8-TCDF	pg/g	219			219									
Total Heptachlorodibenzofuran	pg/g	2210			2210									
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170									
Total Hexachlorodibenzofuran	pg/g	223			223									
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223									
Total Pentachlorodibenzofuran	pg/g	74.4			74.4									
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3									
Total Tetrachlorodibenzofuran	pg/g	219			219									
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6									
SW846 8330B														
2,4,6-Trinitrotoluene	mg/kg	51		n	51									
2,4-Dinitrotoluene	mg/kg	7.4			7.4									
2,6-Dinitrotoluene	mg/kg	1.5			1.5									
Nitroglycerin	mg/kg	8.2		n	8.2									
HPLC														
Nitroguanidine	mg/kg	8200		n	8200									

Table E2-44. Analytical Results Summary for Subsurface Soil at EC-57C

					Location	EC-57C-09		EC-57C-10	
					Sample Name	EC-57C-09-SO-2		EC-57C-10-SO-2	
					Sample Date	9/25/15		9/25/15	
					Start Depth (ft bgs)	1		1	
					End Depth (ft bgs)	2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8270 SIM									
Acenaphthene	µg/kg	4500000	0.92	n	4500000				
Acenaphthylene	µg/kg	2300000	2.38		2300000				
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07				
Benzo(a)anthracene	µg/kg	2900	16.3		2900				
Benzo(a)pyrene	µg/kg	290	11.9		290				
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000				
Chrysene	µg/kg	290000	20.6		290000				
Dibenz(a,h)anthracene	µg/kg	290	2.53		290				
Fluoranthene	µg/kg	3000000	25	n	3000000				
Fluorene	µg/kg	3000000	31.7	n	3000000				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900				
Naphthalene	µg/kg	17000	2.2		17000				
Phenanthrene	µg/kg	2300000	10.9		2300000				
Pyrene	µg/kg	2300000	20	n	2300000				
SW846 8270D									
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07				
Benzo(a)anthracene	µg/kg	2900	16.3		2900				
Benzo(a)pyrene	µg/kg	290	11.9		290	2.6	J	3.4	J
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000				
Chrysene	µg/kg	290000	20.6		290000				
Fluoranthene	µg/kg	3000000	25	n	3000000				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900				
Phenanthrene	µg/kg	2300000	10.9		2300000				
Pyrene	µg/kg	2300000	20	n	2300000				
SW846 8290									
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400				
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400				
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460				
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210				
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210				
1,2,3,4,7,8-HxCDD	pg/g	223			223				
1,2,3,4,7,8-HxCDF	pg/g	219			219				
1,2,3,6,7,8-HxCDD	pg/g	223			223				
1,2,3,6,7,8-HxCDF	pg/g	219			219				
1,2,3,7,8,9-HxCDD	pg/g	223			223				
1,2,3,7,8,9-HxCDF	pg/g	223			223				
1,2,3,7,8-PeCDD	pg/g	22.3			22.3				
1,2,3,7,8-PeCDF	pg/g	744			744				
2,3,4,6,7,8-HxCDF	pg/g	223			223				
2,3,4,7,8-PeCDF	pg/g	74.4			74.4				
2,3,7,8-TCDD	pg/g	21.6			21.6				
2,3,7,8-TCDF	pg/g	219			219				
Total Heptachlorodibenzofuran	pg/g	2210			2210				
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170				
Total Hexachlorodibenzofuran	pg/g	223			223				
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223				
Total Pentachlorodibenzofuran	pg/g	74.4			74.4				
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3				
Total Tetrachlorodibenzofuran	pg/g	219			219				
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6				
SW846 8330B									
2,4,6-Trinitrotoluene	mg/kg	51		n	51				
2,4-Dinitrotoluene	mg/kg	7.4			7.4				
2,6-Dinitrotoluene	mg/kg	1.5			1.5				
Nitroglycerin	mg/kg	8.2		n	8.2				
HPLC									
Nitroguanidine	mg/kg	8200		n	8200				

Table E2-45. Analytical Results Summary for Surface Soil Samples at EC-57D

					Location	EC-57D-01		EC-57D-02		EC-57D-03		EC-57D-04		EC-57D-05		EC-57D-06		EC-57D-07		EC-57D-08		EC-57D-09	
					Sample Name	EC-57D-1-SO-0.5		EC-57D-2-SO-0.5		EC-57D-3-SO-0.5		EC-57D-4-SO-0.5		EC-57D-5-SO-0.5		EC-57D-06-SO-0.5		EC-57D-07-SO-0.5		EC-57D-08-SO-0.5		EC-57D-09-SO-0.5	
					Sample Date	8/26/13		8/28/13		8/26/13		8/28/13		8/29/13		9/24/15		9/24/15		9/24/15		9/24/15	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	1E+05	14159	n	110000	4100		8510		2290		12200		8260									
Antimony	mg/kg	47	0.95	n	47	0.87	L	4.2	L	1.1	L	2		1.5									
Copper	mg/kg	4700	32.83	n	4700	55.4	K	1880	K	26.3	K	78.2		19.4									
Lead	mg/kg	800	123.9		800	80.7	K	457	K	114	K	145		21.1									
Manganese	mg/kg	2600	699.8	n	2600	1330		7370		1070		20600		854		2300		5490		8840		1250	
Zinc	mg/kg	35000	83.92	n	35000	106		625		91.2		101		47.9									
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.041	J	0.12	U	0.12	U								
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.058	U	0.059	U	0.059	U	0.059	U	0.06	U								
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.058	U	0.059	U	0.059	U	0.059	U	0.06	U								

Table E2-45. Analytical Results Summary for Surface Soil Samples at EC-57D

					Location	EC-57D-10		EC-57D-11		EC-57D-12		EC-57D-13		EC-57D-14		EC-57D-15		EC-57D-16		EC-57D-17		EC-57D-18	
					Sample Name	EC-57D-10-SO-0.5		EC-57D-11-SO-0.5		EC-57D-12-SO-0.5		EC-57D-13-SO-0.5		EC-57D-14-SO-0.5		EC-57D-15-SO-0.5		EC-57D-16-SO-0.5		EC-57D-17-SO-0.5		EC-57D-18-SO-0.5	
					Sample Date	9/24/15		9/24/15		1/21/16		1/21/16		1/21/16		1/21/16		1/21/16		1/21/16		1/21/16	
					Start Depth (ft bgs)	0		0		0		0		0		0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																							
Aluminum	mg/kg	1E+05	14159	n	110000																		
Antimony	mg/kg	47	0.95	n	47																		
Copper	mg/kg	4700	32.83	n	4700																		
Lead	mg/kg	800	123.9		800																		
Manganese	mg/kg	2600	699.8	n	2600	1350		12000		1560		878		7960		5670		3930		17500		13900	
Zinc	mg/kg	35000	83.92	n	35000																		
SW846 8330B																							
2,4,6-Trinitrotoluene	mg/kg	51		n	51																		
2,4-Dinitrotoluene	mg/kg	7.4			7.4																		
2,6-Dinitrotoluene	mg/kg	1.5			1.5																		

Table E2-46. Analytical Results Summary for Subsurface Soil at EC-57D

					Location	EC-57D-01		EC-57D-02		EC-57D-03		EC-57D-04		EC-57D-05	
					Sample Name	EC-57D-1-SO-02		EC-57D-2-SO-3.5		EC-57D-3-SO-02		EC-57D-4-SO-02		EC-57D-5-SO-02	
					Sample Date	8/26/13		8/28/13		8/26/13		8/28/13		8/29/13	
					Start Depth (ft bgs)	1		2.5		1		1		1	
					End Depth (ft bgs)	2		3.5		2		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	1E+05	18404	n	1E+05	1760		2410		1810		1920		3040	
Antimony	mg/kg	47	0.68	n	47	0.63	UL	2.6	L	0.41	L	0.75	J	0.95	
Copper	mg/kg	4700	14.44	n	4700	5.4	K	39.4	K	10.2	K	21.4		286	
Lead	mg/kg	800	13.96		800	4.1	K	12.3	K	25.1	K	39.2		4.3	
Manganese	mg/kg	2600	681.6	n	2600	89.3		131		104		440		80.1	
Zinc	mg/kg	35000	44.64	n	35000	13.9		27.3		23		30.5		148	
SW846 8330B															
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.24	J	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.046	J	0.058	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.06	U	0.058	U	0.06	U

Table E2-46. Analytical Results Summary for Subsurface Soil at EC-57D

					Location	EC-57D-06		EC-57D-07		EC-57D-08		EC-57D-09		EC-57D-10	
					Sample Name	EC-57D-06-SO-2		EC-57D-07-SO-2		EC-57D-08-SO-2		EC-57D-09-SO-2		EC-57D-10-SO-2	
					Sample Date	9/24/15		9/24/15		9/24/15		9/28/15		9/28/15	
					Start Depth (ft bgs)	1		1		1		1		1	
					End Depth (ft bgs)	2		2		2		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	1E+05	18404	n	1E+05										
Antimony	mg/kg	47	0.68	n	47										
Copper	mg/kg	4700	14.44	n	4700										
Lead	mg/kg	800	13.96		800										
Manganese	mg/kg	2600	681.6	n	2600	50.5		298		396		348	J	137	J
Zinc	mg/kg	35000	44.64	n	35000										
SW846 8330B															
2,4,6-Trinitrotoluene	mg/kg	51		n	51										
2,4-Dinitrotoluene	mg/kg	7.4			7.4										
2,6-Dinitrotoluene	mg/kg	1.5			1.5										

Table E2-46. Analytical Results Summary for Subsurface Soil at EC-57D

					Location	EC-57D-11A		EC-57D-11A		EC-57D-12		EC-57D-12		EC-57D-13	
					Sample Name	EC-57D-11a-SO-2		EC-57D-11a-SO-2		EC-57D-12-SO-1		EC-57D-12-SO-2		EC-57D-13-SO-1	
					Sample Date	9/24/15		1/21/16		1/21/16		1/21/16		1/21/16	
					Start Depth (ft bgs)	1		2		1		2		1	
					End Depth (ft bgs)	2		2.5		2		4		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	1E+05	18404	n	1E+05										
Antimony	mg/kg	47	0.68	n	47										
Copper	mg/kg	4700	14.44	n	4700										
Lead	mg/kg	800	13.96		800										
Manganese	mg/kg	2600	681.6	n	2600	5030		152		203		17.9		58.6	
Zinc	mg/kg	35000	44.64	n	35000										
SW846 8330B															
2,4,6-Trinitrotoluene	mg/kg	51		n	51										
2,4-Dinitrotoluene	mg/kg	7.4			7.4										
2,6-Dinitrotoluene	mg/kg	1.5			1.5										

Table E2-46. Analytical Results Summary for Subsurface Soil at EC-57D

					Location	EC-57D-13		EC-57D-14		EC-57D-14		EC-57D-15		EC-57D-15	
					Sample Name	EC-57D-13-SO-2		EC-57D-14-SO-1		EC-57D-14-SO-2		EC-57D-15-SO-1		EC-57D-15-SO-2	
					Sample Date	1/21/16		1/21/16		1/21/16		1/21/16		1/21/16	
					Start Depth (ft bgs)	2		1		2		1		2	
					End Depth (ft bgs)	4		2		4		2		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result		Result	
SW846 6020A															
Aluminum	mg/kg	1E+05	18404	n	1E+05										
Antimony	mg/kg	47	0.68	n	47										
Copper	mg/kg	4700	14.44	n	4700										
Lead	mg/kg	800	13.96		800										
Manganese	mg/kg	2600	681.6	n	2600	12.4		208		188		539		71.9	
Zinc	mg/kg	35000	44.64	n	35000										
SW846 8330B															
2,4,6-Trinitrotoluene	mg/kg	51		n	51										
2,4-Dinitrotoluene	mg/kg	7.4			7.4										
2,6-Dinitrotoluene	mg/kg	1.5			1.5										

Table E2-46. Analytical Results Summary for Subsurface Soil at EC-57D

					Location	EC-57D-16		EC-57D-16		EC-57D-18		EC-57D-18	
					Sample Name	EC-57D-16-SO-1		EC-57D-16-SO-2		EC-57D-18-SO-1		EC-57D-18-SO-2	
					Sample Date	1/21/16		1/21/16		1/21/16		1/21/16	
					Start Depth (ft bgs)	1		2		1		2	
					End Depth (ft bgs)	2		4		2		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Aluminum	mg/kg	1E+05	18404	n	1E+05								
Antimony	mg/kg	47	0.68	n	47								
Copper	mg/kg	4700	14.44	n	4700								
Lead	mg/kg	800	13.96		800								
Manganese	mg/kg	2600	681.6	n	2600	385		64.1		533		293	
Zinc	mg/kg	35000	44.64	n	35000								
SW846 8330B													
2,4,6-Trinitrotoluene	mg/kg	51		n	51								
2,4-Dinitrotoluene	mg/kg	7.4			7.4								
2,6-Dinitrotoluene	mg/kg	1.5			1.5								

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Table E2-47. Analytical Results Summary for Surface Soil Samples at EC-58B

					Location	EC-58B-1B		EC-58B-2B		EC-58B-3B	
					Sample Name	EC-58B-1B-SO-0.5		EC-58B-2B-SO-0.5		EC-58B-3B-SO-0.5	
					Sample Date	8/26/13		8/28/13		8/26/13	
					Start Depth (ft bgs)	0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8270 SIM											
Acenaphthene	µg/kg	4500000	41.5	n	4500000	4.2		5		1.8	J
Acenaphthylene	µg/kg	2300000	363		2300000	13.4		16.3		3.4	
Anthracene	µg/kg	2.3E+07	154	n	23000000	15.9		22.1		8	J
Benzo(a)anthracene	µg/kg	2900	1035		2900					18.2	J
Benzo(a)pyrene	µg/kg	290	1036		1036						
Benzo(b)fluoranthene	µg/kg	2900	1116		2900						
Benzo(ghi)perylene	µg/kg	2300000	708		2300000			26.5		9.3	J
Benzo(k)fluoranthene	µg/kg	29000	476		29000					9.4	J
Chrysene	µg/kg	290000	842		290000					19.1	
Dibenz(a,h)anthracene	µg/kg	290	152		290	14.1	J	9.8		3.3	J
Fluoranthene	µg/kg	3000000	1488	n	3000000					32.6	J
Fluorene	µg/kg	3000000	40	n	3000000	4.8		6.1		4.4	J
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900			28.5		8.9	J
Naphthalene	µg/kg	17000	13.3		17000	2.8		1.9		1.7	J
Phenanthrene	µg/kg	2300000	500		2300000	59.6					
Pyrene	µg/kg	2300000	1117	n	2300000					27.7	J
SW846 8270D											
Benzo(a)anthracene	µg/kg	2900	1035		2900	100		98.5			
Benzo(a)pyrene	µg/kg	290	1036		1036	96.7		120		16.3	J
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	148		190		27.8	J
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	48.2	J				
Benzo(k)fluoranthene	µg/kg	29000	476		29000	47.4	J	78.1			
Chrysene	µg/kg	290000	842		290000	106		133			
Fluoranthene	µg/kg	3000000	1488	n	3000000	185		200			
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	54.2	J				
Phenanthrene	µg/kg	2300000	500		2300000			106		29.7	J
Pyrene	µg/kg	2300000	1117	n	2300000	155		174			
SW846 8290											
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	9720	J	10500	J	11300	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	47.3		28.8		23	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	117		151		87.2	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	12.5		9.89		6.31	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	4.01	U	4.02	U	3.43	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	4.01	U	4.02	U	3.43	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	4.01	U	4.02	U	3.43	U
1,2,3,6,7,8-HxCDD	pg/g	223			223	2.65	J	2.2	J	1.84	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	4.01	U	4.02	U	3.43	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	2.08	J	2.08	J	1.93	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	4.01	U	4.02	U	3.43	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	4.01	U	4.02	U	3.43	U
1,2,3,7,8-PeCDF	pg/g	744			744	4.01	U	4.02	U	3.43	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	4.01	U	4.02	U	3.43	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	4.01	U	4.02	U	3.43	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.8	U	0.802	U	0.685	U
2,3,7,8-TCDF	pg/g	219			219	0.8	U	0.802	U	0.685	U
Total Heptachlorodibenzofuran	pg/g	2210			2210	44.9		31		23.5	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	294		422		250	
Total Hexachlorodibenzofuran	pg/g	223			223	12.6		9.08		3.41	J
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	40.6		43.4		34.2	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	5.98	J	2.45	J	3.43	U
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	4.01	U	4.02	U	1.79	J
Total Tetrachlorodibenzofuran	pg/g	219			219	2.04		1.73		0.685	U
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.8	U	0.802	U	1.53	
SW846 8330B											
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.059	U	0.059	U

Table E2-47. Analytical Results Summary for Surface Soil Samples at EC-58B

					Location	EC-58B-4B		EC-58B-A	
					Sample Name	EC-58B-4B-SO-0.5		EC-58B-A-SO-0.5	
					Sample Date	8/26/13		8/20/13	
					Start Depth (ft bgs)	0		0	
					End Depth (ft bgs)	0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8270 SIM									
Acenaphthene	µg/kg	4500000	41.5	n	4500000	3.2		1.3	J
Acenaphthylene	µg/kg	2300000	363		2300000	11.6		3.6	
Anthracene	µg/kg	2.3E+07	154	n	23000000	14.9		6.4	
Benzo(a)anthracene	µg/kg	2900	1035		2900	49.4		37.2	
Benzo(a)pyrene	µg/kg	290	1036		1036			32.7	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900			50.9	
Benzo(ghi)perylene	µg/kg	2300000	708		2300000			32.1	
Benzo(k)fluoranthene	µg/kg	29000	476		29000			18.3	
Chrysene	µg/kg	290000	842		290000	69.4		62	
Dibenz(a,h)anthracene	µg/kg	290	152		290	8.9	J	8.3	
Fluoranthene	µg/kg	3000000	1488	n	3000000			48.3	
Fluorene	µg/kg	3000000	40	n	3000000	2.7		2	J
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	24	J	27.9	
Naphthalene	µg/kg	17000	13.3		17000	2		1.9	J
Phenanthrene	µg/kg	2300000	500		2300000			18.8	
Pyrene	µg/kg	2300000	1117	n	2300000			51.3	
SW846 8270D									
Benzo(a)anthracene	µg/kg	2900	1035		2900				
Benzo(a)pyrene	µg/kg	290	1036		1036	51.9	J		
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	110			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	21.5	J		
Benzo(k)fluoranthene	µg/kg	29000	476		29000	40.2	J		
Chrysene	µg/kg	290000	842		290000				
Fluoranthene	µg/kg	3000000	1488	n	3000000	84.6			
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900				
Phenanthrene	µg/kg	2300000	500		2300000	43.6	J		
Pyrene	µg/kg	2300000	1117	n	2300000	81.4			
SW846 8290									
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	3680		5200	J
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	19.5		215	
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	53.2		197	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	9.2		59.7	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.49	U	2.46	J
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.49	U	3.7	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.49	U	2.14	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	2.06	J	7.4	
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.49	U	2.33	J
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.49	U	4.62	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.49	U	3.7	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.49	U	3.7	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.49	U	3.7	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.49	U	2.86	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.49	U	3.7	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.696	U	0.739	U
2,3,7,8-TCDF	pg/g	219			219	0.815	J	0.601	J
Total Heptachlorodibenzofuran	pg/g	2210			2210	20.6		200	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	166		387	
Total Hexachlorodibenzofuran	pg/g	223			223	5.69		62.9	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	11.1		68.1	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	6.91		13	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.49	U	5.87	
Total Tetrachlorodibenzofuran	pg/g	219			219	3.16		2.51	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.746	J	0.767	J
SW846 8330B									
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U	0.06	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U	0.06	U

Table E2-48. Analytical Results Summary for Subsurface Soil at EC-58B

					Location	EC-58B-1B		EC-58B-3B		EC-58B-4B		EC-58B-4B	
					Sample Name	EC-58B-1B-SO-02		EC-58B-3B-SO-02		EC-58B-4B-SO-07		EC-58B-4B-SO-9	
					Sample Date	8/26/13		8/26/13		8/28/13		9/25/15	
					Start Depth (ft bgs)	1		1		6		7	
					End Depth (ft bgs)	2		2		7		9	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 8270 SIM													
Acenaphthene	µg/kg	4500000	0.92	n	4500000	4.2		12.6		9			
Acenaphthylene	µg/kg	2300000	2.38		2300000	16.5		9.4		39.4			
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	17.4		21.9		69.2			
Benzo(a)anthracene	µg/kg	2900	16.3		2900	94.9		95.6					
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	63.8	J						
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000								
Chrysene	µg/kg	290000	20.6		290000	106							
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	19.8	J	15.5	J				
Fluorene	µg/kg	3000000	31.7	n	3000000	5.2		8.6		22.4			
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	59.4	J						
Naphthalene	µg/kg	17000	2.2		17000	2.8		1.6	J	8			
Phenanthrene	µg/kg	2300000	10.9		2300000			59					
SW846 8270D													
Benzo(a)anthracene	µg/kg	2900	16.3		2900					456			
Benzo(a)pyrene	µg/kg	290	11.9		290	91.5		98		504		650	
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	140		159		660			
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000			45.4	J	153			
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	51.9	J	65.3	J	317			
Chrysene	µg/kg	290000	20.6		290000			117		579			
Dibenz(a,h)anthracene	µg/kg	290	2.53		290					61.1	J		
Fluoranthene	µg/kg	3000000	25	n	3000000	188		184		579			
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900			43.9	J	145			
Phenanthrene	µg/kg	2300000	10.9		2300000	82.2				271			
Pyrene	µg/kg	2300000	20	n	2300000	160		180		838			
SW846 8290													
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	7790	J	12500	J	15600	J		
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	227		14.3		7.54	U		
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	251		101		98.4			
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	64.7		4.64	J	2.41	J		
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.55	J	3.84	U	3.78	U		
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.48	U	3.84	U	3.78	U		
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.25	J	3.84	U	3.78	U		
1,2,3,6,7,8-HxCDD	pg/g	223			223	8.57		3.84	U	3.78	U		
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.02	J	3.84	U	3.78	U		
1,2,3,7,8,9-HxCDD	pg/g	223			223	4.38	J	3.84	U	2.22	J		
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.48	U	3.84	U	3.78	U		
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.48	U	3.84	U	3.78	U		
1,2,3,7,8-PeCDF	pg/g	744			744	2.46	J	3.84	U	3.78	U		
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.58	J	3.84	U	3.78	U		
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	2.22	J	3.84	U	3.78	U		
2,3,7,8-TCDD	pg/g	21.6			21.6	0.444	J	0.766	U	0.754	U		
2,3,7,8-TCDF	pg/g	219			219	1.03	J	0.766	U	0.754	U		
Total Heptachlorodibenzofuran	pg/g	2210			2210	212		15.4		2.41	J		
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	474		267		245			
Total Hexachlorodibenzofuran	pg/g	223			223	72		2.65	J	3.78	U		
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	74.1		23.6		23.4			
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	24.7		3.84	U	3.78	U		
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	10.6		3.84	U	2.91	J		
Total Tetrachlorodibenzofuran	pg/g	219			219	12.2		0.561	J	1.23			
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	3.46		0.794	J	0.686	J		
SW846 8330B													
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U		
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.059	U		
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.059	U		

Table E2-48. Analytical Results Summary for Subsurface Soil at EC-58B

					Location	EC-58B-A		EC-58B-05		EC-58B-06		EC-58B-07	
					Sample Name	EC-58B-A-SO-03		EC-58B-05-SO-2		EC-58B-06-SO-2		EC-58B-07-SO-2	
					Sample Date	8/20/13		9/25/15		9/25/15		9/25/15	
					Start Depth (ft bgs)	2		1		1		1	
					End Depth (ft bgs)	3		2		2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 8270 SIM													
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.1	J						
Acenaphthylene	µg/kg	2300000	2.38		2300000	8.7							
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	11.7							
Benzo(a)anthracene	µg/kg	2900	16.3		2900	96.2							
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	74.9							
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	36.2							
Chrysene	µg/kg	290000	20.6		290000								
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	19.9							
Fluorene	µg/kg	3000000	31.7	n	3000000	2.9							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	64.4							
Naphthalene	µg/kg	17000	2.2		17000	1.7	J						
Phenanthrene	µg/kg	2300000	10.9		2300000	24							
SW846 8270D													
Benzo(a)anthracene	µg/kg	2900	16.3		2900								
Benzo(a)pyrene	µg/kg	290	11.9		290	111		68		50		24	
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900	158							
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000								
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000								
Chrysene	µg/kg	290000	20.6		290000	113							
Dibenz(a,h)anthracene	µg/kg	290	2.53		290								
Fluoranthene	µg/kg	3000000	25	n	3000000	95.9							
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900								
Phenanthrene	µg/kg	2300000	10.9		2300000								
Pyrene	µg/kg	2300000	20	n	2300000	179							
SW846 8290													
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	7860	J						
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	8.11	J						
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	69.5							
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	4.13	J						
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.63	U						
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.63	U						
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.63	U						
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.63	U						
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.63	U						
1,2,3,7,8,9-HxCDD	pg/g	223			223	1.99	J						
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.63	U						
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.63	U						
1,2,3,7,8-PeCDF	pg/g	744			744	3.63	U						
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.63	U						
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.63	U						
2,3,7,8-TCDD	pg/g	21.6			21.6	0.723	U						
2,3,7,8-TCDF	pg/g	219			219	0.545	J						
Total Heptachlorodibenzofuran	pg/g	2210			2210	7.56							
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	201							
Total Hexachlorodibenzofuran	pg/g	223			223	2.64	J						
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	24.2							
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.92	J						
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.63	U						
Total Tetrachlorodibenzofuran	pg/g	219			219	3.28							
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.378	J						
SW846 8330B													
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U						
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.059	U						
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.059	U						

Table E2-48. Analytical Results Summary for Subsurface Soil at EC-58B

					Location	EC-58B-08		EC-58B-09	
					Sample Name	EC-58B-08-SO-2		EC-58B-09-SO-2	
					Sample Date	9/25/15		9/25/15	
					Start Depth (ft bgs)	1		1	
					End Depth (ft bgs)	2		2	
Analyte	Unit	RSL	BTV		PSL	Result		Result	
SW846 8270 SIM									
Acenaphthene	µg/kg	4500000	0.92	n	4500000				
Acenaphthylene	µg/kg	2300000	2.38		2300000				
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07				
Benzo(a)anthracene	µg/kg	2900	16.3		2900				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000				
Chrysene	µg/kg	290000	20.6		290000				
Dibenz(a,h)anthracene	µg/kg	290	2.53		290				
Fluorene	µg/kg	3000000	31.7	n	3000000				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900				
Naphthalene	µg/kg	17000	2.2		17000				
Phenanthrene	µg/kg	2300000	10.9		2300000				
SW846 8270D									
Benzo(a)anthracene	µg/kg	2900	16.3		2900				
Benzo(a)pyrene	µg/kg	290	11.9		290	30		95	
Benzo(b)fluoranthene	µg/kg	2900	23.1		2900				
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000				
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000				
Chrysene	µg/kg	290000	20.6		290000				
Dibenz(a,h)anthracene	µg/kg	290	2.53		290				
Fluoranthene	µg/kg	3000000	25	n	3000000				
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900				
Phenanthrene	µg/kg	2300000	10.9		2300000				
Pyrene	µg/kg	2300000	20	n	2300000				
SW846 8290									
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400				
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400				
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460				
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210				
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210				
1,2,3,4,7,8-HxCDD	pg/g	223			223				
1,2,3,4,7,8-HxCDF	pg/g	219			219				
1,2,3,6,7,8-HxCDD	pg/g	223			223				
1,2,3,6,7,8-HxCDF	pg/g	219			219				
1,2,3,7,8,9-HxCDD	pg/g	223			223				
1,2,3,7,8,9-HxCDF	pg/g	223			223				
1,2,3,7,8-PeCDD	pg/g	22.3			22.3				
1,2,3,7,8-PeCDF	pg/g	744			744				
2,3,4,6,7,8-HxCDF	pg/g	223			223				
2,3,4,7,8-PeCDF	pg/g	74.4			74.4				
2,3,7,8-TCDD	pg/g	21.6			21.6				
2,3,7,8-TCDF	pg/g	219			219				
Total Heptachlorodibenzofuran	pg/g	2210			2210				
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170				
Total Hexachlorodibenzofuran	pg/g	223			223				
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223				
Total Pentachlorodibenzofuran	pg/g	74.4			74.4				
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3				
Total Tetrachlorodibenzofuran	pg/g	219			219				
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6				
SW846 8330B									
2,4,6-Trinitrotoluene	mg/kg	51		n	51				
2,4-Dinitrotoluene	mg/kg	7.4			7.4				
2,6-Dinitrotoluene	mg/kg	1.5			1.5				

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Table E2-49. Analytical Results Summary for Surface Soil Samples at EC-58C

					Location	EC-58C-01		EC-58C-ASurf		EC-58C-B		EC-58C-CSurf	
					Sample Name	EC-58C-1-SO-0.5		EC-58C-A-SO-0.5		EC-58C-B-SO-0.5		EC-58C-C-SO-0.5	
					Sample Date	8/29/13		8/20/13		8/20/13		8/20/13	
					Start Depth (ft bgs)	0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
SW846 6020A													
Aluminum	mg/kg	110000	14159	n	110000	8460		19200		14700		20100	J
Antimony	mg/kg	47	0.95	n	47	0.41	J	1.3		0.48	J	2.5	
Copper	mg/kg	4700	32.83	n	4700	17.8		26.8		8.1		20.8	J
Lead	mg/kg	800	123.9		800	18.4		95.6		24.7		56.7	J
Manganese	mg/kg	2600	699.8	n	2600	151		96.3		115		368	J
Zinc	mg/kg	35000	83.92	n	35000	81.8		116		31.5		79.4	J
SW846 8082A													
Aroclor 1016	mg/kg	5.1		n	5.1	0.029	U	0.03	U	0.03	U	0.032	U
Aroclor 1221	mg/kg	0.83			0.83	0.029	U	0.03	U	0.03	U	0.032	U
Aroclor 1232	mg/kg	0.72			0.72	0.029	U	0.03	U	0.03	U	0.032	U
Aroclor 1242	mg/kg	0.95			0.95	0.029	U	0.03	U	0.03	U	0.032	U
Aroclor 1248	mg/kg	0.95			0.95	0.029	U	0.03	U	0.03	U	0.032	U
Aroclor 1254	mg/kg	0.97			0.97	0.029	U	0.03	U	0.03	U	0.032	U
Aroclor 1260	mg/kg	0.99			0.99	0.029	U	0.03	U	0.03	U	0.032	U
SW846 8270 SIM													
Acenaphthene	µg/kg	4500000	41.5	n	4500000	1.6	J	1.5	J	0.49	J	1.9	J
Acenaphthylene	µg/kg	2300000	363		2300000	7.1	J	3.9		1.9	J	10.1	
Anthracene	µg/kg	2.3E+07	154	n	23000000	7.9	J	5.8		2.7		11.3	
Benzo(a)anthracene	µg/kg	2900	1035		2900	30.5		31.3		16.4		64	
Benzo(a)pyrene	µg/kg	290	1036		1036	34.1		27.3		17.1		67.6	
Benzo(b)fluoranthene	µg/kg	2900	1116		2900	59.2		44.5		30			
Benzo(ghi)perylene	µg/kg	2300000	708		2300000	19.8		24		17.1		63.2	
Benzo(k)fluoranthene	µg/kg	29000	476		29000	20.6		14.2		9.5		41	
Chrysene	µg/kg	290000	842		290000	44.8		43.8		23.9		84.3	
Dibenz(a,h)anthracene	µg/kg	290	152		290	5.9	J	6.9		4.1		17.7	
Fluoranthene	µg/kg	3000000	1488	n	3000000	58.5		53.2		30			
Fluorene	µg/kg	3000000	40	n	3000000	2	J	2.3		1.6	U	3	
Indeno(1,2,3-cd)pyrene	µg/kg	2900	928		2900	20.1		23.7		15		58.1	
Naphthalene	µg/kg	17000	13.3		17000	6.3	U	1.1	J	0.83	J	5.3	

Table E2-49. Analytical Results Summary for Surface Soil Samples at EC-58C

					Location	EC-58C-01		EC-58C-ASurf		EC-58C-B		EC-58C-CSurf	
					Sample Name	EC-58C-1-SO-0.5		EC-58C-A-SO-0.5		EC-58C-B-SO-0.5		EC-58C-C-SO-0.5	
					Sample Date	8/29/13		8/20/13		8/20/13		8/20/13	
					Start Depth (ft bgs)	0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
Phenanthrene	µg/kg	2300000	500		2300000	22.1		23.4		9.5		36.5	
Pyrene	µg/kg	2300000	1117	n	2300000	55.3		46.2		27.9			
SW846 8270D													
Benzo(b)fluoranthene	µg/kg	2900	1116		2900							182	
Fluoranthene	µg/kg	3000000	1488	n	3000000							111	
Pyrene	µg/kg	2300000	1117	n	2300000							137	
SW846 8290													
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	4230		6640	J	2170		2740	
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	12.2	J	17.7		6.43	J	10.1	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	54.1		130		20.4		42.4	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	9.01		16		2.89	J	9.22	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	4.89	U	3.99	U	3.81	U	4.18	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	4.89	U	2.82	J	3.81	U	4.18	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	4.89	U	3.91	J	3.81	U	2.09	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	4.89	U	4.44	J	3.81	U	4.18	U
1,2,3,6,7,8-HxCDF	pg/g	219			219	4.89	U	3.34	J	3.81	U	4.18	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	4.89	U	5.27	J	3.81	U	4.18	U
1,2,3,7,8,9-HxCDF	pg/g	223			223	4.89	U	3.99	U	3.81	U	4.18	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	4.89	U	3.99	U	3.81	U	4.18	U
1,2,3,7,8-PeCDF	pg/g	744			744	4.89	U	2.98	J	3.81	U	4.18	U
2,3,4,6,7,8-HxCDF	pg/g	223			223	4.89	U	4.21	J	3.81	U	4.18	U
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	4.89	U	4.55	J	3.81	U	4.18	U
2,3,7,8-TCDD	pg/g	21.6			21.6	0.974	U	0.795	U	0.76	U	0.834	U
2,3,7,8-TCDF	pg/g	219			219	0.974	U	3.33		0.76	U	1.77	
Total Heptachlorodibenzofuran	pg/g	2210			2210	16.2		25		5.54	J	13.7	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	130		323		51.7		105	
Total Hexachlorodibenzofuran	pg/g	223			223	4.89	U	35.4		1.95	J	7.7	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	15.9		55.8		6.19		17.4	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.55	J	52.8		3.81	U	10.2	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	4.89	U	13.9		3.81	U	2.9	J

Table E2-49. Analytical Results Summary for Surface Soil Samples at EC-58C

					Location	EC-58C-01		EC-58C-ASurf		EC-58C-B		EC-58C-CSurf	
					Sample Name	EC-58C-1-SO-0.5		EC-58C-A-SO-0.5		EC-58C-B-SO-0.5		EC-58C-C-SO-0.5	
					Sample Date	8/29/13		8/20/13		8/20/13		8/20/13	
					Start Depth (ft bgs)	0		0		0		0	
					End Depth (ft bgs)	0.5		0.5		0.5		0.5	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result		Result	
Total Tetrachlorodibenzofuran	pg/g	219			219	2.39		66.1		2.5		13.9	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.974	U	11.1		0.658	J	2.5	
SW846 8330B													
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.06	U	0.059	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.06	U	0.059	U	0.059	U	0.059	U

Table E2-50. Analytical Results Summary for Subsurface Soil at EC-58C

					Location	EC-58C-01		EC-58C-ASub		EC-58C-CSub	
					Sample Name	EC-58C-1-SO-04		EC-58C-A-SO-04		EC-58C-C-SO-04	
					Sample Date	8/29/13		8/20/13		8/20/13	
					Start Depth (ft bgs)	3		3		3	
					End Depth (ft bgs)	4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 6020A											
Aluminum	mg/kg	110000	18404	n	110000	4240		1990		3240	
Antimony	mg/kg	47	0.68	n	47	0.71	U	0.63	U	0.69	UL
Copper	mg/kg	4700	14.44	n	4700	5.8		1.8	J	4.8	
Lead	mg/kg	800	13.96		800	6.3		2.3		5.5	
Manganese	mg/kg	2600	681.6	n	2600	62.6		19.8		20.2	L
Zinc	mg/kg	35000	44.64	n	35000	14.3		5.6		8.4	
SW846 8082A											
Aroclor 1016	mg/kg	5.1		n	5.1	0.027	U	0.028	U	0.027	U
Aroclor 1221	mg/kg	0.83			0.83	0.027	U	0.028	U	0.027	U
Aroclor 1232	mg/kg	0.72			0.72	0.027	U	0.028	U	0.027	U
Aroclor 1242	mg/kg	0.95			0.95	0.027	U	0.028	U	0.027	U
Aroclor 1248	mg/kg	0.95			0.95	0.027	U	0.028	U	0.027	U
Aroclor 1254	mg/kg	0.97			0.97	0.027	U	0.028	U	0.027	U
Aroclor 1260	mg/kg	0.99			0.99	0.027	U	0.028	U	0.027	U
SW846 8270 SIM											
Acenaphthene	µg/kg	4500000	0.92	n	4500000	1.5	U	1.5	U	1.4	U
Acenaphthylene	µg/kg	2300000	2.38		2300000	1.5	U	0.44	J	0.86	K
Anthracene	µg/kg	2.3E+07	2.6	n	2.3E+07	1.5	U	1.5	U	0.66	K
Benzo(a)anthracene	µg/kg	2900	16.31		2900	1.5	U	1.7	J	4.5	K
Benzo(a)pyrene	µg/kg	290	11.91		290	1.5	U	1.8		4.4	K
Benzo(b)fluoranthene	µg/kg	2900	23.14		2900	1.5	U	3.1		7.8	K
Benzo(ghi)perylene	µg/kg	2300000	6.8		2300000	1.5	U	1.7	J	4.5	K
Benzo(k)fluoranthene	µg/kg	29000	5.37		29000	1.5	U	1.1	J	3	K
Chrysene	µg/kg	290000	20.56		290000	1.5	U	2.3		6.4	K
Dibenz(a,h)anthracene	µg/kg	290	2.53		290	1.5	U	1.5	U	1.1	K
Fluoranthene	µg/kg	3000000	24.95	n	3000000	1.5	U	2.6		7.1	K
Fluorene	µg/kg	3000000	31.7	n	3000000	1.5	U	1.5	U	1.4	U
Indeno(1,2,3-cd)pyrene	µg/kg	2900	6.22		2900	1.5	U	1.6	J	3.9	K
Naphthalene	µg/kg	17000	2.2		17000	1.5	U	1.5	U	0.82	J

Table E2-50. Analytical Results Summary for Subsurface Soil at EC-58C

					Location	EC-58C-01		EC-58C-ASub		EC-58C-CSub	
					Sample Name	EC-58C-1-SO-04		EC-58C-A-SO-04		EC-58C-C-SO-04	
					Sample Date	8/29/13		8/20/13		8/20/13	
					Start Depth (ft bgs)	3		3		3	
					End Depth (ft bgs)	4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
Phenanthrene	µg/kg	2300000	10.85		2300000	0.65	J	0.95	J	3.2	K
Pyrene	µg/kg	2300000	19.95	n	2300000	1.5	U	2.6		7.1	K
SW846 8290											
1,2,3,4,6,7,8,9-OCDD	pg/g	74400			74400	9180	J	6860	J	4100	K
1,2,3,4,6,7,8,9-OCDF	pg/g	74400			74400	7.21	U	7.16	U	9.2	J
1,2,3,4,6,7,8-HpCDD	pg/g	2460			2460	29.2		24.8		47.7	
1,2,3,4,6,7,8-HpCDF	pg/g	2210			2210	3.62	U	3.59	U	8.76	
1,2,3,4,7,8,9-HpCDF	pg/g	2210			2210	3.62	U	3.59	U	3.99	U
1,2,3,4,7,8-HxCDD	pg/g	223			223	3.62	U	3.59	U	3.99	U
1,2,3,4,7,8-HxCDF	pg/g	219			219	3.62	U	3.59	U	2.59	J
1,2,3,6,7,8-HxCDD	pg/g	223			223	3.62	U	3.59	U	2.57	J
1,2,3,6,7,8-HxCDF	pg/g	219			219	3.62	U	3.59	U	3.99	U
1,2,3,7,8,9-HxCDD	pg/g	223			223	3.62	U	3.59	U	2.15	J
1,2,3,7,8,9-HxCDF	pg/g	223			223	3.62	U	3.59	U	3.99	U
1,2,3,7,8-PeCDD	pg/g	22.3			22.3	3.62	U	3.59	U	3.99	U
1,2,3,7,8-PeCDF	pg/g	744			744	3.62	U	3.59	U	3.26	J
2,3,4,6,7,8-HxCDF	pg/g	223			223	3.62	U	3.59	U	2.51	J
2,3,4,7,8-PeCDF	pg/g	74.4			74.4	3.62	U	3.59	U	3.79	J
2,3,7,8-TCDD	pg/g	21.6			21.6	0.721	U	0.716	U	0.796	U
2,3,7,8-TCDF	pg/g	219			219	0.721	U	0.716	U	3.08	
Total Heptachlorodibenzofuran	pg/g	2210			2210	3.62	U	3.59	U	13.2	
Total Heptachlorodibenzo-p-dioxin	pg/g	2170			2170	62.2		101		113	
Total Hexachlorodibenzofuran	pg/g	223			223	3.62	U	3.59	U	21	
Total Hexachlorodibenzo-p-dioxin	pg/g	223			223	3.57	J	41.1		29.3	
Total Pentachlorodibenzofuran	pg/g	74.4			74.4	3.62	U	3.59	U	36.8	
Total Pentachlorodibenzo-p-dioxin	pg/g	22.3			22.3	3.62	U	2.67	J	4.63	J
Total Tetrachlorodibenzofuran	pg/g	219			219	0.375	J	0.716	U	43.3	
Total Tetrachlorodibenzo-p-dioxin	pg/g	21.6			21.6	0.721	U	0.479	J	7.94	

Table E2-50. Analytical Results Summary for Subsurface Soil at EC-58C

					Location	EC-58C-01		EC-58C-ASub		EC-58C-CSub	
					Sample Name	EC-58C-1-SO-04		EC-58C-A-SO-04		EC-58C-C-SO-04	
					Sample Date	8/29/13		8/20/13		8/20/13	
					Start Depth (ft bgs)	3		3		3	
					End Depth (ft bgs)	4		4		4	
Analyte	Unit	RSL	BTV		PSL	Result		Result		Result	
SW846 8330B											
2,4,6-Trinitrotoluene	mg/kg	51		n	51	0.12	U	0.12	U	0.12	U
2,4-Dinitrotoluene	mg/kg	7.4			7.4	0.058	U	0.059	U	0.059	U
2,6-Dinitrotoluene	mg/kg	1.5			1.5	0.058	U	0.059	U	0.059	U

Table E2-51. Surface Soil Sampling Results for Arsenic in the IRP Shop Area

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Table E-52. Subsurface Soil Sampling Results for Arsenic in the IRP Shop Area

				Location	EC-28-01		EC-28-02		EC-28-02		EC-28-03		EC-28-04		EC-28-05		EC-28-06		EC-28-07		EC-28-08		EC-28-09		EC-28-09	
				Sample Name	EC-28-1-SO-04		EC-28-02-SO-6		EC-28-2-SO-04		EC-28-3-SO-04		EC-28-4-SO-04		EC-28-05-SO-4		EC-28-06-SO-4		EC-28-07-SO-4		EC-28-08-SO-4		EC-28-09-SO-4		EC-28-09-SO-6	
				Sample Date	7/24/13		10/8/15		7/23/13		7/23/13		7/24/13		10/8/15		10/8/15		10/8/15		10/8/15		10/8/15		10/8/15	
				Start Depth	3		4		3		3		3		3		3		3		3		3		4	
				End Depth	4		6		4		4		4		4		4		4		4		4		6	
Analyte	Unit	RSL	BTV	PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																										
Arsenic	mg/kg	3	9.26	9.26	2.6	K	3.36	J	11.6	K	4.6	K	2.2	K	2.03	J	4.8	J	3.38	J	2.8	J	2.83	J	3.38	J

				Location	EC-28-10		EC-28-10		EC-31-01		EC-31-02		EC-32-01		EC-32-02		EC-32-03		EC-32-09		EC-33-01		EC-33-02		EC-33-03	
				Sample Name	EC-28-10-SO-4		EC-28-10-SO-6		EC-31-1-SO-02		EC-31-2-SO-04		EC-32-1-SO-03		EC-32-2-SO-04		EC-32-03-SO-4		EC-32-09-SO-4		EC-33-1-SO-04		EC-33-2-SO-04		EC-33-3-SO-04	
				Sample Date	10/8/15		10/8/15		7/25/13		7/25/13		7/24/13		7/24/13		10/7/15		10/7/15		7/25/13		7/25/13		7/25/13	
				Start Depth	3		4		1		3		2		3		3		3		3		3		3	
				End Depth	4		6		2		4		3		4		4		4		4		4		4	
Analyte	Unit	RSL	BTV	PSL	Result		Result		Result		Result		Result		Result		Result		Result		Result		Result		Result	
SW846 6020A																										
Arsenic	mg/kg	3	9.26	9.26	4.83	J	7.52	J	4.8		5.3		13.4		4.1		3.2	J	2.42	J	2		1.5		7.7	

				Location	SHOP-06		SHOP-07		SHOP-18	
				Sample Name	Shop-06-SO-4		Shop-07-SO-4		Shop-18-SO-4	
				Sample Date	10/6/15		10/6/15		10/6/15	
				Start Depth	3		3		3	
				End Depth	4		4		4	
Analyte	Unit	RSL	BTV	PSL	Result		Result	SH	Result	
SW846 6020A										
Arsenic	mg/kg	3	9.26	9.26	3.52		7.73		5.17	

Legend

RSL	USEPA Regional Screening Level for Industrial Soil (November 2015); RSLs based on non-carcinogenic (n) effects have been divided by 10
BTV	95% Upper Threshold Limit (UTL) for Suface or Subsurface Soil Background Values
PSL	Project Screening Level - PSL equals the greater of the BTV and IND values
ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
pg/g	picograms per gram
B	analyte was detected in an associated QC blank sample
D	result is from dilution
J	result is estimated
U	analyte was not detected at the limit of detection
K	result is estimated; the reported value may be biased high, and the actual value is expected to be lower than reported
L	result is estimated; the reported value may be biased low, and the actual value is expected to be higher than reported
UJ	analyte was not detected at the limit of detection, limit of detection is estimated
UL	analyte was not detected at the limit of detection, limit of detection is estimated and may be biased low
value	highlighted value is greater than PSL
blank cells	indicates no screening level value specified, not analyzed, or for PAHs: analyses by 8270 SIM and 8270D methods, and the most accurate result was selected for reporting purposes per sample analyzed for PAHs.

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Table E2-53. Analytical Data Summary for Groundwater at Background Well

		Location Name	BG-MW-01		BG-MW-01	
		Sample Date	9/5/13		10/8/15	
		Sample Name	BG-MW-01-GW		BG-MW-01	
Analyte	MCL	Unit	Result		Result	
EPA 6850						
Perchlorate	15	µg/L			0.6	J
SW846 6020A\ E218.6\ SW846 7470A (Dissolved Fraction)						
Aluminum		mg/L			0.0205	
Antimony	0.006	mg/L			0.001	U
Arsenic	0.01	mg/L			0.001	U
Cadmium	0.005	mg/L			0.001	U
Chromium	0.1	mg/L			0.00358	J
Chromium, Hexavalent		µg/L			4	U
Cobalt		mg/L			0.014	
Copper	1.3	mg/L			0.0059	
Lead	0.015	mg/L			0.001	U
Manganese		mg/L			0.0502	
Mercury	0.002	mg/L			0.0001	U
Nickel		mg/L			0.0211	
Titanium		mg/L			0.002	U
Zinc		mg/L			0.0186	
SW846 6020A\ E218.6\ SW846 7470A (Total Fraction)						
Aluminum		mg/L	0.21		0.0642	
Antimony	0.006	mg/L	0.0022	U	0.001	U
Arsenic	0.01	mg/L	0.003	U	0.001	U
Cadmium	0.005	mg/L	0.0011	U	0.001	U
Chromium	0.1	mg/L	0.007		0.0317	
Chromium, Hexavalent		µg/L			4	U
Cobalt		mg/L	0.015		0.0142	
Copper	1.3	mg/L	0.0039	J	0.0264	
Lead	0.015	mg/L	0.0022	U	0.00104	J
Manganese		mg/L	0.058		0.0496	
Mercury	0.002	mg/L	0.0005	U	0.0001	U
Nickel		mg/L	0.02		0.0408	
Silver		mg/L	0.0022	U		
Titanium		mg/L	0.0023	J	0.00118	J
Zinc		mg/L	0.013		0.0458	
SW846 8015C						
Ethanol		mg/L	1	U		
Ethanol		µg/L			1000	U
Methanol		mg/L	1	U		
Methanol		µg/L			1000	U
SW846 8082A						
Aroclor 1016		µg/L	0.95	U	0.25	U
Aroclor 1221		µg/L	0.95	U	0.25	U
Aroclor 1232		µg/L	0.95	U	0.25	U
Aroclor 1242		µg/L	0.95	U	0.25	U
Aroclor 1248		µg/L	0.95	U	0.25	U
Aroclor 1254		µg/L	0.95	U	0.25	U
Aroclor 1260		µg/L	0.95	U	0.25	U
SW846 8151A						
2,4,5-T		µg/L	0.19	UJ	0.1	U
2,4,5-TP	50	µg/L	0.19	UJ	0.1	U
2,4-D	70	µg/L	0.19	UJ	0.1	U
2,4-DB		µg/L	0.19	UJ	0.1	U
Dalapon	200	µg/L	0.19	UJ	0.1	U
Dicamba		µg/L	0.19	UJ	0.1	U
Dichloroprop		µg/L	0.19	UJ	0.1	U
Dinoseb	7	µg/L	0.67	UJ	0.1	U
MCPA		µg/L	38.1	UJ	10	U
MCPP		µg/L	38.1	UJ	10	U
Pentachlorophenol	1	µg/L	0.19	UJ		
SW846 8260B						
2-Butanone		µg/L	5	U		
Acetone		µg/L	5	U		
Benzene	5	µg/L	1	U		
Carbon tetrachloride	5	µg/L	1	U		
Ethylbenzene	700	µg/L	1	U		
Methylene chloride	5	µg/L	1	U		
Naphthalene		µg/L	1	U		
Tetrachloroethene	5	µg/L	1	U		
Toluene	1000	µg/L	1	U		
Trichloroethene	5	µg/L	1.4			
Xylenes (total)	10000	µg/L	3	U		
SW846 8260C						
2-Butanone		µg/L			1	U
Acetone		µg/L			2	U
Benzene	5	µg/L			0.5	U
Carbon tetrachloride	5	µg/L			0.5	U
Ethylbenzene	700	µg/L			0.5	U
Methylene chloride	5	µg/L			0.5	U
mp-Xylene		µg/L			1.5	U
Naphthalene		µg/L			0.5	U

Table E2-53. Analytical Data Summary for Groundwater at Background Well

		Location Name	BG-MW-01		BG-MW-01	
		Sample Date	9/5/13		10/8/15	
		Sample Name	BG-MW-01-GW		BG-MW-01	
Analyte	MCL	Unit	Result		Result	
o-Xylene		µg/L			0.5	U
Tetrachloroethene	5	µg/L			0.5	U
Toluene	1000	µg/L			0.5	U
Trichloroethene	5	µg/L			10	
SW846 8270D\ SW846 8270 SIM						
Acenaphthene		µg/L	0.047	U	0.05	U
Acenaphthylene		µg/L	0.047	U	0.05	U
Anthracene		µg/L	0.047	U	0.05	U
Benzo(a)anthracene		µg/L	0.047	U	0.05	U
Benzo(a)pyrene	0.2	µg/L	0.047	U	0.05	U
Benzo(b)fluoranthene		µg/L	0.047	U	0.05	U
Benzo(ghi)perylene		µg/L	0.047	U	0.05	U
Benzo(k)fluoranthene		µg/L	0.047	U	0.05	U
Chrysene		µg/L	0.047	U	0.05	U
Dibenz(a,h)anthracene		µg/L	0.047	U	0.05	U
Fluoranthene		µg/L	0.047	U	0.05	U
Fluorene		µg/L	0.047	U	0.05	U
Indeno(1,2,3-cd)pyrene		µg/L	0.047	U	0.05	U
Naphthalene		µg/L	0.033	J	0.028	J
Pentachlorophenol	1	µg/L	0.94	UJ	0.1	U
Phenanthrene		µg/L	0.047	U	0.05	U
Pyrene		µg/L	0.047	U	0.05	U
SW846 8290						
1,2,3,4,6,7,8,9-OCDD		pg/L			253	J
1,2,3,4,6,7,8,9-OCDF		pg/L			12.8	J
1,2,3,4,6,7,8-HpCDD		pg/L			41.3	J
1,2,3,4,6,7,8-HpCDF		pg/L			6.12	J
1,2,3,4,7,8,9-HpCDF		pg/L			1.34	U
1,2,3,4,7,8-HxCDD		pg/L			1.78	J
1,2,3,4,7,8-HxCDF		pg/L			1.57	J
1,2,3,6,7,8-HxCDD		pg/L			2.29	J
1,2,3,6,7,8-HxCDF		pg/L			0.849	J
1,2,3,7,8,9-HxCDD		pg/L			1.41	J
1,2,3,7,8,9-HxCDF		pg/L			1.1	J
1,2,3,7,8-PeCDD		pg/L			0.93	U
1,2,3,7,8-PeCDF		pg/L			0.787	U
2,3,4,6,7,8-HxCDF		pg/L			0.925	J
2,3,4,7,8-PeCDF		pg/L			0.776	U
2,3,7,8-TCDD	30	pg/L			0.703	U
2,3,7,8-TCDF		pg/L			0.896	U
TEQ WHO2005 ND=0		pg/L			1.55	
Total Heptachlorodibenzofuran		pg/L			20	J
Total Heptachlorodibenzo-p-dioxin		pg/L			75.9	
Total Hexachlorodibenzofuran		pg/L			12.7	J
Total Hexachlorodibenzo-p-dioxin		pg/L			15.9	J
Total Pentachlorodibenzofuran		pg/L			0.782	U
Total Pentachlorodibenzo-p-dioxin		pg/L			0.93	U
Total Tetrachlorodibenzofuran		pg/L			0.896	U
Total Tetrachlorodibenzo-p-dioxin		pg/L			0.703	U
SW846 8330B						
2,4,6-Trinitrotoluene		µg/L	0.2	U	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U	0.2	U
Nitroglycerin		µg/L	1.5	U	1	U
High Performance Liquid Chromotography						
Nitroguanidine		µg/L	5	U	5	U

Table E2-54. Analytical Data Summary for Groundwater at EC-3

	Location Name		EC-03-04	
	Sample Date		10/2/15	
	Sample Name		EC-03-04-GW	
Analyte	MCL	Unit	Result	
SW846 6020A (Dissolved Fraction)				
Aluminum		mg/L	0.002	U
Cadmium	0.005	mg/L	0.001	U
Chromium	0.1	mg/L	0.00139	J
Cobalt		mg/L	0.00127	J
Lead	0.015	mg/L	0.001	U
Titanium		mg/L	0.000502	J
Zinc		mg/L	0.00217	J
SW846 6020A (Total Fraction)				
Aluminum		mg/L	0.0542	
Cadmium	0.005	mg/L	0.001	U
Chromium	0.1	mg/L	0.00157	J
Cobalt		mg/L	0.00139	J
Lead	0.015	mg/L	0.001	U
Titanium		mg/L	0.00151	J
Zinc		mg/L	0.0025	U
SW846 8015C				
Ethanol		µg/L	1000	U
Methanol		µg/L	1000	U
SW846 8260C				
2-Butanone		µg/L	1	UJ
Acetone		µg/L	2	UJ
Benzene	5	µg/L	0.5	UJ
Carbon tetrachloride	5	µg/L	0.5	UJ
Ethylbenzene	700	µg/L	0.5	UJ
Methylene chloride	5	µg/L	0.5	UJ
mp-Xylene		µg/L	1.5	UJ
o-Xylene		µg/L	0.5	UJ
Toluene	1000	µg/L	0.5	UJ

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Table E2-55. Analytical Data Summary for Groundwater at EC-21

		Location Name	EC-21-41	
		Sample Date	10/5/15	
		Sample Name	EC-21-41-GW	
Analyte	MCL	Unit	Result	
9056				
Chloride		mg/L	6.34	J
Nitrate	10	mg/L	0.505	
Sulfate		mg/L	16.9	
EPA 410.4				
Chemical Oxygen Demand (COD)		mg/L	10	U
SM202320B				
Alkalinity, Bicarbonate (As CaCO3)		mg/L	15.5	
Alkalinity, Carbonate (As CaCO3)		mg/L	5	U
Alkalinity, Hydroxide (As CaCO3)		mg/L	5	U
Alkalinity, Total as CaCO3		mg/L	15.5	
SM2340B				
Hardness		mg/L	18	
SM2540C				
Total Dissolved Solids		mg/L	92	
SM4500F				
Ammonia Nitrogen		mg/L	0.05	UJ
SW846 6020A (Dissolved Fraction)				
Aluminum		mg/L	0.104	J
Antimony	0.006	mg/L	0.001	U
Copper	1.3	mg/L	0.0027	J
Lead	0.015	mg/L	0.000976	J
Manganese		mg/L	0.202	
Zinc		mg/L	0.0415	
SW846 6020A\ SW846 7470A (Total Fraction)				
Aluminum		mg/L	0.156	
Antimony	0.006	mg/L	0.001	U
Arsenic	0.01	mg/L	0.000443	J
Barium	2	mg/L	0.0296	
Beryllium	0.004	mg/L	0.001	U
Cadmium	0.005	mg/L	0.00035	J
Calcium		mg/L	2.34	
Chromium	0.1	mg/L	0.000884	J
Cobalt		mg/L	0.00847	
Copper	1.3	mg/L	0.0018	J
Iron		mg/L	4.39	
Lead	0.015	mg/L	0.00171	J
Magnesium		mg/L	2.95	
Manganese		mg/L	0.29	
Mercury	0.002	mg/L	0.0001	U
Nickel		mg/L	0.0186	
Potassium		mg/L	1.1	
Selenium	0.05	mg/L	0.0025	U
Silver		mg/L	0.001	U
Sodium		mg/L	5.33	
Thallium	0.002	mg/L	0.001	U
Vanadium		mg/L	0.000978	J
Zinc		mg/L	0.0495	
SW846 8082A				
Aroclor 1016		µg/L	0.25	U
Aroclor 1221		µg/L	0.25	U
Aroclor 1232		µg/L	0.25	U
Aroclor 1242		µg/L	0.25	U
Aroclor 1248		µg/L	0.25	U
Aroclor 1254		µg/L	0.25	U
Aroclor 1260		µg/L	0.25	U
SW846 8260C				
1,1,1,2-Tetrachloroethane		µg/L	0.5	U
1,1,1-Trichloroethane	200	µg/L	0.5	U
1,1,2,2-Tetrachloroethane		µg/L	0.5	U
1,1,2-Trichloroethane	5	µg/L	0.5	U
1,1-Dichloroethane		µg/L	0.5	U
1,1-Dichloroethene	7	µg/L	0.5	U
1,2,3-Trichloropropane		µg/L	0.5	U
1,2-Dibromo-3-chloropropane	0.2	µg/L	1	U
1,2-Dibromoethane	0.05	µg/L	0.5	U
1,2-Dichlorobenzene	600	µg/L	0.5	U
1,2-Dichloroethane	5	µg/L	0.5	U
1,2-Dichloropropane	5	µg/L	0.5	U
1,4-Dichlorobenzene	75	µg/L	0.5	U
2-Butanone		µg/L	1	U
2-Hexanone		µg/L	1	U
4-Methyl-2-pentanone		µg/L	1	U
Acetone		µg/L	2	U
Acrylonitrile		µg/L	1	U
Benzene	5	µg/L	0.5	U
Bromochloromethane		µg/L	0.5	U
Bromodichloromethane	80	µg/L	0.5	U
Bromoform	80	µg/L	0.5	U

Table E2-55. Analytical Data Summary for Groundwater at EC-21

		Location Name	EC-21-41	
		Sample Date	10/5/15	
		Sample Name	EC-21-41-GW	
Analyte	MCL	Unit	Result	
Bromomethane		µg/L	0.5	U
Carbon disulfide		µg/L	1	U
Carbon tetrachloride	5	µg/L	0.5	U
Chlorobenzene	100	µg/L	0.5	U
Chloroethane		µg/L	0.5	U
Chloroform	80	µg/L	0.5	UJ
Chloromethane		µg/L	0.5	U
cis-1,2-Dichloroethene	70	µg/L	0.5	U
cis-1,3-Dichloropropene		µg/L	0.5	U
Dibromochloromethane	80	µg/L	0.5	U
Dibromomethane		µg/L	0.5	U
Ethylbenzene	700	µg/L	0.5	U
Iodomethane		µg/L	2	U
Methyl tert-butyl ether		µg/L	0.5	U
Methylene chloride	5	µg/L	0.5	U
Styrene	100	µg/L	0.5	U
Tetrachloroethene	5	µg/L	0.5	U
Toluene	1000	µg/L	0.5	U
trans-1,2-Dichloroethene	100	µg/L	0.5	U
trans-1,3-Dichloropropene		µg/L	0.5	U
trans-1,4-Dichloro-2-butene		µg/L	1	U
Trichloroethene	5	µg/L	0.5	U
Trichlorofluoromethane		µg/L	0.5	U
Vinyl Acetate		µg/L	1	U
Vinyl chloride	2	µg/L	0.5	U
Xylenes (total)	10000	µg/L	1.5	U
SW846 8270D				
Acenaphthene		µg/L	0.31	
Acenaphthylene		µg/L	0.023	J
Anthracene		µg/L	0.27	
Benzo(a)anthracene		µg/L	0.23	
Benzo(a)pyrene	0.2	µg/L	0.18	
Benzo(b)fluoranthene		µg/L	0.27	
Benzo(ghi)perylene		µg/L	0.13	
Benzo(k)fluoranthene		µg/L	0.11	
Chrysene		µg/L	0.24	
Dibenz(a,h)anthracene		µg/L	0.05	U
Fluoranthene		µg/L	0.71	
Fluorene		µg/L	0.5	
Indeno(1,2,3-cd)pyrene		µg/L	0.19	
Naphthalene		µg/L	1.7	
Phenanthrene		µg/L	1.6	
Pyrene		µg/L	0.55	
SW846 8290				
1,2,3,4,6,7,8,9-OCDD		pg/L	154	J
1,2,3,4,6,7,8,9-OCDF		pg/L	15.5	J
1,2,3,4,6,7,8-HpCDD		pg/L	46.3	J
1,2,3,4,6,7,8-HpCDF		pg/L	8.74	J
1,2,3,4,7,8,9-HpCDF		pg/L	2.07	J
1,2,3,4,7,8-HxCDD		pg/L	0.507	U
1,2,3,4,7,8-HxCDF		pg/L	2.18	J
1,2,3,6,7,8-HxCDD		pg/L	6.62	J
1,2,3,6,7,8-HxCDF		pg/L	1.37	J
1,2,3,7,8,9-HxCDD		pg/L	1.97	J
1,2,3,7,8,9-HxCDF		pg/L	0.748	U
1,2,3,7,8-PeCDD		pg/L	1.68	U
1,2,3,7,8-PeCDF		pg/L	0.79	U
2,3,4,6,7,8-HxCDF		pg/L	0.672	U
2,3,4,7,8-PeCDF		pg/L	0.691	U
2,3,7,8-TCDD	30	pg/L	1.75	U
2,3,7,8-TCDF		pg/L	4.01	U
TEQ WHO2005 ND=0		pg/L	1.84	
Total Heptachlorodibenzofuran		pg/L	25.8	
Total Heptachlorodibenzo-p-dioxin		pg/L	77.9	
Total Hexachlorodibenzofuran		pg/L	8.03	J
Total Hexachlorodibenzo-p-dioxin		pg/L	0.512	U
Total Pentachlorodibenzofuran		pg/L	0.738	U
Total Pentachlorodibenzo-p-dioxin		pg/L	1.68	U
Total Tetrachlorodibenzofuran		pg/L	4.01	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	1.75	U
SW846 8330B				
2,4,6-Trinitrotoluene		µg/L	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U
Nitroglycerin		µg/L	1	U

Table E2-55. Analytical Data Summary for Groundwater at EC-21

		Location Name	EC-21-41	
		Sample Date	10/5/15	
		Sample Name	EC-21-41-GW	
Analyte	MCL	Unit	Result	
SW846 9040C				
pH		su	5.72	J
Temperature Celcius		su	20	J
SW846 9050A				
Specific Conductance		umhos/cm	91.7	J
High Performance Liquid Chromotography				
Nitroguanidine		µg/L	25	UJ

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Table E2-56. Analytical Data Summary for Groundwater at EC-22

		Location Name	EC-22-06	
		Sample Date	10/7/15	
		Sample Name	EC-22-06-GW	
Analyte	MCL	Unit	Result	
SW846 6020A (Dissolved Fraction)				
Aluminum		mg/L	0.283	J
Antimony	0.006	mg/L	0.001	UJ
Copper	1.3	mg/L	0.00219	J
Lead	0.015	mg/L	0.001	UJ
Manganese		mg/L	0.292	
Zinc		mg/L	0.0316	J
SW846 6020A (Total Fraction)				
Aluminum		mg/L	0.306	J
Antimony	0.006	mg/L	0.001	UJ
Copper	1.3	mg/L	0.00185	J
Lead	0.015	mg/L	0.001	UJ
Manganese		mg/L	0.245	
Zinc		mg/L	0.0269	J
SW846 8082A				
Aroclor 1016		µg/L	0.25	U
Aroclor 1221		µg/L	0.25	U
Aroclor 1232		µg/L	0.25	U
Aroclor 1242		µg/L	0.25	U
Aroclor 1248		µg/L	0.25	U
Aroclor 1254		µg/L	0.25	U
Aroclor 1260		µg/L	0.25	U
SW846 8270D				
Acenaphthene		µg/L	0.05	UJ
Acenaphthylene		µg/L	0.05	U
Anthracene		µg/L	0.05	U
Benzo(a)anthracene		µg/L	0.05	U
Benzo(a)pyrene	0.2	µg/L	0.05	U
Benzo(b)fluoranthene		µg/L	0.05	U
Benzo(ghi)perylene		µg/L	0.05	U
Benzo(k)fluoranthene		µg/L	0.05	U
Chrysene		µg/L	0.05	U
Dibenz(a,h)anthracene		µg/L	0.05	U
Fluoranthene		µg/L	0.05	U
Fluorene		µg/L	0.05	UJ
Indeno(1,2,3-cd)pyrene		µg/L	0.05	U
Naphthalene		µg/L	0.05	U
Phenanthrene		µg/L	0.05	U
Pyrene		µg/L	0.05	U
SW846 8290				
1,2,3,4,6,7,8,9-OCDD		pg/L	145	J
1,2,3,4,6,7,8,9-OCDF		pg/L	14.7	J
1,2,3,4,6,7,8-HpCDD		pg/L	46.4	J
1,2,3,4,6,7,8-HpCDF		pg/L	6.46	J
1,2,3,4,7,8,9-HpCDF		pg/L	1.21	U

Table E2-56. Analytical Data Summary for Groundwater at EC-22

		Location Name	EC-22-06	
		Sample Date	10/7/15	
		Sample Name	EC-22-06-GW	
Analyte	MCL	Unit	Result	
1,2,3,4,7,8-HxCDD		pg/L	1.91	J
1,2,3,4,7,8-HxCDF		pg/L	1.45	J
1,2,3,6,7,8-HxCDD		pg/L	3.01	J
1,2,3,6,7,8-HxCDF		pg/L	0.508	U
1,2,3,7,8,9-HxCDD		pg/L	0.973	U
1,2,3,7,8,9-HxCDF		pg/L	1.52	J
1,2,3,7,8-PeCDD		pg/L	1.63	U
1,2,3,7,8-PeCDF		pg/L	2.4	U
2,3,4,6,7,8-HxCDF		pg/L	2.59	J
2,3,4,7,8-PeCDF		pg/L	2.27	U
2,3,7,8-TCDD	30	pg/L	1.31	U
2,3,7,8-TCDF		pg/L	4.32	U
TEQ WHO2005 ND=0		pg/L	1.62	
Total Heptachlorodibenzofuran		pg/L	1.19	U
Total Heptachlorodibenzo-p-dioxin		pg/L	1.44	U
Total Hexachlorodibenzofuran		pg/L	3.91	J
Total Hexachlorodibenzo-p-dioxin		pg/L	1.03	U
Total Pentachlorodibenzofuran		pg/L	2.33	U
Total Pentachlorodibenzo-p-dioxin		pg/L	1.63	U
Total Tetrachlorodibenzofuran		pg/L	4.32	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	1.31	U
SW846 8330B				
2,4,6-Trinitrotoluene		µg/L	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U

Table E2-57. Analytical Data Summary for Groundwater at EC-25

		Location Name	EC-25-29	
		Sample Date	9/30/15	
		Sample Name	EC-25-29-GW	
Analyte	MCL	Unit	Result	
EPA 6850				
Perchlorate	15	µg/L	4	U
SW846 6020A (Dissoloved Fraction)				
Aluminum		mg/L	0.002	UJ
Antimony	0.006	mg/L	0.001	U
Copper	1.3	mg/L	0.001	U
Lead	0.015	mg/L	0.001	UJ
Manganese		mg/L	0.0643	
Zinc		mg/L	0.00384	J
SW846 6020A (Total Fraction)				
Aluminum		mg/L	0.028	J
Antimony	0.006	mg/L	0.001	UJ
Copper	1.3	mg/L	0.001	UJ
Lead	0.015	mg/L	0.001	UJ
Manganese		mg/L	0.0627	
Zinc		mg/L	0.00415	J
SW846 8082A				
Aroclor 1016		µg/L	0.25	U
Aroclor 1221		µg/L	0.25	U
Aroclor 1232		µg/L	0.25	U
Aroclor 1242		µg/L	0.25	U
Aroclor 1248		µg/L	0.25	U
Aroclor 1254		µg/L	0.25	U
Aroclor 1260		µg/L	0.25	U
SW846 8270D				
Acenaphthene		µg/L	0.05	U
Acenaphthylene		µg/L	0.05	U
Anthracene		µg/L	0.018	J
Benzo(a)anthracene		µg/L	0.028	J
Benzo(a)pyrene	0.2	µg/L	0.025	J
Benzo(b)fluoranthene		µg/L	0.028	J
Benzo(ghi)perylene		µg/L	0.05	U
Benzo(k)fluoranthene		µg/L	0.05	U
Chrysene		µg/L	0.024	J
Dibenz(a,h)anthracene		µg/L	0.02	J
Fluoranthene		µg/L	0.039	J
Fluorene		µg/L	0.05	U
Indeno(1,2,3-cd)pyrene		µg/L	0.035	J
Naphthalene		µg/L	0.025	J
Phenanthrene		µg/L	0.034	J
Pyrene		µg/L	0.04	J
SW846 8290				
1,2,3,4,6,7,8,9-OCDD		pg/L	171	J
1,2,3,4,6,7,8,9-OCDF		pg/L	14.9	J
1,2,3,4,6,7,8-HpCDD		pg/L	36.8	J

Table E2-57. Analytical Data Summary for Groundwater at EC-25

	Location Name		EC-25-29	
	Sample Date		9/30/15	
	Sample Name		EC-25-29-GW	
Analyte	MCL	Unit	Result	
1,2,3,4,6,7,8-HpCDF		pg/L	7.95	J
1,2,3,4,7,8,9-HpCDF		pg/L	0.935	J
1,2,3,4,7,8-HxCDD		pg/L	3.62	J
1,2,3,4,7,8-HxCDF		pg/L	1.3	J
1,2,3,6,7,8-HxCDD		pg/L	2.43	J
1,2,3,6,7,8-HxCDF		pg/L	0.591	U
1,2,3,7,8,9-HxCDD		pg/L	0.695	U
1,2,3,7,8,9-HxCDF		pg/L	0.743	U
1,2,3,7,8-PeCDD		pg/L	0.949	U
1,2,3,7,8-PeCDF		pg/L	0.685	U
2,3,4,6,7,8-HxCDF		pg/L	0.624	U
2,3,4,7,8-PeCDF		pg/L	0.63	U
2,3,7,8-TCDD	30	pg/L	1.67	U
2,3,7,8-TCDF		pg/L	3.37	U
TEQ WHO2005 ND=0		pg/L	1.25	
Total Heptachlorodibenzofuran		pg/L	0.586	U
Total Heptachlorodibenzo-p-dioxin		pg/L	68.3	
Total Hexachlorodibenzofuran		pg/L	0.646	U
Total Hexachlorodibenzo-p-dioxin		pg/L	0.735	U
Total Pentachlorodibenzofuran		pg/L	0.656	U
Total Pentachlorodibenzo-p-dioxin		pg/L	0.949	U
Total Tetrachlorodibenzofuran		pg/L	3.37	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	1.67	U
SW846 8330B				
2,4,6-Trinitrotoluene		µg/L	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U

Table E2-58. Analytical Data Summary for Groundwater at EC-27

	Location Name		EC-27-03	
	Sample Date		10/2/15	
	Sample Name		EC-27-03-GW	
Analyte	MCL	Unit	Result	
SW846 6020A (Dissoloved Fraction)				
Aluminum		mg/L	0.0211	
Cadmium	0.005	mg/L	0.001	U
Chromium	0.1	mg/L	0.001	U
Cobalt		mg/L	0.0012	J
Lead	0.015	mg/L	0.001	U
Titanium		mg/L	0.002	U
Zinc		mg/L	0.00376	J
SW846 6020A (Total Fraction)				
Aluminum		mg/L	0.292	
Cadmium	0.005	mg/L	0.001	U
Chromium	0.1	mg/L	0.00143	J
Cobalt		mg/L	0.00149	J
Lead	0.015	mg/L	0.001	U
Titanium		mg/L	0.00284	J
Zinc		mg/L	0.0112	
SW846 8015C				
Ethanol		µg/L	1000	U
Methanol		µg/L	1000	U
SW846 8260C				
2-Butanone		µg/L	1	U
Acetone		µg/L	2	U
Benzene	5	µg/L	0.5	U
Carbon tetrachloride	5	µg/L	0.5	U
Ethylbenzene	700	µg/L	0.5	U
Methylene chloride	5	µg/L	0.5	U
mp-Xylene		µg/L	1	U
Naphthalene		µg/L	0.5	U
o-Xylene		µg/L	0.5	U
Tetrachloroethene	5	µg/L	0.5	U
Toluene	1000	µg/L	0.5	U
Trichloroethene	5	µg/L	0.5	U
SW846 8270D				
Naphthalene		µg/L	0.05	U

Table E2-59. Analytical Data Summary for Groundwater at EC-28

Location Name			EC-28-16		EC-28-17	
Sample Date			10/6/15		10/6/15	
Sample Name			EC-28-16-GW		EC-28-17-GW	
Analyte	MCL	Unit	Result		Result	
SW846 6020A\ E218.6 (Dissolved Fraction)						
Aluminum		mg/L	0.002	U	0.002	U
Arsenic	0.01	mg/L	0.000815	J	0.00192	J
Cadmium	0.005	mg/L	0.001	U	0.001	U
Chromium	0.1	mg/L	0.001	U	0.001	U
Chromium, Hexavalent		µg/L	4	U	4	U
Cobalt		mg/L	0.0015	J	0.00497	J
Copper	1.3	mg/L	0.001	U	0.001	U
Lead	0.015	mg/L	0.001	U	0.001	U
Nickel		mg/L	0.00219	J	0.00738	
Titanium		mg/L	0.002	U	0.002	U
Zinc		mg/L	0.00508		0.0165	
SW846 6020A\ E218.6 (Total Fraction)						
Aluminum		mg/L	0.104		0.14	
Arsenic	0.01	mg/L	0.000881	J	0.00209	J
Cadmium	0.005	mg/L	0.001	U	0.001	U
Chromium	0.1	mg/L	0.000426	J	0.000582	J
Chromium, Hexavalent		µg/L	4	U	4	U
Cobalt		mg/L	0.00148	J	0.00484	J
Copper	1.3	mg/L	0.001	U	0.00117	J
Lead	0.015	mg/L	0.001	UJ	0.001	UJ
Nickel		mg/L	0.00202	J	0.00718	
Titanium		mg/L	0.00116	J	0.00167	J
Zinc		mg/L	0.00513		0.0163	
SW846 8015C						
Ethanol		µg/L	1000	U	1000	U
Methanol		µg/L	1000	U	1000	U
SW846 8082A						
Aroclor 1016		µg/L	0.25	U	0.25	U
Aroclor 1221		µg/L	0.25	U	0.25	U
Aroclor 1232		µg/L	0.25	U	0.25	U
Aroclor 1242		µg/L	0.25	U	0.25	U
Aroclor 1248		µg/L	0.25	U	0.25	U
Aroclor 1254		µg/L	0.25	U	0.25	U
Aroclor 1260		µg/L	0.25	U	0.25	U
SW846 8260C						
2-Butanone		µg/L	1	U	1	U
Acetone		µg/L	2	U	2	U
Benzene	5	µg/L	0.5	U	0.5	U
Carbon tetrachloride	5	µg/L	0.5	U	0.5	U
Ethylbenzene	700	µg/L	0.5	U	0.5	U
Methylene chloride	5	µg/L	0.5	U	0.5	U
mp-Xylene		µg/L	1	U	1	U
o-Xylene		µg/L	0.5	U	0.5	U
Toluene	1000	µg/L	0.5	U	0.5	U

Table E2-59. Analytical Data Summary for Groundwater at EC-28

Location Name			EC-28-16		EC-28-17	
Sample Date			10/6/15		10/6/15	
Sample Name			EC-28-16-GW		EC-28-17-GW	
Analyte	MCL	Unit	Result		Result	
SW846 8270D						
Naphthalene		µg/L	0.05	U	0.05	U
Pentachlorophenol	1	µg/L	0.1	U	0.1	U
SW846 8330B						
2,4,6-Trinitrotoluene		µg/L	0.2	U	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U	0.2	U

Table E2-60. Analytical Data Summary for Groundwater at EC-29

	Location Name		EC-29-01		EC-29-11	
	Sample Date		8/30/13		10/6/15	
	Sample Name		EC-29-2-GW		EC-29-11-GW	
Analyte	MCL	Unit	Result		Result	
SW846 6020A (Dissolved Fraction)						
Aluminum		mg/L			0.002	U
Cadmium	0.005	mg/L			0.001	U
Chromium	0.1	mg/L			0.000577	J
Cobalt		mg/L			0.00134	J
Lead	0.015	mg/L			0.001	U
Titanium		mg/L			0.002	U
Zinc		mg/L			0.00718	
SW846 6020A (Total Fraction)						
Aluminum		mg/L	0.16		0.002	U
Cadmium	0.005	mg/L	0.0011	U	0.001	U
Chromium	0.1	mg/L	0.0026		0.000702	J
Cobalt		mg/L	0.013		0.00135	J
Lead	0.015	mg/L	0.0022	U	0.001	UJ
Titanium		mg/L	0.0056	U	0.002	U
Zinc		mg/L	0.047		0.00653	
SW846 8015C						
Ethanol		mg/L	1	U		
Ethanol		µg/L			1000	U
Methanol		mg/L	1	U		
Methanol		µg/L			1000	U
SW846 8082A						
Aroclor 1016		µg/L	0.94	U		
Aroclor 1221		µg/L	0.94	U		
Aroclor 1232		µg/L	0.94	U		
Aroclor 1242		µg/L	0.94	U		
Aroclor 1248		µg/L	0.94	U		
Aroclor 1254		µg/L	0.94	U		
Aroclor 1260		µg/L	0.94	U	0.25	U
SW846 8151A						
2,4,5-T		µg/L	0.19	U	0.1	U
2,4,5-TP	50	µg/L	0.19	U	0.1	U
2,4-D	70	µg/L	0.19	U	0.1	U
2,4-DB		µg/L	0.19	U	0.1	U
Dalapon	200	µg/L	0.19	U	0.1	U
Dicamba		µg/L	0.19	U	0.1	U
Dichloroprop		µg/L	0.19	U	1.01	J
Dinoseb	7	µg/L	0.65	U	0.1	U
MCPA		µg/L	37.2	U	10	U
MCPP		µg/L	37.2	U	10	U
Pentachlorophenol	1	µg/L	0.19	U		
SW846 8260B						
2-Butanone		µg/L	5	U		
Acetone		µg/L	5	U		
Benzene	5	µg/L	1	U		

Table E2-60. Analytical Data Summary for Groundwater at EC-29

	Location Name		EC-29-01		EC-29-11	
	Sample Date		8/30/13		10/6/15	
	Sample Name		EC-29-2-GW		EC-29-11-GW	
Analyte	MCL	Unit	Result		Result	
Carbon tetrachloride	5	µg/L	1	U		
Ethylbenzene	700	µg/L	1	U		
Methylene chloride	5	µg/L	1	U		
Naphthalene		µg/L	1	U		
Tetrachloroethene	5	µg/L	1	U		
Toluene	1000	µg/L	1	U		
Trichloroethene	5	µg/L	1	U		
Xylenes (total)	10000	µg/L	3	U		
SW846 8260C						
2-Butanone		µg/L			1	U
Acetone		µg/L			2	U
Benzene	5	µg/L			0.5	U
Carbon tetrachloride	5	µg/L			0.5	U
Ethylbenzene	700	µg/L			0.5	U
Methylene chloride	5	µg/L			0.5	U
mp-Xylene		µg/L			1	U
Naphthalene		µg/L			0.5	U
o-Xylene		µg/L			0.5	U
Tetrachloroethene	5	µg/L			0.5	U
Toluene	1000	µg/L			0.5	U
Trichloroethene	5	µg/L			0.5	U
SW846 8270D						
Naphthalene		µg/L			0.05	U

Table E2-61. Analytical Data Summary for Groundwater at EC-30

	Location Name		EC-30-02		EC-30-04	
	Sample Date		8/30/13		9/3/13	
	Sample Name		EC-30-1-GW		EC-30 -2-GW	
Analyte	MCL	Unit	Result		Result	
SW846 6020A						
Lead	0.015	mg/L	0.0042		0.0016	J
SW846 8015C						
Ethanol		mg/L	1	U	1	U
Methanol		mg/L	1	U	1	U
SW846 8260B						
2-Butanone		µg/L	5	U	5	U
Acetone		µg/L	5	U	5	U
Benzene	5	µg/L	1	U	1	U
Carbon tetrachloride	5	µg/L	1	U	1	U
Ethylbenzene	700	µg/L	1	U	1	U
Methylene chloride	5	µg/L	1	U	1	U
Naphthalene		µg/L	1	U	1	U
Tetrachloroethene	5	µg/L	1	U	1	U
Toluene	1000	µg/L	1	U	1	U
Trichloroethene	5	µg/L	1	U	1	U
Xylenes (total)	10000	µg/L	3	U	3	U

Table E2-62. Analytical Data Summary for Groundwater at EC-31

	Location Name		EC-31-06	
	Sample Date		10/7/15	
	Sample Name		EC-31-06-GW	
Analyte	MCL	Unit	Result	
SW846 6020A\ E218.6 (Dissolved Fraction)				
Aluminum		mg/L	0.0208	J
Arsenic	0.01	mg/L	0.001	UJ
Cadmium	0.005	mg/L	0.001	UJ
Chromium	0.1	mg/L	0.001	UJ
Chromium, Hexavalent		µg/L	4	UJ
Cobalt		mg/L	0.00915	
Copper	1.3	mg/L	0.001	UJ
Lead	0.015	mg/L	0.001	UJ
Nickel		mg/L	0.0148	J
Titanium		mg/L	0.002	UJ
Zinc		mg/L	0.0193	J
SW846 6020A\ E218.6 (Total Fraction)				
Aluminum		mg/L	0.18	J
Arsenic	0.01	mg/L	0.000792	J
Cadmium	0.005	mg/L	0.001	UJ
Chromium	0.1	mg/L	0.000668	J
Chromium, Hexavalent		µg/L	4	UJ
Cobalt		mg/L	0.00815	J
Copper	1.3	mg/L	0.00224	J
Lead	0.015	mg/L	0.001	UJ
Nickel		mg/L	0.012	J
Titanium		mg/L	0.00297	J
Zinc		mg/L	0.0159	J
SW846 8015C				
Ethanol		µg/L	1000	U
Methanol		µg/L	1000	U
SW846 8082A				
Aroclor 1016		µg/L	0.25	U
Aroclor 1221		µg/L	0.25	U
Aroclor 1232		µg/L	0.25	U
Aroclor 1242		µg/L	0.25	U
Aroclor 1248		µg/L	0.25	U
Aroclor 1254		µg/L	0.25	U
Aroclor 1260		µg/L	0.25	U
SW846 8260C				
2-Butanone		µg/L	1	U
Acetone		µg/L	2	U
Benzene	5	µg/L	0.5	U
Carbon tetrachloride	5	µg/L	0.5	U
Ethylbenzene	700	µg/L	0.5	U
Methylene chloride	5	µg/L	0.5	U
mp-Xylene		µg/L	1	U
o-Xylene		µg/L	0.5	U
Toluene	1000	µg/L	0.5	U

Table E2-62. Analytical Data Summary for Groundwater at EC-31

	Location Name		EC-31-06	
	Sample Date		10/7/15	
	Sample Name		EC-31-06-GW	
Analyte	MCL	Unit	Result	
SW846 8270D				
Naphthalene		µg/L	0.05	U
Pentachlorophenol	1	µg/L	0.1	U

Table E2-63. Analytical Data Summary for Groundwater at EC-32

	Location Name		EC-32-07-GW	
	Sample Date		10/7/15	
	Sample Name		EC-32-07-GW	
Analyte	MCL	Unit	Result	
SW846 6020A\ E218.6 (Dissolved Fraction)				
Arsenic	0.01	mg/L	0.000802	J
Chromium, Hexavalent		µg/L	4	UJ
Copper	1.3	mg/L	0.001	UJ
Nickel		mg/L	0.0131	J
Zinc		mg/L	0.0149	J
SW846 6020A\ E218.6 (Total Fraction)				
Arsenic	0.01	mg/L	0.000987	J
Chromium, Hexavalent		µg/L	4	UJ
Copper	1.3	mg/L	0.00132	J
Nickel		mg/L	0.0114	J
Zinc		mg/L	0.014	J
SW846 8270D				
Acenaphthene		µg/L	0.05	UJ
Acenaphthylene		µg/L	0.05	U
Anthracene		µg/L	0.05	U
Benzo(a)anthracene		µg/L	0.05	U
Benzo(a)pyrene	0.2	µg/L	0.05	U
Benzo(b)fluoranthene		µg/L	0.05	U
Benzo(ghi)perylene		µg/L	0.05	U
Benzo(k)fluoranthene		µg/L	0.05	U
Chrysene		µg/L	0.05	U
Dibenz(a,h)anthracene		µg/L	0.05	U
Fluoranthene		µg/L	0.05	U
Fluorene		µg/L	0.05	UJ
Indeno(1,2,3-cd)pyrene		µg/L	0.05	U
Naphthalene		µg/L	0.037	J
Pentachlorophenol	1	µg/L	0.1	U
Phenanthrene		µg/L	0.05	U
Pyrene		µg/L	0.05	U

Table E2-64. Analytical Data Summary for Groundwater at EC-33

	Location Name		EC-33-02		EC-33-09	
	Sample Date		9/3/13		10/2/15	
	Sample Name		EC-33-2-GW		EC-33-09-GW	
Analyte	MCL	Unit	Result		Result	
SW846 6020A\ E218.6 (Dissolved Fraction)						
Arsenic	0.01	mg/L			0.00181	J
Chromium, Hexavalent*		µg/L			4	UJ
Copper	1.3	mg/L			0.001	U
Nickel		mg/L			0.00245	J
Zinc		mg/L			0.00629	
SW846 6020A\ E218.6 (Total Fraction)						
Arsenic	0.01	mg/L	0.003	U	0.00203	J
Chromium, Hexavalent*		µg/L			4	U
Copper	1.3	mg/L	0.003	B	0.001	U
Nickel		mg/L	0.0056	U	0.00213	J
Zinc		mg/L	0.023	B	0.00587	
SW846 7196A						
Chromium, Hexavalent		mg/L	0.01	U		
SW846 8270 SIM						
Acenaphthene		µg/L	0.047	U		
Acenaphthylene		µg/L	0.047	U		
Anthracene		µg/L	0.047	U		
Benzo(a)anthracene		µg/L	0.047	U		
Benzo(a)pyrene	0.2	µg/L	0.047	U		
Benzo(b)fluoranthene		µg/L	0.047	U		
Benzo(ghi)perylene		µg/L	0.047	U		
Benzo(k)fluoranthene		µg/L	0.047	U		
Chrysene		µg/L	0.047	U		
Dibenz(a,h)anthracene		µg/L	0.047	U		
Fluoranthene		µg/L	0.047	U		
Fluorene		µg/L	0.047	U		
Indeno(1,2,3-cd)pyrene		µg/L	0.047	U		
Naphthalene		µg/L	0.047	U		
Pentachlorophenol	1	µg/L	0.95	U		
Phenanthrene		µg/L	0.047	U		
Pyrene		µg/L	0.047	U		

Table E2-64. Analytical Data Summary for Groundwater at EC-33

	Location Name		EC-33-02		EC-33-09	
	Sample Date		9/3/13		10/2/15	
	Sample Name		EC-33-2-GW		EC-33-09-GW	
Analyte	MCL	Unit	Result		Result	
SW846 8270D						
Acenaphthene		µg/L			0.05	U
Acenaphthylene		µg/L			0.05	U
Anthracene		µg/L			0.05	U
Benzo(a)anthracene		µg/L			0.05	U
Benzo(a)pyrene	0.2	µg/L			0.05	U
Benzo(b)fluoranthene		µg/L			0.05	U
Benzo(ghi)perylene		µg/L			0.05	U
Benzo(k)fluoranthene		µg/L			0.05	U
Chrysene		µg/L			0.05	U
Dibenz(a,h)anthracene		µg/L			0.05	U
Fluoranthene		µg/L			0.05	U
Fluorene		µg/L			0.05	U
Indeno(1,2,3-cd)pyrene		µg/L			0.05	U
Naphthalene		µg/L			0.026	J
Pentachlorophenol	1	µg/L	15.2	U	0.1	U
Phenanthrene		µg/L			0.05	U
Pyrene		µg/L			0.05	U

* Chromium, Hexavalent was re-sampled from location EC-33-09-GW on 10/8/15 due to exceedance of sample holding time on the original sample.

Table E2-65. Analytical Data Summary for Groundwater at EC-34 and EC-57B

	Location Name		EC-34-04	
	Sample Date		9/30/15	
	Sample Name		EC-34-04-GW	
Analyte	MCL	Unit	Result	
SW846 8260C				
Benzene	5	µg/L	0.5	U
Ethylbenzene	700	µg/L	0.5	U
mp-Xylene		µg/L	1.5	U
o-Xylene		µg/L	0.5	U
Toluene	1000	µg/L	0.5	U
SW846 8270D				
Acenaphthene		µg/L	0.05	U
Acenaphthylene		µg/L	0.05	U
Anthracene		µg/L	0.05	U
Benzo(a)anthracene		µg/L	0.05	U
Benzo(a)pyrene	0.2	µg/L	0.05	U
Benzo(b)fluoranthene		µg/L	0.05	U
Benzo(ghi)perylene		µg/L	0.05	U
Benzo(k)fluoranthene		µg/L	0.05	U
Chrysene		µg/L	0.05	U
Dibenz(a,h)anthracene		µg/L	0.05	U
Fluoranthene		µg/L	0.05	U
Fluorene		µg/L	0.021	J
Indeno(1,2,3-cd)pyrene		µg/L	0.05	U
Naphthalene		µg/L	0.13	
Phenanthrene		µg/L	0.025	J
Pyrene		µg/L	0.05	U
SW846 8290				
1,2,3,4,6,7,8,9-OCDD		pg/L	181	J
1,2,3,4,6,7,8,9-OCDF		pg/L	24.5	J
1,2,3,4,6,7,8-HpCDD		pg/L	47.5	J
1,2,3,4,6,7,8-HpCDF		pg/L	6.36	J
1,2,3,4,7,8,9-HpCDF		pg/L	1.45	U
1,2,3,4,7,8-HxCDD		pg/L	2.15	U
1,2,3,4,7,8-HxCDF		pg/L	1.72	U
1,2,3,6,7,8-HxCDD		pg/L	5.04	J
1,2,3,6,7,8-HxCDF		pg/L	1.6	U
1,2,3,7,8,9-HxCDD		pg/L	2.12	U
1,2,3,7,8,9-HxCDF		pg/L	2.13	U
1,2,3,7,8-PeCDD		pg/L	4.63	J
1,2,3,7,8-PeCDF		pg/L	2.42	U
2,3,4,6,7,8-HxCDF		pg/L	1.67	U
2,3,4,7,8-PeCDF		pg/L	4.29	J
2,3,7,8-TCDD	30	pg/L	4.15	U
2,3,7,8-TCDF		pg/L	2.72	U
TEQ WHO2005 ND=0		pg/L	7.02	
Total Heptachlorodibenzofuran		pg/L	17	J
Total Heptachlorodibenzo-p-dioxin		pg/L	1.55	U
Total Hexachlorodibenzofuran		pg/L	1.76	U

Table E2-65. Analytical Data Summary for Groundwater at EC-34 and EC-57B

	Location Name		EC-34-04	
	Sample Date		9/30/15	
	Sample Name		EC-34-04-GW	
Analyte	MCL	Unit	Result	
Total Hexachlorodibenzo-p-dioxin		pg/L	2.24	U
Total Pentachlorodibenzofuran		pg/L	2.21	U
Total Pentachlorodibenzo-p-dioxin		pg/L	2.91	U
Total Tetrachlorodibenzofuran		pg/L	2.72	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	4.15	U
SW846 8330B				
2,4,6-Trinitrotoluene		µg/L	0.23	U
2,4-Dinitrotoluene		µg/L	0.23	U
2,6-Dinitrotoluene		µg/L	0.23	U
Nitroglycerin		µg/L	1.2	U
High Performance Liquid Chromotography				
Nitroguanidine		µg/L	5	U

Table E2-66. Analytical Data Summary for Groundwater at EC-35

	Location Name		EC-35-02	
	Sample Date		7/22/13	
	Sample Name		EC-35-1-GW	
Analyte	MCL	Unit	Result	
SW846 8260B				
Benzene	5	µg/L	1	U
Ethylbenzene	700	µg/L	1	U
Naphthalene		µg/L	1	U
Toluene	1000	µg/L	1	U
Xylenes (total)	10000	µg/L	3	U

Table E2-67. Analytical Data Summary for Groundwater at EC-36

	Location Name		EC-36-03		EC-36-06	
	Sample Date		8/26/13		8/26/13	
	Sample Name		EC-36-2-GW		EC-36-1-GW	
Analyte	MCL	Unit	Result		Result	
SW846 6020A (Total Fraction)						
Arsenic	0.01	mg/L	0.003	U	0.0024	
Cadmium	0.005	mg/L	0.0011	U	0.0011	U
Chromium	0.1	mg/L	0.0091		0.012	
Copper	1.3	mg/L	0.0048		0.0057	
Lead	0.015	mg/L	0.007		0.0075	
Zinc		mg/L	0.018		0.025	
SW846 7470A						
Mercury	0.002	mg/L	0.0005	U	0.0005	U
SW846 8270 SIM						
Acenaphthene		µg/L	0.047	U	0.047	U
Acenaphthylene		µg/L	0.047	U	0.047	U
Anthracene		µg/L	0.018		0.047	U
Benzo(a)anthracene		µg/L	0.047	U	0.047	U
Benzo(a)pyrene	0.2	µg/L	0.047	U	0.047	U
Benzo(b)fluoranthene		µg/L	0.047	U	0.047	U
Benzo(ghi)perylene		µg/L	0.047	U	0.047	U
Benzo(k)fluoranthene		µg/L	0.047	U	0.047	U
Chrysene		µg/L	0.047	U	0.047	U
Dibenz(a,h)anthracene		µg/L	0.047	U	0.047	U
Fluoranthene		µg/L	0.047	U	0.047	U
Fluorene		µg/L	0.047	U	0.047	U
Indeno(1,2,3-cd)pyrene		µg/L	0.047	U	0.047	U
Naphthalene		µg/L	0.047	U	0.047	U
Phenanthrene		µg/L	0.047	U	0.047	U
Pyrene		µg/L	0.047	U	0.047	U
SW846 8290						
1,2,3,4,6,7,8,9-OCDD		pg/L	64.4	J	63.6	U
1,2,3,4,6,7,8,9-OCDF		pg/L	63.2	U	63.6	U
1,2,3,4,6,7,8-HpCDD		pg/L	31.7	U	31.9	U
1,2,3,4,6,7,8-HpCDF		pg/L	31.7	U	31.9	U
1,2,3,4,7,8,9-HpCDF		pg/L	31.7	U	31.9	U
1,2,3,4,7,8-HxCDD		pg/L	31.7	U	31.9	U
1,2,3,4,7,8-HxCDF		pg/L	31.7	U	31.9	U
1,2,3,6,7,8-HxCDD		pg/L	31.7	U	31.9	U
1,2,3,6,7,8-HxCDF		pg/L	31.7	U	31.9	U
1,2,3,7,8,9-HxCDD		pg/L	31.7	U	31.9	U
1,2,3,7,8,9-HxCDF		pg/L	31.7	U	31.9	U
1,2,3,7,8-PeCDD		pg/L	31.7	U	31.9	U
1,2,3,7,8-PeCDF		pg/L	31.7	U	31.9	U
2,3,4,6,7,8-HxCDF		pg/L	31.7	U	31.9	U
2,3,4,7,8-PeCDF		pg/L	31.7	U	31.9	U
2,3,7,8-TCDD	30	pg/L	6.32	U	6.36	U
2,3,7,8-TCDF		pg/L	6.32	U	6.36	U
Total Heptachlorodibenzofuran		pg/L	31.7	U	31.9	U

Table E2-67. Analytical Data Summary for Groundwater at EC-36

	Location Name		EC-36-03		EC-36-06	
	Sample Date		8/26/13		8/26/13	
	Sample Name		EC-36-2-GW		EC-36-1-GW	
Analyte	MCL	Unit	Result		Result	
SW846 6020A (Total Fraction)						
Total Heptachlorodibenzo-p-dioxin		pg/L	31.7	U	31.9	U
Total Hexachlorodibenzofuran		pg/L	31.7	U	31.9	U
Total Hexachlorodibenzo-p-dioxin		pg/L	31.7	U	31.9	U
Total Pentachlorodibenzofuran		pg/L	31.7	U	31.9	U
Total Pentachlorodibenzo-p-dioxin		pg/L	31.7	U	31.9	U
Total Tetrachlorodibenzofuran		pg/L	6.32	U	6.36	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	6.32	U	6.36	U

Table E2-68. Analytical Data Summary for Groundwater at EC-49

		Location Name	EC-49-14	
		Sample Date	10/1/15	
		Sample Name	EC-49-14-GW	
Analyte	MCL	Unit	Result	
EPA 6850				
Perchlorate	15	µg/L	0.67	J
SW846 6020A (Dissolved Fraction)				
Aluminum		mg/L	0.002	U
Antimony	0.006	mg/L	0.001	U
Copper	1.3	mg/L	0.001	U
Lead	0.015	mg/L	0.001	U
Manganese		mg/L	0.0599	
Zinc		mg/L	0.0123	
SW846 6020A (Total Fraction)				
Aluminum		mg/L	0.029	
Antimony	0.006	mg/L	0.001	U
Copper	1.3	mg/L	0.001	U
Lead	0.015	mg/L	0.001	U
Manganese		mg/L	0.0562	
Zinc		mg/L	0.0139	
SW846 8270D				
Acenaphthene		µg/L	0.05	U
Acenaphthylene		µg/L	0.05	U
Anthracene		µg/L	0.05	U
Benzo(a)anthracene		µg/L	0.02	J
Benzo(a)pyrene	0.2	µg/L	0.05	U
Benzo(b)fluoranthene		µg/L	0.029	J
Benzo(ghi)perylene		µg/L	0.05	U
Benzo(k)fluoranthene		µg/L	0.05	U
Chrysene		µg/L	0.05	U
Dibenz(a,h)anthracene		µg/L	0.05	U
Fluoranthene		µg/L	0.05	U
Fluorene		µg/L	0.05	U
Indeno(1,2,3-cd)pyrene		µg/L	0.034	J
Naphthalene		µg/L	0.03	J
Phenanthrene		µg/L	0.05	U
Pyrene		µg/L	0.05	U
SW846 8290				
1,2,3,4,6,7,8,9-OCDD		pg/L	195	J
1,2,3,4,6,7,8,9-OCDF		pg/L	15.8	J
1,2,3,4,6,7,8-HpCDD		pg/L	44.1	J
1,2,3,4,6,7,8-HpCDF		pg/L	7.34	J
1,2,3,4,7,8,9-HpCDF		pg/L	2.16	U
1,2,3,4,7,8-HxCDD		pg/L	2.07	U
1,2,3,4,7,8-HxCDF		pg/L	1.35	U
1,2,3,6,7,8-HxCDD		pg/L	2.2	U
1,2,3,6,7,8-HxCDF		pg/L	1.29	U
1,2,3,7,8,9-HxCDD		pg/L	3.38	J
1,2,3,7,8,9-HxCDF		pg/L	1.81	U

Table E2-68. Analytical Data Summary for Groundwater at EC-49

	Location Name		EC-49-14	
	Sample Date		10/1/15	
	Sample Name		EC-49-14-GW	
Analyte	MCL	Unit	Result	
1,2,3,7,8-PeCDD		pg/L	5.26	U
1,2,3,7,8-PeCDF		pg/L	3.37	U
2,3,4,6,7,8-HxCDF		pg/L	1.35	U
2,3,4,7,8-PeCDF		pg/L	2.97	U
2,3,7,8-TCDD	30	pg/L	4.27	U
2,3,7,8-TCDF		pg/L	2.39	U
TEQ WHO2005 ND=0		pg/L	0.916	
Total Heptachlorodibenzofuran		pg/L	2.02	U
Total Heptachlorodibenzo-p-dioxin		pg/L	82.1	
Total Hexachlorodibenzofuran		pg/L	1.42	U
Total Hexachlorodibenzo-p-dioxin		pg/L	2.07	U
Total Pentachlorodibenzofuran		pg/L	3.16	U
Total Pentachlorodibenzo-p-dioxin		pg/L	5.26	U
Total Tetrachlorodibenzofuran		pg/L	2.39	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	4.27	U
SW846 8330B				
2,4,6-Trinitrotoluene		µg/L	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U

Table E2-69. Analytical Data Summary for Groundwater at EC-52

		Location Name	EC-52-16		EC-52-17	
		Sample Date	10/1/15		10/5/15	
		Sample Name	EC-52-16-GW		EC-52-17-GW	
Analyte	MCL	Unit	Result		Result	
9056						
Chloride		mg/L	2.9		3.4	
Nitrate	10	mg/L	0.222		0.134	J
Sulfate		mg/L	9.22		17.4	
EPA 410.4						
Chemical Oxygen Demand (COD)		mg/L	10	U	10	U
SM202320B						
Alkalinity, Bicarbonate (As CaCO3)		mg/L	6.69		36.9	
Alkalinity, Carbonate (As CaCO3)		mg/L	5	U	5	U
Alkalinity, Hydroxide (As CaCO3)		mg/L	5	U	5	U
Alkalinity, Total as CaCO3		mg/L	6.69		36.9	
SM2340B						
Hardness		mg/L	8.49		33.3	
SM2540C						
Total Dissolved Solids		mg/L	62		130	
SM4500F						
Ammonia Nitrogen		mg/L	0.032	J	0.097	J
SW846 6020A (Dissolved Fraction)						
Aluminum		mg/L	0.0159	J	0.002	UJ
Antimony	0.006	mg/L	0.001	U	0.001	U
Copper	1.3	mg/L	0.00503	J	0.00167	J
Lead	0.015	mg/L	0.001	U	0.001	UJ
Manganese		mg/L	0.0693		1.03	
Zinc		mg/L	0.00563	J	0.03	
SW846 6020A (Total Fraction)						
Aluminum		mg/L	0.0618	J	0.0783	
Antimony	0.006	mg/L	0.001	UJ	0.001	U
Arsenic	0.01	mg/L	0.001	U	0.000751	J
Barium	2	mg/L	0.0218	J	0.0315	
Beryllium	0.004	mg/L	0.001	U	0.001	U
Cadmium	0.005	mg/L	0.001	UJ	0.001	U
Calcium		mg/L	0.713		5.98	
Chromium	0.1	mg/L	0.001	UJ	0.00164	J
Cobalt		mg/L	0.00938	J	0.00784	
Copper	1.3	mg/L	0.00478	J	0.00142	J
Iron		mg/L	3.49		8.45	
Lead	0.015	mg/L	0.001	U	0.001	U
Magnesium		mg/L	1.63		4.47	
Manganese		mg/L	0.0674		1.03	
Nickel		mg/L	0.0119	J	0.00928	
Potassium		mg/L	0.536		0.615	
Selenium	0.05	mg/L	0.00349	J	0.0025	U
Silver		mg/L	0.001	UJ	0.001	U
Sodium		mg/L	2.68		2.79	
Thallium	0.002	mg/L	0.001	U	0.001	U
Vanadium		mg/L	0.001	U	0.00161	J
Zinc		mg/L	0.00558	J	0.0316	
SW846 7470A						
Mercury	0.002	mg/L	0.0001	U	0.0001	U
SW846 8260C						
1,1,1,2-Tetrachloroethane		µg/L	0.5	U	0.5	U
1,1,1-Trichloroethane	200	µg/L	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane		µg/L	0.5	U	0.5	U
1,1,2-Trichloroethane	5	µg/L	0.5	U	0.5	U
1,1-Dichloroethane		µg/L	0.5	U	0.5	U
1,1-Dichloroethene	7	µg/L	0.5	U	0.5	U
1,2,3-Trichloropropane		µg/L	0.5	U	0.5	U
1,2-Dibromo-3-chloropropane	0.2	µg/L	1	U	1	U
1,2-Dibromoethane	0.05	µg/L	0.5	U	0.5	U
1,2-Dichlorobenzene	600	µg/L	0.5	U	0.5	U
1,2-Dichloroethane	5	µg/L	0.5	U	0.5	U
1,2-Dichloropropane	5	µg/L	0.5	U	0.5	U
1,4-Dichlorobenzene	75	µg/L	0.5	U	0.5	U
2-Butanone		µg/L	1	U	1	U
2-Hexanone		µg/L	1	U	1	U
4-Methyl-2-pentanone		µg/L	1	U	1	U
Acetone		µg/L	2	U	2	U
Acrylonitrile		µg/L	1	U	1	U
Benzene	5	µg/L	0.5	U	0.5	U
Bromochloromethane		µg/L	0.5	U	0.5	U
Bromodichloromethane	80	µg/L	0.5	U	0.5	U
Bromoform	80	µg/L	0.5	U	0.5	U
Bromomethane		µg/L	0.5	U	0.5	U
Carbon disulfide		µg/L	1	U	1	U
Carbon tetrachloride	5	µg/L	0.5	U	0.5	U
Chlorobenzene	100	µg/L	0.5	U	0.5	U
Chloroethane		µg/L	0.5	U	0.5	U
Chloroform	80	µg/L	0.5	UJ	0.5	UJ
Chloromethane		µg/L	0.5	U	0.5	U

Table E2-69. Analytical Data Summary for Groundwater at EC-52

		Location Name	EC-52-16		EC-52-17	
		Sample Date	10/1/15		10/5/15	
		Sample Name	EC-52-16-GW		EC-52-17-GW	
Analyte	MCL	Unit	Result		Result	
cis-1,2-Dichloroethene	70	µg/L	0.5	U	0.5	U
cis-1,3-Dichloropropene		µg/L	0.5	U	0.5	U
Dibromochloromethane	80	µg/L	0.5	U	0.5	U
Dibromomethane		µg/L	0.5	U	0.5	U
Ethylbenzene	700	µg/L	0.5	U	0.5	U
Iodomethane		µg/L	2	U	2	U
Methyl tert-butyl ether		µg/L	0.5	U	0.5	U
Methylene chloride	5	µg/L	0.5	U	0.5	U
Styrene	100	µg/L	0.5	U	0.5	U
Tetrachloroethene	5	µg/L	0.5	U	0.5	U
Toluene	1000	µg/L	0.5	U	0.5	U
trans-1,2-Dichloroethene	100	µg/L	0.5	U	0.5	U
trans-1,3-Dichloropropene		µg/L	0.5	U	0.5	U
trans-1,4-Dichloro-2-butene		µg/L	1	U	1	U
Trichloroethene	5	µg/L	0.5	U	0.5	U
Trichlorofluoromethane		µg/L	0.5	U	0.5	U
Vinyl Acetate		µg/L	1	U	1	U
Vinyl chloride	2	µg/L	0.5	U	0.5	U
Xylenes (total)	10000	µg/L	1.5	U	1.5	U
SW846 8330B						
2,4,6-Trinitrotoluene		µg/L	0.2	U	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U	0.2	U
Nitroglycerin		µg/L	1	U	1	U
SW846 9040C						
pH		su	6.37	J	6.6	J
Temperature Celcius		su	20.1	J	19.9	J
SW846 9050A						
Specific Conductance		umhos/cm	48.2	J	115	J
High Performance Liquid Chromotography						
Nitroguanidine		µg/L	5	U	25	UJ

Table E2-70. Analytical Data Summary for Groundwater at EC-57D

	Location Name		EC-57D-12GW	
	Sample Name		EC-57D-12-GW	
	sample_date		9/30/15	
Analyte	MCL	Unit	Result	
SW846 6020A (Dissolved Fraction)				
Aluminum		mg/l	0.002	UJ
Antimony	0.006	mg/l	0.00555	
Copper	1.3	mg/l	0.00115	J
Lead	0.015	mg/l	0.001	UJ
Manganese		mg/l	0.0178	
Zinc		mg/l	0.00322	J
SW846 6020A (Total Fraction)				
Aluminum		mg/l	1.41	J
Antimony	0.006	mg/l	0.00405	J
Copper	1.3	mg/l	0.00171	J
Lead	0.015	mg/l	0.000672	J
Manganese		mg/l	0.0213	
Zinc		mg/l	0.00579	J
SW846 8330B				
2,4,6-Trinitrotoluene		ug/l	0.2	U
2,4-Dinitrotoluene		ug/l	0.2	U
2,6-Dinitrotoluene		ug/l	0.2	U

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Table E2-71. Analytical Data Summary for Groundwater at EC-58C

		Location Name	EC-58C-02	
		Sample Date	10/5/15	
		Sample Name	EC-58C-02-GW	
Analyte	MCL	Unit	Result	
SW846 6020A (Dissolved Fraction)				
Aluminum		mg/L	0.0201	J
Antimony	0.006	mg/L	0.001	U
Copper	1.3	mg/L	0.001	U
Lead	0.015	mg/L	0.001	UJ
Manganese		mg/L	3.04	
Zinc		mg/L	0.00952	
SW846 6020A (Total Fraction)				
Aluminum		mg/L	0.0932	
Antimony	0.006	mg/L	0.001	U
Copper	1.3	mg/L	0.001	U
Lead	0.015	mg/L	0.001	U
Manganese		mg/L	2.8	
Zinc		mg/L	0.00756	
SW846 8082A				
Aroclor 1016		µg/L	0.25	U
Aroclor 1221		µg/L	0.25	U
Aroclor 1232		µg/L	0.25	U
Aroclor 1242		µg/L	0.25	U
Aroclor 1248		µg/L	0.25	U
Aroclor 1254		µg/L	0.25	U
Aroclor 1260		µg/L	0.25	U
SW846 8270D				
Acenaphthene		µg/L	0.05	U
Acenaphthylene		µg/L	0.05	U
Anthracene		µg/L	0.05	U
Benzo(a)anthracene		µg/L	0.05	U
Benzo(a)pyrene	0.2	µg/L	0.05	U
Benzo(b)fluoranthene		µg/L	0.05	U
Benzo(ghi)perylene		µg/L	0.05	U
Benzo(k)fluoranthene		µg/L	0.05	U
Chrysene		µg/L	0.05	U
Dibenz(a,h)anthracene		µg/L	0.05	U
Fluoranthene		µg/L	0.05	U
Fluorene		µg/L	0.05	U
Indeno(1,2,3-cd)pyrene		µg/L	0.05	U
Naphthalene		µg/L	0.025	J
Phenanthrene		µg/L	0.05	U
Pyrene		µg/L	0.05	U

Table E2-71. Analytical Data Summary for Groundwater at EC-58C

	Location Name		EC-58C-02	
	Sample Date		10/5/15	
	Sample Name		EC-58C-02-GW	
Analyte	MCL	Unit	Result	
SW846 8290				
1,2,3,4,6,7,8,9-OCDD		pg/L	177	J
1,2,3,4,6,7,8,9-OCDF		pg/L	22.6	J
1,2,3,4,6,7,8-HpCDD		pg/L	46	J
1,2,3,4,6,7,8-HpCDF		pg/L	10.1	J
1,2,3,4,7,8,9-HpCDF		pg/L	2.66	J
1,2,3,4,7,8-HxCDD		pg/L	2.44	J
1,2,3,4,7,8-HxCDF		pg/L	2.84	J
1,2,3,6,7,8-HxCDD		pg/L	2.82	J
1,2,3,6,7,8-HxCDF		pg/L	3.09	J
1,2,3,7,8,9-HxCDD		pg/L	3.76	J
1,2,3,7,8,9-HxCDF		pg/L	1.05	U
1,2,3,7,8-PeCDD		pg/L	3.1	J
1,2,3,7,8-PeCDF		pg/L	3.17	J
2,3,4,6,7,8-HxCDF		pg/L	1.44	J
2,3,4,7,8-PeCDF		pg/L	1.43	U
2,3,7,8-TCDD	30	pg/L	1.22	U
2,3,7,8-TCDF		pg/L	2.91	U
TEQ WHO2005 ND=0		pg/L	5.48	
Total Heptachlorodibenzofuran		pg/L	21	J
Total Heptachlorodibenzo-p-dioxin		pg/L	85	
Total Hexachlorodibenzofuran		pg/L	0.884	U
Total Hexachlorodibenzo-p-dioxin		pg/L	1.18	U
Total Pentachlorodibenzofuran		pg/L	1.52	U
Total Pentachlorodibenzo-p-dioxin		pg/L	2.36	U
Total Tetrachlorodibenzofuran		pg/L	2.91	U
Total Tetrachlorodibenzo-p-dioxin		pg/L	1.22	U
SW846 8330B				
2,4,6-Trinitrotoluene		µg/L	0.2	U
2,4-Dinitrotoluene		µg/L	0.2	U
2,6-Dinitrotoluene		µg/L	0.2	U

Legend

MCL	USEPA Maximum Contaminant Level for Drinking Water (November 2015)
mg/L	milligrams per liter
µg/L	micrograms per liter
pg/L	picograms per gram
J	result is estimated
U	analyte was not detected at the limit of detection
value	highlighted value is greater than PSL
blank cells	indicates no screening level value specified, not analyzed, or for PAHs: analyses by 8270 SIM and 8270D methods, and the most accurate result was selected for reporting purposes per sample analyzed for PAHs.

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Table E2-72. Analytical Summary Results for Sediment at the Former Curtis Bay Ordnance Depot

Location		EC-TRIB-1		EC-TRIB-2		EC-TRIB-3		EC-58B-1-SED	
Sample Name		EC-Trib-1-SD		EC-Trib-2-SD		EC-Trib-3-SD		EC-58B-1-SD	
Sample Date		09/28/15		09/28/15		09/28/15		8/27/13	
Parameter	Unit	Result		Result		Result			
SW846 6020A									
Aluminum	mg/kg	6040		13700		9490		5810	
Antimony	mg/kg	0.279	UJ	0.598	UJ	0.366	J	1.7	
Arsenic	mg/kg	3.62		94.1		17.6			
Cadmium	mg/kg	0.0562	J	0.765	J	0.305	J		
Chromium	mg/kg	8.82	J	21.4	J	19.7	J		
Cobalt	mg/kg	2.68		9.45		2.67			
Copper	mg/kg	6.1		33.7		10.2		17.1	
Lead	mg/kg	13.5	J	47.1	J	19.3	J	34.9	
Manganese	mg/kg	25.1	J	146	J	128	J	1240	
Nickel	mg/kg	4.65		14.2		5.25			
Titanium	mg/kg	138		229		514			
Zinc	mg/kg	26.2	J	147	J	49	J	63.4	
SW846 7196A									
Chromium, Hexavalent	mg/kg	0.619	UJ	1.2	UJ	0.625	UJ		
SW846 7471B									
Mercury	mg/kg	0.0376		0.0838		0.0266			
SW846 8015C									
Ethanol	µg/kg	1300	U	2500	U	1300	U		
Methanol	µg/kg	1300	U	2500	U	1300	U		
SW846 8082A									
Aroclor 1016	µg/kg	11	U	20	U	11	U		
Aroclor 1221	µg/kg	11	U	20	U	11	U		
Aroclor 1232	µg/kg	11	U	20	U	11	U		
Aroclor 1242	µg/kg	11	U	20	U	11	U		
Aroclor 1248	µg/kg	11	U	20	U	11	U		
Aroclor 1254	µg/kg	11	U	20	U	11	U		
Aroclor 1260	µg/kg	11	U	20	U	11	U		
SW846 8151A									
2,4,5-T	µg/kg	5.4	U	10	U	5.4	U		
2,4,5-TP	µg/kg	5.4	U	10	U	5.4	U		
2,4-D	µg/kg	5.4	U	10	U	5.4	U		
2,4-DB	µg/kg	5.4	U	10	U	5.4	U		
Dalapon	µg/kg	5.4	U	10	U	5.4	U		
Dicamba	µg/kg	5.4	U	10	U	5.4	U		
Dichloroprop	µg/kg	5.4	U	10	U	5.4	U		
Dinoseb	µg/kg	5.4	U	10	U	5.4	U		
MCPA	µg/kg	540	U	1000	U	540	U		
MCPP	µg/kg	540	U	1000	U	540	U		
SW846 8260C									
2-Butanone	µg/kg	3	U	5.7	U	2.9	U		
Acetone	µg/kg	12	U	23	U	12	U		
Benzene	µg/kg	1.4	U	2.7	U	1.4	U		
Carbon tetrachloride	µg/kg	1.4	U	2.7	U	1.4	U		
Ethylbenzene	µg/kg	1.4	U	2.7	U	1.4	U		
Methylene chloride	µg/kg	6	U	11	U	5.9	U		
mp-Xylene	µg/kg	3	U	5.7	U	2.9	U		
o-Xylene	µg/kg	1.4	UJ	2.7	U	1.4	U		
Tetrachloroethene	µg/kg	1.4	U	2.7	U	1.4	U		
Toluene	µg/kg	1.4	U	2.7	U	1.4	U		
Trichloroethene	µg/kg	6	U	11	U	5.9	U		
SW846 8270D/ SW846 8270 SIM									
Acenaphthene	µg/kg	2.2	U	6.2	U	0.85	J	5.5	
Acenaphthylene	µg/kg	2.4	J	6.2	U	2.2	U	53.6	
Anthracene	µg/kg	1.6	J	6.2	U	2.6	J	33.5	
Benzo(a)anthracene	µg/kg	10		7.2	J	10		182	
Benzo(a)pyrene	µg/kg	17		5.8	J	11		197	
Benzo(b)fluoranthene	µg/kg	32		8.2	J	18		348	
Benzo(ghi)perylene	µg/kg	16		5.8	J	8.2		67.2	J
Benzo(k)fluoranthene	µg/kg	11		4.7	J	6		112	
Chrysene	µg/kg	17		7.3	J	12		231	
Dibenz(a,h)anthracene	µg/kg	5.8		6.2	U	2.8	J	20.7	J
Fluoranthene	µg/kg	14		12	J	19		370	
Fluorene	µg/kg	2.2	U	6.2	U	2.2	U	15.6	
Indeno(1,2,3-cd)pyrene	µg/kg	24		7.4	J	12		55	J
Naphthalene	µg/kg	2.2	U	6.2	U	2.2	U	4.6	
Pentachlorophenol	µg/kg	4.2	U	12	U	4.2	U		
Phenanthrene	µg/kg	13		9.4	J	14		101	
Pyrene	µg/kg	13		8.9	J	21		315	
SW846 8290									
1,2,3,4,6,7,8,9-OCDD	pg/g	8150	J	5890	J	5040	J	5060	
1,2,3,4,6,7,8,9-OCDF	pg/g	2.2	J	6.38	J	9.05		11.8	J
1,2,3,4,6,7,8-HpCDD	pg/g	94.4		60.1		34.2		39.1	
1,2,3,4,6,7,8-HpCDF	pg/g	1.04	J	2.58	J	3.57	J	6.24	J
1,2,3,4,7,8,9-HpCDF	pg/g	3.11	UJ	4.21	U	3.66	UJ	< 5.12	U
1,2,3,4,7,8-HxCDD	pg/g	0.528	J	0.78	J	0.471	J	< 5.12	U
1,2,3,4,7,8-HxCDF	pg/g	3.11	U	0.709	J	0.468	J	< 5.12	U
1,2,3,6,7,8-HxCDD	pg/g	1.46	J	1.38	J	0.854	J	< 5.12	U
1,2,3,6,7,8-HxCDF	pg/g	3.11	U	0.496	J	0.371	J	< 5.12	U

Table E2-72. Analytical Summary Results for Sediment at the Former Curtis Bay Ordnance Depot

Location		EC-TRIB-1		EC-TRIB-2		EC-TRIB-3		EC-58B-1-SED	
Sample Name		EC-Trib-1-SD		EC-Trib-2-SD		EC-Trib-3-SD		EC-58B-1-SD	
Sample Date		09/28/15		09/28/15		09/28/15		8/27/13	
1,2,3,7,8,9-HxCDD	pg/g	1.53	J	1.62	J	0.915	J	< 5.12	U
1,2,3,7,8,9-HxCDF	pg/g	3.11	UJ	4.21	U	3.66	UJ	< 5.12	U
1,2,3,7,8-PeCDD	pg/g	0.323	J	0.411	J	0.3	J	< 5.12	U
1,2,3,7,8-PeCDF	pg/g	0.177	J	0.379	J	0.218	J	< 5.12	U
2,3,4,6,7,8-HxCDF	pg/g	3.11	U	0.557	J	0.563	J	< 5.12	U
2,3,4,7,8-PeCDF	pg/g	0.3	J	0.603	J	0.707	J	< 5.12	U
2,3,7,8-TCDD	pg/g	0.2	J	0.0546	U	0.144	J	< 1.02	U
2,3,7,8-TCDF	pg/g	0.234	J	0.385	J	0.299	J	0.727	J
Total Heptachlorodibenzofuran	pg/g	1.62	J	3.67	J	8.45		13	
Total Heptachlorodibenzo-p-dioxin	pg/g	253		141		84.9		93	
Total Hexachlorodibenzofuran	pg/g	1.44	J	4.6		6.4		2.98	J
Total Hexachlorodibenzo-p-dioxin	pg/g	61.1		18.7		12.2		8.95	
Total Pentachlorodibenzofuran	pg/g	1.66	J	5.15		7.32		4.39	J
Total Pentachlorodibenzo-p-dioxin	pg/g	3.99		2.7	J	2.49	J	< 5.12	U
Total Tetrachlorodibenzofuran	pg/g	2.07		8.06		4.96		1.53	
Total Tetrachlorodibenzo-p-dioxin	pg/g	0.762		0.607	J	0.652	J	1.07	J
SW846 8330B									
2,4,6-Trinitrotoluene	mg/kg	0.11	UJ	0.15	UJ	0.085	UJ	< 0.25	U
2,4-Dinitrotoluene	mg/kg	0.11	UJ	0.15	UJ	0.085	UJ	< 0.2	U
2,6-Dinitrotoluene	mg/kg	0.051	UJ	0.073	UJ	0.043	UJ	< 0.2	U
Nitroglycerin	mg/kg	0.26	UJ	0.37	UJ	0.22	UJ		
High Performance Liquid Chromatography									
Nitroguanidine	µg/kg	24	U	37	U	24	U		

ft bgs	feet below ground surface
mg/kg	milligrams per kilogram
µg/kg	micrograms per kilogram
pg/g	picograms per gram
%	percent
J	result is estimated
U	analyte was not detected at the limit of detection
UJ	analyte was not detected at the limit of detection, limit of detection is estimated
blank cells	indicates not analyzed,

Table E2-73. Analytical Summary Results for Surface Water at the Former Curtis Bay Ordnance Depot

Location		EC-TRIB-3		EC-TRIB-1		EC-TRIB-2		EC-58B-1-SW	
Sample Name		EC-Trib-3-SW		EC-Trib-1-SW		EC-Trib-2-SW		EC-58B-1-SW	
Sample Date		9/28/15		9/28/15		9/28/15		8/27/13	
Parameter	Unit	Result		Result		Result		Result	
SW846 6020A									
Aluminum	mg/L	2.15	J	0.314	J	2.58	J		
Antimony	mg/L	0.000473	J	0.000607	J	0.001	UJ		
Arsenic	mg/L	0.0135		0.00471	J	0.0768			
Cadmium	mg/L	0.001	UJ	0.001	UJ	0.001	UJ		
Chromium	mg/L	0.00556	J	0.000884	J	0.00305	J		
Cobalt	mg/L	0.000949	J	0.0017	J	0.0106	J		
Copper	mg/L	0.0051	J	0.00172	J	0.00262	J		
Lead	mg/L	0.00345	J	0.00178	J	0.00369	J		
Manganese	mg/L	0.231		0.409		1.39			
Nickel	mg/L	0.00251	J	0.00265	J	0.0109	J		
Titanium	mg/L	0.0552		0.00653		0.034			
Zinc	mg/L	0.013	J	0.0238	J	0.0256	J		
SW846 7196A									
Chromium, Hexavalent*	µg/L	4	UJ	4	U	4	U		
SW846 7470A									
Mercury	mg/L	0.0001	U	0.0001	U	0.0001	U		
SW846 8015C									
Ethanol	µg/L	1000	U	1000	U	1000	U		
Methanol	µg/L	1000	U	1000	U	1000	U		
SW846 8082A									
Aroclor 1016	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
Aroclor 1221	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
Aroclor 1232	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
Aroclor 1242	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
Aroclor 1248	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
Aroclor 1254	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
Aroclor 1260	µg/L	0.25	UJ	0.25	UJ	0.25	UJ		
SW846 8151A									
2,4,5-T	µg/L	0.1	U	0.1	U	0.1	U		
2,4,5-TP	µg/L	0.1	U	0.1	U	0.1	U		
2,4-D	µg/L	0.1	U	0.1	U	0.1	U		
2,4-DB	µg/L	0.1	U	0.1	U	0.1	U		
Dalapon	µg/L	0.1	U	0.1	U	0.1	U		
Dicamba	µg/L	0.1	U	0.1	U	0.1	U		
Dichloroprop	µg/L	0.1	U	0.1	U	0.1	U		
Dinoseb	µg/L	0.1	U	0.1	U	0.1	U		
MCPA	µg/L	10	U	10	U	10	U		
MCPP	µg/L	10	U	10	U	10	U		
SW846 8260C									
2-Butanone	µg/L	1	U	1	U	1	U		
Acetone	µg/L	2.3		3.8		2	U		
Benzene	µg/L	0.5	U	0.5	U	0.5	U		
Carbon tetrachloride	µg/L	0.5	U	0.5	U	0.5	U		
Ethylbenzene	µg/L	0.5	U	0.5	U	0.5	U		
Methylene chloride	µg/L	0.5	U	0.5	U	0.5	U		
mp-Xylene	µg/L	1	U	1.5	U	1.5	U		
Naphthalene	µg/L	0.5	U	0.5	U	0.5	U		
o-Xylene	µg/L	0.5	U	0.5	U	0.5	U		
Tetrachloroethene	µg/L	0.5	U	0.5	U	0.5	U		
Toluene	µg/L	0.5	U	0.5	U	0.54	J		
Trichloroethene	µg/L	0.5	U	0.5	U	0.5	U		
SW846 8270D/ SW846 8270 SIM									
Acenaphthene	µg/L	0.05	U	0.05	U	0.05	U	0.32	
Acenaphthylene	µg/L	0.05	U	0.05	U	0.05	U	0.047	U
Anthracene	µg/L	0.05	U	0.05	U	0.05	U	0.098	
Benzo(a)anthracene	µg/L	0.023	J	0.024	J	0.05	U	0.021	J
Benzo(a)pyrene	µg/L	0.026	J	0.024	J	0.05	U	0.047	U
Benzo(b)fluoranthene	µg/L	0.026	J	0.026	J	0.05	U	0.039	J
Benzo(ghi)perylene	µg/L	0.032	J	0.048	J	0.05	U	0.023	J
Benzo(k)fluoranthene	µg/L	0.022	J	0.026	J	0.05	U	0.047	U
Chrysene	µg/L	0.022	J	0.05	U	0.05	U	0.027	K
Dibenz(a,h)anthracene	µg/L	0.026	J	0.05	U	0.05	U	0.047	U
Fluoranthene	µg/L	0.05	U	0.033	J	0.05	U	0.12	
Fluorene	µg/L	0.05	U	0.05	U	0.05	U	0.22	
Indeno(1,2,3-cd)pyrene	µg/L	0.034	J	0.036	J	0.05	U	0.047	U
Naphthalene	µg/L	0.05	U	0.022	J	0.05	U	0.12	
Pentachlorophenol	µg/L	0.1	U						
Phenanthrene	µg/L	0.05	U	0.05	U	0.05	U	0.14	
Pyrene	µg/L	0.05	U	0.03	J	0.05	U	0.08	
SW846 8290									
1,2,3,4,6,7,8,9-OCDD	pg/L	329	J	176	J	655	J	45.3	J
1,2,3,4,6,7,8,9-OCDF	pg/L	3.81	U	9.41	J	8.79	U	63.2	U
1,2,3,4,6,7,8-HpCDD	pg/L	23.5	UJ	23.4	UJ	23.7	UJ	31.7	U
1,2,3,4,6,7,8-HpCDF	pg/L	0.868	U	23.4	UJ	23.7	UJ	31.7	U
1,2,3,4,7,8,9-HpCDF	pg/L	0.953	U	0.986	U	3.01	U	31.7	U
1,2,3,4,7,8-HxCDD	pg/L	0.762	U	1.63	U	4.12	U	31.7	U
1,2,3,4,7,8-HxCDF	pg/L	0.779	U	0.825	U	2.24	U	31.7	U
1,2,3,6,7,8-HxCDD	pg/L	0.777	U	1.67	U	4.1	U	31.7	U

Table E2-73. Analytical Summary Results for Surface Water at the Former Curtis Bay Ordnance Depot

Location		EC-TRIB-3		EC-TRIB-1		EC-TRIB-2			EC-58B-1-SW	
Sample Name		EC-Trib-3-SW		EC-Trib-1-SW		EC-Trib-2-SW			EC-58B-1-SW	
Sample Date		9/28/15		9/28/15		9/28/15			8/27/13	
Parameter	Unit	Result		Result		Result			Result	
1,2,3,6,7,8-HxCDF	pg/L	0.778	U	0.794	U	2.03	U		31.7	U
1,2,3,7,8,9-HxCDD	pg/L	0.726	U	1.55	U	3.88	U		31.7	U
1,2,3,7,8,9-HxCDF	pg/L	0.944	U	0.938	U	3.01	U		31.7	U
1,2,3,7,8-PeCDD	pg/L	1.86	U	2.61	U	6.42	U		31.7	U
1,2,3,7,8-PeCDF	pg/L	1.68	U	1.76	U	4.36	U		31.7	U
2,3,4,6,7,8-HxCDF	pg/L	0.764	U	0.782	U	2.28	U		31.7	U
2,3,4,7,8-PeCDF	pg/L	1.61	U	1.68	U	4.33	U		31.7	U
2,3,7,8-TCDD	pg/L	2.29	U	2.32	U	3.82	U		6.32	U
2,3,7,8-TCDF	pg/L	4.11	UJ	3.34	U	5.07	U		6.32	U
Total Heptachlorodibenzofuran	pg/L	0.908	U	0.916	U	2.65	U		31.7	U
Total Heptachlorodibenzo-p-dioxin	pg/L	4.6	J	6.79	J	3.12	U		31.7	U
Total Hexachlorodibenzofuran	pg/L	0.81	U	0.83	U	2.34	U		31.7	U
Total Hexachlorodibenzo-p-dioxin	pg/L	0.755	U	1.61	U	4.03	U		31.7	U
Total Pentachlorodibenzofuran	pg/L	1.65	U	1.72	U	4.34	U		31.7	U
Total Pentachlorodibenzo-p-dioxin	pg/L	1.86	U	2.61	U	6.42	U		31.7	U
Total Tetrachlorodibenzofuran	pg/L	4.11	U	11		5.07	U		6.32	U
Total Tetrachlorodibenzo-p-dioxin	pg/L	2.29	U	2.32	U	3.82	U		6.32	U
SW846 8330B										
2,4,6-Trinitrotoluene	µg/L	0.2	UJ	0.2	UJ	0.2	UJ			
2,4-Dinitrotoluene	µg/L	0.2	UJ	0.2	UJ	0.2	UJ			
2,6-Dinitrotoluene	µg/L	0.2	UJ	0.2	UJ	0.2	UJ			
Nitroglycerin	µg/L	1	UJ	1	UJ	1	UJ			
High Performance Liquid Chromatography										
Nitroguanidine	µg/L	25	UJ	25	UJ	25	UJ			

* Chromium, Hexavalent was re-sampled from all Tributary locations
on 10/8/15 due to exceedance of sample holding time on the original sample.

mg/L	milligrams per liter
µg/L	micrograms per liter
pg/L	picograms per gram
J	result is estimated
U	analyte was not detected at the limit of detection, limit of detection is estimated
UJ	analyte was not detected at the limit of detection
blank cells	indicates not analyzed

Table E6-1. Analytical Results Summary for ISM Surface Soil Samples at EC-21

			Sample Name:		EC21-IS-SO-01		EC21-IS-SO-02		EC21-IS-SO-03		EC21-IS-SO-04		EC21-IS-SO-05		EC21-IS-SO-06	
			Date Sampled:		4/16/2019		4/16/2019		4/16/2019		4/16/2019		4/16/2019		4/16/2019	
Analyte	**USEPA RSL Soil**	**Unit**			**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
Metals (SW6020A)																
Lead	800	mg/kg		231		167		377		668		**974**		539		
PAHs (SW8270D)																
Acenaphthene	4500000	µg/kg		2920		2090		2570		1520		1220		5840		
Acenaphthylene	4500000	µg/kg		3560		2690		1790	J	1270		257		1730		
Anthracene	23000000	µg/kg		11300		6720		6400		3990		2560		17600		
Benzo(a)anthracene	21000	µg/kg		**49100**		**36900**		**27100**		20000		10100		**55500**		
Benzo(a)pyrene	2100	µg/kg		**43500**		**32500**		**24200**		**17700**		**7210**		**47900**		
Benzo(b)fluoranthene	21000	µg/kg		**62300**		**45600**		**32700**		**24900**		11600		**64200**		
Benzo(g,h,I)perylene	23000000	µg/kg		29200		23400		17100	J	12600		4570		31700		
Benzo(k)fluoranthene	210000	µg/kg		22000		15900		12400	J	6360		3640		25000		
Chrysene	2100000	µg/kg		52700		39600		29300		21000		10200		57000		
Dibenz(a,h)Anthracene	2100	µg/kg		**5890**		**4450**		**3420**		**2450**		1220		**6320**		
Fluoranthene	3000000	µg/kg		94400		70000		51200		37400		19900		107000		
Fluorene	3000000	µg/kg		3050		2210		2750		1530		1090		5550		
Indeno(1,2,3-c,d)Pyrene	21000	µg/kg		**30100**		**24300**		18300	J	13400		5010		**34300**		
Naphthalene	17000	µg/kg		1470		916		1740	J	797		263		2060		
Phenanthrene	17000	µg/kg		**51000**		**38000**		**33400**		**20600**		13300		**73400**		
Pyrene	2300000	µg/kg		87800		62400		46700		33100		18500		102000		

Notes
USEPA RSL Soil = Regional Screening Level for Industrial Soil (May 2019); RSLs based on non-carcinogenic (n) effects have been divided by 10, per MDE Guidance (MDE Division of Environmental Response and Revitalization Assessment, Cleanup and Reuse Section, Remedial Response Program. Technical Decision Compendium.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Cells exceeding the USEPA RSL Soil are boldfaced

Table E6-1. Analytical Results Summary for ISM Surface Soil Samples at EC-21

			Sample Name:		EC21-IS-SO-07	
			Date Sampled:		4/16/2019	
Analyte	**USEPA RSL Soil**	**Unit**	**Result**	**Qualifier**	**Result**	**Qualifier**
Metals (SW6020A)						
Lead	800	mg/kg	274		331	
PAHs (SW8270D)						
Acenaphthene	4500000	µg/kg	1490		2350	
Acenaphthylene	4500000	µg/kg	863	J	1200	J
Anthracene	23000000	µg/kg	3640		5510	
Benzo(a)anthracene	21000	µg/kg	15000		**21700**	
Benzo(a)pyrene	2100	µg/kg	**13500**		**19100**	
Benzo(b)fluoranthene	21000	µg/kg	18300		**25600**	
Benzo(g,h,I)perylene	23000000	µg/kg	6940	J	13200	J
Benzo(k)fluoranthene	210000	µg/kg	5060	J	7000	J
Chrysene	2100000	µg/kg	16100		22800	
Dibenz(a,h)Anthracene	2100	µg/kg	1900		**2570**	
Fluoranthene	3000000	µg/kg	28700		43800	
Fluorene	3000000	µg/kg	1610		2420	
Indeno(1,2,3-c,d)Pyrene	21000	µg/kg	7490	J	13600	J
Naphthalene	17000	µg/kg	1000	J	1940	J
Phenanthrene	17000	µg/kg	**19000**		**29300**	
Pyrene	2300000	µg/kg	25600		41500	

Notes
USEPA RSL Soil = Regional Screening Level for Industrial Soil (May 2019); RSLs based on non-carcinogenic (n) effects have been divided by 10, per MDE Guidance (MDE Division of Environmental Response and Revitalization Assessment, Cleanup and Reuse Section, Remedial Response Program. Technical Decision Compendium.
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
Cells exceeding the USEPA RSL Soil are boldfaced

Table E6-2. Analytical Summary Results for ISM EC-21 Sediment at the Former Curtis Bay Ordnance Depot

	Sample Name:		EC21-IS-SD-01		EC21-IS-SD-02		EC21-IS-SD-03		BACKGROUND-IS-SD-01		BACKGROUND-IS-SD-02		BACKGROUND-IS-SD-03	
	Date Sampled:		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019	
Analyte	**Eco Sediment**	**Unit**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
Metals (SW6020A & SW7471B)														
Aluminum	25000	mg/kg	15700		19900		17100		3000		3020		2720	
Antimony	2	mg/kg	6.3		4.1		5.2		< 0.62	UJ	< 0.59	U	< 0.54	U
Arsenic	9.8	mg/kg	5.8		6.1		5.1		3.1		2.9		3.1	
Barium	20	mg/kg	417		371		355		25.5		27.5		23.7	
Beryllium	NS	mg/kg	0.37	J	0.48	J	0.41	J	0.25	J	0.24	J	0.21	J
Cadmium	0.99	mg/kg	0.59		0.37	J	0.47	J	< 0.32	U	< 0.31	U	< 0.28	U
Calcium	NS	mg/kg	45000		40000		37900		431	J	440		436	
Chromium	43.4	mg/kg	18.2		23.2		19.3		6.7		7.2		6.5	
Cobalt	50	mg/kg	4	J	4.9		4.1		2.6		2.6		2.4	
Copper	31.6	mg/kg	55		59.1		55.9		5.2		4.4		4.4	
Iron	20000	mg/kg	11500		15500		12600		5670		5350		6010	
Lead	35.8	mg/kg	349		220		256		11.5		12.5		13.6	
Magnesium	NS	mg/kg	1090		1130		1110		379	J	502		385	
Manganese	460	mg/kg	150		167		162		79.6		69.5		61.7	
Mercury	0.18	mg/kg	0.16	J	0.14	J	0.13	J	< 0.13	U	< 0.12	U	< 0.12	U
Nickel	22.7	mg/kg	9.7		10.5		9.1		2.9		3.1		2.6	
Potassium	NS	mg/kg	1800		2040		2000		181		216		179	
Selenium	2	mg/kg	1.2	J	1.1	J	1.2	J	0.79	J	< 1.5	U	< 1.4	U
Silver	1	mg/kg	0.33	J	< 0.59	U	< 0.62	U	< 0.62	U	< 0.59	U	< 0.54	U
Sodium	NS	mg/kg	231		185		208		42.7	J	53.5		49.2	
Thallium	NS	mg/kg	0.16	J	0.16	J	< 0.32	U	< 0.32	U	< 0.31	U	< 0.28	U
Vanadium	NS	mg/kg	28.9		34.5		29.5		12.2		11		11	
Zinc	121	mg/kg	163		123		133		15.6		16.8		14.9	
PAHs (SW8270 SIM)														
Acenaphthene	6.7	µg/kg	7		0.75	J	1	J	5.7		0.58	J	0.61	J
Acenaphthylene	5.9	µg/kg	8.2		9.4		3.7		1.1	J	0.99	J	1.1	J
Anthracene	57.2	µg/kg	25.8	J	9.2	J	4.6	J	12.3		2.2	J	2.6	J
Benzo(a)anthracene	108	µg/kg	72.7	J	32	J	20.1	J	32.6		15.2	J	14.2	J
Benzo(a)pyrene	150	µg/kg	76.4	J	52.3	J	26	J	33.4		22.3		20.2	
Benzo(b)fluoranthene	27.2	µg/kg	134	J	110	J	58.9	J	61	J	44.8		43.3	
Benzo(g,h,I)perylene	170	µg/kg	25.4	J	18.4	J	10.1	J	19.6	J	12.7		11.4	
Benzo(k)fluoranthene	240	µg/kg	47.9	J	40.3	J	20.2	J	22.2		15.5		14.5	
Chrysene	166	µg/kg	91.3	J	39.4	J	27.6	J	44.6	J	23.1	J	22.5	J
Dibenz(a,h)Anthracene	33	µg/kg	9.8		7.2		3.5		6.2	J	3.1	J	2.8	J
Fluoranthene	423	µg/kg	145	J	55.3	J	46.2	J	71.8	J	39.8	J	38.3	J
Fluorene	77.4	µg/kg	7.9		1.5	J	1.6	J	6.3		1.2	J	1.8	J
Indeno(1,2,3-c,d)Pyrene	17	µg/kg	33.9	J	26.5	J	12.8	J	24.5	J	14.5	J	14.3	J
Naphthalene	176	µg/kg	12.5		2.6	J	2.8	J	1.8	J	1.3	J	1.4	J
Phenanthrene	204	µg/kg	91.4	J	13.6	J	16.5	J	60.1	J	14.4	J	14.3	J
Pyrene	195	µg/kg	128	J	58.5	J	42.9	J	59.1	J	36.7	J	34.2	J
Total LMW PAHs	76	µg/kg	152.8		37.05		30.2		87.3		20.67		21.81	
Total HMW PAHs	190	µg/kg	764.4		439.9		268.3		375		227.7		215.7	
Total PAHs	1610	µg/kg	917.2		476.95		298.5		462.3		248.37		237.51	

Notes

Eco Sediment = USEPA Region III BTAG Sediment Screening Benchmarks (USEPA, 2006) when available then USEPA Region IV Ecological Sediment Screening Levels (USEPA, 2018).

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

J = Analyte detected at an estimated concentration less than the limit of quantitation and greater than the method detection limit.

U = analyte was not detected at a concentration greater than the limit of detection.

Cells exceeding the background value are bolded.

Cells exceeding USEPA BTAG and or the USEPA Reg 4 value are shaded gray

Table E6-3 Analytical Summary Results for ISM EC-58B Sediment at the Former Curtis Bay Ordnance Depot

	Sample Name:		EC58B-IS-SD-01		EC58B-IS-SD-02		EC58B-IS-SD-03		BACKGROUND-IS-SD-01		BACKGROUND-IS-SD-02		BACKGROUND-IS-SD-03	
	Date Sampled:		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019	
Analyte	**Eco Sediment**	**Unit**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
Metals (SW6020A & SW7471B)														
Aluminum	25000	mg/kg	6750		6810		7640		3000		3020		2720	
Antimony	2	mg/kg	0.81	J	0.35	J	0.34	J	< 0.62	UJ	< 0.59	U	< 0.54	U
Arsenic	9.8	mg/kg	6.9		7.1		7.3		3.1		2.9		3.1	
Barium	20	mg/kg	48.9		39.7		38.3		25.5		27.5		23.7	
Beryllium	NS	mg/kg	0.42	J	0.44	J	0.44	J	0.25	J	0.24	J	0.21	J
Cadmium	0.99	mg/kg	0.25	J	0.17	J	< 0.33	U	< 0.32	U	< 0.31	U	< 0.28	U
Calcium	NS	mg/kg	1210		1180		1310		431	J	440		436	
Chromium	43.4	mg/kg	18.5		17.9		19.1		6.7		7.2		6.5	
Cobalt	50	mg/kg	3.8		4.3		4.4	J	2.6		2.6		2.4	
Copper	31.6	mg/kg	56.9	J	19.4	J	28.6	J	5.2		4.4		4.4	
Iron	20000	mg/kg	16900		20800		21000		5670		5350		6010	
Lead	35.8	mg/kg	148	J	42.7	J	60.9	J	11.5		12.5		13.6	
Magnesium	NS	mg/kg	771		797		704		379	J	502		385	
Manganese	460	mg/kg	153		152		153		79.6		69.5		61.7	
Mercury	0.18	mg/kg	< 0.11	U	< 0.12	U	< 0.11	U	< 0.13	U	< 0.12	U	< 0.12	U
Nickel	22.7	mg/kg	8.3		6.1		6.5		2.9		3.1		2.6	
Potassium	NS	mg/kg	479		497		514		181		216		179	
Selenium	2	mg/kg	1	J	1.8	J	< 3.2	U	0.79	J	< 1.5	U	< 1.4	U
Silver	1	mg/kg	< 0.59	U	< 0.63	U	< 0.64	U	< 0.62	U	< 0.59	U	< 0.54	U
Sodium	NS	mg/kg	29.5	J	29.5	J	25	J	42.7	J	53.5		49.2	
Thallium	NS	mg/kg	< 0.31	U	< 0.32	U	< 0.33	U	< 0.32	U	< 0.31	U	< 0.28	U
Vanadium	NS	mg/kg	28.5		29.5		30.2		12.2		11		11	
Zinc	121	mg/kg	120	J	42.4	J	47.4	J	15.6		16.8		14.9	

Table E6-3 Analytical Summary Results for ISM EC-58B Sediment at the Former Curtis Bay Ordnance Depot

	Sample Name:		EC58B-IS-SD-01		EC58B-IS-SD-02		EC58B-IS-SD-03		BACKGROUND-IS-SD-01		BACKGROUND-IS-SD-02		BACKGROUND-IS-SD-03	
	Date Sampled:		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019	
Analyte	**Eco Sediment**	**Unit**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
PAHs (SW8270 SIM)														
Acenaphthene	6.7	µg/kg	0.95	J	1.1	J	0.51	J	5.7		0.58	J	0.61	J
Acenaphthylene	5.9	µg/kg	5.1		12.6		3.6	J	1.1	J	0.99	J	1.1	J
Anthracene	57.2	µg/kg	4.1		7.1		2.8	J	12.3		2.2	J	2.6	J
Benzo(a)anthracene	108	µg/kg	35.1	J	81	J	25.9	J	32.6	J	15.2	J	14.2	J
Benzo(a)pyrene	150	µg/kg	34.9	J	75.6	J	25.8	J	33.4		22.3		20.2	
Benzo(b)fluoranthene	27.2	µg/kg	51.9	J	108	J	37.6	J	61	J	44.8		43.3	
Benzo(g,h,I)perylene	170	µg/kg	20.5	J	36.5	J	16.4	J	19.6	J	12.7		11.4	
Benzo(k)fluoranthene	240	µg/kg	18.2	J	39	J	13.7	J	22.2		15.5		14.5	
Chrysene	166	µg/kg	41.2	J	85.9	J	28.6	J	44.6	J	23.1	J	22.5	J
Dibenz(a,h)Anthracene	33	µg/kg	7.1		11.5		5.1	J	6.2	J	3.1	J	2.8	J
Fluoranthene	423	µg/kg	57	J	121	J	40.7	J	71.8	J	39.8	J	38.3	J
Fluorene	77.4	µg/kg	1.5	J	1.9	J	0.82	J	6.3		1.2	J	1.8	J
Indeno(1,2,3-c,d)Pyrene	17	µg/kg	25.4	J	47.6	J	19.8	J	24.5	J	14.5	J	14.3	J
Naphthalene	176	µg/kg	3.9		4.5		1.7	J	1.8	J	1.3	J	1.4	J
Phenanthrene	204	µg/kg	17.9	J	23.6	J	10.7	J	60.1	J	14.4	J	14.3	J
Pyrene	195	µg/kg	51.1	J	108	J	36.4	J	59.1	J	36.7	J	34.2	J
Total LMW PAHs	76	µg/kg	33.45		50.8		20.13		87.3		20.67		21.81	
Total HMW PAHs	190	µg/kg	342.4		714.1		250		375		227.7		215.7	
Total PAHs	1610	µg/kg	375.85		764.9		270.13		462.3		248.37		237.51	

Table E6-3 Analytical Summary Results for ISM EC-58B Sediment at the Former Curtis Bay Ordnance Depot

	Sample Name:		EC58B-IS-SD-01		EC58B-IS-SD-02		EC58B-IS-SD-03		BACKGROUND-IS-SD-01		BACKGROUND-IS-SD-02		BACKGROUND-IS-SD-03	
	Date Sampled:		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019	
Analyte	**Eco Sediment**	**Unit**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
Dioxins/Furans (SW8290A)														
1,2,3,4,6,7,8-Heptachlorodibenzofuran	NS	pg/g	< 0.032	U	< 0.032	U	< 0.021	U	< 0.026	U	< 0.028	U	< 0.015	U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	NS	pg/g	66.3		59.4		40.2		36.1		35.2		35.6	
1,2,3,4,7,8,9-Heptachlorodibenzofuran	NS	pg/g	0.481	J	0.378	J	0.272	J	0.125	J	0.09	J	0.164	J
1,2,3,4,7,8-Hexachlorodibenzofuran	NS	pg/g	1.33	J	0.814	J	0.65	J	0.22	J	0.206	J	0.3	J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	NS	pg/g	0.839	J	0.68	J	0.518	J	0.4	J	0.386	J	0.409	J
1,2,3,6,7,8-Hexachlorodibenzofuran	NS	pg/g	1.17	J	0.779	J	0.61	J	0.16	J	0.18	J	0.26	J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	NS	pg/g	1.66	J	1.05	J	0.776	J	0.74	J	0.718	J	0.742	J
1,2,3,7,8,9-Hexachlorodibenzofuran (Hxcdf)	NS	pg/g	0.427	J	0.069	J	0.225	J	< 0.03	U	0.095	J	0.096	J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	NS	pg/g	2.08	J	1.67	J	1.27	J	0.876	J	0.757	J	0.801	J
1,2,3,7,8-Pentachlorodibenzofuran	NS	pg/g	0.742	J	0.455	J	0.389	J	0.17	J	0.123	J	0.151	J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	NS	pg/g	0.604	J	0.374	J	0.287	J	0.258	J	0.189	J	0.241	J
2,3,4,6,7,8-Hexachlorodibenzofuran	NS	pg/g	1.31	J	0.81	J	0.672	J	0.235	J	0.216	J	0.27	J
2,3,4,7,8-Pentachlorodibenzofuran	NS	pg/g	1.47	J	0.883	J	0.736	J	0.264	J	0.27	J	0.374	J
2,3,7,8-Tetrachlorodibenzodioxin	0.85	pg/g	0.156	J	0.089	J	0.062	J	< 0.038	U	0.06	J	0.067	J
2,3,7,8-Tetrachlorodibenzofuran	NS	pg/g	0.924		0.57		0.189	J	0.212	J	0.18	J	0.311	J
Ocdd (Octachlorodibenzo-4-Dioxin)	NS	pg/g	9600		9010		6760		2540		2150		2210	
Ocdf (Octachlorodibenzofuran)	NS	pg/g	< 0.024	U	< 0.02	U	< 0.015	U	< 0.029	U	< 0.026	U	< 0.027	U
Total HpCDD # Homologues	NS	pg/g	2		2		2		2		2		2	
Total Hpcdds	NS	pg/g	157		138		94.1		85.3		80.7		80.6	
Total HpCDF # Homologues	NS	pg/g	3		4		3		4		2		3	
Total Hpcdfs	NS	pg/g	9.72		6.95		5.34		2.47		2.13		3.34	
Total HxCDD # Homologues	NS	pg/g	8		7		8		7		7		7	
Total Hxcdds	NS	pg/g	25.6		18.1		15		12.1		10.9		11.4	
Total HxCDF # Homologues	NS	pg/g	10		9		9		4		6		9	
Total Hxcdfs	NS	pg/g	12.2		8.19		6.52		1.08		1.97		3.35	
Total PeCDD # Homologues	NS	pg/g	7		8		5		5		5		7	
Total Pecdds	NS	pg/g	4.84		3.56		2.06		1.83		1.32		2.34	
Total PeCDF # Homologues	NS	pg/g	18		15		17		12		12		16	
Total Pecdfs	NS	pg/g	20.3		11.9		10.3		3.27		3.97		6.58	
Total TCDD # Homologues	NS	pg/g	10		5		8		2		4		6	
Total Tcdds	NS	pg/g	2.64		0.988		1.2		0.466		0.565		0.9	
Total TCDF # Homologues	NS	pg/g	20		15		17		13		11		15	
Total Tcdfs	NS	pg/g	17.8		7.63		6.29		2.93		2.27		4.57	
Lower Bound PCDD/F TEQ (WHO 2005)	NS	pg/g	5.81		4.72		3.54		1.74		1.6		1.77	
Mid Point PCDD/F TEQ (WHO 2005)	NS	pg/g	5.81		4.73		3.54		1.78		1.62		1.78	
Upper Bound PCDD/F TEQ (WHO 2005)	NS	pg/g	5.81		4.73		3.54		1.8		1.62		1.78	
FISH TEQ (WHO 2005)	0.85	pg/g	3.49		2.53		1.96		1.02		0.93		1.09	

Notes

Eco Sediment = USEPA Region III BTAG Sediment Screening Benchmarks (USEPA, 2006) when available then USEPA Region IV Ecological Sediment Screening Levels (USEPA, 2018).

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

pg/g = picograms per gram

J = Analyte detected at an estimated concentration less than the limit of quantitation and greater than the method detection limit.

U = analyte was not detected at a concentration greater than the limit of detection.

detection; concentration of this analyte in the April 2019 background sample was reported as non-detect.

Cells exceeding the background value are bolded.

Cells exceeding USEPA BTAG and or the USEPA Reg 4 value are shaded gray

Table E6-4 Analytical Summary Results for ISM Unnamed Tributary and ISM Background Sediment at the Former Curtis Bay Ordnance Depot

	Sample Name:		UNNAMEDTRIB-IS-SD-01		UNNAMEDTRIB-IS-SD-02		UNNAMEDTRIB-IS-SD-03		BACKGROUND-IS-SD-01		BACKGROUND-IS-SD-02		BACKGROUND-IS-SD-03	
	Date Sampled:		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019		4/15/2019	
Analyte	**Eco Sediment**	**Unit**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**	**Result**	**Qualifier**
Metals (SW6020A)														
Arsenic	9.8	mg/kg	39.4		47.2		44.4		3.1		2.9		3.1	
Lead	35.8	mg/kg	49.4		38.6		33.3		11.5		12.5		13.6	

Notes

Eco Sediment = USEPA Region III BTAG Sediment Screening Benchmarks (USEPA, 2006) when available then USEPA Region IV Ecological Sediment Screening Levels (USEPA, 2018).

mg/kg = milligrams per kilogram

Cells exceeding USEPA BTAG and or the USEPA Reg 4 value are shaded gray

ENVIRONMENTAL
Data Services, Inc.

DATA VALIDATION SUMMARY REPORT
FORMER CURTIS BAY ORDNANCE DEPOT, BALTIMORE, MARYLAND

Client: EA Engineering, Science & Technology, Inc., Hunt Valley, Maryland
SDG: 3028443
Laboratory: ALS Environmental, Middletown, Pennsylvania
ALS Life Sciences, Burlington, Ontario, Canada
Site: Former Curtis Bay Ordnance Depot, Baltimore, Maryland
Date: August 6, 2019

SVOC			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
7	EC21-IS-SO-01	3028443007	Soil
8	EC21-IS-SO-02	3028443008	Soil
9	EC21-IS-SO-03	3028443009	Soil
10	EC21-IS-SO-04	3028443010	Soil
11	EC21-IS-SO-05	3028443011	Soil
11MS	EC21-IS-SO-05MS	3028443011MS	Soil
11MSD	EC21-IS-SO-05MSD	3028443011MSD	Soil
12	EC21-IS-SO-06	3028443012	Soil
13	EC21-IS-SO-07	3028443013	Soil
14	EC21-IS-SO-08	3028443014	Soil

SVOC-SIM			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	Background-IS-SD-01	3028443001	Sediment
1MS	Background-IS-SD-01MS	3028443001MS	Sediment
1MSD	Background-IS-SD-01MSD	3028443001MSD	Sediment
2	Background-IS-SD-02	3028443002	Sediment
3	Background-IS-SD-03	3028443003	Sediment
4	EC21-IS-SD-01	3028443004	Sediment
5	EC21-IS-SD-02	3028443005	Sediment
6	EC21-IS-SD-03	3028443006	Sediment
15	EC58B-IS-SD-01	3028443015	Sediment
16	EC58B-IS-SD-02	3028443016	Sediment
17	EC58B-IS-SD-03	3028443017	Sediment
22	CBD-ERB-02	3028443022	Water
23	CBD-ERB-03	3028443023	Water
24	CBD-ERB-04	3028443024	Water

Metals			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	Background-IS-SD-01	3028443001	Sediment
1MS	Background-IS-SD-01MS	3028443001MS	Sediment
1MSD	Background-IS-SD-01MSD	3028443001MSD	Sediment
2	Background-IS-SD-02	3028443002	Sediment

Metals			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
3	Background-IS-SD-03	3028443003	Sediment
4	EC21-IS-SD-01	3028443004	Sediment
5	EC21-IS-SD-02	3028443005	Sediment
6	EC21-IS-SD-03	3028443006	Sediment
7*	EC21-IS-SO-01	3028443007	Soil
8*	EC21-IS-SO-02	3028443008	Soil
9*	EC21-IS-SO-03	3028443009	Soil
10*	EC21-IS-SO-04	3028443010	Soil
11*	EC21-IS-SO-05	3028443011	Soil
11MS*	EC21-IS-SO-05MS	3028443011MS	Soil
11MSD*	EC21-IS-SO-05MSD	3028443011MSD	Soil
12*	EC21-IS-SO-06	3028443012	Soil
13*	EC21-IS-SO-07	3028443013	Soil
14*	EC21-IS-SO-08	3028443014	Soil
15	EC58B-IS-SD-01	3028443015	Sediment
16	EC58B-IS-SD-02	3028443016	Sediment
17	EC58B-IS-SD-03	3028443017	Sediment
18†	UnnamedTrib-IS-SD-01	3028443018	Sediment
19†	UnnamedTrib-IS-SD-02	3028443019	Sediment
20†	UnnamedTrib-IS-SD-03	3028443020	Sediment
21†	CBD-ERB-01	3028443021	Water
22	CBD-ERB-02	3028443022	Water
23	CBD-ERB-03	3028443023	Water
24	CBD-ERB-04	3028443024	Water

* - Lead only † - Arsenic/Lead only

Mercury			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	Background-IS-SD-01	3028443001	Sediment
1MS	Background-IS-SD-01MS	3028443001MS	Sediment
1MSD	Background-IS-SD-01MSD	3028443001MSD	Sediment
2	Background-IS-SD-02	3028443002	Sediment
3	Background-IS-SD-03	3028443003	Sediment
4	EC21-IS-SD-01	3028443004	Sediment
5	EC21-IS-SD-02	3028443005	Sediment
6	EC21-IS-SD-03	3028443006	Sediment
15	EC58B-IS-SD-01	3028443015	Sediment
16	EC58B-IS-SD-02	3028443016	Sediment
17	EC58B-IS-SD-03	3028443017	Sediment
22	CBD-ERB-02	3028443022	Water
23	CBD-ERB-03	3028443023	Water
24	CBD-ERB-04	3028443024	Water

Dioxin/Furans			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
1	Background-IS-SD-01	L2266444-1	Sediment
1MS	Background-IS-SD-01MS	WG3040926-9	Sediment
1MSD	Background-IS-SD-01MSD	WG3040926-10	Sediment
2	Background-IS-SD-02	L2266444-4	Sediment
3	Background-IS-SD-03	L2266444-5	Sediment

Dioxin/Furans			
EDS ID	Client Sample ID	Laboratory Sample ID	Matrix
15	EC58B-IS-SD-01	L2266444-6	Sediment
16	EC58B-IS-SD-02	L2266444-7	Sediment
17	EC58B-IS-SD-03	L2266444-8	Sediment
23	CBD-ERB-03	L2266444-9	Water

A full data validation was performed on the analytical data for eight soil samples, twelve sediment samples, and four aqueous equipment rinsate blank samples collected on April 15-16, 2019 by EA Engineering at the Curtis Bay Depot site in Baltimore, Maryland. The samples were analyzed under the *"Test Methods for the Evaluation of Solid Waste, USEPA SW-846, Third Edition, September 1986, with revisions"*.

Specific method references are as follows:

Analysis	*Method References*
SVOC	USEPA SW-846 Method 8270D
PAH	USEPA SW-846 Method 8270D SIM
Total Metals	USEPA SW-846 Method 6020A
Metals (As/Pb)	USEPA SW-846 Method 6020A
Mercury	USEPA SW-846 Method 7471B
Dioxin/Furan	USEPA SW-846 Method 8290A

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods, DoD Quality Systems Manual for Environmental Laboratories (QSM), Version 5.0, July 2013, the Final Addendum to the Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, March 2019, and the USEPA National Functional Guidelines for Organic and Inorganic Data Review as follows:

- The USEPA Contract Laboratories Program National Functional Guidelines for Organic Superfund Methods Data Review, January 2017;
- The USEPA "Contract Laboratories Program National Functional Guidelines for Inorganic Superfund Methods Data Review," January 2017;
- and the reviewer's professional judgment.

The following items/criteria were reviewed for this report:

Organics

- Holding times and sample preservation
- Gas Chromatography/Mass Spectrometry (GC/MS) Tuning
- Initial and continuing calibration summaries
- Method blank and field blank contamination
- Surrogate Spike recoveries
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) recoveries
- Laboratory Control Sample (LCS) recoveries
- Internal standard area and retention time summary forms
- Target Compound Identification

- Compound Quantitation
- Tentatively Identified Compounds (TICs)
- Field Triplicate sample precision

Inorganics

- Holding times and sample preservation
- ICP/MS Tuning
- Initial and continuing calibration verifications
- Method blank and field blank contamination
- ICP Interference Check Sample
- Laboratory Control Sample (LCS) recoveries
- Matrix Spike Analysis
- Duplicate Sample Analysis
- ICP Serial Dilution
- Compound Quantitation
- ICP/MS Internal standards
- Field Triplicate sample precision

A full Level IV data validation was performed with this review including a recalculation of 10% of the detected results in the samples.

Data Usability Assessment

There were no rejections of data.

Overall the data is acceptable for the intended purposes as qualified for the deficiencies detailed in this report.

Please note that any results qualified (U) due to blank contamination may be then qualified (J) due to another action. Therefore, the results may be qualified (UJ) due to the culmination of the blank contaminations and actions from other exceedances of QC criteria.

Semivolatile Organic Compounds (SVOC & SVOC-SIM)

Holding Times

- All samples were extracted within 7 days for water samples, 14 days for soil samples, and analyzed within 40 days.

GC/MS Tuning

- All criteria were met.

Initial Calibration

- All %RSD and/or correlation coefficients and mean RRF criteria.

Continuing Calibration

- All %D and RRF criteria were met.

Method Blank

- The method blanks exhibited the following contamination.

SVOC-SIM				
Blank ID	Compound	Conc. ug/kg	Qualifier	Affected Samples
2935240 (MB)	Fluoranthene	0.80	None	All Associated >5X
	Pyrene	0.58	None	

Field Blank

- Field QC results are summarized below.

SVOC-SIM				
Blank ID	Compound	Conc. ug/L	Qualifier	Affected Samples
CBD-ERB-02	None - ND	-	-	-
CBD-ERB-03	None - ND	-	-	-
CBD-ERB-04	None - ND	-	-	-

Surrogate Spike Recoveries

- All samples exhibited acceptable surrogate %R values except for the following.

SVOC-SIM			
EDS Sample ID	Surrogate	%R	Qualifier
17	2-Methylnaphthalene	32.7%	J/UJ
	Fluoranthene-d10	49.1%	

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

SVOC			
EDS Sample ID	Compound	MS %R/MSD %R/RPD	Qualifier
11	Benzo(a)anthracene	43.2%/7.8%/OK	None - 4X Rule Applies
	Benzo(b)fluoranthene	35.6%/-17.4%/OK	
	Chrysene	46.3%/11.2%/OK	
	Phenanthrene	-47.9%/-41.8%/OK	

SVOC-SIM			
EDS Sample ID	Compound	MS %R/MSD %R/RPD	Qualifier
1	Benzo(b)fluoranthene	47.5%/OK/OK	J
	Benzo(ghi)perylene	37.1%/34.7%/OK	J
	Chrysene	53.2%/OK/OK	J
	Dibenzo(ah)anthracene	48.0%/49.1%/OK	J
	Fluoranthene	32.7%/50.8%/OK	J
	Indeno(123-cd)pyrene	42.0%/40.0%/OK	J
	Phenanthrene	22.4%/35.8%/OK	J
	Pyrene	45.3%/OK/OK	J

Laboratory Control Samples

- The LCS samples exhibited acceptable percent recoveries (%R).

Internal Standard (IS) Area Performance

- All internal standards met response and retention time (RT) criteria.

Target Compound Identification

- All mass spectra and quantitation criteria were met.

Compound Quantitation

- Several samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.

Tentatively Identified Compounds (TICs)

- TICs were not reported.

Field Triplicate Sample Precision

- Field triplicate results are summarized below. The precision was unacceptable (>30%) for several compounds in all triplicate pairs. These results were qualified as estimated (J).

SVOC-SIM					
Compound	Background-IS-SD-01 ug/kg	Background-IS-SD-02 ug/kg	Background-IS-SD-03 ug/kg	%RSD	Qualifier
Acenaphthene	5.7	0.58	0.61	128%	None - <5X LOQ
Acenaphthylene	1.1	0.99	1.1	6%	None
Anthracene	12.3	2.2	2.6	100%	None - <5X LOQ
Benzo(a)anthracene	32.6	15.2	14.2	50%	J
Benzo(a)pyrene	33.4	22.3	20.2	28%	None
Benzo(b)fluoranthene	61.0	44.8	43.3	20%	
Benzo(g,h,i)perylene	19.6	12.7	11.4	30%	
Benzo(k)fluoranthene	22.2	15.5	14.5	24%	
Chrysene	44.6	23.1	22.5	42%	J
Dibenzo(a,h)anthracene	6.2	3.1	2.8	47%	None - <5X LOQ
Fluoranthene	71.8	39.8	38.3	38%	J
Fluorene	6.3	1.2	1.8	90%	None - <5X LOQ
Indeno(1,2,3-cd)pyrene	24.5	14.5	14.3	33%	J
Naphthalene	1.8	1.3	1.4	18%	None
Phenanthrene	60.1	14.4	14.3	89%	J
Pyrene	59.1	36.7	34.2	32%	

SVOC-SIM					
Compound	EC21-IS-SD-01 ug/kg	EC21-IS-SD-02 ug/kg	EC21-IS-SD-03 ug/kg	%RSD	Qualifier
Acenaphthene	7.0	0.75	1.0	121%	None - <5X LOQ
Acenaphthylene	8.2	9.4	3.7	42%	
Anthracene	25.8	9.2	4.6	84%	J
Benzo(a)anthracene	72.7	32.0	20.1	66%	
Benzo(a)pyrene	76.4	52.3	26.0	49%	
Benzo(b)fluoranthene	134	110	58.9	38%	
Benzo(g,h,i)perylene	25.4	18.4	10.1	43%	
Benzo(k)fluoranthene	47.9	40.3	20.2	40%	
Chrysene	91.3	39.4	27.6	64%	
Dibenzo(a,h)anthracene	9.8	7.2	3.5	46%	None - <5X LOQ
Fluoranthene	145	55.3	46.2	66%	J
Fluorene	7.9	1.5	1.6	100%	None - <5X LOQ
Indeno(1,2,3-cd)pyrene	33.9	26.5	12.8	44%	J
Naphthalene	12.5	2.6	2.8	95%	None - <5X LOQ
Phenanthrene	91.4	13.6	16.5	109%	J
Pyrene	128	58.5	42.9	59%	

SVOC-SIM					
Compound	EC58B-IS-SD-01 ug/kg	EC58B-IS-SD-02 ug/kg	EC58B-IS-SD-03 ug/kg	%RSD	Qualifier
Acenaphthene	0.95	1.1	0.51	36%	None - <5X LOQ
Acenaphthylene	5.1	12.6	3.6	68%	
Anthracene	4.1	7.1	2.8	47%	
Benzo(a)anthracene	35.1	81.0	25.9	62%	J
Benzo(a)pyrene	34.9	75.6	25.8	58%	
Benzo(b)fluoranthene	51.9	108	37.6	57%	
Benzo(g,h,i)perylene	20.5	36.5	16.4	43%	
Benzo(k)fluoranthene	18.2	39.0	13.7	57%	

SVOC-SIM					
Compound	EC58B-IS-SD-01 ug/kg	EC58B-IS-SD-02 ug/kg	EC58B-IS-SD-03 ug/kg	%RSD	Qualifier
Chrysene	41.2	85.9	28.6	58%	J
Dibenzo(a,h)anthracene	7.1	11.5	5.1	41%	None - <5X LOQ
Fluoranthene	57.0	121	40.7	58%	J
Fluorene	1.5	1.9	0.82	39%	None - <5X LOQ
Indeno(1,2,3-cd)pyrene	25.4	47.6	19.8	48%	J
Naphthalene	3.9	4.5	1.7	44%	None - <5X LOQ
Phenanthrene	17.9	23.6	10.7	37%	J
Pyrene	51.1	108	36.4	58%	

SVOC					
Compound	EC21-IS-SO-03 ug/kg	EC21-IS-SO-07 ug/kg	EC21-IS-SO-08 ug/kg	%RSD	Qualifier
Acenaphthene	2570	1490	2350	27%	None
Acenaphthylene	1790	863	1200	37%	J
Anthracene	6400	3640	5510	27%	None
Benzo(a)anthracene	27100	15000	21700	29%	
Benzo(a)pyrene	24200	13500	19100	28%	
Benzo(b)fluoranthene	32700	18300	25600	28%	
Benzo(g,h,i)perylene	17100	6940	13200	41%	J
Benzo(k)fluoranthene	12400	5060	7000	47%	
Chrysene	29300	16100	22800	29%	None
Dibenzo(a,h)anthracene	3420	1900	2570	29%	
Fluoranthene	51200	28700	43800	28%	
Fluorene	2750	1610	2420	26%	
Indeno(1,2,3-cd)pyrene	18300	7490	13600	41%	J
Naphthalene	1740	1000	1940	32%	
Phenanthrene	33400	19000	29300	27%	None
Pyrene	46700	25600	41500	29%	

Metals and Mercury

Holding Times

- All samples were prepared and analyzed within 28 days for mercury and 180 days for all other metals.

ICP/MS Tuning

- All criteria were met.

Initial Calibration Verification

- All initial calibration criteria were met.

Continuing Calibration Verification

- All continuing calibration criteria were met.

Method Blank

- The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. mg/kg	Qualifier	Affected Samples
2936454 (MB)	Iron	20.7	None	All Associated >10X
2936448 (MB)	Iron	10.0	None	

Field Blank

- Field QC results are summarized below.

Blank ID	Compound	Conc. mg/L	Qualifier	Affected Samples
CBD-ERB-01	None - ND	-	-	-
CBD-ERB-02	Zinc	0.0027	None	All Associated >10X
CBD-ERB-03	Sodium	0.13	None	All Associated >10X
	Zinc	0.0020	None	
CBD-ERB-04	None - ND	-	-	-

ICP Interference Check Sample

- The ICP interference check sample exhibited acceptable %R values.

Laboratory Control Samples

- The LCS sample exhibited acceptable recoveries.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RPD	Qualifier	Affected Samples
1	Antimony	OK/69%/OK	UJ	1
	Calcium	OK/48%/OK	J	
	Magnesium	139%/OK/OK	J	

ICP Serial Dilution

- An ICP serial dilution was not performed.

Compound Quantitation

- Several samples were analyzed at various dilutions due to high concentrations of target compounds. The reporting limits were adjusted accordingly. No action was required.

ICP/MS Internal Standards

- All criteria were met.

Field Triplicate Sample Precision

- Field triplicate results are summarized below. The precision was unacceptable (>30%) for several compounds in one triplicate pair. These results were qualified as estimated (J).

Metals/Hg					
Compound	Background-IS-SD-01 mg/kg	Background-IS-SD-02 mg/kg	Background-IS-SD-03 mg/kg	%RSD	Qualifier
Aluminum	3000	3020	2720	6%	None
Arsenic	3.1	2.9	3.1	4%	
Barium	25.5	27.5	23.7	7%	
Beryllium	0.25	0.24	0.21	9%	
Calcium	431	440	436	1%	
Chromium	6.7	7.2	6.5	5%	
Cobalt	2.6	2.6	2.4	5%	
Copper	5.2	4.4	4.4	10%	
Iron	5670	5350	6010	6%	

Metals/Hg					
Compound	Background-IS-SD-01 mg/kg	Background-IS-SD-02 mg/kg	Background-IS-SD-03 mg/kg	%RSD	Qualifier
Lead	11.5	12.5	13.6	8%	None
Magnesium	379	502	385	16%	
Manganese	79.6	69.5	61.7	13%	
Nickel	2.9	3.1	2.6	9%	
Potassium	181	216	179	11%	
Selenium	0.79	1.5U	1.4U	NC	
Sodium	42.7	53.5	49.2	11%	
Vanadium	12.2	11.0	11.0	6%	
Zinc	15.6	16.8	14.9	6%	

Metals/Hg					
Compound	EC21-IS-SD-01 mg/kg	EC21-IS-SD-02 mg/kg	EC21-IS-SD-03 mg/kg	%RSD	Qualifier
Aluminum	15700	19900	17100	12%	None
Antimony	6.3	4.1	5.2	21%	
Arsenic	5.8	6.1	5.1	9%	
Barium	417	371	355	8%	
Beryllium	0.37	0.48	0.41	13%	
Cadmium	0.59	0.37	0.47	23%	
Calcium	45000	40000	37900	9%	
Chromium	18.2	23.2	19.3	13%	
Cobalt	4.0	4.9	4.1	11%	
Copper	55.0	59.1	55.9	4%	
Iron	11500	15500	12600	16%	
Lead	349	220	256	24%	
Magnesium	1090	1130	1110	2%	
Manganese	150	167	162	5%	
Mercury	0.16	0.14	0.13	11%	
Nickel	9.7	10.5	9.1	7%	
Potassium	1800	2040	2000	7%	
Selenium	1.2	1.1	1.2	5%	
Silver	0.33	0.59U	0.62U	NC	
Sodium	231	185	208	11%	
Thallium	0.16	0.16	0.32U	0%	
Vanadium	28.9	34.5	29.5	10%	
Zinc	163	123	133	15%	

Metals/Hg					
Compound	EC58B-IS-SD-01 mg/kg	EC58B-IS-SD-02 mg/kg	EC58B-IS-SD-03 mg/kg	%RSD	Qualifier
Aluminum	6750	6810	7640	7%	None
Antimony	0.81	0.35	0.34	54%	None - <5X LOQ
Arsenic	6.9	7.1	7.3	3%	None
Barium	48.9	39.7	38.3	14%	
Beryllium	0.42	0.44	0.44	3%	
Cadmium	0.25	0.17	0.33	32%	None - <5X LOQ
Calcium	1210	1180	1310	6%	None
Chromium	18.5	17.9	19.1	3%	
Cobalt	3.8	4.3	4.4	8%	

Metals/Hg					
Compound	EC58B-IS-SD-01 mg/kg	EC58B-IS-SD-02 mg/kg	EC58B-IS-SD-03 mg/kg	%RSD	Qualifier
Copper	56.9	19.4	28.6	56%	J
Iron	16900	20800	21000	12%	None
Lead	148	42.7	60.9	67%	J
Magnesium	771	797	704	6%	None
Manganese	153	152	153	0%	
Nickel	8.3	6.1	6.5	17%	
Potassium	479	497	514	4%	
Selenium	1.0	1.8	3.2U	40%	None - <5X LOQ
Sodium	29.5	29.5	25.0	9%	None
Vanadium	28.5	29.5	30.2	3%	
Zinc	120	42.4	47.4	62%	J

Metals					
Compound	UnnamedTrib-IS-SD-01 mg/kg	UnnamedTrib-IS-SD-03 mg/kg	UnnamedTrib-IS-SD-03 mg/kg	%RSD	Qualifier
Arsenic	39.4	47.2	44.4	9%	None
Lead	49.4	38.6	33.3	20%	

Dioxins/Furans

Holding times

- All samples were extracted within 30 days of collection and analyzed 45 days after extraction.

Initial Calibration

- The initial calibration percent recoveries (%R) criteria are met. The GC resolution criteria are met (percent valley ≤25%). The instrument sensitivity criteria are met (S/N ≥10) and the retention time criteria are met.

Calibration Verification

- The continuing calibration %R criteria are met. The instrument sensitivity criteria are met (S/N ≥10) and the retention time criteria are met.

Method Blank Analysis

- The method blanks exhibited the following contamination.

Blank ID	Compound	Conc. pg/g	Qualifier	Affected Samples
WG3040926-1	1,2,3,7,8-PeCDD	0.0260	None	All Associated >5X
	1,2,3,6,7,8-HxCDD	0.0325	None	
	OCDD	0.640	None	All Associated >10X
	1,2,3,4,6,7,8-HpCDF	0.0295	None	All Associated >5X

Field Blank Analysis

- Field QC results are summarized below.

Blank ID	Compound	Conc. pg/L	Qualifier	Affected Samples
CBD-ERB-03	OCDD	15.2	None	All Associated >10X
	1,2,3,4,6,7,8-HpCDF	1.13	U	All Samples
	OCDF	6.33	U	

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries

- The MS/MSD samples exhibited acceptable percent recoveries (%R) and RPD values except for the following.

EDS Sample ID	Compound	MS %R/MSD %R/RPD	Qualifier	Affected Samples
1	OCDD	NC/NC/NC	None	4X Rule Applies

Laboratory Control Sample Recoveries (LCS)

- The LCS exhibited acceptable percent recoveries (%R).

Identification Criteria

- All compounds were properly identified. The responses and S/N criteria were met. No interferences were noted.

Compound Quantitation

- Several samples were analyzed at a dilution due to high concentrations of OCDD. The reporting limits were adjusted accordingly. No action was required.
- Several analytes in several samples were flagged (R) by the laboratory indicating ion abundance ratios associated with a particular compound are outside QC limits. The reported result is an estimated maximum possible concentration (EMPC) for the associated compound. The reviewer further qualified these results estimated (J).

Field Triplicate Sample Precision

- Field triplicate results are summarized below. The precision was acceptable.

Dioxin/Furan					
Compound	Background-IS-SD-01 pg/g	Background-IS-SD-02 pg/g	Background-IS-SD-03 pg/g	%RSD	Qualifier
2,3,7,8-TCDD	0.038U	0.0602	0.0665	7%	None
1,2,3,7,8-PeCDD	0.258	0.189	0.241	16%	
1,2,3,4,7,8-HxCDD	0.400	0.386	0.409	3%	
1,2,3,6,7,8-HxCDD	0.740	0.718	0.742	2%	
1,2,3,7,8,9-HxCDD	0.876	0.757	0.801	7%	
1,2,3,4,6,7,8-HpCDD	36.1	35.2	35.6	1%	
OCDD	2540	2150	2210	9%	
2,3,7,8-TCDF	0.212	0.180	0.311	29%	
1,2,3,7,8-PeCDF	0.17	0.123	0.151	16%	
2,3,4,7,8-PeCDF	0.264	0.270	0.374	20%	
1,2,3,4,7,8-HxCDF	0.220	0.206	0.300	21%	
1,2,3,6,7,8-HxCDF	0.16	0.18	0.260	26%	
2,3,4,6,7,8-HxCDF	0.235	0.216	0.270	11%	
1,2,3,7,8,9-HxCDF	0.030U	0.0950	0.096	1%	
1,2,3,4,7,8,9-HxCDF	0.125	0.090	0.164	29%	

Dioxin/Furan					
Compound	EC58B-IS-SD-01 pg/g	EC58B-IS-SD-02 pg/g	EC58B-IS-SD-03 pg/g	%RSD	Qualifier
2,3,7,8-TCDD	0.156	0.0885	0.0624	47%	None - <5X LQL
1,2,3,7,8-PeCDD	0.604	0.374	0.287	39%	
1,2,3,4,7,8-HxCDD	0.839	0.680	0.518	24%	None
1,2,3,6,7,8-HxCDD	1.66	1.05	0.776	39%	None - <5X LQL
1,2,3,7,8,9-HxCDD	2.08	1.67	1.27	24%	None
1,2,3,4,6,7,8-HpCDD	66.3	59.4	40.2	24%	
OCDD	9600	9010	6760	18%	
2,3,7,8-TCDF	0.924	0.570	0.189	66%	None - <5X LQL
1,2,3,7,8-PeCDF	0.742	0.455	0.389	35%	
2,3,4,7,8-PeCDF	1.47	0.883	0.736	38%	
1,2,3,4,7,8-HxCDF	1.33	0.814	0.650	38%	
1,2,3,6,7,8-HxCDF	1.17	0.779	0.610	34%	
2,3,4,6,7,8-HxCDF	1.31	0.810	0.672	36%	
1,2,3,7,8,9-HxCDF	0.427	0.069	0.225	75%	
1,2,3,4,7,8,9-HxCDF	0.481	0.378	0.272	28%	None

Please contact the undersigned a[redacted] if you have any questions or need further information.

Signed: [redacted] Dated: 8/7/19

Senior Chemist

Data Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
J	The analyte is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity, but the result may be biased high.
J-	The result is an estimated quantity, but the result may be biased low.
NJ	The analysis has been "tentatively identified" or "presumptively" as present and the associated numerical value is the estimated concentration in the samples.
UJ	The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
R	The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the samples.

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443001** Date Collected: 4/15/2019 13:15 Matrix: Solid

Sample ID: **Background-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	5.7		ug/kg	3.3	2.7	0.46	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Acenaphthylene	1.1J	J	ug/kg	3.3	2.7	0.42	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Anthracene	12.3		ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Benzo(a)anthracene	32.6 J		ug/kg	3.3	2.7	0.86	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Benzo(a)pyrene	33.4		ug/kg	3.3	2.7	0.99	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Benzo(b)fluoranthene	61.0 J	~~26~~	ug/kg	3.3	2.7	1.1	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Benzo(g,h,i)perylene	19.6 J	~~31.3~~	ug/kg	3.3	2.7	0.87	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Benzo(k)fluoranthene	22.2		ug/kg	3.3	2.7	0.97	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Chrysene	44.6 J	~~25~~	ug/kg	3.3	2.7	0.95	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Dibenzo(a,h)anthracene	6.2 J	~~29.3~~	ug/kg	3.3	2.7	0.79	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Fluoranthene	71.8 J	~~22.2~~	ug/kg	3.3	2.7	0.55	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Fluorene	6.3		ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Indeno(1,2,3-cd)pyrene	24.5 J	~~27.2~~	ug/kg	3.3	2.7	0.81	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Naphthalene	1.8J		ug/kg	3.3	2.7	0.47	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Phenanthrene	60.1 J	~~20.2~~	ug/kg	3.3	2.7	0.63	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Pyrene	59.1 J	~~24~~	ug/kg	3.3	2.7	0.56	8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	68.8		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
Fluoranthene-d10 (S)	75.5		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 12:42	GEC	B
METALS												
Aluminum, Total	3000		mg/kg	38.2	25.3	12.4	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Antimony, Total	0.62~~0~~ UJ	~~U,2~~	mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Arsenic, Total	3.1		mg/kg	1.4	0.95	0.48	SW846 6020A	4/30/19	AHI	5/21/19 19:33	MO	B1
Barium, Total	25.5		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Beryllium, Total	0.25J	J	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Cadmium, Total	0.32U	U	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Calcium, Total	431 J	~~3~~	mg/kg	47.7	32.0	7.6	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Chromium, Total	6.7		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Cobalt, Total	2.6		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Copper, Total	5.2		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Iron, Total	5670	~~18~~	mg/kg	23.9	15.7	7.6	SW846 6020A	4/30/19	AHI	5/21/19 19:33	MO	B1
Lead, Total	11.5		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Magnesium, Total	379 J	~~4~~	mg/kg	47.7	32.0	4.8	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443001** Date Collected: 4/15/2019 13:15 Matrix: Solid

Sample ID: **Background-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Manganese, Total	79.6		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Mercury, Total	0.13U	U	mg/kg	0.19	0.13	0.063	SW846 7471B	5/3/19	MSA	5/3/19 06:40	MSA	B2
Nickel, Total	2.9		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Potassium, Total	181		mg/kg	47.7	32.0	6.2	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Selenium, Total	0.79J	J	mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/21/19 19:33	MO	B1
Silver, Total	0.62U	U	mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Sodium, Total	42.7J	J	mg/kg	47.7	32.0	4.8	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Thallium, Total	0.32U	U	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Vanadium, Total	12.2		mg/kg	1.4	0.95	0.48	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
Zinc, Total	15.6		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/20/19 15:27	MO	B1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:12	SUB	B

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443002** Date Collected: 4/15/2019 13:15 Matrix: Solid

Sample ID: **Background-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.58J	J	ug/kg	3.3	2.7	0.46	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Acenaphthylene	0.99J	J	ug/kg	3.3	2.7	0.42	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Anthracene	2.2J	J	ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Benzo(a)anthracene	15.2 J		ug/kg	3.3	2.7	0.85	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Benzo(a)pyrene	22.3		ug/kg	3.3	2.7	0.98	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Benzo(b)fluoranthene	44.8		ug/kg	3.3	2.7	1.1	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Benzo(g,h,i)perylene	12.7		ug/kg	3.3	2.7	0.86	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Benzo(k)fluoranthene	15.5		ug/kg	3.3	2.7	0.96	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Chrysene	23.1 J		ug/kg	3.3	2.7	0.94	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Dibenzo(a,h)anthracene	3.1J	J	ug/kg	3.3	2.7	0.78	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Fluoranthene	39.8 J		ug/kg	3.3	2.7	0.55	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Fluorene	1.2J	J	ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Indeno(1,2,3-cd)pyrene	14.5 J		ug/kg	3.3	2.7	0.80	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Naphthalene	1.3J	J	ug/kg	3.3	2.7	0.47	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Phenanthrene	14.4 J		ug/kg	3.3	2.7	0.63	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Pyrene	36.7 J		ug/kg	3.3	2.7	0.56	8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	70.4		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
Fluoranthene-d10 (S)	81.4		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 14:07	GEC	B
METALS												
Aluminum, Total	3020		mg/kg	36.6	24.2	11.9	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Antimony, Total	0.59U	U	mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Arsenic, Total	2.9		mg/kg	1.4	0.91	0.46	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Barium, Total	27.5		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Beryllium, Total	0.24J	J	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Cadmium, Total	0.31U	U	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Calcium, Total	440		mg/kg	45.7	30.6	7.3	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Chromium, Total	7.2		mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Cobalt, Total	2.6		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Copper, Total	4.4		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Iron, Total	5350		mg/kg	22.9	15.1	7.3	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Lead, Total	12.5		mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Magnesium, Total	502		mg/kg	45.7	30.6	4.6	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Manganese, Total	69.5		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Mercury, Total	0.12U	U	mg/kg	0.19	0.12	0.061	SW846 7471B	5/3/19	MSA	5/3/19 06:28	MSA	B2
Nickel, Total	3.1		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443002** Date Collected: 4/15/2019 13:15 Matrix: Solid

Sample ID: **Background-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	216		mg/kg	45.7	30.6	5.9	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Selenium, Total	1.5U	U	mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Silver, Total	0.59U	U	mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Sodium, Total	53.5		mg/kg	45.7	30.6	4.6	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Thallium, Total	0.31U	U	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Vanadium, Total	11.0		mg/kg	1.4	0.91	0.46	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
Zinc, Total	16.8		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:14	MO	B1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:12	SUB	B

[redacted]

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443003** Date Collected: 4/15/2019 13:15 Matrix: Solid

Sample ID: **Background-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.61J	J	ug/kg	3.2	2.6	0.44	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Acenaphthylene	1.1J	J	ug/kg	3.2	2.6	0.40	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Anthracene	2.6J	J	ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Benzo(a)anthracene	14.2 J		ug/kg	3.2	2.6	0.83	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Benzo(a)pyrene	20.2		ug/kg	3.2	2.6	0.95	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Benzo(b)fluoranthene	43.3		ug/kg	3.2	2.6	1.1	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Benzo(g,h,i)perylene	11.4		ug/kg	3.2	2.6	0.84	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Benzo(k)fluoranthene	14.5		ug/kg	3.2	2.6	0.93	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Chrysene	22.5 J		ug/kg	3.2	2.6	0.91	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Dibenzo(a,h)anthracene	2.8J	J	ug/kg	3.2	2.6	0.76	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Fluoranthene	38.3 J		ug/kg	3.2	2.6	0.53	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Fluorene	1.8J	J	ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Indeno(1,2,3-cd)pyrene	14.3 J		ug/kg	3.2	2.6	0.78	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Naphthalene	1.4J	J	ug/kg	3.2	2.6	0.45	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Phenanthrene	14.3 J		ug/kg	3.2	2.6	0.61	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Pyrene	34.2 J		ug/kg	3.2	2.6	0.54	8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	61.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
Fluoranthene-d10 (S)	77.4		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 14:35	GEC	B
METALS												
Aluminum, Total	2720		mg/kg	33.5	22.2	10.9	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Antimony, Total	0.54U	U	mg/kg	0.84	0.54	0.28	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Arsenic, Total	3.1		mg/kg	1.3	0.84	0.42	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Barium, Total	23.7		mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Beryllium, Total	0.21J	J	mg/kg	0.42	0.28	0.14	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Cadmium, Total	0.28U	U	mg/kg	0.42	0.28	0.14	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Calcium, Total	436		mg/kg	41.9	28.1	6.7	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Chromium, Total	6.5		mg/kg	0.84	0.54	0.28	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Cobalt, Total	2.4		mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Copper, Total	4.4		mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Iron, Total	6010		mg/kg	20.9	13.8	6.7	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Lead, Total	13.6		mg/kg	0.84	0.54	0.28	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Magnesium, Total	385		mg/kg	41.9	28.1	4.2	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Manganese, Total	61.7		mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Mercury, Total	0.12U	U	mg/kg	0.19	0.12	0.062	SW846 7471B	5/3/19	MSA	5/3/19 06:29	MSA	B2
Nickel, Total	2.6		mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443003** Date Collected: 4/15/2019 13:15 Matrix: Solid

Sample ID: **Background-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	179		mg/kg	41.9	28.1	5.4	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Selenium, Total	1.4U	U	mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Silver, Total	0.54U	U	mg/kg	0.84	0.54	0.28	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Sodium, Total	49.2		mg/kg	41.9	28.1	4.2	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Thallium, Total	0.28U	U	mg/kg	0.42	0.28	0.14	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Vanadium, Total	11.0		mg/kg	1.3	0.84	0.42	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
Zinc, Total	14.9		mg/kg	2.1	1.4	0.67	SW846 6020A	4/30/19	AHI	5/24/19 12:17	MO	B1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:13	SUB	B

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443004** Date Collected: 4/15/2019 14:45 Matrix: Solid

Sample ID: **EC21-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	7.0		ug/kg	3.2	2.6	0.45	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Acenaphthylene	8.2		ug/kg	3.2	2.6	0.41	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Anthracene	25.8 J		ug/kg	3.2	2.6	0.47	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Benzo(a)anthracene	72.7 J		ug/kg	3.2	2.6	0.84	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Benzo(a)pyrene	76.4 J		ug/kg	3.2	2.6	0.97	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Benzo(b)fluoranthene	134 J		ug/kg	3.2	2.6	1.1	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Benzo(g,h,i)perylene	25.4 J		ug/kg	3.2	2.6	0.85	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Benzo(k)fluoranthene	47.9 J		ug/kg	3.2	2.6	0.95	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Chrysene	91.3 J		ug/kg	3.2	2.6	0.93	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Dibenzo(a,h)anthracene	9.8		ug/kg	3.2	2.6	0.77	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Fluoranthene	145 J		ug/kg	3.2	2.6	0.54	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Fluorene	7.9		ug/kg	3.2	2.6	0.47	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Indeno(1,2,3-cd)pyrene	33.9 J		ug/kg	3.2	2.6	0.79	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Naphthalene	12.5		ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Phenanthrene	91.4 J		ug/kg	3.2	2.6	0.62	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Pyrene	128 J		ug/kg	3.2	2.6	0.55	8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	68.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
Fluoranthene-d10 (S)	74.6		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 15:04	GEC	B
METALS												
Aluminum, Total	15700		mg/kg	70.2	46.5	22.8	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Antimony, Total	6.3		mg/kg	0.88	0.57	0.29	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Arsenic, Total	5.8		mg/kg	1.3	0.88	0.44	SW846 6020A	4/30/19	AHI	5/24/19 13:55	MO	B1
Barium, Total	417		mg/kg	2.2	1.4	0.70	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Beryllium, Total	0.37J	J	mg/kg	0.88	0.59	0.29	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Cadmium, Total	0.59		mg/kg	0.44	0.29	0.14	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Calcium, Total	45000		mg/kg	87.7	58.8	14.0	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Chromium, Total	18.2		mg/kg	1.8	1.1	0.58	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Cobalt, Total	4.0J	J	mg/kg	4.4	2.9	1.4	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Copper, Total	55.0		mg/kg	4.4	2.9	1.4	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Iron, Total	11500		mg/kg	21.9	14.5	7.0	SW846 6020A	4/30/19	AHI	5/24/19 13:55	MO	B1
Lead, Total	349		mg/kg	0.88	0.57	0.29	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Magnesium, Total	1090		mg/kg	43.9	29.4	4.4	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Manganese, Total	150		mg/kg	4.4	2.9	1.4	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Mercury, Total	0.16J	J	mg/kg	0.19	0.13	0.063	SW846 7471B	5/3/19	MSA	5/3/19 06:31	MSA	B2
Nickel, Total	9.7		mg/kg	4.4	2.9	1.4	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443004** Date Collected: 4/15/2019 14:45 Matrix: Solid

Sample ID: **EC21-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	1800		mg/kg	43.9	29.4	5.7	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Selenium, Total	1.2J	J	mg/kg	2.2	1.4	0.70	SW846 6020A	4/30/19	AHI	5/24/19 13:55	MO	B1
Silver, Total	0.33J	J	mg/kg	0.88	0.57	0.29	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Sodium, Total	231		mg/kg	43.9	29.4	4.4	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Thallium, Total	0.16J	J	mg/kg	0.44	0.29	0.14	SW846 6020A	4/30/19	AHI	5/24/19 12:20	MO	B1
Vanadium, Total	28.9		mg/kg	2.6	1.8	0.88	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1
Zinc, Total	163		mg/kg	4.4	2.9	1.4	SW846 6020A	4/30/19	AHI	5/24/19 15:01	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443005** Date Collected: 4/15/2019 14:45 Matrix: Solid

Sample ID: **EC21-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.75J	J	ug/kg	3.2	2.6	0.44	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Acenaphthylene	9.4		ug/kg	3.2	2.6	0.40	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Anthracene	9.2 J		ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Benzo(a)anthracene	32.0		ug/kg	3.2	2.6	0.83	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Benzo(a)pyrene	52.3		ug/kg	3.2	2.6	0.95	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Benzo(b)fluoranthene	110		ug/kg	3.2	2.6	1.1	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Benzo(g,h,i)perylene	18.4		ug/kg	3.2	2.6	0.84	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Benzo(k)fluoranthene	40.3		ug/kg	3.2	2.6	0.93	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Chrysene	39.4		ug/kg	3.2	2.6	0.91	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Dibenzo(a,h)anthracene	7.2		ug/kg	3.2	2.6	0.76	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Fluoranthene	55.3 J		ug/kg	3.2	2.6	0.53	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Fluorene	1.5J	J	ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Indeno(1,2,3-cd)pyrene	26.5 J		ug/kg	3.2	2.6	0.78	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Naphthalene	2.6J	J	ug/kg	3.2	2.6	0.45	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Phenanthrene	13.6 J		ug/kg	3.2	2.6	0.61	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Pyrene	58.5 J		ug/kg	3.2	2.6	0.54	8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	64.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
Fluoranthene-d10 (S)	74.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 15:32	GEC	B
METALS												
Aluminum, Total	19900		mg/kg	73.0	48.4	23.7	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Antimony, Total	4.1		mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Arsenic, Total	6.1		mg/kg	1.4	0.91	0.46	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Barium, Total	371		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Beryllium, Total	0.48J	J	mg/kg	0.91	0.61	0.30	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Cadmium, Total	0.37J	J	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Calcium, Total	40000		mg/kg	91.2	61.1	14.6	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Chromium, Total	23.2		mg/kg	1.8	1.2	0.60	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Cobalt, Total	4.9		mg/kg	4.6	3.0	1.5	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Copper, Total	59.1		mg/kg	4.6	3.0	1.5	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Iron, Total	15500		mg/kg	22.8	15.1	7.3	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Lead, Total	220		mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Magnesium, Total	1130		mg/kg	45.6	30.6	4.6	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Manganese, Total	167		mg/kg	4.6	3.0	1.5	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Mercury, Total	0.14J	J	mg/kg	0.19	0.13	0.063	SW846 7471B	5/3/19	MSA	5/3/19 06:32	MSA	B2
Nickel, Total	10.5		mg/kg	4.6	3.0	1.5	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443005** Date Collected: 4/15/2019 14:45 Matrix: Solid

Sample ID: **EC21-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	2040		mg/kg	45.6	30.6	5.9	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Selenium, Total	1.1J	J	mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Silver, Total	0.59U	U	mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Sodium, Total	185		mg/kg	45.6	30.6	4.6	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Thallium, Total	0.16J	J	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:23	MO	B1
Vanadium, Total	34.5		mg/kg	2.7	1.8	0.91	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1
Zinc, Total	123		mg/kg	4.6	3.0	1.5	SW846 6020A	4/30/19	AHI	5/24/19 14:52	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443006** Date Collected: 4/15/2019 14:45 Matrix: Solid

Sample ID: **EC21-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	1.0J	J	ug/kg	3.3	2.7	0.46	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Acenaphthylene	3.7		ug/kg	3.3	2.7	0.42	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Anthracene	4.6 J		ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Benzo(a)anthracene	20.1		ug/kg	3.3	2.7	0.85	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Benzo(a)pyrene	26.0		ug/kg	3.3	2.7	0.98	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Benzo(b)fluoranthene	58.9		ug/kg	3.3	2.7	1.1	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Benzo(g,h,i)perylene	10.1		ug/kg	3.3	2.7	0.86	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Benzo(k)fluoranthene	20.2		ug/kg	3.3	2.7	0.96	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Chrysene	27.6		ug/kg	3.3	2.7	0.94	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Dibenzo(a,h)anthracene	3.5		ug/kg	3.3	2.7	0.78	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Fluoranthene	46.2 J		ug/kg	3.3	2.7	0.55	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Fluorene	1.6J	J	ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Indeno(1,2,3-cd)pyrene	12.8 J		ug/kg	3.3	2.7	0.80	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Naphthalene	2.8J	J	ug/kg	3.3	2.7	0.47	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Phenanthrene	16.5 J		ug/kg	3.3	2.7	0.63	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Pyrene	42.9 J		ug/kg	3.3	2.7	0.56	8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	71.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
Fluoranthene-d10 (S)	73.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 16:01	GEC	B
METALS												
Aluminum, Total	17100		mg/kg	38.0	25.2	12.4	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Antimony, Total	5.2		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Arsenic, Total	5.1		mg/kg	1.4	0.95	0.48	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Barium, Total	355		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Beryllium, Total	0.41J	J	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Cadmium, Total	0.47J	J	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Calcium, Total	37900		mg/kg	47.5	31.8	7.6	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Chromium, Total	19.3		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Cobalt, Total	4.1		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Copper, Total	55.9		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Iron, Total	12600		mg/kg	23.8	15.7	7.6	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Lead, Total	256		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Magnesium, Total	1110		mg/kg	47.5	31.8	4.8	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Manganese, Total	162		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Mercury, Total	0.13J	J	mg/kg	0.18	0.12	0.059	SW846 7471B	5/3/19	MSA	5/3/19 06:33	MSA	B2
Nickel, Total	9.1		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443006** Date Collected: 4/15/2019 14:45 Matrix: Solid

Sample ID: **EC21-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	2000		mg/kg	47.5	31.8	6.2	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Selenium, Total	1.2J	J	mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Silver, Total	0.62U	U	mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Sodium, Total	208		mg/kg	47.5	31.8	4.8	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Thallium, Total	0.32U	U	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Vanadium, Total	29.5		mg/kg	1.4	0.95	0.48	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1
Zinc, Total	133		mg/kg	2.4	1.6	0.76	SW846 6020A	4/30/19	AHI	5/24/19 12:26	MO	B1

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Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443007** Date Collected: 4/16/2019 14:15 Matrix: Solid

Sample ID: **EC21-IS-SO-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	2920		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Acenaphthylene	3560		ug/kg	98.7	66.1	6.9	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Anthracene	11300		ug/kg	4930	3310	395	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Benzo(a)anthracene	49100		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Benzo(a)pyrene	43500		ug/kg	4930	3310	197	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Benzo(b)fluoranthene	62300		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Benzo(g,h,i)perylene	29200		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Benzo(k)fluoranthene	22000		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Chrysene	52700		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Dibenzo(a,h)anthracene	5890		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Fluoranthene	94400		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Fluorene	3050		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Indeno(1,2,3-cd)pyrene	30100		ug/kg	4930	3310	345	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Naphthalene	1470		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Phenanthrene	51000		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Pyrene	87800		ug/kg	4930	3310	247	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	59.7		%	39 - 132	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
2,4,6-Tribromophenol (S)	51.4		%	39 - 132	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
2-Fluorobiphenyl (S)	58.3		%	44 - 115	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
2-Fluorobiphenyl (S)	74.5		%	44 - 115	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
2-Fluorophenol (S)	48		%	35 - 115	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
2-Fluorophenol (S)	40.6		%	35 - 115	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Nitrobenzene-d5 (S)	59.8		%	37 - 122	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Nitrobenzene-d5 (S)	50.5		%	37 - 122	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Phenol-d5 (S)	39.5		%	33 - 122	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Phenol-d5 (S)	46.5		%	33 - 122	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
Terphenyl-d14 (S)	66.7		%	54 - 127	SW846 8270D	4/29/19	J1H	4/30/19 17:35	GEC	B
Terphenyl-d14 (S)	84.2		%	54 - 127	SW846 8270D	4/29/19	J1H	5/1/19 15:57	CGS	B
METALS										
Lead, Total	231		mg/kg	0.89	0.58	0.29	SW846 6020A	4/30/19	AHI	5/24/19 12:57	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443008** Date Collected: 4/16/2019 13:45 Matrix: Solid

Sample ID: **EC21-IS-SO-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	2090		ug/kg	94.3	63.2	5.7	SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Acenaphthylene	2690		ug/kg	94.3	63.2	6.6	SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Anthracene	6720		ug/kg	94.3	63.2	7.5	SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Benzo(a)anthracene	36900		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Benzo(a)pyrene	32500		ug/kg	943	632	37.7	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Benzo(b)fluoranthene	45600		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Benzo(g,h,i)perylene	23400		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Benzo(k)fluoranthene	15900		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Chrysene	39600		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Dibenzo(a,h)anthracene	4450		ug/kg	94.3	63.2	5.7	SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Fluoranthene	70000		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Fluorene	2210		ug/kg	94.3	63.2	5.7	SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Indeno(1,2,3-cd)pyrene	24300		ug/kg	943	632	66.0	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Naphthalene	916		ug/kg	94.3	63.2	5.7	SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Phenanthrene	38000		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Pyrene	62400		ug/kg	943	632	47.2	SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	55.2		%	39 - 132			SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
2,4,6-Tribromophenol (S)	65.2		%	39 - 132			SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
2-Fluorobiphenyl (S)	78.5		%	44 - 115			SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
2-Fluorobiphenyl (S)	59.2		%	44 - 115			SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
2-Fluorophenol (S)	50.1		%	35 - 115			SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
2-Fluorophenol (S)	40.3		%	35 - 115			SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Nitrobenzene-d5 (S)	64.3		%	37 - 122			SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Nitrobenzene-d5 (S)	52.3		%	37 - 122			SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Phenol-d5 (S)	40.1		%	33 - 122			SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
Phenol-d5 (S)	48.6		%	33 - 122			SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Terphenyl-d14 (S)	77.8		%	54 - 127			SW846 8270D	4/29/19	J1H	5/1/19 10:38	CGS	B
Terphenyl-d14 (S)	69.5		%	54 - 127			SW846 8270D	4/29/19	J1H	4/30/19 18:00	GEC	B
METALS												
Lead, Total	167		mg/kg	0.85	0.55	0.28	SW846 6020A	4/30/19	AHI	5/24/19 13:00	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443009** Date Collected: 4/16/2019 10:45 Matrix: Solid

Sample ID: **EC21-IS-SO-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	2570		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Acenaphthylene	1790	J	ug/kg	100	67.0	7.0	SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Anthracene	6400		ug/kg	100	67.0	8.0	SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Benzo(a)anthracene	27100		ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Benzo(a)pyrene	24200		ug/kg	1000	670	40.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Benzo(b)fluoranthene	32700		ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Benzo(g,h,i)perylene	17100	J	ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Benzo(k)fluoranthene	12400	J	ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Chrysene	29300		ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Dibenzo(a,h)anthracene	3420		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Fluoranthene	51200		ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Fluorene	2750		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Indeno(1,2,3-cd)pyrene	18300	J	ug/kg	1000	670	70.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Naphthalene	1740	J	ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Phenanthrene	33400		ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Pyrene	46700		ug/kg	1000	670	50.0	SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	74.7		%	39 - 132			SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
2,4,6-Tribromophenol (S)	63.4		%	39 - 132			SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
2-Fluorobiphenyl (S)	89.3		%	44 - 115			SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
2-Fluorobiphenyl (S)	66.6		%	44 - 115			SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
2-Fluorophenol (S)	57		%	35 - 115			SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
2-Fluorophenol (S)	51.6		%	35 - 115			SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Nitrobenzene-d5 (S)	60.7		%	37 - 122			SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Nitrobenzene-d5 (S)	68.8		%	37 - 122			SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Phenol-d5 (S)	55.6		%	33 - 122			SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
Phenol-d5 (S)	48.1		%	33 - 122			SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Terphenyl-d14 (S)	74.9		%	54 - 127			SW846 8270D	4/29/19	J1H	4/30/19 18:24	GEC	B
Terphenyl-d14 (S)	89		%	54 - 127			SW846 8270D	4/29/19	J1H	5/1/19 11:03	CGS	B
METALS												
Lead, Total	377		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 13:03	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443010** Date Collected: 4/16/2019 13:15 Matrix: Solid

Sample ID: **EC21-IS-SO-04** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	1520		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Acenaphthylene	1270		ug/kg	98.0	65.7	6.9	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Anthracene	3990		ug/kg	98.0	65.7	7.8	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Benzo(a)anthracene	20000		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Benzo(a)pyrene	17700		ug/kg	980	657	39.2	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Benzo(b)fluoranthene	24900		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Benzo(g,h,i)perylene	12600		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Benzo(k)fluoranthene	6360		ug/kg	98.0	65.7	4.9	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Chrysene	21000		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Dibenzo(a,h)anthracene	2450		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Fluoranthene	37400		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Fluorene	1530		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Indeno(1,2,3-cd)pyrene	13400		ug/kg	980	657	68.6	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Naphthalene	797		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Phenanthrene	20600		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Pyrene	33100		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	47.8		%	39 - 132			SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
2,4,6-Tribromophenol (S)	42.8		%	39 - 132			SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
2-Fluorobiphenyl (S)	82.4		%	44 - 115			SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
2-Fluorobiphenyl (S)	64		%	44 - 115			SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
2-Fluorophenol (S)	33.1		%	35 - 115			SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
2-Fluorophenol (S)	28.4	X	%	35 - 115			SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Nitrobenzene-d5 (S)	56.7		%	37 - 122			SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Nitrobenzene-d5 (S)	66.8		%	37 - 122			SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Phenol-d5 (S)	31.5	2	%	33 - 122			SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
Phenol-d5 (S)	36.1		%	33 - 122			SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Terphenyl-d14 (S)	84.9		%	54 - 127			SW846 8270D	4/29/19	J1H	5/1/19 11:27	CGS	B
Terphenyl-d14 (S)	68.2		%	54 - 127			SW846 8270D	4/29/19	J1H	4/30/19 18:49	GEC	B
METALS												
Lead, Total	668		mg/kg	0.99	0.64	0.33	SW846 6020A	4/30/19	AHI	5/24/19 13:06	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443011** Date Collected: 4/16/2019 12:45 Matrix: Solid

Sample ID: **EC21-IS-SO-05** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	1220		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Acenaphthylene	257		ug/kg	100	67.0	7.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Anthracene	2560		ug/kg	100	67.0	8.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Benzo(a)anthracene	10100	~~7,6~~	ug/kg	400	268	20.0	SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Benzo(a)pyrene	7210		ug/kg	100	67.0	4.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Benzo(b)fluoranthene	11600	~~11,1 2~~	ug/kg	400	268	20.0	SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Benzo(g,h,i)perylene	4570		ug/kg	100	67.0	5.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Benzo(k)fluoranthene	3640		ug/kg	100	67.0	5.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Chrysene	10200	~~10,9~~	ug/kg	400	268	20.0	SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Dibenzo(a,h)anthracene	1220		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Fluoranthene	19900	~~3,4~~	ug/kg	400	268	20.0	SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Fluorene	1090		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Indeno(1,2,3-cd)pyrene	5010		ug/kg	100	67.0	7.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Naphthalene	263		ug/kg	100	67.0	6.0	SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Phenanthrene	13300	~~1,2~~	ug/kg	400	268	20.0	SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Pyrene	18500	~~5,6~~	ug/kg	400	268	20.0	SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	60.7		%	39 - 132			SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
2,4,6-Tribromophenol (S)	67.1		%	39 - 132			SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
2-Fluorobiphenyl (S)	79		%	44 - 115			SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
2-Fluorobiphenyl (S)	64.2		%	44 - 115			SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
2-Fluorophenol (S)	45.9		%	35 - 115			SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
2-Fluorophenol (S)	51.4		%	35 - 115			SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Nitrobenzene-d5 (S)	58.7		%	37 - 122			SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Nitrobenzene-d5 (S)	67.3		%	37 - 122			SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Phenol-d5 (S)	44.1		%	33 - 122			SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
Phenol-d5 (S)	50.7		%	33 - 122			SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Terphenyl-d14 (S)	77.5		%	54 - 127			SW846 8270D	4/29/19	J1H	5/1/19 11:52	CGS	B
Terphenyl-d14 (S)	64.8		%	54 - 127			SW846 8270D	4/29/19	J1H	4/30/19 19:14	GEC	B
METALS												
Lead, Total	974		mg/kg	0.93	0.61	0.31	SW846 6020A	4/30/19	AHI	5/24/19 13:31	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443012** Date Collected: 4/16/2019 12:15 Matrix: Solid

Sample ID: **EC21-IS-SO-06** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	5840		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Acenaphthylene	1730		ug/kg	98.7	66.1	6.9	SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Anthracene	17600		ug/kg	1970	1320	158	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Benzo(a)anthracene	55500		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Benzo(a)pyrene	47900		ug/kg	1970	1320	78.9	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Benzo(b)fluoranthene	64200		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Benzo(g,h,i)perylene	31700		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Benzo(k)fluoranthene	25000		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Chrysene	57000		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Dibenzo(a,h)anthracene	6320		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Fluoranthene	107000		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Fluorene	5550		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Indeno(1,2,3-cd)pyrene	34300		ug/kg	1970	1320	138	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Naphthalene	2060		ug/kg	98.7	66.1	5.9	SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Phenanthrene	73400		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Pyrene	102000		ug/kg	1970	1320	98.7	SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	43.8		%	39 - 132			SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
2,4,6-Tribromophenol (S)	48		%	39 - 132			SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
2-Fluorobiphenyl (S)	47.2		%	44 - 115			SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
2-Fluorobiphenyl (S)	61		%	44 - 115			SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
2-Fluorophenol (S)	29.8	✗	%	35 - 115			SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
2-Fluorophenol (S)	34.3		%	35 - 115			SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Nitrobenzene-d5 (S)	40.7		%	37 - 122			SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Nitrobenzene-d5 (S)	52.6		%	37 - 122			SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Phenol-d5 (S)	35.9		%	33 - 122			SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Phenol-d5 (S)	30.6	✗	%	33 - 122			SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
Terphenyl-d14 (S)	75.8		%	54 - 127			SW846 8270D	4/29/19	J1H	5/1/19 12:39	CGS	B
Terphenyl-d14 (S)	60.7		%	54 - 127			SW846 8270D	4/29/19	J1H	4/30/19 20:28	GEC	B
METALS												
Lead, Total	539		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 13:09	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443013** Date Collected: 4/16/2019 10:45 Matrix: Solid

Sample ID: **EC21-IS-SO-07** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	1490		ug/kg	94.9	63.6	5.7	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Acenaphthylene	863	J	ug/kg	94.9	63.6	6.6	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Anthracene	3640		ug/kg	94.9	63.6	7.6	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Benzo(a)anthracene	15000		ug/kg	475	318	23.7	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Benzo(a)pyrene	13500		ug/kg	475	318	19.0	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Benzo(b)fluoranthene	18300		ug/kg	475	318	23.7	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Benzo(g,h,i)perylene	6940	J	ug/kg	94.9	63.6	4.7	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Benzo(k)fluoranthene	5060	J	ug/kg	94.9	63.6	4.7	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Chrysene	16100		ug/kg	475	318	23.7	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Dibenzo(a,h)anthracene	1900		ug/kg	94.9	63.6	5.7	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Fluoranthene	28700		ug/kg	475	318	23.7	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Fluorene	1610		ug/kg	94.9	63.6	5.7	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Indeno(1,2,3-cd)pyrene	7490	J	ug/kg	94.9	63.6	6.6	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Naphthalene	1000	J	ug/kg	94.9	63.6	5.7	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Phenanthrene	19000		ug/kg	475	318	23.7	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Pyrene	25600		ug/kg	475	318	23.7	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B

Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*	*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	57		%	39 - 132	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
2,4,6-Tribromophenol (S)	44.3		%	39 - 132	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
2-Fluorobiphenyl (S)	49.6		%	44 - 115	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
2-Fluorobiphenyl (S)	67.2		%	44 - 115	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
2-Fluorophenol (S)	40.6		%	35 - 115	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
2-Fluorophenol (S)	34.5	1	%	35 - 115	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Nitrobenzene-d5 (S)	43.1		%	37 - 122	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Nitrobenzene-d5 (S)	54.9		%	37 - 122	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Phenol-d5 (S)	35.2		%	33 - 122	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
Phenol-d5 (S)	43.2		%	33 - 122	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Terphenyl-d14 (S)	66.5		%	54 - 127	SW846 8270D	4/29/19	J1H	5/1/19 15:08	CGS	B
Terphenyl-d14 (S)	50.3	2	%	54 - 127	SW846 8270D	4/29/19	J1H	4/30/19 20:53	GEC	B
METALS										
Lead, Total	274		mg/kg	0.95	0.62	0.31	SW846 6020A	4/30/19	AHI	5/24/19 13:12	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443014** Date Collected: 4/16/2019 10:45 Matrix: Solid

Sample ID: **EC21-IS-SO-08** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILES												
Acenaphthene	2350		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Acenaphthylene	1200	J	ug/kg	98.0	65.7	6.9	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Anthracene	5510		ug/kg	98.0	65.7	7.8	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Benzo(a)anthracene	21700		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Benzo(a)pyrene	19100		ug/kg	980	657	39.2	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Benzo(b)fluoranthene	25600		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Benzo(g,h,i)perylene	13200	J	ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Benzo(k)fluoranthene	7000	J	ug/kg	98.0	65.7	4.9	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Chrysene	22800		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Dibenzo(a,h)anthracene	2570		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Fluoranthene	43800		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Fluorene	2420		ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Indeno(1,2,3-cd)pyrene	13600	J	ug/kg	980	657	68.6	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Naphthalene	1940	J	ug/kg	98.0	65.7	5.9	SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Phenanthrene	29300		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Pyrene	41500		ug/kg	980	657	49.0	SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2,4,6-Tribromophenol (S)	51.2		%	39 - 132			SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
2,4,6-Tribromophenol (S)	63.8		%	39 - 132			SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
2-Fluorobiphenyl (S)	57.1		%	44 - 115			SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
2-Fluorobiphenyl (S)	73.4		%	44 - 115			SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
2-Fluorophenol (S)	42.3		%	35 - 115			SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
2-Fluorophenol (S)	50.4		%	35 - 115			SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Nitrobenzene-d5 (S)	62.5		%	37 - 122			SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Nitrobenzene-d5 (S)	50.4		%	37 - 122			SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Phenol-d5 (S)	41.5		%	33 - 122			SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Phenol-d5 (S)	47.7		%	33 - 122			SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
Terphenyl-d14 (S)	62.7		%	54 - 127			SW846 8270D	4/29/19	J1H	4/30/19 21:17	GEC	B
Terphenyl-d14 (S)	80.2		%	54 - 127			SW846 8270D	4/29/19	J1H	5/1/19 15:33	CGS	B
METALS												
Lead, Total	331		mg/kg	0.86	0.56	0.28	SW846 6020A	4/30/19	AHI	5/24/19 13:43	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443015** Date Collected: 4/15/2019 17:15 Matrix: Solid

Sample ID: **EC58B-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.95J	J	ug/kg	3.2	2.6	0.44	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Acenaphthylene	5.1		ug/kg	3.2	2.6	0.40	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Anthracene	4.1		ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Benzo(a)anthracene	35.1 J		ug/kg	3.2	2.6	0.82	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Benzo(a)pyrene	34.9		ug/kg	3.2	2.6	0.95	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Benzo(b)fluoranthene	51.9		ug/kg	3.2	2.6	1.1	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Benzo(g,h,i)perylene	20.5		ug/kg	3.2	2.6	0.83	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Benzo(k)fluoranthene	18.2		ug/kg	3.2	2.6	0.93	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Chrysene	41.2		ug/kg	3.2	2.6	0.91	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Dibenzo(a,h)anthracene	7.1		ug/kg	3.2	2.6	0.75	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Fluoranthene	57.0 J		ug/kg	3.2	2.6	0.53	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Fluorene	1.5J	J	ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Indeno(1,2,3-cd)pyrene	25.4 J		ug/kg	3.2	2.6	0.77	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Naphthalene	3.9		ug/kg	3.2	2.6	0.45	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Phenanthrene	17.9 J		ug/kg	3.2	2.6	0.60	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Pyrene	51.1 J		ug/kg	3.2	2.6	0.54	8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	68.7		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
Fluoranthene-d10 (S)	68.2		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 11:46	GEC	B
METALS												
Aluminum, Total	6750		mg/kg	36.6	24.2	11.9	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Antimony, Total	0.81J	J	mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Arsenic, Total	6.9		mg/kg	1.4	0.91	0.46	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Barium, Total	48.9		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Beryllium, Total	0.42J	J	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Cadmium, Total	0.25J	J	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Calcium, Total	1210		mg/kg	45.7	30.6	7.3	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Chromium, Total	18.5		mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Cobalt, Total	3.8		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Copper, Total	56.9 J		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Iron, Total	16900		mg/kg	22.9	15.1	7.3	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Lead, Total	148 J		mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Magnesium, Total	771		mg/kg	45.7	30.6	4.6	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Manganese, Total	153		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Mercury, Total	0.11U	U	mg/kg	0.17	0.11	0.055	SW846 7471B	5/3/19	MSA	5/3/19 06:34	MSA	B2
Nickel, Total	8.3		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443015** Date Collected: 4/15/2019 17:15 Matrix: Solid

Sample ID: **EC58B-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	479		mg/kg	45.7	30.6	5.9	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Selenium, Total	1.0J	J	mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Silver, Total	0.59U	U	mg/kg	0.91	0.59	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Sodium, Total	29.5J	J	mg/kg	45.7	30.6	4.6	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Thallium, Total	0.31U	U	mg/kg	0.46	0.31	0.15	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Vanadium, Total	28.5		mg/kg	1.4	0.91	0.46	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
Zinc, Total	120 J		mg/kg	2.3	1.5	0.73	SW846 6020A	4/30/19	AHI	5/24/19 12:29	MO	B1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:13	SUB	B

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443016** Date Collected: 4/15/2019 17:15 Matrix: Solid
Sample ID: **EC58B-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	1.1J	J	ug/kg	3.3	2.7	0.46	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Acenaphthylene	12.6		ug/kg	3.3	2.7	0.42	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Anthracene	7.1		ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Benzo(a)anthracene	81.0 J		ug/kg	3.3	2.7	0.85	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Benzo(a)pyrene	75.6		ug/kg	3.3	2.7	0.98	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Benzo(b)fluoranthene	108		ug/kg	3.3	2.7	1.1	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Benzo(g,h,i)perylene	36.5		ug/kg	3.3	2.7	0.86	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Benzo(k)fluoranthene	39.0		ug/kg	3.3	2.7	0.96	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Chrysene	85.9		ug/kg	3.3	2.7	0.94	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Dibenzo(a,h)anthracene	11.5		ug/kg	3.3	2.7	0.78	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Fluoranthene	121 J		ug/kg	3.3	2.7	0.55	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Fluorene	1.9J	J	ug/kg	3.3	2.7	0.48	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Indeno(1,2,3-cd)pyrene	47.6 J		ug/kg	3.3	2.7	0.80	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Naphthalene	4.5		ug/kg	3.3	2.7	0.47	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Phenanthrene	23.6 J		ug/kg	3.3	2.7	0.63	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Pyrene	108 J		ug/kg	3.3	2.7	0.56	8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	67.8		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
Fluoranthene-d10 (S)	69.1		%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 12:14	GEC	B
METALS												
Aluminum, Total	6810		mg/kg	38.8	25.7	12.6	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Antimony, Total	0.35J	J	mg/kg	0.97	0.63	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Arsenic, Total	7.1		mg/kg	2.9	1.9	0.97	SW846 6020A	4/30/19	AHI	5/24/19 14:55	MO	B1
Barium, Total	39.7		mg/kg	2.4	1.6	0.78	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Beryllium, Total	0.44J	J	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Cadmium, Total	0.17J	J	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Calcium, Total	1180		mg/kg	48.4	32.5	7.8	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Chromium, Total	17.9		mg/kg	0.97	0.63	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Cobalt, Total	4.3		mg/kg	2.4	1.6	0.78	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Copper, Total	19.4 J		mg/kg	2.4	1.6	0.78	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Iron, Total	20800		mg/kg	48.4	32.0	15.5	SW846 6020A	4/30/19	AHI	5/24/19 14:55	MO	B1
Lead, Total	42.7 J		mg/kg	0.97	0.63	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Magnesium, Total	797		mg/kg	48.4	32.5	4.8	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Manganese, Total	152		mg/kg	2.4	1.6	0.78	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Mercury, Total	0.12U	U	mg/kg	0.19	0.12	0.062	SW846 7471B	5/3/19	MSA	5/3/19 06:35	MSA	B2
Nickel, Total	6.1		mg/kg	2.4	1.6	0.78	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443016** Date Collected: 4/15/2019 17:15 Matrix: Solid

Sample ID: **EC58B-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	497		mg/kg	48.4	32.5	6.3	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Selenium, Total	1.8J	J	mg/kg	4.8	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:55	MO	B1
Silver, Total	0.63U	U	mg/kg	0.97	0.63	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Sodium, Total	29.5J	J	mg/kg	48.4	32.5	4.8	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Thallium, Total	0.32U	U	mg/kg	0.48	0.32	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Vanadium, Total	29.5		mg/kg	1.5	0.97	0.48	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
Zinc, Total	42.4 J		mg/kg	2.4	1.6	0.78	SW846 6020A	4/30/19	AHI	5/24/19 12:32	MO	B1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:14	SUB	B

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Project Coordinator

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443017** Date Collected: 4/15/2019 17:15 Matrix: Solid

Sample ID: **EC58B-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.51J	J	ug/kg	3.2	2.6	0.45	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Acenaphthylene	3.6		ug/kg	3.2	2.6	0.41	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Anthracene	2.8J	J	ug/kg	3.2	2.6	0.47	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Benzo(a)anthracene	25.9		ug/kg	3.2	2.6	0.84	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Benzo(a)pyrene	25.8		ug/kg	3.2	2.6	0.97	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Benzo(b)fluoranthene	37.6		ug/kg	3.2	2.6	1.1	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Benzo(g,h,i)perylene	16.4		ug/kg	3.2	2.6	0.85	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Benzo(k)fluoranthene	13.7		ug/kg	3.2	2.6	0.95	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Chrysene	28.6		ug/kg	3.2	2.6	0.93	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Dibenzo(a,h)anthracene	5.1		ug/kg	3.2	2.6	0.77	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Fluoranthene	40.7		ug/kg	3.2	2.6	0.54	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Fluorene	0.82J	J	ug/kg	3.2	2.6	0.47	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Indeno(1,2,3-cd)pyrene	19.8		ug/kg	3.2	2.6	0.79	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Naphthalene	1.7J	J	ug/kg	3.2	2.6	0.46	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Phenanthrene	10.7		ug/kg	3.2	2.6	0.62	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Pyrene	36.4		ug/kg	3.2	2.6	0.55	8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	32.7	J	%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
Fluoranthene-d10 (S)	49.1	J	%	50 - 150			8270 SIM	4/29/19	J1H	5/2/19 11:17	GEC	B
METALS												
Aluminum, Total	7640		mg/kg	78.7	52.2	25.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Antimony, Total	0.34J	J	mg/kg	0.98	0.64	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Arsenic, Total	7.3		mg/kg	3.0	2.0	0.98	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Barium, Total	38.3		mg/kg	2.5	1.6	0.79	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Beryllium, Total	0.44J	J	mg/kg	0.98	0.66	0.32	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Cadmium, Total	0.33U	U	mg/kg	0.49	0.33	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Calcium, Total	1310		mg/kg	98.4	65.9	15.7	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Chromium, Total	19.1		mg/kg	2.0	1.3	0.65	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Cobalt, Total	4.4J	J	mg/kg	4.9	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Copper, Total	28.6 J		mg/kg	4.9	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Iron, Total	21000		mg/kg	49.2	32.5	15.7	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Lead, Total	60.9 J		mg/kg	0.98	0.64	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Magnesium, Total	704		mg/kg	49.2	33.0	4.9	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Manganese, Total	153		mg/kg	4.9	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Mercury, Total	0.11U	U	mg/kg	0.17	0.11	0.057	SW846 7471B	5/3/19	MSA	5/3/19 06:39	MSA	B2
Nickel, Total	6.5		mg/kg	4.9	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443017** Date Collected: 4/15/2019 17:15 Matrix: Solid

Sample ID: **EC58B-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Potassium, Total	514		mg/kg	49.2	33.0	6.4	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Selenium, Total	3.2U	U	mg/kg	4.9	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Silver, Total	0.64U	U	mg/kg	0.98	0.64	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Sodium, Total	25.0J	J	mg/kg	49.2	33.0	4.9	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Thallium, Total	0.33U	U	mg/kg	0.49	0.33	0.16	SW846 6020A	4/30/19	AHI	5/24/19 12:44	MO	B1
Vanadium, Total	30.2		mg/kg	3.0	2.0	0.98	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
Zinc, Total	47.4 J		mg/kg	4.9	3.2	1.6	SW846 6020A	4/30/19	AHI	5/24/19 14:58	MO	B1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:14	SUB	B

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443018** Date Collected: 4/15/2019 09:00 Matrix: Solid

Sample ID: **UnnamedTrib-IS-SD-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Arsenic, Total	39.4		mg/kg	1.5	0.99	0.49	SW846 6020A	4/30/19	AHI	5/24/19 12:47	MO	B1
Lead, Total	49.4		mg/kg	0.99	0.64	0.33	SW846 6020A	4/30/19	AHI	5/24/19 12:47	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443019** Date Collected: 4/15/2019 09:00 Matrix: Solid

Sample ID: **UnnamedTrib-IS-SD-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Arsenic, Total	47.2		mg/kg	1.4	0.92	0.46	SW846 6020A	4/30/19	AHI	5/24/19 12:50	MO	B1
Lead, Total	38.6		mg/kg	0.92	0.60	0.30	SW846 6020A	4/30/19	AHI	5/24/19 12:50	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443020** Date Collected: 4/15/2019 09:00 Matrix: Solid

Sample ID: **UnnamedTrib-IS-SD-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Arsenic, Total	44.4		mg/kg	1.5	0.98	0.49	SW846 6020A	4/30/19	AHI	5/24/19 12:54	MO	B1
Lead, Total	33.3		mg/kg	0.98	0.64	0.32	SW846 6020A	4/30/19	AHI	5/24/19 12:54	MO	B1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443021** Date Collected: 4/15/2019 11:15 Matrix: Water

Sample ID: **CBD-ERB-01** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
METALS												
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	4/24/19	AHI	5/8/19 12:21	MO	A1
Lead, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:21	MO	A1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443022** Date Collected: 4/15/2019 16:30 Matrix: Water

Sample ID: **CBD-ERB-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.043U	U	ug/L	0.054	0.043	0.012	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Acenaphthylene	0.043U	U	ug/L	0.054	0.043	0.012	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Anthracene	0.043U	U	ug/L	0.054	0.043	0.018	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Benzo(a)anthracene	0.043U	U	ug/L	0.054	0.043	0.018	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Benzo(a)pyrene	0.043U	U	ug/L	0.054	0.043	0.022	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Benzo(b)fluoranthene	0.043U	U	ug/L	0.054	0.043	0.022	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Benzo(g,h,i)perylene	0.043U	U	ug/L	0.054	0.043	0.041	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Benzo(k)fluoranthene	0.043U	U	ug/L	0.054	0.043	0.027	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Chrysene	0.043U	U	ug/L	0.054	0.043	0.018	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Dibenzo(a,h)anthracene	0.043U	U	ug/L	0.054	0.043	0.025	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Fluoranthene	0.043U	U	ug/L	0.054	0.043	0.019	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Fluorene	0.043U	U	ug/L	0.054	0.043	0.016	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Indeno(1,2,3-cd)pyrene	0.054U	U	ug/L	0.054	0.054	0.044	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Naphthalene	0.043U	U	ug/L	0.054	0.043	0.040	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Phenanthrene	0.043U	U	ug/L	0.054	0.043	0.022	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Pyrene	0.043U	U	ug/L	0.054	0.043	0.016	8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	71.1		%	29 - 112			8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
Fluoranthene-d10 (S)	80.6		%	45 - 130			8270 SIM	4/22/19	CAC	4/25/19 07:03	CGS	B
METALS												
Aluminum, Total	0.059U	U	mg/L	0.089	0.059	0.030	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Antimony, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Barium, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Cadmium, Total	0.00070U	U	mg/L	0.0011	0.00070	0.00037	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Calcium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Chromium, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Cobalt, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Copper, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Iron, Total	0.037U	U	mg/L	0.056	0.037	0.019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Lead, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Magnesium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Manganese, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Mercury, Total	0.00013U	U	mg/L	0.00022	0.00013	0.00007 4	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443022** Date Collected: 4/15/2019 16:30 Matrix: Water

Sample ID: **CBD-ERB-02** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Nickel, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Potassium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Selenium, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Silver, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Sodium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Vanadium, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1
Zinc, Total	0.0027J	J	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:25	MO	A1

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ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443023** Date Collected: 4/16/2019 09:45 Matrix: Water

Sample ID: **CBD-ERB-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.043U	U	ug/L	0.054	0.043	0.012	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Acenaphthylene	0.043U	U	ug/L	0.054	0.043	0.012	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Anthracene	0.043U	U	ug/L	0.054	0.043	0.018	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Benzo(a)anthracene	0.043U	U	ug/L	0.054	0.043	0.018	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Benzo(a)pyrene	0.043U	U	ug/L	0.054	0.043	0.022	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Benzo(b)fluoranthene	0.043U	U	ug/L	0.054	0.043	0.022	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Benzo(g,h,i)perylene	0.043U	U	ug/L	0.054	0.043	0.041	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Benzo(k)fluoranthene	0.043U	U	ug/L	0.054	0.043	0.027	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Chrysene	0.043U	U	ug/L	0.054	0.043	0.018	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Dibenzo(a,h)anthracene	0.043U	U	ug/L	0.054	0.043	0.025	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Fluoranthene	0.043U	U	ug/L	0.054	0.043	0.020	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Fluorene	0.043U	U	ug/L	0.054	0.043	0.016	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Indeno(1,2,3-cd)pyrene	0.054U	U	ug/L	0.054	0.054	0.045	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Naphthalene	0.043U	U	ug/L	0.054	0.043	0.040	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Phenanthrene	0.043U	U	ug/L	0.054	0.043	0.022	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Pyrene	0.043U	U	ug/L	0.054	0.043	0.016	8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	68.1		%	29 - 112			8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
Fluoranthene-d10 (S)	78		%	45 - 130			8270 SIM	4/22/19	CAC	4/25/19 06:29	CGS	B
METALS												
Aluminum, Total	0.059U	U	mg/L	0.089	0.059	0.030	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Antimony, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Arsenic, Total	0.0020U	U	mg/L	0.0030	0.0020	0.0010	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Barium, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Beryllium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Cadmium, Total	0.00070U	U	mg/L	0.0011	0.00070	0.00037	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Calcium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Chromium, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Cobalt, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Copper, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Iron, Total	0.037U	U	mg/L	0.056	0.037	0.019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Lead, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Magnesium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Manganese, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Mercury, Total	0.00013U	U	mg/L	0.00022	0.00013	0.00007 4	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1

ALS Environmental

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443023** Date Collected: 4/16/2019 09:45 Matrix: Water

Sample ID: **CBD-ERB-03** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
Nickel, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Potassium, Total	0.073U	U	mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Selenium, Total	0.0037U	U	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Silver, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Sodium, Total	0.13		mg/L	0.11	0.073	0.037	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Thallium, Total	0.00070U	U	mg/L	0.0010	0.00070	0.00030	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Vanadium, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
Zinc, Total	0.0020J	J	mg/L	0.0056	0.0037	0.0019	SW846 6020A	4/24/19	AHI	5/8/19 12:28	MO	A1
SUBCONTRACTED ANALYSIS												
Subcontracted Analysis	See attached						Subcontract			5/26/19 07:14	SUB	D

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Project Coordinator

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NELAP Certifications: NJ PA010 , NY 11759 , PA 22-293 DoD ELAP: PJLA 74618
State Certifications: FL E871113 , WA C999 , MD 128 , VA 460157 , WV DW 9961-C , WV 343

ANALYTICAL RESULTS

Workorder: 3028443 EAE011|2019-CURTIS BAY MD DOD

Lab ID: **3028443024** Date Collected: 4/16/2019 16:45 Matrix: Water

Sample ID: **CBD-ERB-04** Date Received: 4/17/2019 21:45

Parameters	Results	Flag	Units	LOQ	LOD	DL	Method	Prepared	By	Analyzed	By	Cntr
SEMIVOLATILE SIM												
Acenaphthene	0.042U	U	ug/L	0.052	0.042	0.012	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Acenaphthylene	0.042U	U	ug/L	0.052	0.042	0.012	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Anthracene	0.042U	U	ug/L	0.052	0.042	0.018	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Benzo(a)anthracene	0.042U	U	ug/L	0.052	0.042	0.018	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Benzo(a)pyrene	0.042U	U	ug/L	0.052	0.042	0.021	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Benzo(b)fluoranthene	0.042U	U	ug/L	0.052	0.042	0.021	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Benzo(g,h,i)perylene	0.042U	U	ug/L	0.052	0.042	0.040	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Benzo(k)fluoranthene	0.042U	U	ug/L	0.052	0.042	0.026	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Chrysene	0.042U	U	ug/L	0.052	0.042	0.018	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Dibenzo(a,h)anthracene	0.042U	U	ug/L	0.052	0.042	0.024	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Fluoranthene	0.042U	U	ug/L	0.052	0.042	0.019	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Fluorene	0.042U	U	ug/L	0.052	0.042	0.016	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Indeno(1,2,3-cd)pyrene	0.052U	U	ug/L	0.052	0.052	0.043	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Naphthalene	0.042U	U	ug/L	0.052	0.042	0.039	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Phenanthrene	0.042U	U	ug/L	0.052	0.042	0.021	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Pyrene	0.042U	U	ug/L	0.052	0.042	0.016	8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Surrogate Recoveries	*Results*	*Flag*	*Units*	*Limits*			*Method*	*Prepared*	*By*	*Analyzed*	*By*	*Cntr*
2-Methylnapthalene-d10 (S)	74.5		%	29 - 112			8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
Fluoranthene-d10 (S)	81.9		%	45 - 130			8270 SIM	4/22/19	CAC	4/25/19 07:37	CGS	A
METALS												
Lead, Total	0.0015U	U	mg/L	0.0022	0.0015	0.00074	SW846 6020A	5/9/19	AHI	5/25/19 16:19	MO	C1

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Project Coordinator

ALS Life Sciences

Sample Analysis Report

Sample Name	**BACKGROUND-IS-SD-01**	Sampling Date	15-Apr-19	
ALS Sample ID	L2266444-1	Extraction Date	10-May-19	Approved:
Analysis Method	EPA 8290A	Sample Size	15.66 g	T Patterson
Analysis Type	Sample	Percent Moisture	n/a	--e-signature--
Sample Matrix	Soil	Split Ratio	1	22-May-2019

Run Information	**Run 1**
Filename	7-190516A08
Run Date	16-May-19 16:56
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-7 DB5MSUST285842H

Target Analytes	TEF (WHO 2005)	Ret. Time	Conc. pg/g	EDL pg/g	Flags	EMPC pg/g	LQL	
2,3,7,8-TCDD	1	NotFnd	<0.038	0.038	U		0.64	
1,2,3,7,8-PeCDD	1	31.92	0.258	0.020	J,B		3.2	
1,2,3,4,7,8-HxCDD	0.1	34.00	0.400	0.037	J		3.2	
1,2,3,6,7,8-HxCDD	0.1	34.06	0.740	0.037	J		3.2	
1,2,3,7,8,9-HxCDD	0.1	34.18	0.876	0.036	J		3.2	
1,2,3,4,6,7,8-HpCDD	0.01	35.67	36.1	0.15			3.2	
OCDD	0.0003	37.16	2540	0.15			6.4	
2,3,7,8-TCDF	0.1	26.71	0.212	0.041	M,J		0.64	
1,2,3,7,8-PeCDF	0.03	30.96	<0.17	0.029	~~M,J,R~~	0.17	3.2	J
2,3,4,7,8-PeCDF	0.3	31.69	0.264	0.024	J		3.2	
1,2,3,4,7,8-HxCDF	0.1	33.51	0.220	0.026	J		3.2	
1,2,3,6,7,8-HxCDF	0.1	33.58	<0.16	0.026	~~J,R~~	0.16	3.2	J
2,3,4,6,7,8-HxCDF	0.1	33.91	0.235	0.025	J		3.2	
1,2,3,7,8,9-HxCDF	0.1	NotFnd	<0.030	0.030	U		3.2	
1,2,3,4,6,7,8-HpCDF	0.01	35.12	1.21	0.026	M		3.2	U
1,2,3,4,7,8,9-HpCDF	0.01	35.90	0.125	0.027	M,J		3.2	
OCDF	0.0003	37.24	1.82	0.029	M		6.4	U

Extraction Standards	pg		% Rec	Limits
13C12-2,3,7,8-TCDD	2000	27.62	85	40-130
13C12-1,2,3,7,8-PeCDD	2000	31.90	78	40-130
13C12-1,2,3,4,7,8-HxCDD	2000	34.00	70	40-130
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	65	40-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.66	65	25-130
13C12-OCDD	4000	37.15	50	25-130
13C12-2,3,7,8-TCDF	2000	26.69	72	40-130
13C12-1,2,3,7,8-PeCDF	2000	30.95	71	40-130
13C12-2,3,4,7,8-PeCDF	2000	31.68	70	40-130
13C12-1,2,3,4,7,8-HxCDF	2000	33.50	61	40-130
13C12-1,2,3,6,7,8-HxCDF	2000	33.57	59	40-130
13C12-2,3,4,6,7,8-HxCDF	2000	33.89	61	40-130
13C12-1,2,3,7,8,9-HxCDF	2000	34.31	60	40-130
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.11	54	25-130
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.90	63	25-130

Cleanup Standard	pg			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.63	90	40-130

Homologue Group Totals	# peaks	Conc. pg/g	EDL pg/g	LQL
Total-TCDD	2.00	0.466	0.038	0.64
Total-PeCDD	5.00	1.83	0.020	3.2
Total-HxCDD	7.00	12.1	0.037	3.2
Total-HpCDD	2.00	85.3	0.15	3.2
Total-TCDF	13.00	2.93	0.041	0.64
Total-PeCDF	12.00	3.27	0.029	3.2
Total-HxCDF	4.00	1.08	0.030	3.2
Total-HpCDF	4.00	2.47	0.027	3.2

Toxic Equivalency - (WHO 2005)	pg/g
Lower Bound PCDD/F TEQ (WHO 2005)	1.74
Mid Point PCDD/F TEQ (WHO 2005)	1.78
Upper Bound PCDD/F TEQ (WHO 2005)	1.80

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalenc
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

[redacted] 7/3/19

ALS Life Sciences

Sample Analysis Report

Sample Name	**BACKGROUND-IS-SD-02**		Sampling Date	15-Apr-19	
ALS Sample ID	L2266444-4		Extraction Date	10-May-19	
Analysis Method	EPA 8290A		Sample Size	20.11	g
Analysis Type	Sample		Percent Moisture	n/a	
Sample Matrix	Soil		Split Ratio	1	

Approved:
T.Patterson
--e-Signature--
22-May-2019

Run Information	**Run 1**
Filename	7-190516A09
Run Date	16-May-19 17:38
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-7 DB5MSUST285842H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	
2,3,7,8-TCDD	1	27.68	0.0602	0.035	M,J		0.50	
1,2,3,7,8-PeCDD	1	31.93	0.189	0.024	M,J,B		2.5	
1,2,3,4,7,8-HxCDD	0.1	34.01	0.386	0.039	M,J		2.5	
1,2,3,6,7,8-HxCDD	0.1	34.06	0.718	0.037	M,J		2.5	
1,2,3,7,8,9-HxCDD	0.1	34.18	0.757	0.037	M,J		2.5	
1,2,3,4,6,7,8-HpCDD	0.01	35.67	35.2	0.10			2.5	
OCDD	0.0003	37.16	2150	0.13			5.0	
2,3,7,8-TCDF	0.1	26.71	0.180	0.033	M,J		0.50	
1,2,3,7,8-PeCDF	0.03	30.97	0.123	0.039	M,J		2.5	
2,3,4,7,8-PeCDF	0.3	31.70	0.270	0.034	J		2.5	
1,2,3,4,7,8-HxCDF	0.1	33.51	0.206	0.021	J		2.5	
1,2,3,6,7,8-HxCDF	0.1	33.58	<0.18	0.020	HR	0.18	2.5	J
2,3,4,6,7,8-HxCDF	0.1	33.90	0.216	0.020	J		2.5	
1,2,3,7,8,9-HxCDF	0.1	34.35	0.0950	0.025	M,J		2.5	
1,2,3,4,6,7,8-HpCDF	0.01	35.12	1.13	0.028	J		2.5	U
1,2,3,4,7,8,9-HpCDF	0.01	35.92	<0.090	0.030	M,J,R	0.090	2.5	J
OCDF	0.0003	37.25	2.12	0.026	J		5.0	U

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.63	89	40-130
13C12-1,2,3,7,8-PeCDD	2000	31.92	78	40-130
13C12-1,2,3,4,7,8-HxCDD	2000	34.00	95	40-130
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	85	40-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.66	87	25-130
13C12-OCDD	4000	37.16	72	25-130
13C12-2,3,7,8-TCDF	2000	26.71	75	40-130
13C12-1,2,3,7,8-PeCDF	2000	30.96	73	40-130
13C12-2,3,4,7,8-PeCDF	2000	31.69	71	40-130
13C12-1,2,3,4,7,8-HxCDF	2000	33.51	83	40-130
13C12-1,2,3,6,7,8-HxCDF	2000	33.58	80	40-130
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	79	40-130
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	75	40-130
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.12	77	25-130
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.90	85	25-130

Cleanup Standard	**pg**			
37Cl-2,3,7,8-TCDD (Cleanup)	40	27.66	78	40-130

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**	**LQL**
Total-TCDD	4.00	0.565	0.035	0.50
Total-PeCDD	5.00	1.32	0.024	2.5
Total-HxCDD	7.00	10.9	0.039	2.5
Total-HpCDD	2.00	80.7	0.10	2.5
Total-TCDF	11.00	2.27	0.033	0.50
Total-PeCDF	12.00	3.97	0.039	2.5
Total-HxCDF	6.00	1.97	0.025	2.5
Total-HpCDF	2.00	2.13	0.030	2.5

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	1.60
Mid Point PCDD/F TEQ (WHO 2005)	1.62
Upper Bound PCDD/F TEQ (WHO 2005)	1.62

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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ALS Life Sciences

Sample Analysis Report

Sample Name	**BACKGROUND-IS-SD-03**	Sampling Date	15-Apr-19	
ALS Sample ID	L2266444-5	Extraction Date	10-May-19	Approved:
Analysis Method	EPA 8290A	Sample Size	20.15 g	T.Patterson
Analysis Type	Sample	Percent Moisture	n/a	-e-signature-
Sample Matrix	Soil	Split Ratio	1	22-May-2019

Run Information	**Run 1**
Filename	7-190516A10
Run Date	16-May-19 18:20
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg/g
Instrument - Column	HRMS-7 DB5MSUST285842H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	
2,3,7,8-TCDD	1	27.66	0.0665	0.035	M,J		0.50	
1,2,3,7,8-PeCDD	1	31.93	0.241	0.019	J,R		2.5	
1,2,3,4,7,8-HxCDD	0.1	34.01	0.409	0.033	J		2.5	
1,2,3,6,7,8-HxCDD	0.1	34.06	0.742	0.032	J		2.5	
1,2,3,7,8,9-HxCDD	0.1	34.19	0.801	0.032	J		2.5	
1,2,3,4,6,7,8-HpCDD	0.01	35.67	35.6	0.18			2.5	
OCDD	0.0003	37.16	2210	0.20			5.0	
2,3,7,8-TCDF	0.1	26.74	0.311	0.033	J		0.50	
1,2,3,7,8-PeCDF	0.03	30.97	0.151	0.024	J		2.5	
2,3,4,7,8-PeCDF	0.3	31.70	0.374	0.020	J		2.5	
1,2,3,4,7,8-HxCDF	0.1	33.51	0.300	0.023	J		2.5	
1,2,3,6,7,8-HxCDF	0.1	33.58	0.260	0.023	J		2.5	
2,3,4,6,7,8-HxCDF	0.1	33.91	0.270	0.024	J		2.5	
1,2,3,7,8,9-HxCDF	0.1	34.35	<0.096	0.028	M,R,B	0.096	2.5	J
1,2,3,4,6,7,8-HpCDF	0.01	35.12	1.75	0.015	B		2.5	U
1,2,3,4,7,8,9-HpCDF	0.01	35.92	0.164	0.018	J		2.5	
OCDF	0.0003	37.25	2.87	0.027	B		5.0	U

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.65	96	40-130
13C12-1,2,3,7,8-PeCDD	2000	31.92	85	40-130
13C12-1,2,3,4,7,8-HxCDD	2000	34.00	90	40-130
13C12-1,2,3,6,7,8-HxCDD	2000	34.05	83	40-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.67	86	25-130
13C12-OCDD	4000	37.16	64	25-130
13C12-2,3,7,8-TCDF	2000	26.71	81	40-130
13C12-1,2,3,7,8-PeCDF	2000	30.96	79	40-130
13C12-2,3,4,7,8-PeCDF	2000	31.69	78	40-130
13C12-1,2,3,4,7,8-HxCDF	2000	33.51	85	40-130
13C12-1,2,3,6,7,8-HxCDF	2000	33.58	77	40-130
13C12-2,3,4,6,7,8-HxCDF	2000	33.90	79	40-130
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	78	40-130
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.12	75	25-130
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.92	81	25-130

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.66	82	40-130

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**	
Total-TCDD	6.00	0.900	0.035	0.50
Total-PeCDD	7.00	2.34	0.019	2.5
Total-HxCDD	7.00	11.4	0.033	2.5
Total-HpCDD	2.00	80.6	0.18	2.5
Total-TCDF	15.00	4.57	0.033	0.50
Total-PeCDF	16.00	6.58	0.024	2.5
Total-HxCDF	9.00	3.35	0.028	2.5
Total-HpCDF	3.00	3.34	0.018	2.5

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	1.77
Mid Point PCDD/F TEQ (WHO 2005)	1.78
Upper Bound PCDD/F TEQ (WHO 2005)	1.78

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
B	Indicates that this target was detected in the blank at greater than 10% of the sample concentration.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**EC58B-IS-SD-01**	Sampling Date	15-Apr-19		
ALS Sample ID	L2266444-6	Extraction Date	10-May-19		Approved:
Analysis Method	EPA 8290A	Sample Size	20.26	g	T.Patterson
Analysis Type	Sample	Percent Moisture	n/a		--e-signature--
Sample Matrix	Soil	Split Ratio	1		22-May-2019

Run Information	**Run 1**	**Run 2**
Filename	7-190516A11	7-190521A14
Run Date	16-May-19 19:02	21-May-19 20:01
Final Volume	20 uL	100 uL
Dilution Factor	1	5
Analysis Units	pg/g	pg/g
Instrument - Column	HRMS-7 DB5MSUST285842H	HRMS-7 DB5MSUST285842H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	
2,3,7,8-TCDD	1	27.65	0.156	0.039	M,J		0.49							
1,2,3,7,8-PeCDD	1	31.93	0.604	0.028	J		2.5							
1,2,3,4,7,8-HxCDD	0.1	34.02	0.839	0.044	J		2.5							
1,2,3,6,7,8-HxCDD	0.1	34.07	1.66	0.043	J		2.5							
1,2,3,7,8,9-HxCDD	0.1	34.20	2.08	0.042	J		2.5							
1,2,3,4,6,7,8-HpCDD	0.01	35.69	66.3	0.20			2.5							
OCDD	0.0003							37.16	9600	1.9			120	
2,3,7,8-TCDF	0.1	26.72	0.924	0.034			0.49							
1,2,3,7,8-PeCDF	0.03	30.97	0.742	0.035	M,J		2.5							
2,3,4,7,8-PeCDF	0.3	31.70	1.47	0.031	J		2.5							
1,2,3,4,7,8-HxCDF	0.1	33.52	1.33	0.055	J		2.5							
1,2,3,6,7,8-HxCDF	0.1	33.59	1.17	0.055	J		2.5							
2,3,4,6,7,8-HxCDF	0.1	33.91	1.31	0.052	J		2.5							
1,2,3,7,8,9-HxCDF	0.1	34.35	0.427	0.069	M,J		2.5							
1,2,3,4,6,7,8-HpCDF	0.01	35.13	6.41	0.032			2.5							U
1,2,3,4,7,8,9-HpCDF	0.01	35.93	0.481	0.035	J		2.5							
OCDF	0.0003	37.26	5.38	0.024			4.9							U

Extraction Standards	**pg**		**% Rec**	**Limits**		**% Rec**
13C12-2,3,7,8-TCDD	2000	27.63	71	40-130		
13C12-1,2,3,7,8-PeCDD	2000	31.92	60	40-130		
13C12-1,2,3,4,7,8-HxCDD	2000	34.01	67	40-130		
13C12-1,2,3,6,7,8-HxCDD	2000	34.06	57	40-130		
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.67	62	25-130		
13C12-OCDD	4000			25-130	37.15	52
13C12-2,3,7,8-TCDF	2000	26.71	59	40-130		
13C12-1,2,3,7,8-PeCDF	2000	30.96	57	40-130		
13C12-2,3,4,7,8-PeCDF	2000	31.69	54	40-130		
13C12-1,2,3,4,7,8-HxCDF	2000	33.51	58	40-130		
13C12-1,2,3,6,7,8-HxCDF	2000	33.58	55	40-130		
13C12-2,3,4,6,7,8-HxCDF	2000	33.91	56	40-130		
13C12-1,2,3,7,8,9-HxCDF	2000	34.32	53	40-130		
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.12	53	25-130		
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.92	61	25-130		

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.66	60	40-130

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**# peaks**	**Conc. pg/g**	**EDL pg/g**
Total-TCDD	10.00	2.64	0.039	0.49			
Total-PeCDD	7.00	4.84	0.028	2.5			
Total-HxCDD	8.00	25.6	0.044	2.5			
Total-HpCDD	2.00	157	0.20	2.5			
Total-TCDF	20.00	17.8	0.034	0.49			
Total-PeCDF	18.00	20.3	0.035	2.5			
Total-HxCDF	10.00	12.2	0.069	2.5			
Total-HpCDF	3.00	9.72	0.035	2.5			

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	5.81
Mid Point PCDD/F TEQ (WHO 2005)	5.81
Upper Bound PCDD/F TEQ (WHO 2005)	5.81

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**EC58B-IS-SD-02**	Sampling Date	15-Apr-19	Approved: T.Patterson --e-signature-- 22-May-2019
ALS Sample ID	L2266444-7	Extraction Date	10-May-19	
Analysis Method	EPA 8290A	Sample Size	20.11 g	
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Soil	Split Ratio	1	

Run Information	**Run 1**	**Run 2**
Filename	7-190516A12	7-190521A15
Run Date	16-May-19 19:44	21-May-19 20:43
Final Volume	20 uL	100 uL
Dilution Factor	1	5
Analysis Units	pg/g	pg/g
Instrument - Column	HRMS-7 DB5MSUST285842H	HRMS-7 DB5MSUST285842H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**	
2,3,7,8-TCDD	1	27.66	0.0885	0.035	M,J		0.50							
1,2,3,7,8-PeCDD	1	31.94	0.374	0.022	J		2.5							
1,2,3,4,7,8-HxCDD	0.1	34.02	0.680	0.043	J		2.5							
1,2,3,6,7,8-HxCDD	0.1	34.07	1.05	0.041	J		2.5							
1,2,3,7,8,9-HxCDD	0.1	34.20	1.67	0.041	J		2.5							
1,2,3,4,6,7,8-HpCDD	0.01	35.69	59.4	0.19			2.5							
OCDD	0.0003							37.16	9010	1.4			120	
2,3,7,8-TCDF	0.1	26.72	0.570	0.029	M		0.50							
1,2,3,7,8-PeCDF	0.03	30.97	0.455	0.092	J		2.5							
2,3,4,7,8-PeCDF	0.3	31.70	0.883	0.077	J		2.5							
1,2,3,4,7,8-HxCDF	0.1	33.52	0.814	0.035	J		2.5							
1,2,3,6,7,8-HxCDF	0.1	33.59	0.779	0.035	J		2.5							
2,3,4,6,7,8-HxCDF	0.1	33.92	0.810	0.036	J		2.5							
1,2,3,7,8,9-HxCDF	0.1	34.34	<0.069	0.043	[illegible]	0.069	2.5							J
1,2,3,4,6,7,8-HpCDF	0.01	35.13	4.00	0.032			2.5							U
1,2,3,4,7,8,9-HpCDF	0.01	35.93	0.378	0.033	J		2.5							
OCDF	0.0003	37.26	4.41	0.020	M		5.0							U

Extraction Standards	**pg**		**% Rec**	**Limits**		**% Rec**
13C12-2,3,7,8-TCDD	2000	27.63	79	40-130		
13C12-1,2,3,7,8-PeCDD	2000	31.92	69	40-130		
13C12-1,2,3,4,7,8-HxCDD	2000	34.01	73	40-130		
13C12-1,2,3,6,7,8-HxCDD	2000	34.07	69	40-130		
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.67	73	25-130		
13C12-OCDD	4000			25-130	37.15	52
13C12-2,3,7,8-TCDF	2000	26.71	67	40-130		
13C12-1,2,3,7,8-PeCDF	2000	30.96	65	40-130		
13C12-2,3,4,7,8-PeCDF	2000	31.69	63	40-130		
13C12-1,2,3,4,7,8-HxCDF	2000	33.51	67	40-130		
13C12-1,2,3,6,7,8-HxCDF	2000	33.58	62	40-130		
13C12-2,3,4,6,7,8-HxCDF	2000	33.91	63	40-130		
13C12-1,2,3,7,8,9-HxCDF	2000	34.33	63	40-130		
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.13	62	25-130		
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.92	70	25-130		

Cleanup Standard	**pg**					
37Cl-2,3,7,8-TCDD (Cleanup)	40	27.65	69	40-130		

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**# peaks**	**Conc. pg/g**	**EDL pg/g**
Total-TCDD	5.00	0.988	0.035	0.50			
Total-PeCDD	8.00	3.56	0.022	2.5			
Total-HxCDD	7.00	18.1	0.043	2.5			
Total-HpCDD	2.00	138	0.19	2.5			
Total-TCDF	15.00	7.63	0.029	0.50			
Total-PeCDF	15.00	11.9	0.092	2.5			
Total-HxCDF	9.00	8.19	0.043	2.5			
Total-HpCDF	4.00	6.95	0.033	2.5			

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	4.72
Mid Point PCDD/F TEQ (WHO 2005)	4.73
Upper Bound PCDD/F TEQ (WHO 2005)	4.73

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

Sample Name	**EC58B-IS-SD-03**	Sampling Date	15-Apr-19	
ALS Sample ID	L2266444-8	Extraction Date	10-May-19	Approved: T.Patterson --e-signature-- 22-May-2019
Analysis Method	EPA 8290A	Sample Size	20.20 g	
Analysis Type	Sample	Percent Moisture	n/a	
Sample Matrix	Soil	Split Ratio	1	

Run Information	**Run 1**	**Run 2**
Filename	7-190516A13	7-190521A16
Run Date	16-May-19 20:26	21-May-19 21:25
Final Volume	20 uL	100 uL
Dilution Factor	1	5
Analysis Units	pg/g	pg/g
Instrument - Column	HRMS-7 DB5MSUST285842H	HRMS-7 DB5MSUST285842H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**		**Ret. Time**	**Conc. pg/g**	**EDL pg/g**	**Flags**	**EMPC pg/g**	**LQL**
2,3,7,8-TCDD	1	27.65	0.0624	0.031	J		0.50							
1,2,3,7,8-PeCDD	1	31.93	0.287	0.015	J		2.5							
1,2,3,4,7,8-HxCDD	0.1	34.02	0.518	0.032	J		2.5							
1,2,3,6,7,8-HxCDD	0.1	34.07	0.776	0.031	J		2.5							
1,2,3,7,8,9-HxCDD	0.1	34.20	1.27	0.031	J		2.5							
1,2,3,4,6,7,8-HpCDD	0.01	35.69	40.2	0.10			2.5							
OCDD	0.0003								37.16	6760	1.5			120
2,3,7,8-TCDF	0.1	26.67	0.189	0.025	M,J		0.50							
1,2,3,7,8-PeCDF	0.03	30.97	0.389	0.026	J		2.5							
2,3,4,7,8-PeCDF	0.3	31.70	0.736	0.022	J		2.5							
1,2,3,4,7,8-HxCDF	0.1	33.52	0.650	0.017	J		2.5							
1,2,3,6,7,8-HxCDF	0.1	33.59	0.610	0.016	J		2.5							
2,3,4,6,7,8-HxCDF	0.1	33.91	0.672	0.016	J		2.5							
1,2,3,7,8,9-HxCDF	0.1	34.36	0.225	0.020	J		2.5							
1,2,3,4,6,7,8-HpCDF	0.01	35.13	3.26	0.021			2.5	U						
1,2,3,4,7,8,9-HpCDF	0.01	35.93	0.272	0.023	J		2.5							
OCDF	0.0003	37.26	3.22	0.015	J		5.0	U						

Extraction Standards	**pg**		**% Rec**	**Limits**		**% Rec**
13C12-2,3,7,8-TCDD	2000	27.63	93	40-130		
13C12-1,2,3,7,8-PeCDD	2000	31.92	85	40-130		
13C12-1,2,3,4,7,8-HxCDD	2000	34.01	83	40-130		
13C12-1,2,3,6,7,8-HxCDD	2000	34.06	73	40-130		
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.67	81	25-130		
13C12-OCDD	4000			25-130	37.16	59
13C12-2,3,7,8-TCDF	2000	26.69	79	40-130		
13C12-1,2,3,7,8-PeCDF	2000	30.96	78	40-130		
13C12-2,3,4,7,8-PeCDF	2000	31.69	76	40-130		
13C12-1,2,3,4,7,8-HxCDF	2000	33.51	74	40-130		
13C12-1,2,3,6,7,8-HxCDF	2000	33.58	73	40-130		
13C12-2,3,4,6,7,8-HxCDF	2000	33.91	73	40-130		
13C12-1,2,3,7,8,9-HxCDF	2000	34.33	71	40-130		
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.12	66	25-130		
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.92	78	25-130		

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.65	83	40-130

Homologue Group Totals	**# peaks**	**Conc. pg/g**	**EDL pg/g**		**# peaks**	**Conc. pg/g**	**EDL pg/g**
Total-TCDD	8.00	1.20	0.031	0.50			
Total-PeCDD	5.00	2.06	0.015	2.5			
Total-HxCDD	8.00	15.0	0.032	2.5			
Total-HpCDD	2.00	94.1	0.10	2.5			
Total-TCDF	17.00	6.29	0.025	0.50			
Total-PeCDF	17.00	10.3	0.026	2.5			
Total-HxCDF	9.00	6.52	0.020	2.5			
Total-HpCDF	3.00	5.34	0.023	2.5			

Toxic Equivalency - (WHO 2005)	**pg/g**
Lower Bound PCDD/F TEQ (WHO 2005)	3.54
Mid Point PCDD/F TEQ (WHO 2005)	3.54
Upper Bound PCDD/F TEQ (WHO 2005)	3.54

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration - elevated detection limit due to interference or positive id criterion failure

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Sample Analysis Report

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Sample Name	**CBD-ERB-03**	Sampling Date	16-Apr-19		Approved:
ALS Sample ID	L2266444-9	Extraction Date	7-May-19		T.Patterson
Analysis Method	EPA 8290A	Sample Size	0.950	L	--e-signature--
Analysis Type	Sample	Percent Moisture	n/a		10-May-2019
Sample Matrix	Water	Split Ratio	1		

Run Information	**Run 1**
Filename	7-190509A13
Run Date	09-May-19 20:18
Final Volume	20 uL
Dilution Factor	1
Analysis Units	pg/L
Instrument - Column	HRMS-7 DB5MSUSR826225H

Target Analytes	**TEF (WHO 2005)**	**Ret. Time**	**Conc. pg/L**	**EDL pg/L**	**Flags**	**EMPC pg/L**	**LQL**	
2,3,7,8-TCDD	1	NotFnd	<0.74	0.74	U		11	
1,2,3,7,8-PeCDD	1	NotFnd	<0.41	0.41	U		53	
1,2,3,4,7,8-HxCDD	0.1	NotFnd	<0.51	0.51	U		53	
1,2,3,6,7,8-HxCDD	0.1	NotFnd	<0.39	0.39	U		53	
1,2,3,7,8,9-HxCDD	0.1	NotFnd	<0.42	0.42	U		53	
1,2,3,4,6,7,8-HpCDD	0.01	35.67	<1.1	0.54	M,J	1.1	53	J
OCDD	0.0003	37.16	15.2	1.3	M,J		110	
2,3,7,8-TCDF	0.1	NotFnd	<0.53	0.53	U		11	
1,2,3,7,8-PeCDF	0.03	NotFnd	<0.40	0.40	U		53	
2,3,4,7,8-PeCDF	0.3	NotFnd	<0.31	0.31	U		53	
1,2,3,4,7,8-HxCDF	0.1	NotFnd	<0.35	0.35	U		53	
1,2,3,6,7,8-HxCDF	0.1	NotFnd	<0.30	0.30	U		53	
2,3,4,6,7,8-HxCDF	0.1	NotFnd	<0.32	0.32	U		53	
1,2,3,7,8,9-HxCDF	0.1	34.33	<0.53	0.53	M,U	0.26	53	
1,2,3,4,6,7,8-HpCDF	0.01	35.13	1.13	0.47	M,J		53	
1,2,3,4,7,8,9-HpCDF	0.01	NotFnd	<0.68	0.68	U		53	
OCDF	0.0003	37.26	6.33	1.1	M,J		110	

Extraction Standards	**pg**		**% Rec**	**Limits**
13C12-2,3,7,8-TCDD	2000	27.71	100	40-130
13C12-1,2,3,7,8-PeCDD	2000	31.95	79	40-130
13C12-1,2,3,4,7,8-HxCDD	2000	34.02	58	40-130
13C12-1,2,3,6,7,8-HxCDD	2000	34.07	88	40-130
13C12-1,2,3,4,6,7,8-HpCDD	2000	35.67	65	25-130
13C12-OCDD	4000	37.15	39	25-130
13C12-2,3,7,8-TCDF	2000	26.80	87	40-130
13C12-1,2,3,7,8-PeCDF	2000	30.99	78	40-130
13C12-2,3,4,7,8-PeCDF	2000	31.73	82	40-130
13C12-1,2,3,4,7,8-HxCDF	2000	33.52	63	40-130
13C12-1,2,3,6,7,8-HxCDF	2000	33.59	96	40-130
13C12-2,3,4,6,7,8-HxCDF	2000	33.92	85	40-130
13C12-1,2,3,7,8,9-HxCDF	2000	34.34	70	40-130
13C12-1,2,3,4,6,7,8-HpCDF	2000	35.12	66	25-130
13C12-1,2,3,4,7,8,9-HpCDF	2000	35.92	63	25-130

Cleanup Standard	**pg**			
37Cl4-2,3,7,8-TCDD (Cleanup)	40	27.74	88	40-130

Homologue Group Totals	**# peaks**	**Conc. pg/L**	**EDL pg/L**		
Total-TCDD	0.00	<0.74	0.74	U	11
Total-PeCDD	0.00	<0.41	0.41	U	53
Total-HxCDD	0.00	<0.51	0.51	U	53
Total-HpCDD	0.00	<0.54	0.54	U	53
Total-TCDF	0.00	<0.53	0.53	U	11
Total-PeCDF	0.00	<0.40	0.40	U	53
Total-HxCDF	0.00	<0.53	0.53	U	53
Total-HpCDF	1.00	1.13	0.68		53

Toxic Equivalency - (WHO 2005)	**pg/L**
Lower Bound PCDD/F TEQ (WHO 2005)	0.0178
Mid Point PCDD/F TEQ (WHO 2005)	0.827
Upper Bound PCDD/F TEQ (WHO 2005)	1.63

EDL	Indicates the Estimated Detection Limit, based on the measured background noise for this target in this sample.
TEF	Indicates the Toxic Equivalency Factor
TEQ	Indicates the Toxic Equivalency
M	Indicates that a peak has been manually integrated.
U	Indicates that this compound was not detected above the EDL.
J	Indicates that a target analyte was detected below the calibrated range.
R	Indicates that the ion abundance ratio for this compound did not meet the acceptance criterion.
LQL	Lower Quantification Limit, based on the lowest calibration level corrected for sample size, splits and dilutions.
EMPC	Estimated Maximum Possible Concentration – elevated detection limit due to interference or positive id criterion failure

[redacted] 7/3/19

Table F-1
Surface Soil, Sediment, and Surface Water Ecological Screening Levels

Chemical	Soil Criteria (mg/kg)	Soil Criteria Notes	Freshwater Sediment Criteria (mg/kg)	Sediment Criteria Notes	Freshwater Surface Water Criteria (µg/L)	Freshwater Surface Water Criteria Notes
Metals						
Aluminum	pH<5.5	EPA EcoSSL	25000	Region 4	87	Region 3
Antimony	0.27	EPA EcoSSL	2	Region 3	30	Region 3
Arsenic	18	EPA EcoSSL	9.8	Region 3	5	Region 3
Barium	330	EPA EcoSSL	20	Region 4	4	Region 3
Beryllium	21	EPA EcoSSL	NA	---	0.66	Region 3
Cadmium	0.36	EPA EcoSSL	0.99	Region 3	0.25	Region 3, assuming hardness of 100
Calcium	NA	---	NA	---	116000	Region 3
Chromium	26	EPA EcoSSL	43.4	Region 3	85	Region 3 value for total chromium assuiming hardness of 100
Cobalt	13	EPA EcoSSL	50	Region 3	23	Region 3
Copper	28	EPA EcoSSL	31.6	Region 3	9	Region 3, assuming hardness of 100
Iron	NA	---	20000	Region 3	300	Region 3
Lead	11	EPA EcoSSL	35.8	Region 3	2.5	Region 3, assuming hardness of 100
Magnesium	NA	---	NA	---	82000	Region 3
Manganese	220	EPA EcoSSL	460	Region 3	120	Region 3
Mercury	0.013	Region 4	0.18	Region 3	0.026	Region 3
Nickel	38	EPA EcoSSL	22.7	Region 3	52	Region 3, assuming hardness of 100
Potassium	NA	---	NA	---	53000	Region 3
Selenium	0.52	EPA EcoSSL	2	Region 3	1	Region 3
Silver	4.2	EPA EcoSSL	1	Region 3	3.2	Region 3, assuming hardness of 100
Sodium	NA	---	NA	---	680000	Region 3
Thallium	0.22	Region 4	NA	---	0.8	Region 3
Titanium	NA	---	NA	---	NA	---
Vanadium	7.8	---	NA	---	20	Region 3
Zinc	46	---	121	Region 3	120	Region 3, assuming hardness of 100
Dioxins						
Dioxin TEQ	3.15E-06	Region 4	0.00000085	Region 3 value for 2,3,7,8-TCDD	3.10E-09	Region 3 value for 2,3,7,8-TCDD
PCBs						
Aroclor 1260	4.10E-02	Region 4 value for total PCBs	0.0598	Region 3 value for total PCBs	0.000074	Region 3
PAHs						
Acenaphthene	Refer to total LMW PAHs	---	Refer to total PAHs	---	5.8	Region 3
Acenaphthylene	Refer to total LMW PAHs	---	Refer to total PAHs	---	13	Region 4
Anthracene	Refer to total LMW PAHs	---	Refer to total PAHs	---	0.012	Region 3
Benzo(a)anthracene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.018	Region 3
Benzo(a)pyrene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.015	Region 3
Benzo(b)fluoranthene	Refer to total HMW PAHs	---	Refer to total PAHs	---	2.6	Region 4
Benzo(g,h,i)perylene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.012	Region 4
Benzo(k)fluoranthene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.06	Region 4
Chrysene	Refer to total HMW PAHs	---	Refer to total PAHs	---	4.7	Region 4
Dibenzo(a,h)anthracene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.012	Region 4
Fluoranthene	Refer to total LMW PAHs	---	Refer to total PAHs	---	0.04	Region 3
Fluorene	Refer to total LMW PAHs	---	Refer to total PAHs	---	3	Region 3
Indeno(1,2,3-cd)pyrene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.012	Region 4
Naphthalene	Refer to total LMW PAHs	---	Refer to total PAHs	---	1.1	Region 3
Phenanthrene	Refer to total LMW PAHs	---	Refer to total PAHs	---	0.4	Region 3
Pyrene	Refer to total HMW PAHs	---	Refer to total PAHs	---	0.025	Region 3
Total PAHs	Refer to total HMW/LMW PAHs	---	1.61	Region 3	NA	---
Total LMW PAHs	29	EPA EcoSSL	Refer to total PAHs	---	NA	---
Total HMW PAHs	1.1	EPA EcoSSL	Refer to total PAHs	---	NA	---

Note:
COPC: Chemical of potential concern
HMW: High molecular weight
LMW: Low molecular weight
mg/kg: milligrams per kilogram
NA: Criteria not available
OC: Organic carbon
PAH: Polycyclic aromatic hydrocarbon
µg/L: micrograms per liter

Table F-1
Surface Soil, Sediment, and Surface Water Ecological Screening Levels

Chemical	Soil Criteria (mg/kg)	Soil Criteria Notes	Freshwater Sediment Criteria (mg/kg)	Sediment Criteria Notes	Freshwater Surface Water Criteria (µg/L)	Freshwater Surface Water Criteria Notes
Explosives						
2,4,6-Trinitrotoluene	7.5	Region 4	0.092	Region 3	100	Region 3
2,4-Dinitrotoluene	6	Region 4	0.0416	Region 3	44	Region 3
2,6-Dinitrotoluene	4	Region 4	0.296	Region 4 assuming 1% OC	81	Region 3
VOCS						
2-Butanone (Methyl ethyl ketone)	1	Regino 4	8	Region 4 assuming 1% OC	14000	Region 3
Acetone	1.2	Region 4	0.065	Region 4	1500	Region 3
Benzene	0.12	Region 4	0.01	Region 4	370	Region 3
Methylene chloride	0.21	Region 4	0.018	Region 4	98.1	Region 3
Toluene	0.15	Region 4	0.01	Region 4 assuming 1% OC	2	Region 3
Total Xylenes	0.1	Region 4	0.13	Region 4 assuming 1% OC	13	Region 3

Note:
COPC: Chemical of potential concern
HMW: High molecular weight
LMW: Low molecular weight
mg/kg: milligrams per kilogram
NA: Criteria not available
OC: Organic carbon
PAH: Polycyclic aromatic hydrocarbon
µg/L: micrograms per liter

Table F-2
Uptake Models Relating Concentrations in Soil to Concentrations in Plants

Chemical	Food Item (Plant) Uptake			
	Uptake Model[A, B, C]	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Log K_{ow}	Source
Metals				
Aluminum	Uptake Factor	4.00E-03	--	Baes et al. 1984
Antimony	Uptake Factor	2.00E-01	--	Baes et al. 1984
Arsenic	Log Linear	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	--	Bechtel Jacobs 1998
Barium	Uptake Factor	1.50E-01	--	Baes et al. 1984
Beryllium	Uptake Factor	1.00E-02	--	Baes et al. 1984
Cadmium	Log Linear	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	--	Bechtel Jacobs 1998
Chromium	Uptake Factor	7.50E-03	--	Baes et al. 1984
Cobalt	Uptake Factor	2.00E-02	--	Baes et al. 1984
Copper	Log Linear	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	--	Bechtel Jacobs 1998
Lead	Log Linear	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	--	Bechtel Jacobs 1998
Manganese	Uptake Factor	2.50E-01	--	Baes et al. 1984
Mercury	Log Linear	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	--	Bechtel Jacobs 1998
Nickel	Log Linear	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	--	Bechtel Jacobs 1998
Selenium	Log Linear	ln(dry plant conc, mg/kg) = (-0.678+1.104*ln(soil conc))	--	Bechtel Jacobs 1998
Silver	Uptake Factor	4.00E-01	--	Baes et al. 1984
Thallium	Uptake Factor	4.00E-03	--	Baes et al. 1984
Titanium	Uptake Factor	1.00E+00	--	Default
Vanadium	Uptake Factor	5.50E-03	--	Baes et al. 1984
Zinc	Log Linear	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	--	Bechtel Jacobs 1998
Dioxins				
Dioxin TEQ	Uptake Factor	3.87E-03	6.92E+00	BAF calculated via regression from Travis and Arms 1988, Log Kow for TCDD used
PCBs				
Aroclor 1260	Uptake Factor	6.44E-04	8.27E+00	BAF calculated via regression from Travis and Arms 1988
PAHs				
Total LMW PAHs	Uptake Factor	1.17E-01	--	Average of individual PAH biotransfer factors calculated via regression from Travis and Arms 1988
Total HMW PAHs	Uptake Factor	1.17E-01	--	Average of individual PAH biotransfer factors calculated via regression from Travis and Arms 1988
Explosives				
2,4,6-Trinitrotoluene	Uptake Factor	2.74E+00	1.99E+00	BAF calculated via regression from Travis and Arms 1988
2,4-Dinitrotoluene	Uptake Factor	2.13E+00	2.18E+00	BAF calculated via regression from Travis and Arms 1988
2,6-Dinitrotoluene	Uptake Factor	2.13E+00	2.18E+00	BAF calculated via regression from Travis and Arms 1988
VOCS				
2-Butanone (Methyl ethyl ketone)	Uptake Factor	2.74E+01	2.60E-01	BAF calculated via regression from Travis and Arms 1988
Acetone	Uptake Factor	5.29E+01	-2.35E-01	BAF calculated via regression from Travis and Arms 1988
Benzene	Uptake Factor	2.74E+00	1.99E+00	BAF calculated via regression from Travis and Arms 1988
Methylene chloride	Uptake Factor	6.51E+00	1.34E+00	BAF calculated via regression from Travis and Arms 1988
Toluene	Uptake Factor	1.32E+00	2.54E+00	BAF calculated via regression from Travis and Arms 1988
Total Xylenes	Uptake Factor	6.34E-01	3.09E+00	BAF calculated via regression from Travis and Arms 1988

Notes:

A - Equation types:

Uptake Factor: [ConcBio] = m x [ConcSoil]

Log linear: [ConcBio] = 10b*[ConcSoil]m

B - Uptake factor for organics derived using the following equations from Travis & Arms 1988 (equation 5, pg 273): Log Upfp = 1.588 - (0.578)(Log Kow)

UpF_p = plant uptake factor

K_{ow} = octanol-water partitioning coefficient

Log K_{ow} values from KOWWIN program from EPI suite.

C - Uptake factor for inorganics derived using the following equations from Bechtel Jacobs 1998: ln(plant) = B0 + B1(ln(soil concentration))

B0 = Constituent-specific intercept based on tissue type

B1 = Constituent-specific slope based on tissue type

Data for B0 and B1 are presented in Bechtel Jacobs 1998, Table 7, pg. 22.

BAF: Bioaccumulation factor

Table F-3
Uptake Models Relating Concentrations in Soil to Concentrations in Soil Invertebrates

Chemical	Food Item (Worm) Uptake		
	Uptake Model[A, B, C]	BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Source
Metals			
Aluminum	Uptake Factor	1.18E-01	90% UF, Sample et al 1998a
Antimony	Uptake Factor	1.00E+00	Default
Arsenic	Log Linear	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	Sample et al. 1998a
Barium	Uptake Factor	1.60E-01	90% UF, Sample et al 1998a
Beryllium	Uptake Factor	1.18E+00	90% UF, Sample et al 1998a
Cadmium	Log Linear	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	Sample et al. 1998a
Chromium	Log Linear	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	Sample et al. 1998a
Cobalt	Uptake Factor	2.91E-01	90% UF, Sample et al 1998a
Copper	Log Linear	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	Sample et al. 1998a
Lead	Log Linear	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	Sample et al. 1998a
Manganese	Log Linear	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	Sample et al. 1998a
Mercury	Log Linear	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	Sample et al. 1998a
Nickel	Log Linear	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	Sample et al. 1998a
Selenium	Log Linear	ln(dry worm conc, mg/kg) = (-0.075+0.733*ln(soil conc))	Sample et al. 1998a
Silver	Uptake Factor	1.53E+01	90% UF, Sample et al 1998a
Thallium	Uptake Factor	1.00E+00	Default
Titanium	Uptake Factor	1.00E+00	Default
Vanadium	Uptake Factor	8.80E-01	90% UF, Sample et al 1998a
Zinc	Log Linear	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	Sample et al. 1998a
Dioxins			
Dioxin TEQ	Uptake Factor	1.00E+00	Default
PCBs			
Aroclor 1260	Log Linear	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	Equation for PCB from Sample et al. 1998a
PAHs			
Total LMW PAHs	Uptake Factor	3.00E-01	Beyer and Stafford 1993, value for total PAHs
Total HMW PAHs	Uptake Factor	3.00E-01	Beyer and Stafford 1993, value for total PAHs
Explosives			
2,4,6-Trinitrotoluene	Uptake Factor	1.00E+00	Default
2,4-Dinitrotoluene	Uptake Factor	1.00E+00	Default
2,6-Dinitrotoluene	Uptake Factor	1.00E+00	Default
VOCS			
2-Butanone (Methyl ethyl ketone)	Uptake Factor	1.00E+00	Default
Acetone	Uptake Factor	1.00E+00	Default
Benzene	Uptake Factor	1.00E+00	Default
Methylene chloride	Uptake Factor	1.00E+00	Default
Toluene	Uptake Factor	1.00E+00	Default
Total Xylenes	Uptake Factor	1.00E+00	Default

Note:
A - The default uptake factor for chemicals were no information was available was assumed to be 1.
B - Equation types:
Uptake Factor: [ConcBio] = m x [ConcSoil]
Log linear: [ConcBio] = 10b*[ConcSoil]m
C - Uptake factor derived using the following equations from Sample, et. al 1998a:
ln(earthworm) = B0 + B1(ln(soil concentration))
B0 = Constituent-specific intercept based on tissue type
B1 = Constituent-specific slope based on tissue type
Data for B0 and B1 are presented in Sample, et. al 1998a, Table 12, pg. 33.
BAF: Bioaccumulation factor

Table F-4
Uptake Models Relating Doses Ingested by Small Mammals to Concentrations in Small Mammals

Chemical	Food Item (Small Mammal) Uptake			
	Uptake Model	UF/BTF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Log K_{ow}	Source
Metals				
Aluminum	Uptake Factor	7.32E-02	--	Sample et al. 1998b
Antimony	Uptake Factor	1.00E+00	--	Default
Arsenic	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	--	Sample et al. 1998b
Barium	Log Linear	ln(dry mammal conc, mg/kg) = (-1.412+0.7*ln(soil conc))	--	Sample et al. 1998b
Beryllium	Uptake Factor	1.00E+00	--	Default
Cadmium	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	--	Sample et al. 1998b
Chromium	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	--	Sample et al. 1998b
Cobalt	Uptake Factor	1.00E-01	--	90% UF from Sample et al. 1998b
Copper	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	--	Sample et al. 1998b
Lead	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	--	Sample et al. 1998b
Manganese	Uptake Factor	5.87E-02	--	90% UF, Sample et al 1998b
Mercury	Uptake Factor	1.92E-01	--	90% UF, Sample et al 1998b
Nickel	Log Linear	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	--	Sample et al. 1998b
Selenium	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4158+0.3764*ln(soil conc))	--	Sample et al. 1998b
Silver	Uptake Factor	5.01E-01	--	90% UF, Sample et al 1998b
Thallium	Uptake Factor	1.23E-01	--	90% UF from Sample et al. 1998b
Titanium	Uptake Factor	1.00E+00	--	Default
Vanadium	Uptake Factor	1.79E-02	--	90% UF from Sample et al. 1998b
Zinc	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	--	Sample et al. 1998b
Dioxins				
Dioxin TEQ	Biotransfer Factor	8.36E-01	6.92E+00	Regression from Travis and Arms 1988, Log Kow for TCDD used
PCBs				
Aroclor 1260	Biotransfer Factor	1.86E+01	8.27E+00	Regression from Travis and Arms 1988
PAHs				
Total LMW PAHs	Biotransfer Factor	1.12E-01	--	Average of individual PAH biotransfer factors calculated via regression from Travis and Arms 1988
Total HMW PAHs	Biotransfer Factor	1.12E-01	--	Average of individual PAH biotransfer factors calculated via regression from Travis and Arms 1988
Explosives				
2,4,6-Trinitrotoluene	Biotransfer Factor	9.82E-06	1.99E+00	Regression from Travis and Arms 1988
2,4-Dinitrotoluene	Biotransfer Factor	1.52E-05	2.18E+00	Regression from Travis and Arms 1988
2,6-Dinitrotoluene	Biotransfer Factor	1.52E-05	2.18E+00	Regression from Travis and Arms 1988
VOCS				
2-Butanone (Methyl ethyl ketone)	Biotransfer Factor	1.83E-07	2.60E-01	Regression from Travis and Arms 1988
Acetone	Biotransfer Factor	5.85E-08	-2.35E-01	Regression from Travis and Arms 1988
Benzene	Biotransfer Factor	9.82E-06	1.99E+00	Regression from Travis and Arms 1988
Methylene chloride	Biotransfer Factor	2.20E-06	1.34E+00	Regression from Travis and Arms 1988
Toluene	Biotransfer Factor	3.48E-05	2.54E+00	Regression from Travis and Arms 1988
Total Xylenes	Biotransfer Factor	1.24E-04	3.09E+00	Regression from Travis and Arms 1988

Note:

Biotransfer factor:

Derived using the following equations from Travis & Arms 1988 (equation 2, pg. 272): Log BTF = -7.6 + log Kow

BTF = bio transfer factor

K_{ow} = octanol-water partitioning coefficient

Log K_{ow} values from KOWWIN program from EPI suite.

Biotransfer factors were divided by 0.25 to account for wet weight to dry weight conversion.

UF: Uptake factor. An uptake factor is multiplied by the soil concentration in order to get a small mammal tissue concentration.

BTF: Biotransfer factor. A biotransfer factor is multiplied by the daily dose to a small mammal in order to get a small mammal tissue concentration.

Table F-5
Uptake Models Relating Concentrations in Surface Water to Concentrations in Fish

Chemical	Food Item (Fish) Uptake			
	Uptake Model[A, B]	BCFBAF value (L/kg wet weight)	BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Source
Metals				
Aluminum	Uptake Factor	2.70E+00	1.08E+01	From Table C-5 - USEPA 1999
Antimony	Uptake Factor	1.00E+00	4.00E+00	Based on bluegill in Table 5 - USEPA 1980
Arsenic	Uptake Factor	4.00E+00	1.60E+01	Based on bluegill in Table 5 - USEPA 1985a
Barium	Uptake Factor	4.00E+00	1.60E+01	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Beryllium	Uptake Factor	6.20E+01	2.48E+02	From Table C-5 - USEPA 1999
Cadmium	Uptake Factor	5.90E+01	2.36E+02	Based on bluegill in Table 5 - USEPA 2001
Chromium	Uptake Factor	2.00E+02	8.00E+02	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Cobalt	Uptake Factor	1.00E+00	4.00E+00	Default
Copper	Uptake Factor	4.64E+02	1.86E+03	Based on fathead minnow in Table 5 - USEPA 2003
Lead	Uptake Factor	4.50E+01	1.80E+02	Based on bluegill in Table 5 - USEPA 1985b
Manganese	Uptake Factor	4.00E+02	1.60E+03	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Mercury	Uptake Factor	1.80E+03	7.20E+03	Based on rainbow trout in Table 5 - USEPA 1985c
Nickel	Uptake Factor	2.70E+01	1.08E+02	Based on rainbow trout/fathead minnow in Table 5 - USEPA 1986
Selenium	Uptake Factor	2.42E+02	9.68E+02	Based on bluegill in Table 5 - USEPA 1987a
Silver	Uptake Factor	8.77E+01	3.51E+02	From Table C-5 - USEPA 1999
Thallium	Uptake Factor	1.00E+03	4.00E+03	BCF from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=chem
Titanium	Uptake Factor	1.00E+00	4.00E+00	Default
Vanadium	Uptake Factor	1.00E+00	4.00E+00	Default
Zinc	Uptake Factor	1.30E+01	5.20E+01	Based on mummichog in Table 5 - USEPA 1987b
Dioxins				
Dioxin TEQ	Uptake Factor	1.42E+04	5.68E+04	BCF calculated via Regression from BCFBAF Program, value for TCDD
PCBs				
Aroclor 1260	Uptake Factor	27570	1.10E+05	BCF calculated via Regression from BCFBAF Program
PAHs				
Total LMW PAHs	Uptake Factor	--	1.28E+04	Average of BCFs of individual PAHs
Total HMW PAHs	Uptake Factor	--	1.28E+04	Average of BCFs of individual PAHs
Explosives				
2,4,6-Trinitrotoluene	Uptake Factor	5.28E+00	2.11E+01	BCF calculated via Regression from BCFBAF Program
2,4-Dinitrotoluene	Uptake Factor	9.41E+00	3.76E+01	BCF calculated via Regression from BCFBAF Program
2,6-Dinitrotoluene	Uptake Factor	1.13E+01	4.52E+01	BCF calculated via Regression from BCFBAF Program
VOCS				
2-Butanone (Methyl ethyl ketone)	Uptake Factor	3.16E+00	1.26E+01	BCF calculated via Regression from BCFBAF Program
Acetone	Uptake Factor	3.16E+00	1.26E+01	BCF calculated via Regression from BCFBAF Program
Benzene	Uptake Factor	1.18E+01	4.72E+01	BCF calculated via Regression from BCFBAF Program
Methylene chloride	Uptake Factor	3.10E+00	1.24E+01	BCF calculated via Regression from BCFBAF Program
Toluene	Uptake Factor	2.94E+01	1.18E+02	BCF calculated via Regression from BCFBAF Program
Total Xylenes	Uptake Factor	5.65E+01	2.26E+02	BCF calculated via Regression from BCFBAF Program

Note:
A - Equation types:
Uptake Factor:
B -Uptake factor for organics derived using the BCFBAF Program from USEPA
http://www.epa.gov/oppt/exposure/pubs/episuitedl.htm
BAF: Bioaccumulation factor
BCFBAF: Biococentration factor/Bioaccumulation factor
Uptake factors from BCFBAF were divided by 0.25 to account for wet weight to dry weight conversion.

Table F-6
Uptake Models Relating Concentrations in Sediment to Concentrations in Benthos

Chemical	Food Item (Benthos) Uptake		
	Uptake Model	UF/BSAF	Source
Metals			
Aluminum	Uptake Factor	1.00E+00	Default
Antimony	Uptake Factor	1.00E+00	Default
Arsenic	Uptake Factor	1.27E-01	Median BSAF (not normalized for TOC and lipids) from data of non-depurated organisms as advised for use (Bechtel Jacobs 1998)
Barium	Uptake Factor	1.00E+00	Default
Beryllium	Uptake Factor	1.00E+00	Default
Cadmium	Uptake Factor	3.07E+00	90th percentile BSAF (not normalized for TOC and lipids) from data of depurated organisms as advised for use (Bechtel Jacobs 1998)
Chromium	Uptake Factor	4.68E-01	90th percentile BSAF (not normalized for TOC and lipids) from data for all organisms (Bechtel Jacobs 1998)
Cobalt	Uptake Factor	1.00E+00	Default
Copper	Uptake Factor	5.25E+00	90th percentile BSAF (not normalized for TOC and lipids) from data for all organisms as advised for use (Bechtel Jacobs 1998)
Lead	Uptake Factor	6.60E-02	Median BSAF (not normalized for TOC and lipids) from data of non-depurated organisms as advised for use (Bechtel Jacobs 1998)
Manganese	Uptake Factor	1.00E+00	Default
Mercury	Uptake Factor	2.87E+00	90th percentile BSAF (not normalized for TOC and lipids) from data for all organisms (Bechtel Jacobs 1998)
Nickel	Uptake Factor	2.32E+00	90th percentile BSAF (not normalized for TOC and lipids) from data for all organisms (Bechtel Jacobs 1998)
Selenium	Uptake Factor	1.00E+00	Default
Silver	Uptake Factor	1.00E+00	Default
Thallium	Uptake Factor	1.00E+00	Default
Titanium	Uptake Factor	1.00E+00	Default
Vanadium	Uptake Factor	1.00E+00	Default
Zinc	Uptake Factor	4.76E+00	90th percentile BSAF (not normalized for TOC and lipids) from data of depurated organisms as advised for use (Bechtel Jacobs 1998)
Dioxins			
Dioxin TEQ	BSAF	5.44E-01	Average of whole body freshwater BSAF from EPA data set (2009), value for 2,3,7,8-TCDD
PCBs			
Aroclor 1260	BSAF	3.38E+00	Average of whole body freshwater BSAF for Total PCBs from EPA data set (2009)
PAHs			
Total LMW PAHs	BSAF	6.95E-02	Average of whole body freshwater BSAF from EPA data set (2009), average value for individual LMW PAHs
Total HMW PAHs	BSAF	1.78E-02	Average of whole body freshwater BSAF from EPA data set (2009), average value for individual HMW PAHs
Explosives			
2,4,6-Trinitrotoluene	BSAF	4.00E+00	Default
2,4-Dinitrotoluene	BSAF	4.00E+00	Default
2,6-Dinitrotoluene	BSAF	4.00E+00	Default
VOCS			
2-Butanone (Methyl ethyl ketone)	BSAF	4.00E+00	Default
Acetone	BSAF	4.00E+00	Default
Benzene	BSAF	4.00E+00	Default
Methylene chloride	BSAF	4.00E+00	Default
Toluene	BSAF	4.00E+00	Default
Total Xylenes	BSAF	4.00E+00	Default

Note:
BSAF: Biota-sediment accumulation factor
TOC: Total organic carbon

Table F-7
Wildlife Exposure Factors for Ecological Risk Assessment

Exposure Parameter	Value	Units	Notes
DEER MOUSE			
Body Weight	0.021	kg	Average adult male and female weights from North America (Millar 1989) as cited in EPA 1993
Food Ingestion Rate	0.051	g dry wt./g-day	Converted assuming 75% prey moisture (USACHPPM 2004)
Food Ingestion Rate	0.21	g wet wt./g-day	Average non-breeding adult male and female rates (Cronin & Bradley 1988) as cited in EPA 1993
Incidental Soil Ingestion Rate	2.00%	% of total mass of diet	Beyer et al. 1994 value for white-footed mouse
Water Ingestion Rate	0.19	L/kg-day	Value for adult rates (EPA 1993)
AMERICAN ROBIN			
Body Weight	0.077	kg	EPA 1993
Food Ingestion Rate	0.22	kg dry wt./kg-day	Converted assuming 75% prey moisture (USACHPPM 2004)
Food Ingestion Rate	0.89	kg wet wt./kg-day	EPA 1993
Incidental Soil Ingestion Rate	10.50%	% of total mass of diet	Value base on woodcock (Sample and Suter 1994)
Water Ingestion Rate	0.14	L/kg-day	EPA 1993
RED FOX			
Body Weight	4.5	kg	Sample et al. 1996
Food Ingestion Rate	0.017	kg dry wt./kg-day	Converted assuming 75% prey moisture (USACHPPM 2004)
Food Ingestion Rate	0.069	kg wet wt./kg-day	Sargeant (1978) as cited in Sample and Suter 1994
Incidental Soil Ingestion Rate	2.80%	% of total mass of diet	Beyer et al. 1994
Water Ingestion Rate	0.085	L/kg-day	EPA 1993, average of male and female rates
OSPREY			
Body Weight	1.486	kg	EPA 1993 (Value is average of male and female weights, 1.403 and 1.568 respectively)
Food Ingestion Rate	0.0525	g dry wt./g-day	EPA 1993, converted assuming 75% prey moisture (ARAMS 2004)
Food Ingestion Rate	0.21	g wet wt./g-day	EPA 1993
Incidental Sediment Ingestion Rate	2.00%	% of total mass of diet	As a piscivore, expected to be negligible (Sample and Suter 1994), conservative value used.
Water Ingestion Rate	0.052	L/kg-day	EPA 1993

Notes:

kg : kilogram
g dry wt./g-day : grams of dry weight per gram of body weight per day
g wet wt./g-day : grams of wet weight per gram of body weight per day
% of total mass of diet : percent of total mass of diet
L/kg-day liters per kilogram of body weight per day

Table F-8
Soil Toxicity Reference Values for Plants and Soil Invertebrates

Chemical	Plant TRV (mg/kg dry wt)	Toxicity Reference Value Source and Notes	Earthworm TRV (mg/kg dry wt)	Toxicity Reference Value Source and Notes
Metals				
Aluminum	5.00E+01	Efroymson et al. 1997a	NA	---
Antimony	5.00E+00	Efroymson et al. 1997a	7.80E+01	EPA 2005c
Arsenic	1.80E+01	EPA 2005d	6.00E+01	Efroymson et al. 1997b
Barium	5.00E+02	Efroymson et al. 1997a	3.30E+02	EPA 2005e
Beryllium	1.00E+01	Efroymson et al. 1997a	4.00E+01	EPA 2005f
Cadmium	3.20E+01	EPA 2005g	1.40E+02	EPA 2005g
Chromium	1.00E+00	Efroymson et al. 1997a	4.00E-01	Efroymson et al. 1997b
Cobalt	1.30E+01	EPA 2005h	NA	---
Copper	7.00E+01	EPA 2007b	8.00E+01	EPA 2007b
Lead	1.20E+02	EPA 2005i	1.70E+03	EPA 2005i
Manganese	2.20E+02	EPA 2007c	4.50E+02	EPA 2007c
Mercury	3.00E-01	Efroymson et al. 1997a	1.00E-01	Efroymson et al. 1997b
Nickel	3.80E+01	EPA 2007d	2.80E+02	EPA 2007d
Selenium	5.20E-01	EPA 2007f	4.10E+00	EPA 2007f
Silver	5.60E+02	EPA 2006	NA	---
Thallium	1.00E+00	Efroymson et al. 1997a	NA	---
Titanium	NA	---	NA	---
Vanadium	2.00E+00	Efroymson et al. 1997a	NA	---
Zinc	1.60E+02	EPA 2007g	1.20E+02	EPA 2007g
Dioxins				
Dioxin TEQ	NA	---	5.00E-01	Reinecke and Nash 1984
PCBs				
Aroclor 1260	4.00E+01	Efroymson et al. 1997a, value for PCBs	3.30E-01	Region IV value (EPA 2018) for soil invertebrates, value for total PCBs
PAHs				
Total LMW PAHs	2.00E+01	Efroymson et al. 1997a, value for acenaphthene	2.90E+01	EPA 2007e
Total HMW PAHs	2.00E+01	Efroymson et al. 1997a, value for acenaphthene	1.80E+01	EPA 2007e
Explosives				
2,4,6-Trinitrotoluene	6.20E+01	Region 4 Screening Level (2018)	3.20E+01	Region 4 Screening Level (2018)
2,4-Dinitrotoluene	6.00E+00	Region 4 Screening Level (2018)	1.80E+01	Region 4 Screening Level (2018)
2,6-Dinitrotoluene	6.00E+00	Region 4 Screening Level (2018), value for 2,4-dinitrotoluene	3.00E+01	Region 4 Screening Level (2018)
VOCS				
2-Butanone (Methyl ethyl ketone)	NA	---	NA	---
Acetone	NA	---	NA	---
Benzene	NA	---	NA	---
Methylene chloride	NA	---	NA	---
Toluene	2.00E+02	Efroymson et al. 1997a	NA	---
Total Xylenes	NA	---	NA	---

Note:
HMW: High molecular weight
LMW: Low molecular weight
mg/kg dry wt: milligrams per kilogram dry weight
NA: TRV not available
PAH: Polycyclic aromatic hydrocarbon
TRV: Toxicity reference value

Table F-9
Dose-based Toxicity Reference Values for Birds

Chemical	Avian NOAEL (mg/kg-bw day)	Avian NOAEL Source and Notes	Avian LOAEL (mg/kg-bw day)	Avian LOAEL Source and Notes
Metals				
Aluminum	1.10E+02	Sample et al. 1996	NA	---
Antimony	NA	---	NA	---
Arsenic	2.24E+00	EPA 2005d	4.51E+00	Geometric mean of LOAELs for growth and reproduction in EPA 2005d
Barium	2.08E+01	Sample et al. 1996	4.17E+01	Sample et al. 1996
Beryllium	NA	---	NA	---
Cadmium	1.47E+00	EPA 2005g	6.35E+00	Geometric mean of LOAELs for growth and reproduction in EPA 2005g
Chromium	2.66E+00	EPA 2008	1.56E+01	Geometric mean of LOAELs for growth and reproduction in EPA 2008
Cobalt	7.61E+00	EPA 2005h	1.83E+01	Geometric mean of LOAELs for growth and reproduction in EPA 2005h
Copper	4.05E+00	EPA 2007b	1.21E+01	Corresponding LOAEL from EPA 2007b
Lead	1.63E+00	EPA 2005i	3.26E+00	Corresponding LOAEL from EPA 2005i
Manganese	1.79E+02	EPA 2007c	3.77E+02	Geometric mean of LOAELs for growth and reproduction in EPA 2007c
Mercury	4.50E-01	Sample et al. 1996	9.00E-01	Sample et al. 1996
Nickel	6.71E+00	EPA 2007d	1.86E+01	Geometric mean of LOAELs for growth and reproduction in EPA 2007d
Selenium	2.90E-01	EPA 2007f	5.79E-01	Corresponding LOAEL from EPA 2007f
Silver	2.02E+00	EPA 2006	2.02E+01	Corresponding LOAEL from EPA 2006
Thallium	NA	---	NA	---
Titanium	NA	---	NA	---
Vanadium	3.44E-01	EPA 2005j	6.88E-01	Corresponding LOAEL from EPA 2005j
Zinc	6.61E+01	EPA 2007g	1.71E+02	Geometric mean of LOAELs for growth and reproduction in EPA 2007g
Dioxins				
Dioxin TEQ	1.40E-05	Sample et al. 1996	1.40E-04	Sample et al. 1996
PCBs				
Aroclor 1260	1.80E-01	Sample et al. 1996, value for Aroclor 1254	1.80E+00	Sample et al. 1996, value for Aroclor 1254
PAHs				
Total LMW PAHs	5.62E+03	EPA 2007e did not derive value due to too few studies, value is from the only study not rejected for use (Landis Associates Inc. 1985)	5.62E+04	Value is derived from the NOAEL by applying a factor of 10
Total HMW PAHs	2.00E+00	EPA 2007e did not derive value due to too few studies, values if from the only study not rejected for use (Trust et al. 1994)	2.00E+01	EPA 2007e did not derive value due to too few studies, values if from the only study not rejected for use (Trust et al. 1994)
Explosives				
2,4,6-Trinitrotoluene	6.00E+01	Johnson and Reddy 2015	9.00E+01	Johnson and Reddy 2015
2,4-Dinitrotoluene	1.00E-02	USACHPPM 2012	1.30E-01	USACHPPM 2012
2,6-Dinitrotoluene	1.00E-01	USACHPPM 2012	1.00E+00	USACHPPM 2012
VOCS				
2-Butanone (Methyl ethyl ketone)	NA	---	NA	---
Acetone	NA	---	NA	---
Benzene	NA	---	NA	---
Methylene chloride	NA	---	NA	---
Toluene	NA	---	NA	---
Total Xylenes	NA	---	NA	---

Note:
HMW: High molecular weight
LMW: Low molecular weight
LOAEL: Lowest observed adverse effects level
mg/kg-bw day: milligrams per kilogram body weight per day
NA: Not available
NOAEL: No observed adverse effects level
PAH: Polycyclic aromatic hydrocarbon

Table F-10
Dose-based Toxicity Reference Values for Mammals

Chemical	Mammalian NOAEL (mg/kg-bw day)	Mammalian NOAEL Source and Notes	Mammalian LOAEL (mg/kg-bw day)	Mammalian LOAEL Source and Notes
Metals				
Aluminum	1.93E+00	Sample et al. 1996	1.93E+01	Sample et al. 1996
Antimony	5.90E-02	EPA 2005c	5.90E-01	Corresponding LOAEL from EPA 2005c
Arsenic	1.04E+00	EPA 2005d	1.66E+00	Corresponding LOAEL from EPA 2005d
Barium	5.18E+01	EPA 2005e	8.27E+01	Geometric mean of LOAELs for growth and reproduction in EPA 2005e
Beryllium	5.32E-01	EPA 2005f	6.73E-01	Geometric mean of LOAELs for growth and reproduction in EPA 2005f
Cadmium	7.70E-01	EPA 2005g	7.70E+00	Corresponding LOAEL from EPA 2005g
Chromium	2.40E+00	EPA 2008 value for trivalent chromium	5.82E+01	Geometric mean of LOAELs for growth and reproduction for trivalent chromium in EPA 2008
Cobalt	7.33E+00	EPA 2005h	1.89E+01	Geometric mean of LOAELs for growth and reproduction in EPA 2005h
Copper	5.60E+00	EPA 2007b	9.34E+00	Corresponding LOAEL from EPA 2007b
Lead	4.70E+00	EPA 2005i	8.90E+00	Corresponding LOAEL from EPA 2005i
Manganese	5.15E+01	EPA 2007c	1.46E+02	Geometric mean of LOAELs for growth and reproduction in EPA 2007c
Mercury	1.32E+01	Sample et al. 1996	NA	---
Nickel	1.70E+00	EPA 2007d	3.40E+00	Corresponding LOAEL from EPA 2007d
Selenium	1.43E-01	EPA 2007f	2.15E-01	Corresponding LOAEL from EPA 2007f
Silver	6.02E+00	EPA 2006	6.02E+01	Corresponding LOAEL from EPA 2006
Thallium	7.40E-03	Sample et al. 1996	7.40E-02	Sample et al. 1996
Titanium	NA	---	NA	---
Vanadium	4.16E+00	EPA 2005j	8.31E+00	Corresponding LOAEL from EPA 2005j
Zinc	7.54E+01	EPA 2007g	2.98E+02	Geometric mean of LOAELs for growth and reproduction in EPA 2007g
Dioxins				
Dioxin TEQ	1.00E-06	Sample et al. 1996	1.00E-05	Sample et al. 1996
PCBs				
Aroclor 1260	6.80E-02	Sample et al. 1996, value for Aroclor 1254	6.80E-01	Sample et al. 1996, value for Aroclor 1254
PAHs				
Total LMW PAHs	6.56E+01	EPA 2007e	3.28E+02	Corresponding LOAEL from EPA 2007e
Total HMW PAHs	6.15E-01	EPA 2007e	3.01E+00	Corresponding LOAEL from EPA 2007e
Explosives				
2,4,6-Trinitrotoluene	9.00E-01	Johnson and Reddy 2015	1.70E+00	Johnson and Reddy 2015
2,4-Dinitrotoluene	6.70E-01	USACHPPM 2012	1.40E+00	USACHPPM 2012
2,6-Dinitrotoluene	7.00E-01	USACHPPM 2012	7.00E+00	USACHPPM 2012
VOCS				
2-Butanone (Methyl ethyl ketone)	1.77E+03	Sample et al. 1996	4.57E+03	Sample et al. 1996
Acetone	1.00E+01	Sample et al. 1996	5.00E+01	Sample et al. 1996
Benzene	2.64E+01	Sample et al. 1996	2.64E+02	Sample et al. 1996
Methylene chloride	5.85E+00	Sample et. al 1996	5.00E+01	Sample et. al 1996
Toluene	2.60E+01	Sample et. al 1996	2.60E+02	Sample et. al 1996
Total Xylenes	2.10E+00	Sample et. al 1996	2.60E+00	Sample et. al 1996

Note:
HMW: High molecular weight
LMW: Low molecular weight
LOAEL: Lowest observed adverse effects level
mg/kg-bw day: milligrams per kilogram body weight per day
NA: Not available
NOAEL: No observed adverse effects level
PAH: Polycyclic aromatic hydrocarbon

Table F-11
Sediment Toxicity Reference Values for Benthic Organism Exposures

Chemical	Sediment TRV based on threshold effects (mg/kg dry wt.)	TRV based on the mid-point between threshold and probable effects (mg/kg dry wt.)	Sediment TRV based on probable effects (mg/kg dry wt.)	Source
Metals				
Aluminum	2.55E+04	NA	NA	ARCS *H. azteca* TEL (EPA 1996)
Antimony	2.00E+00	1.35E+01	2.50E+01	ER-L and ER-M for marine sediment from Long and Morgan (1991)
Arsenic	9.79E+00	2.14E+01	3.30E+01	TEC and PEC values from MacDonald et al. (2000)
Barium	1.30E+02	NA	NA	Value is marine sediment TEL from Leung et al. 2005
Beryllium	1.10E+00	1.56E+01	3.00E+01	Dutch Target and Intervention values for soil/sediment (Verbruggen et al. 2001)
Cadmium	9.90E-01	2.99E+00	4.98E+00	TEC and PEC values from MacDonald et al. (2000)
Chromium	4.34E+01	7.72E+01	1.11E+02	TEC and PEC values from MacDonald et al. (2000)
Cobalt	5.00E+01	NA	NA	Ontario Ministry of the Environment (1993) open water disposal guideline parameter
Copper	3.16E+01	9.03E+01	1.49E+02	TEC and PEC values from MacDonald et al. (2000)
Lead	3.58E+01	8.19E+01	1.28E+02	TEC and PEC values from MacDonald et al. (2000)
Manganese	4.60E+02	7.80E+02	1.10E+03	LEL and SEL from Ontario Ministry of the Environment (2008)
Mercury	1.80E-01	0.62	1.06E+00	TEC and PEC values from MacDonald et al. (2000)
Nickel	2.27E+01	3.57E+01	4.86E+01	TEC and PEC values from MacDonald et al. (2000)
Selenium	7.00E-01	5.04E+01	1.00E+02	Dutch Target and Intervention values for soil/sediment (Netherlands Ministry of Housing, Spatial Planning and the Environment 2000)
Silver	5.00E-01	7.75E+00	1.50E+01	Ontario Ministry of the Environment (1993) open water disposal guideline parameter and Intervention value for soil/sediment (Netherlands Ministry of Housing, Spatial Planning and the Environment 2000)
Thallium	1.00E+00	8	1.50E+01	Dutch Target and Intervention values for soil/sediment (Verbruggen et al. 2001)
Titanium	NA	NA	NA	---
Vanadium	4.20E+01	1.46E+02	2.50E+02	Dutch Target and Intervention values for soil/sediment (Verbruggen et al. 2001)
Zinc	1.21E+02	2.90E+02	4.59E+02	TEC and PEC values from MacDonald et al. (2000)
Dioxins				
Dioxin TEQ	8.50E-07	NA	NA	TEL from Canadian Sediment Quality Guidelines for the Protection of Aquatic Life 2002
PCBs				
Aroclor 1260	6.00E-02	2.00E-01	3.40E-01	TEL and PEL from Canadian Sediment Quality Guidelines for the Protection of Aquatic Life 2002, value for Aroclor 1260
PAHs				
Total PAHs	1.61E+00	1.22E+01	2.28E+01	TEC and PEC values for total PAHs from MacDonald et al. (2000)
Explosives				
2,4,6-Trinitrotoluene	2.70E+01	6.95E+01	1.12E+02	Region 4 Screening Level (2018) assuming 1% OC
2,4-Dinitrotoluene	2.90E+02	1.60E+03	2.90E+03	Region 4 Screening Level (2018) assuming 1% OC, value for probable effects less than threshold effects
2,6-Dinitrotoluene	2.96E+02	NA	NA	Region 4 Screening Level (2018)
VOCS				
2-Butanone (Methyl ethyl ketone)	2.93E+00	NA	NA	DiToro at al. 2000 assuming 1% OC
Acetone	2.27E+00	NA	NA	Sediment quality guideline from DiToro et al. 2000, assuming 1% organic carbon
Benzene	6.46E+00	NA	NA	DiToro at al. 2000 assuming 1% organic carbon
Methylene chloride	3.73E+00	NA	NA	Sediment quality guideline from DiToro et al. 2000, assuming 1% organic carbon
Toluene	1.00E-02	6.50E+01	1.30E+02	Dutch Target and Intervention values for soil/sediment (Netherlands Ministry of Housing, Spatial Planning and the Environment 2000)
Total Xylenes	1.30E-01	4.72E+00	9.30E+00	Dutch Target and Intervention values for sediment (Verbruggen et al. 2001)

Note:
ARCS: Assessment and Remediation of Contaminated Sediments
ER-L: Effects Range-Low
ER-M: Effects Range-Medium
ET: Ecotox threshold
HMW: High molecular weight
LEL: Lowest effect level
LMW: Low molecular weight
mg/kg dry wt: milligrams per kilogram dry weight
MPC: Maximal permissible concentration
NA: Not available
OC: Organic carbon
PAH: Polycyclic aromatic hydrocarbon
PEC: Probable effect concentration
PEL: Probable effect level
SEL: Severe effect level
TEC: Threshold effect concentration
TEL: Threshold effect level
TRV: Toxicity reference value

Table F-12
Surface Water Toxicity Reference Values for Aquatic Organism Exposures

Chemical	Chronic Surface Water TRV (ug/L)	Acute Surface Water TRV (ug/L)	Source for Surface Water TRVs
Metals			
Aluminum	8.70E+01	7.50E+02	NAWQC values (EPA 2015)
Antimony	3.00E+01	1.80E+02	Tier II values from Suter and Tsao 1996
Arsenic	1.50E+02	3.40E+02	NAWQC (EPA 2015), based on dissolved concentrations
Barium	4.00E+00	1.10E+02	Tier II values from Suter and Tsao 1996
Beryllium	6.60E-01	3.50E+01	Tier II values from Suter and Tsao 1996
Cadmium	2.50E-01	2.00E+00	NAWQC (EPA 2015), based on dissolved concentrations. Criterion is a function of hardness. Default of 100 mg/L used.
Chromium	7.40E+01	5.70E+02	NAWQC (EPA 2015)
Cobalt	2.30E+01	1.50E+03	Tier II values from Suter and Tsao 1996
Copper	1.20E+01	1.80E+01	NAWQC (Suter and Tsao 1996)
Lead	8.10E+00	2.10E+02	NAWQC (EPA 2015)
Manganese	1.20E+02	2.30E+03	Tier II values from Suter and Tsao 1996
Mercury	7.70E-01	1.4	NAWQC (EPA 2015)
Nickel	5.20E+01	4.70E+02	NAWQC (EPA 2015), based on dissolved concentrations. Criterion is a function of hardness. Default of 100 mg/L used.
Selenium	5.00E+00	NA	NAWQC (EPA 2015)
Silver	3.60E-01	3.20E+00	Tier II value from Suter and Tsao 1996 and NAWQC (EPA 2015)
Thallium	1.20E+01	1.10E+02	Tier II values from Suter and Tsao 1996
Titanium	NA	2.00E+03	British Columbia Water Quality Guidelines as presented in NOAA Sceening Quick Reference Tables
Vanadium	2.00E+01	2.80E+02	Tier II values from Suter and Tsao 1996
Zinc	1.20E+02	1.20E+02	NAWQC (EPA 2015), based on dissolved concentrations. Criterion is a function of hardness. Default of 100 mg/L used.
Dioxins			
Dioxin TEQ	1.00E-05	1.00E-01	Region IV screening value from Suter and Tsao 1996
PCBs			
Aroclor 1260	1.40E-02	1.70E+03	NAWQC value for total PCBs for chronic value, Tier II values for acute value (Suter and Tsao 1996)
PAHs			
Acenaphthene	2.30E+01	8.00E+01	NAWQC (Suter and Tsao 1996)
Acenaphthylene	NA	NA	---
Anthracene	7.30E-01	1.30E+01	Tier II values from Suter and Tsao 1996
Benzo(a)anthracene	2.70E-02	4.90E-01	Tier II values from Suter and Tsao 1996
Benzo(a)pyrene	1.40E-02	2.40E-01	Tier II values from Suter and Tsao 1996
Benzo(b)fluoranthene	NA	NA	---
Benzo(g,h,i)perylene	NA	NA	---
Benzo(k)fluoranthene	NA	NA	---
Chrysene	NA	NA	---
Dibenzo(a,h)anthracene	NA	NA	---
Fluoranthene	6.16E+00	3.36E+01	NAWQC (Suter and Tsao 1996)
Fluorene	3.90E+00	7.00E+01	Tier II values from Suter and Tsao 1996
Indeno(1,2,3-cd)pyrene	NA	NA	---
Naphthalene	1.20E+01	1.90E+02	Tier II values from Suter and Tsao 1996
Phenanthrene	6.30E+00	3.00E+01	NAWQC (Suter and Tsao 1996)
Pyrene	NA	NA	---
Explosives			
2,4,6-Trinitrotoluene	1.30E+01	1.20E+02	Region 4 Screening Level (2018)
2,4-Dinitrotoluene	4.40E+01	3.90E+02	Region 4 Screening Level (2018)
2,6-Dinitrotoluene	8.10E+01	7.30E+02	Region 4 Screening Level (2018)
VOCS			
2-Butanone (Methyl ethyl ketone)	1.40E+04	2.40E+05	Tier II values from Suter and Tsao 1996
Acetone	1.50E+03	2.80E+04	Tier II values from Suter and Tsao 1996
Benzene	1.30E+02	2.30E+03	Tier II values from Suter and Tsao 1996
Methylene chloride	2.20E+03	2.60E+04	Tier II values from Suter and Tsao 1996
Toluene	9.80E+00	1.20E+02	Tier II values from Suter and Tsao 1996
Total Xylenes	1.30E+01	2.30E+02	Tier II value from Suter and Tsao 1996

Note:
HMW: High molecular weight
LMW: Low molecular weight
LOAEL: Lowest observed adverse effects level
NA: TRV not available
NAWQC - National Ambient Water Quality Criteria
NOAEL: No observed adverse effects level
PAH: Polycyclic aromatic hydrocarbon
TRV: Toxicity reference value
µg/L: micrograms per liter

Table EC3-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	3/3	2.38E+04	pH<5.5	NO
Cadmium	3/3	3.50E+00	3.60E-01	YES
Chromium	3/3	3.08E+01	2.60E+01	YES
Cobalt	3/3	4.60E+00	1.30E+01	NO
Lead	3/3	2.69E+02	1.10E+01	YES
Titanium	3/3	5.33E+02	NA	YES
Zinc	3/3	1.79E+02	4.60E+01	YES
VOCS				
2-Butanone (Methyl ethyl ketone)	2/3	7.90E-03	1.00E+00	NO
Acetone	3/3	3.42E-02	1.20E+00	NO

Note:

mg/kg - Milligrams per kilogram.

VOC - Volatile organic compound.

Table EC3-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Metals		
Cadmium	3/3	3.50E+00
Chromium	3/3	3.08E+01
Lead	3/3	2.69E+02
Titanium	3/3	5.33E+02
Zinc	3/3	1.79E+02

Note:

mg/kg - Milligrams per kilogram.

Table EC3-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Cadmium	3.20E+01	3.50E+00	1.1E-01
Chromium	1.00E+00	3.08E+01	**3.1E+01**
Lead	1.20E+02	2.69E+02	**2.2E+00**
Titanium	NA	5.33E+02	--
Zinc	1.60E+02	1.79E+02	1.1E+00

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC3-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Cadmium	1.40E+02	3.50E+00	2.5E-02
Chromium	4.00E-01	3.08E+01	**7.7E+01**
Lead	1.70E+03	2.69E+02	1.6E-01
Titanium	NA	5.33E+02	--
Zinc	1.20E+02	1.79E+02	**1.5E+00**

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC3-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Cadmium	1.47E+00	6.35E+00	**3.6E+00**	8.4E-01
Chromium	2.66E+00	1.56E+01	**1.9E+00**	3.2E-01
Lead	1.63E+00	3.26E+00	**2.5E+01**	**1.3E+01**
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	**1.8E+00**	7.1E-01

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC3-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Cadmium	7.70E-01	7.70E+00	1.0E-01	3.6E-02	1.0E-02	3.6E-03
Chromium	2.40E+00	5.82E+01	5.8E-02	4.5E-02	2.4E-03	1.9E-03
Lead	4.70E+00	8.90E+00	3.0E-01	1.6E-01	1.6E-01	8.3E-02
Titanium	NA	NA	--	--	--	--
Zinc	7.54E+01	2.98E+02	6.8E-02	3.4E-02	1.7E-02	8.6E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC3-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Cadmium	1.70E-01	3/3	3.50E+00	Exceeds
Chromium	2.49E+01	3/3	3.08E+01	Exceeds
Lead	1.24E+02	3/3	2.69E+02	Exceeds
Titanium	NA	3/3	5.33E+02	Exceeds
Zinc	8.39E+01	3/3	1.79E+02	Exceeds

Note:

BTV - 95 Percent upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NC = Not calculated.

wt - Weight.

Table EC3-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	3.50E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	2.24E+01	3.27E-01	4.99E+00	0.00E+00	5.32E+00
Chromium	3.08E+01	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.50E+00	2.88E+00	2.11E+00	0.00E+00	4.99E+00
Lead	2.69E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	7.35E+01	2.51E+01	1.63E+01	0.00E+00	4.15E+01
Titanium	5.33E+02	0.00E+00	1.00E+00	5.33E+02	4.98E+01	1.19E+02	0.00E+00	1.68E+02
Zinc	1.79E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.69E+02	1.67E+01	1.04E+02	0.00E+00	1.21E+02

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC3-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	3.50E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	1.23E+00	1.44E-02	6.31E-02	0.00E+00	7.75E-02
Chromium	3.08E+01	0.00E+00	7.50E-03	2.31E-01	1.26E-01	1.18E-02	0.00E+00	1.38E-01
Lead	2.69E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	6.11E+00	1.10E+00	3.13E-01	0.00E+00	1.42E+00
Titanium	5.33E+02	0.00E+00	1.00E+00					
Zinc	1.79E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	8.60E+01	7.34E-01	4.41E+00	0.00E+00	5.14E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC3-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Cadmium	3.50E+00	0.00E+00	7.75E-02	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	1.20E+00	6.76E-03	2.06E-02	0.00E+00	2.74E-02
Chromium	3.08E+01	0.00E+00	1.38E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	2.87E+00	5.95E-02	4.96E-02	0.00E+00	1.09E-01
Lead	2.69E+02	0.00E+00	1.42E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.28E+01	5.20E-01	2.21E-01	0.00E+00	7.41E-01
Titanium	5.33E+02	0.00E+00	0.00E+00	Uptake Factor	1.00E+00	5.33E+02	1.03E+00	9.19E+00	0.00E+00	1.02E+01
Zinc	1.79E+02	0.00E+00	5.14E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.28E+02	3.46E-01	2.21E+00	0.00E+00	2.56E+00

Note:

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

TABLE EC16-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-16 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-16

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
PCB Aroclors																	
11096-82-5	**Aroclor 1260**	**3.10E-02**		**2.60E+00**		**mg/kg**	**EC-16-11-SO-0.5**	**8/15**	**1.00E-02 - 1.90E-01**	**2.60E+00**	**NA**	**9.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic

NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers:

TABLE EC16-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-16 - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-16

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
PCB Aroclors																	
11096-82-5	**Aroclor 1260**	**8.80E-03**	**J**	**2.60E+00**		**mg/kg**	**EC-16-11-SO-0.5**	**11/19**	**9.60E-03 - 1.90E-01**	**2.60E+00**	**NA**	**9.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic

NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value

TABLE EC16-3
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURES
EC-16 Site Worker Scenario

Scenario Timeframe: Current and Future
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Aroclor 1260	1.171	--	2.00E+00	3.58E-07	7E-07
				Total Pathway Cancer Risk	7E-07
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Aroclor 1260	1.171	--	2.00E+00	2.69E-07	5E-07
				Total Pathway Cancer Risk	5E-07
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Aroclor 1260	9.22E-10	--	5.70E-07	7.52E-11	4E-17
				Total Pathway Cancer Risk	4E-17
				Receptor RME Incremental Cancer Risk Total =	**1E-06**

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

RME=reasonable maximum exposure
TEF=toxicity equivalence factor
CDI=chronic daily intake
mg/kg=milligrams per kilogram
mg/m^3=milligrams per meter cubed
mg/kg-day=milligrams per kilogram per day
1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.

TABLE EC16-4
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURES
EC-16 Construction Worker Scenario

Scenario Timeframe: Future

Exposure Media: Surface and Subsurface Soil (0-6 foot)

Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil

Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Aroclor 1260	0.902	--	2.00E+00	3.64E-08	7E-08
				Total Pathway Cancer Risk	7E-08
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Aroclor 1260	0.902	--	2.00E+00	7.06E-09	1E-08
				Total Pathway Cancer Risk	1E-08
Inhalation Pathway	RME Estimated Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Aroclor 1260	7.10E-10	--	5.70E-07	2.32E-12	1E-18
				Total Pathway Cancer Risk	1E-18
				Receptor RME Incremental Cancer Risk Total =	**9E-08**

Air Concentration = Concentration in Soil/Particulate Emission Factor
Particulate Emission Factor = 1.27×10^9 m^3/kg
RME=reasonable maximum exposure
TEF=toxicity equivalence factor
CDI=chronic daily intake
mg/kg-day=milligrams per kilogram per day
mg/kg=milligrams per kilogram

Table EC16-7 Detection Comparison to Screening Levels

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
PCBs					
Aroclor 1260	8/15	2.60E+00	1.17E+00	4.10E-02	YES

Note:

mg/kg - Milligrams per kilogram.

Table EC16-8 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
PCBs			
Aroclor 1260	8/15	2.60E+00	1.17E+00

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

Table EC16-9 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC
PCBs					
Aroclor 1260	4.00E+01	2.60E+00	6.5E-02	1.17E+00	2.9E-02

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC16-10 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC
PCBs					
Aroclor 1260	3.30E-01	2.60E+00	**7.9E+00**	1.17E+00	**3.5E+00**

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC16-11 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	**2.0E+01**	**2.0E+00**

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC16-12 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	**6.9E+00**	6.9E-01

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC16-13 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	1.6E-01	1.2E-01	1.6E-02	1.2E-02

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC16-14 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
PCBs						
Aroclor 1260	NA	8/15	2.60E+00	1.17E+00	Exceeds	Exceeds

Note:

95UCLM - 95 Percent upper confidence limit of the mean.

BTV - 95 Percent upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC16-15 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs								
Aroclor 1260	2.60E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	1.50E+01	2.43E-01	3.35E+00	0.00E+00	3.59E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC16-16 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)	95UCLM Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs								
Aroclor 1260	1.17E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	5.08E+00	1.09E-01	1.13E+00	0.00E+00	1.24E+00

Note:

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC16-17 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs								
Aroclor 1260	2.60E+00	0.00E+00	6.44E-04	1.67E-03	1.07E-02	8.58E-05	0.00E+00	1.07E-02

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC16-18 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs										
Aroclor 1260	2.60E+00	0.00E+00	1.07E-02	Biotransfer Factor	1.86E+01	2.00E-01	5.02E-03	3.46E-03	0.00E+00	8.48E-03

Note:

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

TABLE EC21-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-21 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-21

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	**WHO TEQ (ND=0)**	**4.05E-07**		**9.87E-04**		**mg/kg**	**EC-21-A-SO-0.5**	**34/34**	**0.00E+00 - 0.00E+00**	**9.87E-04**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
WHOTEQ	**WHO TEQ (ND=DL)**	**1.33E-06**		**9.87E-04**		**mg/kg**	**EC-21-A-SO-0.5**	**34/34**	**6.26E-07 - 6.26E-07**	**9.87E-04**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
Explosives																	
118-96-7	2,4,6-Trinitrotoluene	2.60E-02	J	1.60E-01	J	mg/kg	EC-21-10-SO-0.5	4/18	2.40E-01 - 2.50E-01	1.60E-01	NA	5.10E+01	N	NA	NA	No	BSL
606-20-2	2,6-Dinitrotoluene	9.10E-01		1.30E+00		mg/kg	EC-21-B-SO-0.5	3/33	1.90E-01 - 2.00E-01	1.30E+00	NA	1.50E+00	C	NA	NA	No	BSL
Metals																	
7429-90-5	Aluminum	2.40E+03		3.57E+04		mg/kg	EC-21-30-SO-0.5	18/18	4.02E+01 - 6.24E+01	3.57E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-36-0	**Antimony**	**2.76E-01**	**J**	**8.00E+01**		**mg/kg**	**EC-21-A-SO-0.5**	**33/34**	**2.46E-01 - 1.60E+00**	**8.00E+01**	**NA**	**4.70E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	Copper	8.00E+00		3.53E+03		mg/kg	EC-21-A-SO-0.5	18/18	2.50E+00 - 5.52E+01	3.53E+03	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	**Lead**	**7.80E+00**		**3.23E+03**		**mg/kg**	**EC-21-A-SO-0.5**	**34/34**	**9.90E-02 - 2.21E+01**	**3.23E+03**	**NA**	**5.50E+02**	**G**	**NA**	**NA**	**Yes**	**ASL**
7439-96-5	**Manganese**	**5.59E+01**	**K**	**6.16E+04**	**J**	**mg/kg**	**EC-21-38-SO-0.59**	**29/29**	**1.00E-01 - 1.17E+02**	**6.16E+04**	**NA**	**2.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	Zinc	1.69E+01		1.02E+03		mg/kg	EC-21-A-SO-0.5	18/18	2.50E+00 - 3.90E+00	1.02E+03	NA	3.50E+04	N	NA	NA	No	BSL
PAHS																	
83-32-9	Acenaphthene	4.20E-04	J	2.23E+00	J/	mg/kg	EC-21-10-SO-0.5, EC-21-C-SO-0.5	18/18	1.80E-03 - 1.22E+00	2.23E+00	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	1.40E-03	J	7.17E-01	J	mg/kg	EC-21-10-SO-0.5	17/18	1.80E-03 - 1.22E+00	7.17E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.40E-03	J	6.02E+00		mg/kg	EC-21-C-SO-0.5	18/18	1.80E-03 - 1.22E+00	6.02E+00	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	**Benzo(a)anthracene**	**9.10E-03**		**3.60E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**34/34**	**1.80E-03 - 1.22E+00**	**3.60E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**Benzo(a)pyrene**	**1.19E-02**		**3.30E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**34/34**	**1.80E-03 - 1.22E+00**	**3.30E+01**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	**2.23E-02**		**5.00E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**34/34**	**1.80E-03 - 1.22E+00**	**5.00E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	Benzo(g,h,I)perylene	4.10E-03		9.54E+00		mg/kg	EC-21-C-SO-0.5	18/18	1.80E-03 - 1.22E+00	9.54E+00	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	7.70E-03		1.89E+01	J	mg/kg	EC-21-10-SO-0.5	18/18	1.80E-03 - 1.22E+00	1.89E+01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	1.84E-02		2.52E+01	J	mg/kg	EC-21-10-SO-0.5	18/18	1.80E-03 - 1.22E+00	2.52E+01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	**Dibenz[a,h]anthracene**	**1.50E-03**		**6.60E+00**		**mg/kg**	**EC-21-33-SO-0.59**	**33/34**	**1.80E-03 - 1.22E+00**	**6.60E+00**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	Fluoranthene	1.92E-02		3.80E+01	J	mg/kg	EC-21-10-SO-0.5	18/18	1.80E-03 - 1.22E+00	3.80E+01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	4.70E-04	J	2.53E+00		mg/kg	EC-21-C-SO-0.5	17/18	1.80E-03 - 1.22E+00	2.53E+00	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	**Indeno(1,2,3-c,d)pyrene**	**4.60E-03**		**3.00E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**34/34**	**1.80E-03 - 1.22E+00**	**3.00E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
91-20-3	Naphthalene	9.30E-04	J	1.26E+00		mg/kg	EC-21-C-SO-0.5	18/18	1.80E-03 - 1.22E+00	1.26E+00	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	8.20E-03		2.58E+01		mg/kg	EC-21-C-SO-0.5	18/18	1.80E-03 - 1.22E+00	2.58E+01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	1.74E-02		3.52E+01		mg/kg	EC-21-C-SO-0.5	18/18	1.80E-03 - 1.22E+00	3.52E+01	NA	2.30E+03	N	NA	NA	No	BSL
PCB Aroclors																	
11096-82-5	Aroclor 1260	6.70E-02		1.10E-01	J	mg/kg	EC-21-10-SO-0.5	2/18	3.60E-02 - 5.00E-02	1.10E-01	NA	9.90E-01	C	NA	NA	No	BSL
SVOCS																	
121-14-2	**2,4-Dinitrotoluene**	**2.60E-02**	**J**	**1.98E+01**		**mg/kg**	**EC-21-B-SO-0.5**	**6/33**	**1.90E-01 - 1.00E+00**	**1.98E+01**	**NA**	**7.40E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Toxicity Level; NUT = Essential Nutrient

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram

Data Qualifiers: B = Indicates analyte detected in associated method blank; J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC21-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-21 - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-21

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	**WHO TEQ (ND=0)**	**6.16E-08**		**9.87E-04**		**mg/kg**	**EC-21-A-SO-0.5**	**67/67**	**0.00E+00 - 0.00E+00**	**9.87E-04**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
WHOTEQ	**WHO TEQ (ND=DL)**	**1.83E-07**		**9.87E-04**		**mg/kg**	**EC-21-A-SO-0.5**	**67/67**	**5.05E-07 - 5.05E-07**	**9.87E-04**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
Explosives																	
118-96-7	2,4,6-Trinitrotoluene	2.60E-02	J	1.60E-01	J	mg/kg	EC-21-10-SO-0.5	4/35	2.40E-01 - 2.50E-01	1.60E-01	NA	5.10E+01	N	NA	NA	No	BSL
606-20-2	2,6-Dinitrotoluene	5.20E-02	J	1.30E+00		mg/kg	EC-21-B-SO-0.5	4/65	1.90E-01 - 2.00E-01	1.30E+00	NA	1.50E+00	C	NA	NA	No	BSL
Metals																	
7429-90-5	Aluminum	1.63E+03		3.57E+04		mg/kg	EC-21-30-SO-0.5	35/35	3.70E+01 - 1.02E+03	3.57E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-36-0	**Antimony**	**2.76E-01**	**J**	**8.00E+01**		**mg/kg**	**EC-21-A-SO-0.5**	**39/67**	**2.46E-01 - 1.60E+00**	**8.00E+01**	**NA**	**4.70E+01**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	Copper	2.40E+00	J	3.53E+03		mg/kg	EC-21-A-SO-0.5	35/35	2.30E+00 - 5.52E+01	3.53E+03	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	**Lead**	**6.61E-01**		**3.23E+03**		**mg/kg**	**EC-21-A-SO-0.5**	**67/67**	**9.90E-02 - 2.21E+01**	**3.23E+03**	**NA**	**5.50E+02**	**G**	**NA**	**NA**	**Yes**	**ASL**
7439-96-5	**Manganese**	**7.59E-01**		**6.16E+04**	**J**	**mg/kg**	**EC-21-38-SO-0.59**	**61/61**	**1.00E-01 - 1.17E+02**	**6.16E+04**	**NA**	**2.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	Zinc	1.22E+01		1.02E+03		mg/kg	EC-21-A-SO-0.5	35/35	2.30E+00 - 3.90E+00	1.02E+03	NA	3.50E+04	N	NA	NA	No	BSL
PAHS																	
83-32-9	Acenaphthene	4.20E-04	J	2.23E+00	J	mg/kg	EC-21-C-SO-0.5, EC-21-10-SO-0.5	22/35	1.80E-03 - 1.22E+00	2.23E+00	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	3.30E-04	J	7.17E-01	J	mg/kg	EC-21-10-SO-0.5	26/35	1.80E-03 - 1.22E+00	7.17E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	3.60E-04		6.02E+00		mg/kg	EC-21-C-SO-0.5	24/35	1.80E-03 - 1.22E+00	6.02E+00	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	**Benzo(a)anthracene**	**1.80E-03**		**3.60E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**53/67**	**1.80E-03 - 1.22E+00**	**3.60E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**Benzo(a)pyrene**	**9.20E-04**	**J**	**3.30E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**56/67**	**1.80E-03 - 1.22E+00**	**3.30E+01**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	**1.50E-03**	**J**	**5.00E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**57/67**	**1.80E-03 - 1.22E+00**	**5.00E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	Benzo(g,h,I)perylene	7.40E-04	J	9.54E+00		mg/kg	EC-21-C-SO-0.5	29/35	1.80E-03 - 1.22E+00	9.54E+00	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	9.50E-04	K	1.89E+01	J	mg/kg	EC-21-10-SO-0.5	27/35	1.80E-03 - 1.22E+00	1.89E+01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	1.40E-03	J	2.52E+01	J	mg/kg	EC-21-10-SO-0.5	27/35	1.80E-03 - 1.22E+00	2.52E+01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	**Dibenz[a,h]anthracene**	**7.10E-04**	**J**	**6.60E+00**		**mg/kg**	**EC-21-33-SO-0.59**	**46/67**	**1.80E-03 - 1.22E+00**	**6.60E+00**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	Fluoranthene	6.90E-04	J	3.80E+01	J	mg/kg	EC-21-10-SO-0.5	30/35	1.80E-03 - 1.22E+00	3.80E+01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	4.70E-04	J	2.53E+00		mg/kg	EC-21-C-SO-0.5	21/35	1.80E-03 - 1.22E+00	2.53E+00	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	**Indeno(1,2,3-c,d)pyrene**	**1.40E-03**	**J**	**3.00E+01**		**mg/kg**	**EC-21-33-SO-0.59**	**53/67**	**1.80E-03 - 1.22E+00**	**3.00E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
PAHs																	
91-20-3	Naphthalene	6.20E-04	J	1.26E+00		mg/kg	EC-21-C-SO-0.5	23/35	1.80E-03 - 1.22E+00	1.26E+00	NA	8.60E+00	C	NA	NA	No	BSL
PAHS																	
85-01-8	Phenanthrene	6.30E-04	J	2.58E+01		mg/kg	EC-21-C-SO-0.5	30/35	1.80E-03 - 1.22E+00	2.58E+01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	5.30E-04	J	3.52E+01		mg/kg	EC-21-C-SO-0.5	32/35	1.80E-03 - 1.22E+00	3.52E+01	NA	2.30E+03	N	NA	NA	No	BSL
PCB Aroclors																	
11096-82-5	Aroclor 1260	6.70E-02		1.10E-01	J	mg/kg	EC-21-10-SO-0.5	2/35	3.50E-02 - 5.00E-02	1.10E-01	NA	9.90E-01	C	NA	NA	No	BSL
SVOCS																	
121-14-2	**2,4-Dinitrotoluene**	**2.60E-02**	**J**	**1.98E+01**		**mg/kg**	**EC-21-B-SO-0.5**	**7/65**	**1.90E-01 - 1.00E+00**	**1.98E+01**	**NA**	**7.40E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Toxicity Level; NUT = Essential Nutrient

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram

Data Qualifiers: B = Indicates analyte detected in associated method blank; J = Indicates an estimated value; L = Reported concentration is below the CRQL (non-metals)/Reported concentration is between the MDL

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC21-3

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Antimony	9.87	--	4.00E-04	8.45E-06	0.021
Lead	433.6	--	NA	NA	NA
Manganese	5658	--	2.40E-02	4.84E-03	0.202
Benzo(a)anthracene	11.83	--	NA	NA	NA
Benzo(a)pyrene	11.19	--	3.00E-04	9.58E-06	0.032
Benzo(b)fluoranthene	17.15	--	NA	NA	NA
Dibenz(a,h)anthracene	1.97	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.67	--	NA	NA	NA
Dioxin TEQ	3.1E-05	1	7.00E-10	2.61E-11	3.7E-02
2,4-Dinitrotoluene	2.98	--	2.00E-03	2.55E-06	1.3E-03
				Total Pathway Hazard Index	0.3

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Antimony	9.87	--	6.00E-05	3.58E-06	0.06
Lead	433.6	--	NA	NA	NA
Manganese	5658	--	9.60E-04	NA	NA
Benzo(a)anthracene	11.83	--	NA	NA	NA
Benzo(a)pyrene	11.19	--	3.00E-04	5.27E-06	0.018
Benzo(b)fluoranthene	17.15	--	NA	NA	NA
Dibenz(a,h)anthracene	1.97	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.674	--	NA	NA	NA
Dioxin TEQ	0.0000305	1	7.00E-10	3.32E-12	4.7E-03
2,4-Dinitrotoluene	2.978	--	2.00E-03	1.08E-06	5.4E-04
				Total Pathway Hazard Index	0.1

TABLE EC21-3

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Antimony	7.77E-09	--	3.00E-04	1.77E-09	0.000006
Lead	3.41E-07	--	NA	NA	NA
Manganese	4.46E-06	--	5.00E-05	1.02E-06	0.02
Benzo(a)anthracene	9.31E-09	--	NA	NA	NA
Benzo(a)pyrene	8.81E-09	--	2.00E-06	2.01E-09	0.0010
Benzo(b)fluoranthene	1.35E-08	--	NA	NA	NA
Dibenz(a,h)anthracene	1.55E-09	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	6.83E-09	--	NA	NA	NA
Dioxin TEQ	2.40E-14	1	4.00E-08	5.48E-15	1.4E-07
2,4-Dinitrotoluene	2.34E-09	--	NA	NA	NA
				Total Pathway Hazard Index	0.02
Air Concentration = Concentration in Soil/Particulate Emission Factor					
Particulate Emission Factor = 1.27×10^9 m^3/kg					RME
NA=not applicable to pathway; ND=not detected				Receptor HI Total =	**0.4**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
0.03 dermal absorption for dioxins
0.13 for PAHs
0.1 for semivolatiles

TABLE EC21-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-21 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Antimony	9.87	--	NA	NA	NA
Lead	433.6	--	NA	NA	NA
Manganese	5658	--	NA	NA	NA
Benzo(a)anthracene	11.83	--	1.00E-01	3.62E-06	3.6E-07
Benzo(a)pyrene	11.19	--	1.00E+00	3.42E-06	3.4E-06
Benzo(b)fluoranthene	17.15	--	1.00E-01	5.24E-06	5.2E-07
Dibenz(a,h)anthracene	1.97	--	1.00E+00	6.02E-07	6.0E-07
Indeno(1,2,3-cd)pyrene	8.67	--	1.00E-01	2.65E-06	2.7E-07
Dioxin TEQ	3.1E-05	1	1.30E+05	9.33E-12	1.2E-06
2,4-Dinitrotoluene	2.98	--	2.00E+00	9.11E-07	1.8E-06
				Total Pathway Cancer Risk	8.2E-06

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Antimony	9.87	--	NA	NA	NA
Lead	433.6	--	NA	NA	NA
Manganese	5658	--	NA	NA	NA
Benzo(a)anthracene	11.83	--	1.00E-01	1.99E-06	2.0E-07
Benzo(a)pyrene	11.19	--	1.00E+00	1.88E-06	1.9E-06
Benzo(b)fluoranthene	17.15	--	1.00E-01	2.89E-06	2.9E-07
Dibenz(a,h)anthracene	1.97	--	1.00E+00	3.31E-07	3.3E-07
Indeno(1,2,3-cd)pyrene	8.674	--	1.00E-01	1.46E-06	1.5E-07
Dioxin TEQ	0.0000305	1	1.30E+05	1.18E-12	1.5E-07
2,4-Dinitrotoluene	2.978	--	2.00E+00	3.85E-07	7.7E-07
				Total Pathway Cancer Risk	3.8E-06

TABLE EC21-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-21 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Antimony	7.77E-09	--	NA	NA	NA
Lead	3.41E-07	--	NA	NA	NA
Manganese	4.46E-06	--	NA	NA	NA
Benzo(a)anthracene	9.31E-09	--	6.00E-05	7.60E-10	4.6E-14
Benzo(a)pyrene	8.81E-09	--	6.00E-04	7.18E-10	4.3E-13
Benzo(b)fluoranthene	1.35E-08	--	6.00E-05	1.10E-09	6.6E-14
Dibenz(a,h)anthracene	1.55E-09	--	6.00E-04	1.26E-10	7.6E-14
Indeno(1,2,3-cd)pyrene	6.83E-09	--	6.00E-05	5.57E-10	3.3E-14
Total Tetrachlorodibenzo-p-dioxin	2.40E-14	1	3.8E-02	1.96E-15	7.4E-17
2,4-Dinitrotoluene	2.34E-09	--	5.7E-07	1.91E-10	1.1E-16
				Total Pathway Cancer Risk	6.5E-13

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

Receptor Incremental Cancer Risk Total = RME **1E-05**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

TABLE EC21-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Antimony	9.655	--	4.00E-04	2.73E-05	0.068
Lead	228.7	--	NA	NA	NA
Manganese	3017	--	2.40E-02	8.52E-03	0.355
Benzo(a)anthracene	4.84	--	NA	NA	NA
Benzo(a)pyrene	5.86	--	3.00E-04	1.66E-05	0.055
Benzo(b)fluoranthene	8.99	--	NA	NA	NA
Dibenz(a,h)anthracene	0.80	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3.5	--	NA	NA	NA
Dioxin TEQ	8.4E-05	1	7.00E-10	2.38E-10	0.3
2,4-Dinitrotoluene	2.30	--	2.00E-03	6.50E-06	3.3E-03
				Total Pathway Hazard Index	0.8

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Antimony	9.655	--	6.00E-05	3.50E-06	0.06
Lead	228.7	--	NA	NA	NA
Manganese	3017	--	9.60E-04	NA	NA
Benzo(a)anthracene	4.84	--	NA	NA	NA
Benzo(a)pyrene	5.86	--	3.00E-04	2.76E-06	0.009
Benzo(b)fluoranthene	8.99	--	NA	NA	NA
Dibenz(a,h)anthracene	0.802	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3.52	--	NA	NA	NA
Dioxin TEQ	0.0000841	1	7.00E-10	9.14E-12	1.3E-02
2,4-Dinitrotoluene	2.302	--	2.00E-03	8.34E-07	4.2E-04
				Total Pathway Hazard Index	0.08

TABLE EC21-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Antimony	7.60E-09	--	3.00E-04	1.74E-09	0.000006
Lead	1.80E-07	--	NA	NA	NA
Manganese	2.38E-06	--	5.00E-05	5.42E-07	0.011
Benzo(a)anthracene	3.81E-09	--	NA	NA	NA
Benzo(a)pyrene	4.61E-09	--	2.00E-06	1.05E-09	0.0005
Benzo(b)fluoranthene	7.08E-09	--	NA	NA	NA
Dibenz(a,h)anthracene	6.31E-10	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	2.77E-09	--	NA	NA	NA
Dioxin TEQ	6.62E-14	1	4.00E-08	1.51E-14	3.8E-07
2,4-Dinitrotoluene	1.81E-09	--	NA	NA	NA
				Total Pathway Hazard Index	0.011

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor HI Total =	**0.9**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.

TABLE EC21-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients

TABLE EC21-6

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Antimony	9.655	--	NA	NA	NA
Lead	228.7	--	NA	NA	NA
Manganese	3017	--	NA	NA	NA
Benzo(a)anthracene	4.84	--	1.00E-01	1.95E-07	2.0E-08
Benzo(a)pyrene	5.86	--	1.00E+00	2.37E-07	2.4E-07
Benzo(b)fluoranthene	8.99	--	1.00E-01	3.63E-07	3.6E-08
Dibenz(a,h)anthracene	0.80	--	1.00E+00	3.24E-08	3.2E-08
Indeno(1,2,3-cd)pyrene	3.5	--	1.00E-01	1.42E-07	1.4E-08
Dioxin TEQ	8.4E-05	1	1.30E+05	3.39E-12	4.4E-07
2,4-Dinitrotoluene	2.30	--	2.00E+00	9.28E-08	1.86E-07
				Total Pathway Cancer Risk	9.7E-07

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Antimony	9.655	--	NA	NA	NA
Lead	228.7	--	NA	NA	NA
Manganese	3017	--	NA	NA	NA
Benzo(a)anthracene	4.84	--	1.00E-01	3.26E-08	3.3E-09
Benzo(a)pyrene	5.86	--	1.00E+00	3.94E-08	3.9E-08
Benzo(b)fluoranthene	8.99	--	1.00E-01	6.05E-08	6.0E-09
Dibenz(a,h)anthracene	0.802	--	1.00E+00	5.40E-09	5.4E-09
Indeno(1,2,3-cd)pyrene	3.52	--	1.00E-01	2.37E-08	2.4E-09
Dioxin TEQ	0.0000841	1	1.30E+05	1.31E-13	1.7E-08
2,4-Dinitrotoluene	2.3	--	2.00E+00	1.19E-08	2.38E-08
				Total Pathway Cancer Risk	9.7E-08

TABLE EC21-6

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Antimony	7.60E-09	--	NA	NA	NA
Lead	1.80E-07	--	NA	NA	NA
Manganese	2.38E-06	--	NA	NA	NA
Benzo(a)anthracene	3.81E-09	--	6.00E-05	1.24E-11	7.5E-16
Benzo(a)pyrene	4.61E-09	--	6.00E-04	1.50E-11	9.0E-15
Benzo(b)fluoranthene	7.08E-09	--	6.00E-05	2.31E-11	1.4E-15
Dibenz(a,h)anthracene	6.31E-10	--	6.00E-04	2.06E-12	1.2E-15
Indeno(1,2,3-cd)pyrene	2.77E-09	--	6.00E-05	9.04E-12	5.4E-16
Dioxin TEQ	6.62E-14	1	3.8E-02	2.16E-16	8.2E-18
2,4-Dinitrotoluene	1.81E-09	--	5.7E-07	5.91E-12	3.37E-18
				Total Pathway Cancer Risk	1.3E-14

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**1E-06**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

Table EC21-13 Detection Comparison to Screening Levels

Analyte	Surface Soil			Sediment			Selection of Chemicals of Potential Concern	
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Frequency	Maximum (mg/kg)	Sediment Screening Criteria (mg/kg)	Terrestrial Habitats	Aquatic Habitats
Metals								
Aluminum	18/18	3.57E+04	pH<5.5	3/3	1.99E+04	2.50E+04	NO	NO
Antimony	33/34	8.00E+01	2.70E-01	3/3	6.30E+00	2.00E+00	YES	YES
Arsenic	--	--	1.80E+01	3/3	6.10E+00	9.80E+00	NO	NO
Barium	--	--	3.30E+02	3/3	4.17E+02	2.00E+01	NO	YES
Beryllium	--	--	2.10E+01	3/3	4.80E-01	NA	NO	YES
Cadmium	--	--	3.60E-01	3/3	5.90E-01	9.90E-01	NO	NO
Calcium	--	--	NA	3/3	4.50E+04	NA	NO	NO
Chromium	--	--	2.60E+01	3/3	2.32E+01	4.34E+01	NO	NO
Cobalt	--	--	1.30E+01	3/3	4.90E+00	5.00E+01	NO	NO
Copper	18/18	3.53E+03	2.80E+01	3/3	5.91E+01	3.16E+01	YES	YES
Iron	--	--	NA	3/3	1.55E+04	2.00E+04	NO	NO
Lead	34/34	3.23E+03	1.10E+01	3/3	3.49E+02	3.58E+01	YES	YES
Magnesium	--	--	NA	3/3	1.13E+03	NA	NO	NO
Manganese	29/29	6.16E+04	2.20E+02	3/3	1.67E+02	4.60E+02	YES	NO
Mercury	--	--	1.30E-02	3/3	1.60E-01	1.80E-01	NO	NO
Nickel	--	--	3.80E+01	3/3	1.05E+01	2.27E+01	NO	NO
Potassium	--	--	NA	3/3	2.04E+03	NA	NO	NO
Selenium	--	--	5.20E-01	3/3	1.20E+00	2.00E+00	NO	NO
Silver	--	--	4.20E+00	1/3	3.30E-01	1.00E+00	NO	NO
Sodium	--	--	NA	3/3	2.31E+02	NA	NO	NO
Thallium	--	--	2.20E-01	2/3	1.60E-01	NA	NO	NO
Vanadium	--	--	7.80E+00	3/3	3.45E+01	NA	NO	YES
Zinc	18/18	1.02E+03	4.60E+01	3/3	1.63E+02	1.21E+02	YES	YES
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	34/34	1.98E-03	3.15E-06	--	--	8.50E-07	YES	NO
Dioxin TEQ Birds EPA2008 (ND=DL)	34/34	1.98E-03	3.15E-06	--	--	8.50E-07	YES	NO
Dioxin TEQ Mammals EPA2008 (ND=0)	34/34	9.87E-04	3.15E-06	--	--	8.50E-07	YES	NO
Dioxin TEQ Mammals EPA2008 (ND=DL)	34/34	9.87E-04	3.15E-06	--	--	8.50E-07	YES	NO
PCBs								
Aroclor 1260	2/18	1.10E-01	4.10E-02	--	--	5.98E-02	YES	NO
PAHs								
Acenaphthene	18/18	2.23E+00	Refer to total LMW PAHs	3/3	7.00E-03	Refer to total PAHs	NO	NO
Acenaphthylene	17/18	7.17E-01	Refer to total LMW PAHs	3/3	9.40E-03	Refer to total PAHs	NO	NO
Anthracene	18/18	6.02E+00	Refer to total LMW PAHs	3/3	2.58E-02	Refer to total PAHs	NO	NO
Benzo(a)anthracene	34/34	3.60E+01	Refer to total HMW PAHs	3/3	7.27E-02	Refer to total PAHs	NO	NO
Benzo(a)pyrene	34/34	3.30E+01	Refer to total HMW PAHs	3/3	7.64E-02	Refer to total PAHs	NO	NO
Benzo(b)fluoranthene	34/34	5.00E+01	Refer to total HMW PAHs	3/3	1.34E-01	Refer to total PAHs	NO	NO

Table EC21-13 Detection Comparison to Screening Levels

Analyte	Surface Soil			Sediment			Selection of Chemicals of Potential Concern	
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Frequency	Maximum (mg/kg)	Sediment Screening Criteria (mg/kg)	Terrestrial Habitats	Aquatic Habitats
Benzo(g,h,i)perylene	18/18	9.54E+00	Refer to total HMW PAHs	3/3	2.54E-02	Refer to total PAHs	NO	NO
Benzo(k)fluoranthene	18/18	1.89E+01	Refer to total HMW PAHs	3/3	4.79E-02	Refer to total PAHs	NO	NO
Chrysene	18/18	2.52E+01	Refer to total HMW PAHs	3/3	9.13E-02	Refer to total PAHs	NO	NO
Dibenzo(a,h)anthracene	33/34	6.60E+00	Refer to total HMW PAHs	3/3	9.80E-03	Refer to total PAHs	NO	NO
Fluoranthene	18/18	3.80E+01	Refer to total LMW PAHs	3/3	1.45E-01	Refer to total PAHs	NO	NO
Fluorene	17/18	2.53E+00	Refer to total LMW PAHs	3/3	7.90E-03	Refer to total PAHs	NO	NO
Indeno(1,2,3-cd)pyrene	34/34	3.00E+01	Refer to total HMW PAHs	3/3	3.39E-02	Refer to total PAHs	NO	NO
Naphthalene	18/18	1.26E+00	Refer to total LMW PAHs	3/3	1.25E-02	Refer to total PAHs	NO	NO
Phenanthrene	18/18	2.58E+01	Refer to total LMW PAHs	3/3	9.14E-02	Refer to total PAHs	NO	NO
Pyrene	18/18	3.52E+01	Refer to total HMW PAHs	3/3	1.28E-01	Refer to total PAHs	NO	NO
Total PAHs	34/34	2.31E+02	Refer to total HMW/LMW PAHs	3/3	9.17E-01	1.61E+00	NO	NO
Total LMW PAHs	18/18	3.85E+01	2.90E+01	3/3	1.53E-01	Refer to total PAHs	YES	NO
Total HMW PAHs	34/34	1.91E+02	1.10E+00	3/3	7.21E-01	Refer to total PAHs	YES	NO
Explosives								
2,4,6-Trinitrotoluene	4/18	1.60E-01	7.50E+00	--	--	9.20E-02	NO	NO
2,4-Dinitrotoluene	6/33	1.98E+01	6.00E+00	--	--	4.16E-02	YES	NO
2,6-Dinitrotoluene	3/33	1.30E+00	4.00E+00	--	--	2.96E-01	NO	NO

Note:

Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EP

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - No screening value available.

PAH - Polycyclic aromatic hydrocarbon.

Table EC21-14 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil			Sediment		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals						
Antimony	33/34	8.00E+01	9.87E+00	3/3	6.30E+00	7.97E+00
Barium	--	NO COPC	NO COPC	3/3	4.17E+02	4.62E+02
Beryllium	--	NO COPC	NO COPC	3/3	4.80E-01	5.60E-01
Copper	18/18	3.53E+03	2.21E+03	3/3	5.91E+01	6.21E+01
Lead	34/34	3.23E+03	9.00E+02	3/3	3.49E+02	4.43E+02
Manganese	29/29	6.16E+04	3.28E+03	3/3	NO COPC	NO COPC
Vanadium	--	NO COPC	NO COPC	3/3	3.45E+01	3.87E+01
Zinc	18/18	1.02E+03	4.78E+02	3/3	1.63E+02	1.92E+02
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	34/34	1.98E-03	3.20E-04	--	NO COPC	NO COPC
Dioxin TEQ Birds EPA2008 (ND=DL)	34/34	1.98E-03	3.27E-04	--	NO COPC	NO COPC
Dioxin TEQ Mammals EPA2008 (ND=0)	34/34	9.87E-04	3.05E-05	--	NO COPC	NO COPC
Dioxin TEQ Mammals EPA2008 (ND=DL)	34/34	9.87E-04	1.68E-04	--	NO COPC	NO COPC
PCBs						
Aroclor 1260	2/18	1.10E-01	NC	--	NO COPC	NO COPC
PAHs						
Total LMW PAHs	18/18	3.85E+01	3.05E+01	3/3	NO COPC	NO COPC
Total HMW PAHs	34/34	1.91E+02	6.91E+01	3/3	NO COPC	NO COPC
Explosives						
2,4-Dinitrotoluene	6/33	1.98E+01	2.98E+00	--	NO COPC	NO COPC

Note:

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NC - Not calculated becase number of detects was too low or the analyte is being evaluated as part of a summed concentration.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

Table EC21-15 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	5.00E+00	8.00E+01	**1.60E+01**	9.87E+00	**1.97E+00**
Copper	7.00E+01	3.53E+03	**5.04E+01**	2.21E+03	**3.15E+01**
Lead	1.20E+02	3.23E+03	**2.69E+01**	9.00E+02	**7.50E+00**
Manganese	2.20E+02	6.16E+04	**2.80E+02**	3.28E+03	**1.49E+01**
Zinc	1.60E+02	1.02E+03	**6.38E+00**	4.78E+02	**2.99E+00**
Dioxins					
Dioxin TEQ Birds EPA2008 (ND=0)	NA	1.98E-03	--	3.20E-04	--
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	1.98E-03	--	3.27E-04	--
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	9.87E-04	--	3.05E-05	--
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	9.87E-04	--	1.68E-04	--
PCBs					
Aroclor 1260	4.00E+01	1.10E-01	2.75E-03	1.10E-01	2.75E-03
PAHs					
Total LMW PAHs	2.00E+01	3.85E+01	**1.93E+00**	3.05E+01	**1.52E+00**
Total HMW PAHs	2.00E+01	1.91E+02	**9.53E+00**	6.91E+01	**3.46E+00**
Explosives					
2,4-Dinitrotoluene	6.00E+00	1.98E+01	**3.30E+00**	2.98E+00	4.97E-01

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC21-16 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	7.80E+01	8.00E+01	**1.03E+00**	9.87E+00	1.27E-01
Copper	8.00E+01	3.53E+03	**4.41E+01**	2.21E+03	**2.76E+01**
Lead	1.70E+03	3.23E+03	**1.90E+00**	9.00E+02	5.30E-01
Manganese	4.50E+02	6.16E+04	**1.37E+02**	3.28E+03	**7.29E+00**
Zinc	1.20E+02	1.02E+03	**8.50E+00**	4.78E+02	**3.98E+00**
Dioxins					
Dioxin TEQ Birds EPA2008 (ND=0)	5.00E-01	1.98E-03	3.95E-03	3.20E-04	6.40E-04
Dioxin TEQ Birds EPA2008 (ND=DL)	5.00E-01	1.98E-03	3.95E-03	3.27E-04	6.53E-04
Dioxin TEQ Mammals EPA2008 (ND=(	5.00E-01	9.87E-04	1.97E-03	3.05E-05	6.11E-05
Dioxin TEQ Mammals EPA2008 (ND=1	5.00E-01	9.87E-04	1.97E-03	1.68E-04	3.36E-04
PCBs					
Aroclor 1260	3.30E-01	1.10E-01	3.33E-01	1.10E-01	3.33E-01
PAHs					
Total LMW PAHs	2.90E+01	3.85E+01	**1.33E+00**	3.05E+01	**1.05E+00**
Total HMW PAHs	1.80E+01	1.91E+02	**1.06E+01**	6.91E+01	**3.84E+00**
Explosives					
2,4-Dinitrotoluene	1.80E+01	1.98E+01	**1.10E+00**	2.98E+00	1.66E-01

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC21-17 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs			Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs		
			Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds	Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds
	NOAEL	LOAEL	American Robin	Osprey (benthos)	Osprey (fish)	American Robin	Osprey (benthos)	Osprey (fish)
Metals								
Antimony	NA	NA	--	--	--	--	--	--
Barium	2.08E+01	4.17E+01	NO COPC	**1.14E+00**	8.42E-02	NO COPC	5.67E-01	4.20E-02
Beryllium	NA	NA	NO COPC	--	--	NO COPC	--	--
Copper	4.05E+00	1.21E+01	**8.40E+01**	**4.08E+00**	6.13E-02	**2.81E+01**	**1.37E+00**	2.05E-02
Lead	1.63E+00	3.26E+00	**2.60E+02**	**1.64E+00**	8.99E-01	**1.30E+02**	8.21E-01	4.50E-01
Manganese	1.79E+02	3.77E+02	**3.32E+01**	NO COPC	NO COPC	**1.58E+01**	NO COPC	NO COPC
Vanadium	3.44E-01	6.88E-01	NO COPC	**5.69E+00**	4.21E-01	NO COPC	**2.84E+00**	2.11E-01
Zinc	6.61E+01	1.71E+02	**4.24E+00**	6.26E-01	1.04E-02	**1.63E+00**	2.42E-01	3.99E-03
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	**4.46E+01**	NO COPC	NO COPC	**4.46E+00**	NO COPC	NO COPC
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	**4.46E+01**	NO COPC	NO COPC	**4.46E+00**	NO COPC	NO COPC
PCBs								
Aroclor 1260	1.80E-01	1.80E+00	3.08E-01	NO COPC	NO COPC	3.08E-02	NO COPC	NO COPC
PAHs								
Total LMW PAHs	5.62E+03	5.62E+04	1.10E-03	NO COPC	NO COPC	1.10E-04	NO COPC	NO COPC
Total HMW PAHs	2.00E+00	2.00E+01	**1.53E+01**	NO COPC	NO COPC	**1.53E+00**	NO COPC	NO COPC
Explosives								
2,4-Dinitrotoluene	1.00E-02	1.30E-01	**6.26E+02**	NO COPC	NO COPC	**4.81E+01**	NO COPC	NO COPC

Table EC21-17 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs			Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs		
			Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds	Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds
	NOAEL	LOAEL	American Robin	Osprey (benthos)	Osprey (fish)	American Robin	Osprey (benthos)	Osprey (fish)

Note:

Bold represents a hazard quotient greater than 1.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC21-18 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]			95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]		
			Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds	Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds
	NOAEL	LOAEL	American Robin	Osprey (benthos)	Osprey (fish)	American Robin	Osprey (benthos)	Osprey (fish)
Metals								
Antimony	NA	NA	--	--	--	--	--	--
Barium	2.08E+01	4.17E+01	NO COPC	**1.14E+00**	8.42E-02	NO COPC	5.67E-01	4.20E-02
Beryllium	NA	NA	NO COPC	--	--	NO COPC	--	--
Copper	4.05E+00	1.21E+01	**5.32E+01**	**4.08E+00**	6.13E-02	**1.78E+01**	**1.37E+00**	2.05E-02
Lead	1.63E+00	3.26E+00	**7.82E+01**	**1.64E+00**	8.99E-01	**3.91E+01**	8.21E-01	4.50E-01
Manganese	1.79E+02	3.77E+02	**1.85E+00**	NO COPC	NO COPC	8.80E-01	NO COPC	NO COPC
Vanadium	3.44E-01	6.88E-01	NO COPC	**5.69E+00**	4.21E-01	NO COPC	**2.84E+00**	2.11E-01
Zinc	6.61E+01	1.71E+02	**2.85E+00**	6.26E-01	1.04E-02	**1.10E+00**	2.42E-01	3.99E-03
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	**7.22E+00**	NO COPC	NO COPC	7.22E-01	NO COPC	NO COPC
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	**7.37E+00**	NO COPC	NO COPC	7.37E-01	NO COPC	NO COPC
PCBs								
Aroclor 1260	1.80E-01	1.80E+00	3.08E-01	NO COPC	NO COPC	3.08E-02	NO COPC	NO COPC
PAHs								
Total LMW PAHs	5.62E+03	5.62E+04	8.68E-04	NO COPC	NO COPC	8.68E-05	NO COPC	NO COPC
Total HMW PAHs	2.00E+00	2.00E+01	**5.54E+00**	NO COPC	NO COPC	5.54E-01	NO COPC	NO COPC

Table EC21-18 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]			95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]		
			Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds	Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds
	NOAEL	LOAEL	American Robin	Osprey (benthos)	Osprey (fish)	American Robin	Osprey (benthos)	Osprey (fish)
Explosives								
2,4-Dinitrotoluene	1.00E-02	1.30E-01	**9.41E+01**	NO COPC	NO COPC	**7.24E+00**	NO COPC	NO COPC

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC21-19 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	**1.95E+01**	**2.60E+01**	**1.95E+00**	**2.60E+00**
Copper	5.60E+00	9.34E+00	**3.03E+00**	**1.30E+00**	**1.82E+00**	7.76E-01
Lead	4.70E+00	8.90E+00	**3.09E+00**	**1.47E+00**	**1.63E+00**	7.76E-01
Manganese	5.15E+01	1.46E+02	**2.02E+01**	**3.52E+00**	**7.15E+00**	**1.25E+00**
Zinc	7.54E+01	2.98E+02	2.09E-01	5.95E-02	5.29E-02	1.51E-02
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	**4.24E+00**	**1.97E+00**	4.24E-01	1.97E-01
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	**4.24E+00**	**1.97E+00**	4.24E-01	1.97E-01
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	6.69E-03	5.28E-03	6.69E-04	5.28E-04
PAHs						
Total LMW PAHs	6.56E+01	3.28E+02	5.92E-03	1.15E-03	1.18E-03	2.29E-04
Total HMW PAHs	6.15E-01	3.01E+00	**3.12E+00**	6.05E-01	6.38E-01	1.24E-01
Explosives						
2,4-Dinitrotoluene	6.70E-01	1.40E+00	**3.34E+00**	5.71E-02	**1.60E+00**	2.73E-02

Note:

Bold represents a hazard quotient greater than 1.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC21-20 Comparison of 95UCLM Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	**2.40E+00**	**3.21E+00**	2.40E-01	3.21E-01
Copper	5.60E+00	9.34E+00	**1.99E+00**	8.34E-01	**1.19E+00**	5.00E-01
Lead	4.70E+00	8.90E+00	9.17E-01	4.50E-01	4.84E-01	2.38E-01
Manganese	5.15E+01	1.46E+02	**1.08E+00**	1.88E-01	3.81E-01	6.63E-02
Zinc	7.54E+01	2.98E+02	1.27E-01	4.38E-02	3.21E-02	1.11E-02
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	1.31E-01	6.09E-02	1.31E-02	6.09E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	7.23E-01	3.35E-01	7.23E-02	3.35E-02
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	6.69E-03	5.28E-03	6.69E-04	5.28E-04
PAHs						
Total LMW PAHs	6.56E+01	3.28E+02	4.68E-03	9.06E-04	9.36E-04	1.81E-04
Total HMW PAHs	6.15E-01	3.01E+00	**1.13E+00**	2.19E-01	2.31E-01	4.48E-02
Explosives						
2,4-Dinitrotoluene	6.70E-01	1.40E+00	5.03E-01	8.59E-03	2.41E-01	4.11E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC21-21 Comparison of Exposure Point Concentrations in Sediment to Benthic Organism TRVs

Chemical	Sediment TEC TRV (mg/kg)	Sediment PEC TRV (mg/kg)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC Compared to TEC	Hazard Quotient for Maximum EPC Compared to PEC
Metals					
Antimony	2.00E+00	2.50E+01	6.30E+00	**3.15E+00**	2.52E-01
Barium	1.30E+02	NA	4.17E+02	**3.21E+00**	--
Beryllium	1.10E+00	3.00E+01	4.80E-01	4.36E-01	1.60E-02
Copper	3.16E+01	1.49E+02	5.91E+01	**1.87E+00**	3.97E-01
Lead	3.58E+01	1.28E+02	3.49E+02	**9.75E+00**	**2.73E+00**
Vanadium	4.20E+01	2.50E+02	3.45E+01	8.21E-01	1.38E-01
Zinc	1.21E+02	4.59E+02	1.63E+02	**1.35E+00**	3.55E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

PEC - Probable effect concentration.

TEC - Threshold effect concentration.

TRV - Toxicity reference value.

Table EC21-22 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Antimony	9.50E-01	33/34	8.00E+01	9.87E+00	Exceeds	Exceeds
Copper	3.28E+01	18/18	3.53E+03	2.21E+03	Exceeds	Exceeds
Lead	1.24E+02	34/34	3.23E+03	9.00E+02	Exceeds	Exceeds
Manganese	7.00E+02	29/29	6.16E+04	3.28E+03	Exceeds	Exceeds
Zinc	8.39E+01	18/18	1.02E+03	4.78E+02	Exceeds	Exceeds
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	NA	34/34	1.98E-03	3.20E-04	Exceeds	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	34/34	1.98E-03	3.27E-04	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	34/34	9.87E-04	3.05E-05	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	34/34	9.87E-04	1.68E-04	Exceeds	Exceeds
PCBs						
Aroclor 1260	NA	2/18	1.10E-01	1.10E-01	Exceeds	Exceeds
PAHs						
Total LMW PAHs	1.11E+00	18/18	3.85E+01	3.05E+01	Exceeds	Exceeds
Total HMW PAHs	8.90E+00	34/34	1.91E+02	6.91E+01	Exceeds	Exceeds
Explosives						
2,4-Dinitrotoluene	NA	6/33	1.98E+01	2.98E+00	Exceeds	Exceeds

Note:

95UCLM - 95 percent upper confidence limit of mean

BTV - 95% Upper Threshold Limit (UTL) for Suface Soil Background Values

EPC - exposure point concentration

mg/kg - milligrams per kilogram

PAH - polycyclic aromatic hydrocarbon

RL - reporting limit

TEQ - toxicity equivalent quotient

wt - weight

Table EC21-23 Comparison of Background Sediment Concentrations to Site Sediment Concentrations

Chemical	Background* (mg/kg)	Site Sediment			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Antimony	6.90E-01	3/3	6.30E+00	6.30E+00	Exceeds	Exceeds
Barium	3.04E+01	3/3	4.17E+02	4.17E+02	Exceeds	Exceeds
Beryllium	2.90E-01	3/3	4.80E-01	4.80E-01	Exceeds	Exceeds
Copper	5.83E+00	3/3	5.91E+01	5.91E+01	Exceeds	Exceeds
Lead	1.52E+01	3/3	3.49E+02	3.49E+02	Exceeds	Exceeds
Vanadium	1.31E+01	3/3	3.45E+01	3.45E+01	Exceeds	Exceeds
Zinc	1.82E+01	3/3	1.63E+02	1.63E+02	Exceeds	Exceeds

Note:

*Background Value shown is 95UCLM of background sample collected by EA in April 2019 calculated with the ISM Calculator for 1-sided Upper Confidence Limit for the Mean.

95UCLM - 95 percent upper confidence limit of mean

EPC - exposure point concentration

mg/kg - milligrams per kilogram

wt - weight

Table EC21-24 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	8.00E+01	--	1.00E+00	8.00E+01	7.48E+00	1.78E+01	0.00E+00	2.53E+01
Copper	3.53E+03	--	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	4.61E+01	3.30E+02	1.03E+01	0.00E+00	3.40E+02
Lead	3.23E+03	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	5.46E+02	3.02E+02	1.22E+02	0.00E+00	4.23E+02
Manganese	6.16E+04	--	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	8.23E+02	5.76E+03	1.83E+02	0.00E+00	5.94E+03
Zinc	1.02E+03	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	8.30E+02	9.53E+01	1.85E+02	0.00E+00	2.80E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.98E-03	--	1.00E+00	1.98E-03	1.85E-04	4.40E-04	0.00E+00	6.24E-04
Dioxin TEQ Birds EPA2008 (ND=DL)	1.98E-03	--	1.00E+00	1.98E-03	1.85E-04	4.40E-04	0.00E+00	6.24E-04
Dioxin TEQ Mammals EPA2008 (ND=0)	9.87E-04	--	1.00E+00	9.87E-04	9.23E-05	2.20E-04	0.00E+00	3.12E-04
Dioxin TEQ Mammals EPA2008 (ND=DL)	9.87E-04	--	1.00E+00	9.87E-04	9.23E-05	2.20E-04	0.00E+00	3.12E-04
PCBs								
Aroclor 1260	1.10E-01	--	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	2.03E-01	1.03E-02	4.52E-02	0.00E+00	5.55E-02
PAHs								
Total LMW PAHs	3.85E+01	--	3.00E-01	1.16E+01	3.60E+00	2.57E+00	0.00E+00	6.17E+00
Total HMW PAHs	1.91E+02	--	3.00E-01	5.72E+01	1.78E+01	1.27E+01	0.00E+00	3.05E+01
Explosives								
2,4-Dinitrotoluene	1.98E+01	--	1.00E+00	1.98E+01	1.85E+00	4.41E+00	0.00E+00	6.26E+00

Note:
BAF - Bioaccumulation factor.
DL - Detection limit.
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.
TEQ - Toxicity equivalent quotient.
wt - Weight.

Table EC21-25 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	9.87E+00	0.00E+00	1.00E+00	9.87E+00	9.23E-01	2.20E+00	0.00E+00	3.12E+00
Copper	2.21E+03	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	4.08E+01	2.06E+02	9.07E+00	0.00E+00	2.15E+02
Lead	9.00E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.95E+02	8.41E+01	4.33E+01	0.00E+00	1.27E+02
Manganese	3.28E+03	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	1.11E+02	3.07E+02	2.48E+01	0.00E+00	3.31E+02
Zinc	4.78E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	6.47E+02	4.47E+01	1.44E+02	0.00E+00	1.89E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	3.20E-04	0.00E+00	1.00E+00	3.20E-04	2.99E-05	7.12E-05	0.00E+00	1.01E-04
Dioxin TEQ Birds EPA2008 (ND=DL)	3.27E-04	0.00E+00	1.00E+00	3.27E-04	3.05E-05	7.27E-05	0.00E+00	1.03E-04
PCBs								
Aroclor 1260	1.10E-01	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	2.03E-01	1.03E-02	4.52E-02	0.00E+00	5.55E-02
PAHs								
Total LMW PAHs	3.05E+01	0.00E+00	3.00E-01	9.14E+00	2.85E+00	2.03E+00	0.00E+00	4.88E+00
Total HMW PAHs	6.91E+01	0.00E+00	3.00E-01	2.07E+01	6.46E+00	4.61E+00	0.00E+00	1.11E+01
Explosives								
2,4-Dinitrotoluene	2.98E+00	0.00E+00	1.00E+00	2.98E+00	2.78E-01	6.63E-01	0.00E+00	9.41E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC21-26 Wildlife Exposure Modeling of Maximum Doses to Piscivorous Birds (Osprey [benthos]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	Maximum Sediment Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Modeled Food Item (Benthos) Uptake			Maximum Case Scenario Doses			
			BSAF/Uptake Factor		Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals									
Antimony	6.30E+00	--	1.00E+00	Uptake Factor	6.30E+00	2.65E-02	3.31E-01	0.00E+00	3.57E-01
Barium	4.17E+02	--	1.00E+00	Uptake Factor	4.17E+02	1.75E+00	2.19E+01	0.00E+00	2.36E+01
Beryllium	4.80E-01	--	1.00E+00	Uptake Factor	4.80E-01	2.02E-03	2.52E-02	0.00E+00	2.72E-02
Copper	5.91E+01	--	5.25E+00	Uptake Factor	3.10E+02	2.48E-01	1.63E+01	0.00E+00	1.65E+01
Lead	3.49E+02	--	6.60E-02	Uptake Factor	2.30E+01	1.47E+00	1.21E+00	0.00E+00	2.68E+00
Vanadium	3.45E+01	--	1.00E+00	Uptake Factor	3.45E+01	1.45E-01	1.81E+00	0.00E+00	1.96E+00
Zinc	1.63E+02	--	4.76E+00	Uptake Factor	7.76E+02	6.85E-01	4.07E+01	0.00E+00	4.14E+01

Note:
BSAF - Biota-sediment accumulation factor.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
wt - Weight.

Table EC21-27 Wildlife Exposure Modeling of 95UCLM Doses to Piscivorous Birds (Osprey [benthos]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	95UCLM Sediment Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Modeled Food Item (Benthos) Uptake			95UCLM Case Scenario Doses			
			BSAF/Uptake Factor		95UCLM Food Item Tissue Concentration (mg/L dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals									
Antimony	6.30E+00	0.00E+00	1.00E+00	Uptake Factor	6.30E+00	2.65E-02	3.31E-01	0.00E+00	3.57E-01
Barium	4.17E+02	0.00E+00	1.00E+00	Uptake Factor	4.17E+02	1.75E+00	2.19E+01	0.00E+00	2.36E+01
Beryllium	4.80E-01	0.00E+00	1.00E+00	Uptake Factor	4.80E-01	2.02E-03	2.52E-02	0.00E+00	2.72E-02
Copper	5.91E+01	0.00E+00	5.25E+00	Uptake Factor	3.10E+02	2.48E-01	1.63E+01	0.00E+00	1.65E+01
Lead	3.49E+02	0.00E+00	6.60E-02	Uptake Factor	2.30E+01	1.47E+00	1.21E+00	0.00E+00	2.68E+00
Vanadium	3.45E+01	0.00E+00	1.00E+00	Uptake Factor	3.45E+01	1.45E-01	1.81E+00	0.00E+00	1.96E+00
Zinc	1.63E+02	0.00E+00	4.76E+00	Uptake Factor	7.76E+02	6.85E-01	4.07E+01	0.00E+00	4.14E+01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BSAF - Biota-sediment accumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC21-28 Wildlife Exposure Modeling of Maximum Doses to Piscivorous Birds (Osprey [fish]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	Maximum Sediment Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Fish) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	6.30E+00	--	4.00E+00	0.00E+00	2.65E-02	0.00E+00	0.00E+00	2.65E-02
Barium	4.17E+02	--	1.60E+01	0.00E+00	1.75E+00	0.00E+00	0.00E+00	1.75E+00
Beryllium	4.80E-01	--	2.48E+02	0.00E+00	2.02E-03	0.00E+00	0.00E+00	2.02E-03
Copper	5.91E+01	--	1.86E+03	0.00E+00	2.48E-01	0.00E+00	0.00E+00	2.48E-01
Lead	3.49E+02	--	1.80E+02	0.00E+00	1.47E+00	0.00E+00	0.00E+00	1.47E+00
Vanadium	3.45E+01	--	4.00E+00	0.00E+00	1.45E-01	0.00E+00	0.00E+00	1.45E-01
Zinc	1.63E+02	--	5.20E+01	0.00E+00	6.85E-01	0.00E+00	0.00E+00	6.85E-01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC21-29 Wildlife Exposure Modeling of 95UCLM Doses to Piscivorous Birds (Osprey [fish]) fro

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	95UCLM Sediment Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Fish) Uptake		95UCLM Case	
			BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/L dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)
Metals						
Antimony	6.30E+00	0.00E+00	4.00E+00	0.00E+00	2.65E-02	0.00E+00
Barium	4.17E+02	0.00E+00	1.60E+01	0.00E+00	1.75E+00	0.00E+00
Beryllium	4.80E-01	0.00E+00	2.48E+02	0.00E+00	2.02E-03	0.00E+00
Copper	5.91E+01	0.00E+00	1.86E+03	0.00E+00	2.48E-01	0.00E+00
Lead	3.49E+02	0.00E+00	1.80E+02	0.00E+00	1.47E+00	0.00E+00
Vanadium	3.45E+01	0.00E+00	4.00E+00	0.00E+00	1.45E-01	0.00E+00
Zinc	1.63E+02	0.00E+00	5.20E+01	0.00E+00	6.85E-01	0.00E+00

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

m Media

Scenario Doses	
Dose from Water (mg/kg bw-day)	**Total Dose (mg/kg bw-day)**
0.00E+00	2.65E-02
0.00E+00	1.75E+00
0.00E+00	2.02E-03
0.00E+00	2.48E-01
0.00E+00	1.47E+00
0.00E+00	1.45E-01
0.00E+00	6.85E-01

maximum detected concentration, the

Table EC21-30 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	8.00E+01	--	2.00E-01	1.60E+01	3.28E-01	8.20E-01	0.00E+00	1.15E+00
Copper	3.53E+03	--	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	4.88E+01	1.45E+01	2.50E+00	0.00E+00	1.70E+01
Lead	3.23E+03	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	2.47E+01	1.32E+01	1.26E+00	0.00E+00	1.45E+01
Manganese	6.16E+04	--	2.50E-01	1.54E+04	2.53E+02	7.89E+02	0.00E+00	1.04E+03
Zinc	1.02E+03	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	2.26E+02	4.18E+00	1.16E+01	0.00E+00	1.58E+01
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	9.87E-04	--	3.87E-03	3.83E-06	4.05E-06	1.96E-07	0.00E+00	4.24E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	9.87E-04	--	3.87E-03	3.83E-06	4.05E-06	1.96E-07	0.00E+00	4.24E-06
PCBs								
Aroclor 1260	1.10E-01	--	6.44E-04	7.08E-05	4.51E-04	3.63E-06	0.00E+00	4.55E-04
PAHs								
Total LMW PAHs	3.85E+01	--	1.17E-01	4.49E+00	1.58E-01	2.30E-01	0.00E+00	3.88E-01
Total HMW PAHs	1.91E+02	--	1.17E-01	2.22E+01	7.82E-01	1.14E+00	0.00E+00	1.92E+00
Explosives								
2,4-Dinitrotoluene	1.98E+01	--	2.13E+00	4.21E+01	8.12E-02	2.16E+00	0.00E+00	2.24E+00

Note:

BAF - Bioaccumulation factor.
DL - Detection limit.
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.
TEQ - Toxicity equivalent quotient.
wt - Weight.

Table EC21-31 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	9.87E+00	0.00E+00	2.00E-01	1.97E+00	4.05E-02	1.01E-01	0.00E+00	1.42E-01
Copper	2.21E+03	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	4.06E+01	9.05E+00	2.08E+00	0.00E+00	1.11E+01
Lead	9.00E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	1.20E+01	3.69E+00	6.17E-01	0.00E+00	4.31E+00
Manganese	3.28E+03	0.00E+00	2.50E-01	8.20E+02	1.34E+01	4.20E+01	0.00E+00	5.55E+01
Zinc	4.78E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.48E+02	1.96E+00	7.60E+00	0.00E+00	9.56E+00
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	3.05E-05	0.00E+00	3.87E-03	1.18E-07	1.25E-07	6.07E-09	0.00E+00	1.31E-07
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.68E-04	0.00E+00	3.87E-03	6.51E-07	6.89E-07	3.34E-08	0.00E+00	7.23E-07
PCBs								
Aroclor 1260	1.10E-01	0.00E+00	6.44E-04	7.08E-05	4.51E-04	3.63E-06	0.00E+00	4.55E-04
PAHs								
Total LMW PAHs	3.05E+01	0.00E+00	1.17E-01	3.55E+00	1.25E-01	1.82E-01	0.00E+00	3.07E-01
Total HMW PAHs	6.91E+01	0.00E+00	1.17E-01	8.06E+00	2.83E-01	4.13E-01	0.00E+00	6.96E-01
Explosives								
2,4-Dinitrotoluene	2.98E+00	0.00E+00	2.13E+00	6.34E+00	1.22E-02	3.25E-01	0.00E+00	3.37E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.
BAF - Bioaccumulation factor.
DL - Detection limit.
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.
TEQ - Toxicity equivalent quotient.
wt - Weight.

Table EC21-32 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	8.00E+01	--	1.15E+00	Uptake Factor	1.00E+00	8.00E+01	1.55E-01	1.38E+00	0.00E+00	1.53E+00
Copper	3.53E+03	--	1.70E+01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	2.51E+01	6.82E+00	4.32E-01	0.00E+00	7.25E+00
Lead	3.23E+03	--	1.45E+01	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	3.84E+01	6.24E+00	6.63E-01	0.00E+00	6.90E+00
Manganese	6.16E+04	--	1.04E+03	Uptake Factor	5.87E-02	3.62E+03	1.19E+02	6.24E+01	0.00E+00	1.81E+02
Zinc	1.02E+03	--	1.58E+01	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.46E+02	1.97E+00	2.52E+00	0.00E+00	4.49E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (ND=0)	9.87E-04	--	4.24E-06	Biotransfer Factor	8.36E-01	3.55E-06	1.91E-06	6.12E-08	0.00E+00	1.97E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	9.87E-04	--	4.24E-06	Biotransfer Factor	8.36E-01	3.55E-06	1.91E-06	6.12E-08	0.00E+00	1.97E-06
PCBs										
Aroclor 1260	1.10E-01	--	4.55E-04	Biotransfer Factor	1.86E+01	8.48E-03	2.13E-04	1.46E-04	0.00E+00	3.59E-04
PAHs										
Total LMW PAHs	3.85E+01	--	3.88E-01	Biotransfer Factor	1.12E-01	4.36E-02	7.44E-02	7.53E-04	0.00E+00	7.52E-02
Total HMW PAHs	1.91E+02	--	1.92E+00	Biotransfer Factor	1.12E-01	2.16E-01	3.68E-01	3.72E-03	0.00E+00	3.72E-01
Explosives										
2,4-Dinitrotoluene	1.98E+01	--	2.24E+00	Biotransfer Factor	1.52E-05	3.01E-04	3.83E-02	5.19E-06	0.00E+00	3.83E-02

Note:

BAF - Bioaccumulation factor.
DL - Detection limit.
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.
TEQ - Toxicity equivalent quotient.
wt - Weight.

Table EC21-33 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	9.87E+00	0.00E+00	1.42E-01	Uptake Factor	1.00E+00	9.87E+00	1.91E-02	1.70E-01	0.00E+00	1.89E-01
Copper	2.21E+03	0.00E+00	1.11E+01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	2.34E+01	4.26E+00	4.04E-01	0.00E+00	4.67E+00
Lead	9.00E+02	0.00E+00	4.31E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	2.19E+01	1.74E+00	3.77E-01	0.00E+00	2.12E+00
Manganese	3.28E+03	0.00E+00	5.55E+01	Uptake Factor	5.87E-02	1.93E+02	6.34E+00	3.32E+00	0.00E+00	9.66E+00
Zinc	4.78E+02	0.00E+00	9.56E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.38E+02	9.23E-01	2.38E+00	0.00E+00	3.30E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (ND=0)	3.05E-05	0.00E+00	1.31E-07	Biotransfer Factor	8.36E-01	1.10E-07	5.90E-08	1.89E-09	0.00E+00	6.09E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.68E-04	0.00E+00	7.23E-07	Biotransfer Factor	8.36E-01	6.04E-07	3.25E-07	1.04E-08	0.00E+00	3.35E-07
PCBs										
Aroclor 1260	1.10E-01	0.00E+00	4.55E-04	Biotransfer Factor	1.86E+01	8.48E-03	2.13E-04	1.46E-04	0.00E+00	3.59E-04
PAHs										
Total LMW PAHs	3.05E+01	0.00E+00	3.07E-01	Biotransfer Factor	1.12E-01	3.45E-02	5.88E-02	5.95E-04	0.00E+00	5.94E-02
Total HMW PAHs	6.91E+01	0.00E+00	6.96E-01	Biotransfer Factor	1.12E-01	7.83E-02	1.34E-01	1.35E-03	0.00E+00	1.35E-01
Explosives										
2,4-Dinitrotoluene	2.98E+00	0.00E+00	3.37E-01	Biotransfer Factor	1.52E-05	5.13E-06	5.76E-03	8.84E-08	0.00E+00	5.76E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.
BAF - Bioaccumulation factor.
DL - Detection limit.
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.
TEQ - Toxicity equivalent quotient.
wt - Weight.

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Table EC22-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	5/5	2.35E+04	pH<5.5	NO
Antimony	5/5	1.20E+00	2.70E-01	YES
Copper	5/5	1.72E+01	2.80E+01	NO
Lead	5/5	1.65E+02	1.10E+01	YES
Manganese	5/5	4.48E+02	2.20E+02	YES
Zinc	5/5	2.02E+02	4.60E+01	YES
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	5/5	7.05E-06	3.15E-06	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	5/5	1.42E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	5/5	7.16E-06	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	5/5	1.25E-05	3.15E-06	YES
PAHs				
Acenaphthene	4/5	1.80E-03	Refer to total LMW PAHs	NO
Acenaphthylene	5/5	3.08E-02	Refer to total LMW PAHs	NO
Anthracene	5/5	2.22E-02	Refer to total LMW PAHs	NO
Benzo(a)anthracene	5/5	6.97E-02	Refer to total HMW PAHs	NO
Benzo(a)pyrene	5/5	9.16E-02	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	5/5	2.49E-01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	5/5	7.98E-02	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	5/5	1.09E-01	Refer to total HMW PAHs	NO
Chrysene	5/5	1.03E-01	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	5/5	2.24E-02	Refer to total HMW PAHs	NO
Fluoranthene	5/5	1.13E-01	Refer to total LMW PAHs	NO
Fluorene	4/5	2.70E-03	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	5/5	7.62E-02	Refer to total HMW PAHs	NO
Naphthalene	5/5	3.50E-03	Refer to total LMW PAHs	NO
Phenanthrene	5/5	2.07E-02	Refer to total LMW PAHs	NO
Pyrene	5/5	1.20E-01	Refer to total HMW PAHs	NO
Total LMW PAHs	5/5	8.10E-02	2.90E+01	NO
Total HMW PAHs	5/5	9.10E-01	1.10E+00	NO

Note:

Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EPA 2008).

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

Table EC22-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Antimony	5/5	1.20E+00	1.05E+00
Lead	5/5	1.65E+02	1.54E+02
Manganese	5/5	4.48E+02	4.09E+02
Zinc	5/5	2.02E+02	1.77E+02
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=0)	5/5	7.05E-06	5.15E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	5/5	1.42E-05	1.33E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	5/5	7.16E-06	5.63E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	5/5	1.25E-05	1.19E-05

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

DL - Detection limit.

TEQ - Toxicity equivalent quotient.

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Table EC22-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	5.00E+00	1.20E+00	2.4E-01	1.05E+00	2.1E-01
Lead	1.20E+02	1.65E+02	1.4E+00	1.54E+02	1.3E+00
Manganese	2.20E+02	4.48E+02	**2.0E+00**	4.09E+02	**1.9E+00**
Zinc	1.60E+02	2.02E+02	1.3E+00	1.77E+02	1.1E+00
Dioxins					
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	7.16E-06	--	5.63E-06	--
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	1.25E-05	--	1.19E-05	--

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

PAH - polycyclic aromatic hydrocarbon.

DL - Detection limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

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Table EC22-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	7.80E+01	1.20E+00	1.5E-02	1.05E+00	1.3E-02
Lead	1.70E+03	1.65E+02	9.7E-02	1.54E+02	9.0E-02
Manganese	4.50E+02	4.48E+02	1.0E+00	4.09E+02	9.1E-01
Zinc	1.20E+02	2.02E+02	**1.7E+00**	1.77E+02	**1.5E+00**
Dioxins					
Dioxin TEQ Mammals EPA2008 (ND=0)	5.00E-01	7.16E-06	1.4E-05	5.63E-06	1.1E-05
Dioxin TEQ Mammals EPA2008 (ND=DL	5.00E-01	1.25E-05	2.5E-05	1.19E-05	2.4E-05

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

EA Engineering, Science, and Technology, Inc., PBC

Table EC22-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Lead	1.63E+00	3.26E+00	**1.6E+01**	**8.1E+00**
Manganese	1.79E+02	3.77E+02	2.7E-01	1.3E-01
Zinc	6.61E+01	1.71E+02	**1.9E+00**	7.4E-01
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	1.6E-01	1.6E-02
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	3.2E-01	3.2E-02

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

DL - Detection limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

EA Engineering, Science, and Technology, Inc., PBC

Table EC22-6 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Lead	1.63E+00	3.26E+00	**1.5E+01**	**7.6E+00**
Manganese	1.79E+02	3.77E+02	2.5E-01	1.2E-01
Zinc	6.61E+01	1.71E+02	**1.8E+00**	7.0E-01
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	1.2E-01	1.2E-02
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	3.0E-01	3.0E-02

Note:

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

EA Engineering, Science, and Technology, Inc., PBC

Table EC22-7 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	2.9E-01	3.9E-01	2.9E-02	3.9E-02
Lead	4.70E+00	8.90E+00	1.9E-01	1.1E-01	1.0E-01	5.6E-02
Manganese	5.15E+01	1.46E+02	1.5E-01	2.6E-02	5.2E-02	9.1E-03
Zinc	7.54E+01	2.98E+02	7.3E-02	3.5E-02	1.9E-02	8.8E-03
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	3.08E-02	1.43E-02	3.08E-03	1.43E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	5.39E-02	2.50E-02	5.39E-03	2.50E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

NOAEL - No observed adverse effect level.

DL - Detection limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

EA Engineering, Science, and Technology, Inc., PBC

Table EC22-8 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Antimony	9.50E-01	5/5	1.20E+00	1.05E+00	Exceeds	Exceeds
Lead	1.24E+02	5/5	1.65E+02	1.54E+02	Exceeds	Exceeds
Manganese	7.00E+02	5/5	4.48E+02	4.09E+02	No	No
Zinc	8.39E+01	5/5	2.02E+02	1.77E+02	Exceeds	Exceeds
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	NA	5/5	7.05E-06	5.15E-06	Exceeds	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	5/5	1.42E-05	1.33E-05	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	5/5	7.16E-06	5.63E-06	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL	NA	5/5	1.25E-05	1.19E-05	Exceeds	Exceeds

Note:

95UCLM - 95 Percent upper confidence limit of the mean.

BTV - 95 Percent upper threshold limit for suface soil background values.

DL - Detection limit.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC22-9 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	1.20E+00	--	1.00E+00	1.20E+00	1.12E-01	2.67E-01	0.00E+00	3.79E-01
Lead	1.65E+02	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	4.95E+01	1.54E+01	1.10E+01	0.00E+00	2.64E+01
Manganese	4.48E+02	--	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.86E+01	4.19E+01	6.37E+00	0.00E+00	4.82E+01
Zinc	2.02E+02	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.88E+02	1.89E+01	1.09E+02	0.00E+00	1.27E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	7.05E-06	--	1.00E+00	7.05E-06	6.59E-07	1.57E-06	0.00E+00	2.23E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	1.42E-05	--	1.00E+00	1.42E-05	1.33E-06	3.16E-06	0.00E+00	4.48E-06

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC22-10 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	1.05E+00	0.00E+00	1.00E+00	1.05E+00	9.83E-02	2.34E-01	0.00E+00	3.32E-01
Lead	1.54E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	4.67E+01	1.44E+01	1.04E+01	0.00E+00	2.48E+01
Manganese	4.09E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.69E+01	3.82E+01	5.98E+00	0.00E+00	4.42E+01
Zinc	1.77E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.67E+02	1.65E+01	1.04E+02	0.00E+00	1.20E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	5.15E-06	0.00E+00	1.00E+00	5.15E-06	4.81E-07	1.14E-06	0.00E+00	1.63E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	1.33E-05	0.00E+00	1.00E+00	1.33E-05	1.24E-06	2.96E-06	0.00E+00	4.20E-06

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC22-11 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	1.20E+00	--	2.00E-01	2.40E-01	4.92E-03	1.23E-02	0.00E+00	1.72E-02
Lead	1.65E+02	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	4.65E+00	6.77E-01	2.38E-01	0.00E+00	9.15E-01
Manganese	4.48E+02	--	2.50E-01	1.12E+02	1.84E+00	5.74E+00	0.00E+00	7.58E+00
Zinc	2.02E+02	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	9.19E+01	8.28E-01	4.71E+00	0.00E+00	5.54E+00
Dioxins								
Dioxin TEQ Mammals EPA2008	7.16E-06	--	3.87E-03	2.77E-08	2.94E-08	1.42E-09	0.00E+00	3.08E-08
Dioxin TEQ Mammals EPA2008	1.25E-05	--	3.87E-03	4.86E-08	5.14E-08	2.49E-09	0.00E+00	5.39E-08

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC22-12 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	1.05E+00	0.00E+00	2.00E-01	2.10E-01	4.31E-03	1.08E-02	0.00E+00	1.51E-02
Lead	1.54E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	4.47E+00	6.30E-01	2.29E-01	0.00E+00	8.59E-01
Manganese	4.09E+02	0.00E+00	2.50E-01	1.02E+02	1.68E+00	5.24E+00	0.00E+00	6.91E+00
Zinc	1.77E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	8.54E+01	7.24E-01	4.37E+00	0.00E+00	5.10E+00
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	5.63E-06	0.00E+00	3.87E-03	2.18E-08	2.31E-08	1.12E-09	0.00E+00	2.42E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.19E-05	0.00E+00	3.87E-03	4.60E-08	4.86E-08	2.36E-09	0.00E+00	5.10E-08

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC22-13 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	1.20E+00	--	1.72E-02	Uptake Factor	1.00E+00	1.20E+00	2.32E-03	2.07E-02	0.00E+00	2.30E-02
Lead	1.65E+02	--	9.15E-01	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.03E+01	3.19E-01	1.78E-01	0.00E+00	4.97E-01
Manganese	4.48E+02	--	7.58E+00	Uptake Factor	5.87E-02	2.63E+01	8.66E-01	4.54E-01	0.00E+00	1.32E+00
Zinc	2.02E+02	--	5.54E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.29E+02	3.90E-01	2.23E+00	0.00E+00	2.62E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (	7.16E-06	--	3.08E-08	Biotransfer Factor	8.36E-01	2.57E-08	1.38E-08	4.44E-10	0.00E+00	1.43E-08
Dioxin TEQ Mammals EPA2008 (	1.25E-05	--	5.39E-08	Biotransfer Factor	8.36E-01	4.51E-08	2.42E-08	7.77E-10	0.00E+00	2.50E-08

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC22-14 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	1.05E+00	0.00E+00	1.51E-02	Uptake Factor	1.00E+00	1.05E+00	2.03E-03	1.81E-02	0.00E+00	2.02E-02
Lead	1.54E+02	0.00E+00	8.59E-01	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.00E+01	2.97E-01	1.72E-01	0.00E+00	4.69E-01
Manganese	4.09E+02	0.00E+00	6.91E+00	Uptake Factor	5.87E-02	2.40E+01	7.89E-01	4.14E-01	0.00E+00	1.20E+00
Zinc	1.77E+02	0.00E+00	5.10E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.28E+02	3.41E-01	2.21E+00	0.00E+00	2.55E+00
Dioxins										
Dioxin TEQ Mammals EPA2008	5.63E-06	0.00E+00	2.42E-08	Biotransfer Factor	8.36E-01	2.02E-08	1.09E-08	3.49E-10	0.00E+00	1.12E-08
Dioxin TEQ Mammals EPA2008	1.19E-05	0.00E+00	5.10E-08	Biotransfer Factor	8.36E-01	4.26E-08	2.29E-08	7.35E-10	0.00E+00	2.37E-08

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC27-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	2/2	7.53E+03	pH<5.5	NO
Cadmium	2/2	1.60E+00	3.60E-01	YES
Chromium	2/2	2.04E+01	2.60E+01	NO
Cobalt	2/2	6.60E+00	1.30E+01	NO
Lead	2/2	1.88E+02	1.10E+01	YES
Titanium	2/2	1.75E+02	NA	YES
Zinc	2/2	1.43E+02	4.60E+01	YES
VOCS				
2-Butanone (Methyl ethyl ketone)	2/2	1.39E-02	1.00E+00	NO
Acetone	2/2	1.17E-01	1.20E+00	NO
Benzene	1/2	1.60E-03	1.20E-01	NO
Methylene chloride	1/2	1.20E-03	2.10E-01	NO
Toluene	1/2	1.10E-03	1.50E-01	NO

Note:

mg/kg - Milligrams per kilogram.

NA - No screening value available.

Table EC27-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Metals		
Cadmium	2/2	1.60E+00
Lead	2/2	1.88E+02
Titanium	2/2	1.75E+02
Zinc	2/2	1.43E+02

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

Table EC27-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Cadmium	3.20E+01	1.60E+00	5.0E-02
Lead	1.20E+02	1.88E+02	**1.6E+00**
Titanium	NA	1.75E+02	--
Zinc	1.60E+02	1.43E+02	8.9E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC27-4 Comparison of Exposure Point Concentrations in Soil to Soil

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Cadmium	1.40E+02	1.60E+00	1.1E-02
Lead	1.70E+03	1.88E+02	1.1E-01
Titanium	NA	1.75E+02	--
Zinc	1.20E+02	1.43E+02	1.2E+00

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC27-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Cadmium	1.47E+00	6.35E+00	**1.9E+00**	4.5E-01
Lead	1.63E+00	3.26E+00	**1.8E+01**	**9.1E+00**
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	**1.7E+00**	6.4E-01

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC27-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Cadmium	7.70E-01	7.70E+00	6.2E-02	2.2E-02	6.2E-03	2.2E-03
Lead	4.70E+00	8.90E+00	2.2E-01	1.2E-01	1.2E-01	6.2E-02
Titanium	NA	NA	--	--	--	--
Zinc	7.54E+01	2.98E+02	5.9E-02	3.3E-02	1.5E-02	8.2E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC27-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Cadmium	1.70E-01	2/2	1.60E+00	Exceeds
Lead	1.24E+02	2/2	1.88E+02	Exceeds
Titanium	NA	2/2	1.75E+02	Exceeds
Zinc	8.39E+01	2/2	1.43E+02	Exceeds

Note:

95UCLM - 95 percent upper confidence limit of the mean.

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC27-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.60E+00	--	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.20E+01	1.50E-01	2.68E+00	0.00E+00	2.83E+00
Lead	1.88E+02	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	5.50E+01	1.76E+01	1.22E+01	0.00E+00	2.98E+01
Titanium	1.75E+02	--	1.00E+00	1.75E+02	1.64E+01	3.89E+01	0.00E+00	5.53E+01
Zinc	1.43E+02	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.36E+02	1.34E+01	9.69E+01	0.00E+00	1.10E+02

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC27-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.60E+00	--	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	8.03E-01	6.56E-03	4.12E-02	0.00E+00	4.77E-02
Lead	1.88E+02	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	5.00E+00	7.71E-01	2.56E-01	0.00E+00	1.03E+00
Titanium	1.75E+02	--	1.00E+00	4.80E+00	7.18E-01	2.46E-01	0.00E+00	9.64E-01
Zinc	1.43E+02	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	7.59E+01	5.86E-01	3.89E+00	0.00E+00	4.48E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC27-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Cadmium	1.60E+00	--	4.77E-02	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	8.17E-01	3.09E-03	1.41E-02	0.00E+00	1.72E-02
Lead	1.88E+02	--	1.03E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.09E+01	3.63E-01	1.89E-01	0.00E+00	5.52E-01
Titanium	1.75E+02	--	9.64E-01	Uptake Factor	1.00E+00	1.75E+02	3.38E-01	3.02E+00	0.00E+00	3.36E+00
Zinc	1.43E+02	--	4.48E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.26E+02	2.76E-01	2.18E+00	0.00E+00	2.45E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC28-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	4/4	1.05E+04	pH<5.5	NO
Arsenic	10/10	1.06E+02	1.80E+01	YES
Cadmium	4/4	2.10E+00	3.60E-01	YES
Chromium	4/4	3.06E+01	2.60E+01	YES
Cobalt	4/4	1.13E+01	1.30E+01	NO
Copper	4/4	2.07E+02	2.80E+01	YES
Lead	4/4	4.05E+02	1.10E+01	YES
Nickel	4/4	1.84E+01	3.80E+01	NO
Titanium	4/4	2.73E+02	NA	YES
Zinc	4/4	3.65E+02	4.60E+01	YES
PCBs				
Aroclor 1260	4/4	1.00E+00	4.10E-02	YES
VOCS				
2-Butanone (Methyl ethyl ketone)	4/4	2.52E-02	1.00E+00	NO
Acetone	4/4	2.53E-01	1.20E+00	NO

Note:

mg/kg - Milligrams per kilogram.

NA - No screening value available.

Table EC28-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Arsenic	10/10	1.06E+02	5.74E+01
Cadmium	4/4	2.10E+00	NC
Chromium	4/4	3.06E+01	NC
Copper	4/4	2.07E+02	NC
Lead	4/4	4.05E+02	NC
Titanium	4/4	2.73E+02	NC
Zinc	4/4	3.65E+02	NC
PCBs			
Aroclor 1260	4/4	1.00E+00	NC

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

NC - Not calculated

Table EC28-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Arsenic	1.80E+01	1.06E+02	**5.9E+00**	5.74E+01	**3.2E+00**
Cadmium	3.20E+01	2.10E+00	6.6E-02	2.10E+00	6.6E-02
Chromium	1.00E+00	3.06E+01	**3.1E+01**	3.06E+01	**3.1E+01**
Copper	7.00E+01	2.07E+02	**3.0E+00**	2.07E+02	**3.0E+00**
Lead	1.20E+02	4.05E+02	**3.4E+00**	4.05E+02	**3.4E+00**
Titanium	NA	2.73E+02	--	2.73E+02	--
Zinc	1.60E+02	3.65E+02	**2.3E+00**	3.65E+02	**2.3E+00**
PCBs					
Aroclor 1260	4.00E+01	1.00E+00	2.5E-02	1.00E+00	2.5E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC28-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Arsenic	6.00E+01	1.06E+02	**1.8E+00**	5.74E+01	9.6E-01
Cadmium	1.40E+02	2.10E+00	1.5E-02	2.10E+00	1.5E-02
Chromium	4.00E-01	3.06E+01	**7.7E+01**	3.06E+01	**7.7E+01**
Copper	8.00E+01	2.07E+02	**2.6E+00**	2.07E+02	**2.6E+00**
Lead	1.70E+03	4.05E+02	2.4E-01	4.05E+02	2.4E-01
Titanium	NA	2.73E+02	--	2.73E+02	--
Zinc	1.20E+02	3.65E+02	**3.0E+00**	3.65E+02	**3.0E+00**
PCBs					
Aroclor 1260	3.30E-01	1.00E+00	**3.0E+00**	1.00E+00	**3.0E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC28-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Arsenic	2.24E+00	4.51E+00	**5.1E+00**	**2.5E+00**
Cadmium	1.47E+00	6.35E+00	**2.4E+00**	5.5E-01
Chromium	2.66E+00	1.56E+01	**1.9E+00**	3.2E-01
Copper	4.05E+00	1.21E+01	**6.0E+00**	**2.0E+00**
Lead	1.63E+00	3.26E+00	**3.7E+01**	**1.9E+01**
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	**2.5E+00**	9.7E-01
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	**5.6E+00**	5.6E-01

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC28-6 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Arsenic	2.24E+00	4.51E+00	**2.8E+00**	1.4E+00
Cadmium	1.47E+00	6.35E+00	**2.4E+00**	5.5E-01
Chromium	2.66E+00	1.56E+01	**1.9E+00**	3.2E-01
Copper	4.05E+00	1.21E+01	**6.0E+00**	**2.0E+00**
Lead	1.63E+00	3.26E+00	**3.7E+01**	**1.9E+01**
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	**2.5E+00**	9.7E-01
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	**5.6E+00**	5.6E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC28-7 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Arsenic	1.04E+00	1.66E+00	5.1E-01	2.0E-01	3.2E-01	1.3E-01
Cadmium	7.70E-01	7.70E+00	7.3E-02	2.6E-02	7.3E-03	2.6E-03
Chromium	2.40E+00	5.82E+01	5.7E-02	4.5E-02	2.4E-03	1.9E-03
Copper	5.60E+00	9.34E+00	3.0E-01	1.2E-01	1.8E-01	7.4E-02
Lead	4.70E+00	8.90E+00	4.4E-01	2.2E-01	2.3E-01	1.2E-01
Titanium	NA	NA	--	--	--	--
Zinc	7.54E+01	2.98E+02	1.1E-01	4.0E-02	2.7E-02	1.0E-02
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	6.1E-02	4.8E-02	6.1E-03	4.8E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC28-8 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Arsenic	9.09E+00	10/10	1.06E+02	5.74E+01	Exceeds	Exceeds
Cadmium	1.70E-01	4/4	2.10E+00	NC	Exceeds	--
Chromium	2.49E+01	4/4	3.06E+01	NC	Exceeds	--
Copper	3.28E+01	4/4	2.07E+02	NC	Exceeds	--
Lead	1.24E+02	4/4	4.05E+02	NC	Exceeds	--
Titanium	NA	4/4	2.73E+02	NC	Exceeds	--
Zinc	8.39E+01	4/4	3.65E+02	NC	Exceeds	--
PCBs						
Aroclor 1260	NA	4/4	1.00E+00	NC	Exceeds	--

Note:

95UCLM - 95 percent upper confidence limit of the mean.

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NC = Not calculated.

wt - Weight.

Table EC28-9 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	1.06E+02	--	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	6.50E+00	9.91E+00	1.45E+00	0.00E+00	1.14E+01
Cadmium	2.10E+00	--	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.49E+01	1.96E-01	3.32E+00	0.00E+00	3.52E+00
Chromium	3.06E+01	--	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.50E+00	2.86E+00	2.11E+00	0.00E+00	4.97E+00
Copper	2.07E+02	--	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	2.18E+01	1.93E+01	4.86E+00	0.00E+00	2.42E+01
Lead	4.05E+02	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.02E+02	3.78E+01	2.27E+01	0.00E+00	6.06E+01
Titanium	2.73E+02	--	1.00E+00	2.73E+02	2.55E+01	6.07E+01	0.00E+00	8.63E+01
Zinc	3.65E+02	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.92E+02	3.41E+01	1.32E+02	0.00E+00	1.66E+02
PCBs								
Aroclor 1260	1.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	4.10E+00	9.35E-02	9.11E-01	0.00E+00	1.00E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

Table EC28-10 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	5.74E+01	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	4.21E+00	5.36E+00	9.37E-01	0.00E+00	6.30E+00
Cadmium	2.10E+00	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	1.49E+01	1.96E-01	3.32E+00	0.00E+00	3.52E+00
Chromium	3.06E+01	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.50E+00	2.86E+00	2.11E+00	0.00E+00	4.97E+00
Copper	2.07E+02	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	2.18E+01	1.93E+01	4.86E+00	0.00E+00	2.42E+01
Lead	4.05E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.02E+02	3.78E+01	2.27E+01	0.00E+00	6.06E+01
Titanium	2.73E+02	0.00E+00	1.00E+00	2.73E+02	2.55E+01	6.07E+01	0.00E+00	8.63E+01
Zinc	3.65E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.92E+02	3.41E+01	1.32E+02	0.00E+00	1.66E+02
PCBs								
Aroclor 1260	1.00E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	4.10E+00	9.35E-02	9.11E-01	0.00E+00	1.00E+00

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/L - Milligrams per liter.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC28-11 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	1.06E+02	--	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.89E+00	4.35E-01	9.70E-02	0.00E+00	5.32E-01
Cadmium	2.10E+00	--	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	9.32E-01	8.61E-03	4.77E-02	0.00E+00	5.64E-02
Chromium	3.06E+01	--	7.50E-03	2.30E-01	1.25E-01	1.18E-02	0.00E+00	1.37E-01
Copper	2.07E+02	--	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.60E+01	8.49E-01	8.18E-01	0.00E+00	1.67E+00
Lead	4.05E+02	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	7.69E+00	1.66E+00	3.94E-01	0.00E+00	2.05E+00
Titanium	2.73E+02	--	1.00E+00	6.17E+00	1.12E+00	3.16E-01	0.00E+00	1.44E+00
Zinc	3.65E+02	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.28E+02	1.50E+00	6.54E+00	0.00E+00	8.04E+00
PCBs								
Aroclor 1260	1.00E+00	0.00E+00	6.44E-04	6.44E-04	4.10E-03	3.30E-05	0.00E+00	4.13E-03

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC28-12 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	5.74E+01	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.34E+00	2.35E-01	6.86E-02	0.00E+00	3.04E-01
Cadmium	2.10E+00	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	9.32E-01	8.61E-03	4.77E-02	0.00E+00	5.64E-02
Chromium	3.06E+01	0.00E+00	7.50E-03	2.30E-01	1.25E-01	1.18E-02	0.00E+00	1.37E-01
Copper	2.07E+02	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.60E+01	8.49E-01	8.18E-01	0.00E+00	1.67E+00
Lead	4.05E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	7.69E+00	1.66E+00	3.94E-01	0.00E+00	2.05E+00
Titanium	2.73E+02	0.00E+00	1.00E+00	2.73E+02	1.12E+00	1.40E+01	0.00E+00	1.51E+01
Zinc	3.65E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.28E+02	1.50E+00	6.54E+00	0.00E+00	8.04E+00
PCBs								
Aroclor 1260	1.00E+00	0.00E+00	6.44E-04	6.44E-04	4.10E-03	3.30E-05	0.00E+00	4.13E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC28-13 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Arsenic	1.06E+02	--	5.32E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	3.57E-01	2.05E-01	6.17E-03	0.00E+00	2.11E-01
Cadmium	2.10E+00	--	5.64E-02	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	9.33E-01	4.06E-03	1.61E-02	0.00E+00	2.01E-02
Chromium	3.06E+01	--	1.37E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	2.86E+00	5.91E-02	4.93E-02	0.00E+00	1.08E-01
Copper	2.07E+02	--	1.67E+00	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.66E+01	4.00E-01	2.87E-01	0.00E+00	6.87E-01
Lead	4.05E+02	--	2.05E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.53E+01	7.82E-01	2.65E-01	0.00E+00	1.05E+00
Titanium	2.73E+02	--	1.44E+00	Uptake Factor	1.00E+00	2.73E+02	5.27E-01	4.71E+00	0.00E+00	5.24E+00
Zinc	3.65E+02	--	8.04E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.35E+02	7.05E-01	2.33E+00	0.00E+00	3.04E+00
PCBs										
Aroclor 1260	1.00E+00	0.00E+00	4.13E-03	Biotransfer Factor	1.86E+01	7.71E-02	1.93E-03	1.33E-03	0.00E+00	3.26E-03

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC28-14 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Arsenic	5.74E+01	0.00E+00	3.04E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	2.16E-01	1.11E-01	3.73E-03	0.00E+00	1.15E-01
Cadmium	2.10E+00	0.00E+00	5.64E-02	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	9.33E-01	4.06E-03	1.61E-02	0.00E+00	2.01E-02
Chromium	3.06E+01	0.00E+00	1.37E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	2.86E+00	5.91E-02	4.93E-02	0.00E+00	1.08E-01
Copper	2.07E+02	0.00E+00	1.67E+00	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.66E+01	4.00E-01	2.87E-01	0.00E+00	6.87E-01
Lead	4.05E+02	0.00E+00	2.05E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.53E+01	7.82E-01	2.65E-01	0.00E+00	1.05E+00
Titanium	2.73E+02	0.00E+00	1.51E+01	Uptake Factor	1.00E+00	2.73E+02	5.27E-01	4.71E+00	0.00E+00	5.24E+00
Zinc	3.65E+02	0.00E+00	8.04E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.35E+02	7.05E-01	2.33E+00	0.00E+00	3.04E+00
PCBs										
Aroclor 1260	1.00E+00	0.00E+00	4.13E-03	Biotransfer Factor	1.86E+01	7.71E-02	1.93E-03	1.33E-03	0.00E+00	3.26E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

TABLE EC29-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-29 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-29

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Metals																	
7429-90-5	Aluminum	5.46E+03		1.26E+04		mg/kg	EC-29-4-SO-0.5	4/4	3.65E+01 - 6.99E+01	1.26E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-43-9	Cadmium	3.00E-01	J	1.18E+01		mg/kg	EC-29-4-SO-0.5	4/4	4.60E-01 - 8.70E-01	1.18E+01	NA	9.80E+01	N	NA	NA	No	BSL
7440-47-3	Chromium	1.20E+01		1.02E+02	J	mg/kg	EC-29-4-SO-0.5	4/4	9.10E-01 - 1.70E+00	1.02E+02	NA	1.80E+05	N	NA	NA	No	BSL
7440-48-4	Cobalt	4.60E+00		1.30E+01		mg/kg	EC-29-4-SO-0.5	4/4	2.30E+00 - 4.40E+00	1.30E+01	NA	3.50E+01	N	NA	NA	No	BSL
7439-92-1	**Lead**	**6.92E+01**		**5.59E+02**		**mg/kg**	**EC-29-4-SO-0.5**	**4/4**	**9.10E-01 - 1.70E+00**	**5.59E+02**	**NA**	**5.50E+02**	**G**	**NA**	**NA**	**Yes**	**ASL**
7440-32-6	Titanium	3.83E+01		5.91E+02		mg/kg	EC-29-4-SO-0.5	4/4	2.30E+00 - 4.40E+00	5.91E+02	NA			NA	NA	No	BSL
7440-66-6	Zinc	5.44E+01		2.66E+02	J	mg/kg	EC-29-4-SO-0.5	4/4	2.30E+00 - 4.40E+00	2.66E+02	NA	3.50E+04	N	NA	NA	No	BSL
PCB Aroclors																	
11096-82-5	**Aroclor 1260**	**2.30E-02**	**J**	**1.30E+00**		**mg/kg**	**EC-29-4-SO-0.5**	**8/10**	**1.10E-02 - 5.90E-02**	**1.30E+00**	**NA**	**9.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
VOCS																	
78-93-3	2-Butanone	1.21E-02		1.20E-01		mg/kg	EC-29-4-SO-0.5	4/4	1.04E-02 - 2.05E-02	1.20E-01	NA	1.90E+04	N	NA	NA	No	BSL
67-64-1	Acetone	8.99E-02		4.24E-01		mg/kg	EC-29-4-SO-0.5	4/4	1.04E-02 - 2.05E-02	4.24E-01	NA	6.70E+04	N	NA	NA	No	BSL
71-43-2	Benzene	3.50E-03	J	3.50E-03	J	mg/kg	EC-29-4-SO-0.5	1/4	2.10E-03 - 4.10E-03	3.50E-03	NA	5.10E+00	C	NA	NA	No	BSL
75-09-2	Methylene chloride	4.90E-03	B	1.50E-02		mg/kg	EC-29-3-SO-0.5	3/4	2.10E-03 - 4.10E-03	1.50E-02	NA	3.20E+02	N	NA	NA	No	BSL
108-88-3	Toluene	1.40E-03	J	1.40E-03	J	mg/kg	EC-29-4-SO-0.5	1/4	2.10E-03 - 4.10E-03	1.40E-03	NA	4.70E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Toxicity Level; NUT = Essential Nutrient

Surrogates used: Chromium VI for Chromium.

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram

Data Qualifiers: B = Indicates analyte detected in associated method blank; J = Indicates an estimated value

TABLE EC29-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-29 - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-29

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Metals																	
7429-90-5	Aluminum	5.46E+03		1.26E+04		mg/kg	EC-29-4-SO-0.5	8/8	3.65E+01 - 6.99E+01	1.26E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-43-9	Cadmium	1.90E-01	J	1.18E+01		mg/kg	EC-29-4-SO-0.5	5/8	4.60E-01 - 8.70E-01	1.18E+01	NA	9.80E+01	N	NA	NA	No	BSL
7440-47-3	Chromium	8.90E+00	J	1.02E+02	J	mg/kg	EC-29-4-SO-0.5	8/8	9.10E-01 - 1.70E+00	1.02E+02	NA	1.80E+05	N	NA	NA	No	BSL
7440-48-4	Cobalt	2.40E+00	J	1.59E+01		mg/kg	EC-29-3-SO-04	8/8	2.30E+00 - 4.40E+00	1.59E+01	NA	3.50E+01	N	NA	NA	No	BSL
7439-92-1	**Lead**	**4.90E+00**		**5.59E+02**		**mg/kg**	**EC-29-4-SO-0.5**	**8/8**	**9.10E-01 - 1.70E+00**	**5.59E+02**	**NA**	**5.50E+02**	**G**	**NA**	**NA**	**No**	**BSL**
7440-32-6	Titanium	3.83E+01		5.91E+02		mg/kg	EC-29-4-SO-0.5	8/8	2.30E+00 - 4.40E+00	5.91E+02	NA	NA		NA	NA	No	NSL
7440-66-6	Zinc	1.62E+01	J	2.66E+02	J	mg/kg	EC-29-4-SO-0.5	8/8	2.30E+00 - 4.40E+00	2.66E+02	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
91-20-3	Naphthalene	2.41E-02		2.41E-02		mg/kg	EC-29-4-SO-02	1/8	1.80E-03 - 4.10E-03	2.41E-02	NA	8.60E+00	C	NA	NA	No	BSL
PCB Aroclors																	
11096-82-5	**Aroclor 1260**	**2.30E-02**	**J**	**1.30E+00**		**mg/kg**	**EC-29-4-SO-0.5**	**8/14**	**1.10E-02 - 5.90E-02**	**1.30E+00**	**NA**	**9.90E-01**	**C**	**NA**	**NA**	**Yes**	**ASL**
VOCS																	
78-93-3	2-Butanone	8.50E-03	J	1.20E-01		mg/kg	EC-29-4-SO-0.5	5/8	9.20E-03 - 2.05E-02	1.20E-01	NA	1.90E+04	N	NA	NA	No	BSL
67-64-1	Acetone	1.09E-02		4.24E-01		mg/kg	EC-29-4-SO-0.5	8/8	9.20E-03 - 2.05E-02	4.24E-01	NA	6.70E+04	N	NA	NA	No	BSL
71-43-2	Benzene	3.50E-03	J	3.50E-03	J	mg/kg	EC-29-4-SO-0.5	1/8	1.80E-03 - 4.10E-03	3.50E-03	NA	5.10E+00	C	NA	NA	No	BSL
75-09-2	Methylene chloride	4.90E-03	B	6.91E-02	K	mg/kg	EC-29-1-SO-02.5	7/8	1.80E-03 - 4.10E-03	6.91E-02	NA	3.20E+02	N	NA	NA	No	BSL
108-88-3	Toluene	1.40E-03	J	1.40E-03	J	mg/kg	EC-29-4-SO-0.5	1/8	1.80E-03 - 4.10E-03	1.40E-03	NA	4.70E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Surrogates used: Chromium VI for Chromium.

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers:
B = Indicates analyte detected in associated method blank
J = Indicates an estimated value

TABLE EC 29-3

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-29 Site Worker Scenario

Scenario Timeframe: Current and Future
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration[1] (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Aroclor 1260	0.73	--	2.00E+00	2.22E-07	4E-07
				Total Pathway Cancer Risk	4E-07
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [2] (mg/kg-day)	RME Incremental Cancer Risks
Aroclor 1260	0.73	--	2.00E+00	2.36E-07	5E-07
				Total Pathway Cancer Risk	5E-07
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Aroclor 1260	5.72E-10	--	5.70E-07	4.66E-11	3E-17
				Total Pathway Cancer Risk	3E-17
Notes:				Receptor RME Incremental Cancer Risk Total =	**9E-07**

1. Used maximum concentrations for EC-29 COPCs, based on limited number of detected samples.
2. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
Air Concentration = Concentration in Soil/Particulate Emission Factor
Particulate Emission Factor = 1.27×10^9 m^3/kg
RME=reasonable maximum exposure
RfD=reference dose; RfC=reference concentration
TEF=toxicity equivalence factor
CDI=chronic daily intake
NA=not applicable to pathway; ND=not detected

TABLE 29-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-29 Construction Worker Scenario

Scenario Timeframe: Future

Exposure Media: Surface and Subsurface Soil (0-6 foot)

Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil

Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration[1] (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Aroclor 1260	0.53	--	2.00E+00	2.15E-08	4E-08
				Total Pathway Cancer Risk	4E-08
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Aroclor 1260	0.53	--	2.00E+00	3.86E-09	8E-09
				Total Pathway Cancer Risk	8E-09
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Aroclor 1260	4.19E-10	--	5.70E-07	1.37E-12	8E-19
				Total Pathway Cancer Risk	8E-19
				Receptor RME Incremental Cancer Risk Total =	**5E-08**

Notes:
1. Used maximum concentrations for EC-29 COPCs, based on limited number of detected samples.
2. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
Air Concentration = Concentration in Soil/Particulate Emission Factor
Particulate Emission Factor = 1.27×10^9 m^3/kg
RME=reasonable maximum exposure
RfD=reference dose; RfC=reference concentration
TEF=toxicity equivalence factor
CDI=chronic daily intake
NA=not applicable to pathway; ND=not detected

Table EC29-7 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern[a]
	Frequency	Maximum (mg/kg)	Soil Screening Criteria[b] (mg/kg)	Terrestrial Habitats[c]
Metals				
Aluminum	4/4	1.26E+04	pH<5.5	NO
Cadmium	4/4	1.18E+01	3.60E-01	YES
Chromium	4/4	1.02E+02	2.60E+01	YES
Cobalt	4/4	1.30E+01	1.30E+01	YES
Lead	4/4	5.59E+02	1.10E+01	YES
Titanium	4/4	5.91E+02	NA	YES
Zinc	4/4	2.66E+02	4.60E+01	YES
PCBs				
Aroclor 1260	8/10	1.30E+00	4.10E-02	YES
VOCS				
2-Butanone (Methyl ethyl ketone)	4/4	1.20E-01	1.00E+00	NO
Acetone	4/4	4.24E-01	1.20E+00	NO
Benzene	1/4	3.50E-03	1.20E-01	NO
Methylene chloride	3/4	1.50E-02	2.10E-01	NO
Toluene	1/4	1.40E-03	1.50E-01	NO

Note:

mg/kg - Milligrams per kilogram.

NA - No screening value available.

Table EC29-8 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Cadmium	4/4	1.18E+01	NC
Chromium	4/4	1.02E+02	NC
Cobalt	4/4	1.30E+01	NC
Lead	4/4	5.59E+02	NC
Titanium	4/4	5.91E+02	NC
Zinc	4/4	2.66E+02	NC
PCBs			
Aroclor 1260	8/10	1.30E+00	7.26E-01

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

NC - Not calculated.

PAH - Polycyclic aromatic hydrocarbon.

Table EC29-9 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Cadmium	3.20E+01	1.18E+01	3.7E-01	1.18E+01	3.7E-01
Chromium	1.00E+00	1.02E+02	**1.0E+02**	1.02E+02	**1.0E+02**
Cobalt	1.30E+01	1.30E+01	1.0E+00	1.30E+01	1.0E+00
Lead	1.20E+02	5.59E+02	**4.7E+00**	5.59E+02	**4.7E+00**
Titanium	NA	5.91E+02	--	5.91E+02	--
Zinc	1.60E+02	2.66E+02	**1.7E+00**	2.66E+02	**1.7E+00**
PCBs					
Aroclor 1260	4.00E+01	1.30E+00	3.3E-02	7.26E-01	1.8E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC29-10 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Cadmium	1.40E+02	1.18E+01	8.4E-02	1.18E+01	8.4E-02
Chromium	4.00E-01	1.02E+02	**2.6E+02**	1.02E+02	**2.6E+02**
Cobalt	NA	1.30E+01	--	1.30E+01	--
Lead	1.70E+03	5.59E+02	3.3E-01	5.59E+02	3.3E-01
Titanium	NA	5.91E+02	--	5.91E+02	--
Zinc	1.20E+02	2.66E+02	**2.2E+00**	2.66E+02	**2.2E+00**
PCBs					
Aroclor 1260	3.30E-01	1.30E+00	**3.9E+00**	7.26E-01	**2.2E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC29-11 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Cadmium	1.47E+00	6.35E+00	**9.7E+00**	**2.2E+00**
Chromium	2.66E+00	1.56E+01	**4.3E+00**	7.3E-01
Cobalt	7.61E+00	1.83E+01	2.7E-01	1.1E-01
Lead	1.63E+00	3.26E+00	**5.0E+01**	**2.5E+01**
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	**2.2E+00**	8.4E-01
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	**7.9E+00**	7.9E-01

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC29-12 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Hazard Quotients Based on Comparison of Doses to NOAELs[a]	Hazard Quotients Based on Comparison of Doses to LOAELs[a]
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Cadmium	1.47E+00	6.35E+00	**9.7E+00**	**2.2E+00**
Chromium	2.66E+00	1.56E+01	**4.3E+00**	7.3E-01
Cobalt	7.61E+00	1.83E+01	2.7E-01	1.1E-01
Lead	1.63E+00	3.26E+00	**5.0E+01**	**2.5E+01**
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	**2.2E+00**	8.4E-01
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	**3.7E+00**	3.7E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC29-14 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Cadmium	1.70E-01	4/4	1.18E+01	NC	Exceeds	--
Chromium	2.49E+01	4/4	1.02E+02	NC	Exceeds	--
Cobalt	1.02E+01	4/4	1.30E+01	NC	Exceeds	--
Lead	1.24E+02	4/4	5.59E+02	NC	Exceeds	--
Titanium	NA	4/4	5.91E+02	NC	Exceeds	--
Zinc	8.39E+01	4/4	2.66E+02	NC	Exceeds	--
PCBs						
Aroclor 1260	NA	8/10	1.30E+00	7.26E-01	Exceeds	Exceeds

Note:

95UCLM - 95 percent upper confidence limit of the mean.

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NC = Not calculated.

wt - Weight.

Table EC29-15 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.18E+01	--	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	5.89E+01	1.10E+00	1.31E+01	0.00E+00	1.42E+01
Chromium	1.02E+02	--	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.77E+00	9.53E+00	1.95E+00	0.00E+00	1.15E+01
Cobalt	1.30E+01	--	2.91E-01	3.78E+00	1.21E+00	8.42E-01	0.00E+00	2.06E+00
Lead	5.59E+02	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.33E+02	5.22E+01	2.95E+01	0.00E+00	8.17E+01
Titanium	5.91E+02	--	1.00E+00	5.91E+02	5.52E+01	1.31E+02	0.00E+00	1.87E+02
Zinc	2.66E+02	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.34E+02	2.49E+01	1.19E+02	0.00E+00	1.44E+02
PCBs								
Aroclor 1260	1.30E+00	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	5.85E+00	1.21E-01	1.30E+00	0.00E+00	1.42E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC29-16 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.18E+01	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	5.89E+01	1.10E+00	1.31E+01	0.00E+00	1.42E+01
Chromium	1.02E+02	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	8.77E+00	9.53E+00	1.95E+00	0.00E+00	1.15E+01
Cobalt	1.30E+01	0.00E+00	2.91E-01	3.78E+00	1.21E+00	8.42E-01	0.00E+00	2.06E+00
Lead	5.59E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.33E+02	5.22E+01	2.95E+01	0.00E+00	8.17E+01
Titanium	5.91E+02	0.00E+00	1.00E+00	5.91E+02	5.52E+01	1.31E+02	0.00E+00	1.87E+02
Zinc	2.66E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.34E+02	2.49E+01	1.19E+02	0.00E+00	1.44E+02
PCBs								
Aroclor 1260	7.26E-01	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	2.65E+00	6.78E-02	5.89E-01	0.00E+00	6.57E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC29-17 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.18E+01	--	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	2.39E+00	4.84E-02	1.23E-01	0.00E+00	1.71E-01
Chromium	1.02E+02	--	7.50E-03	7.65E-01	4.18E-01	3.92E-02	0.00E+00	4.57E-01
Cobalt	1.30E+01	--	2.00E-02	2.60E-01	5.33E-02	1.33E-02	0.00E+00	6.66E-02
Lead	5.59E+02	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	9.22E+00	2.29E+00	4.72E-01	0.00E+00	2.76E+00
Titanium	5.91E+02	--	1.00E+00	9.51E+00	2.42E+00	4.87E-01	0.00E+00	2.91E+00
Zinc	2.66E+02	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.07E+02	1.09E+00	5.49E+00	0.00E+00	6.58E+00
PCBs								
Aroclor 1260	1.30E+00	0.00E+00	6.44E-04	8.37E-04	5.33E-03	4.29E-05	0.00E+00	5.37E-03

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC29-18 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.18E+01	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	2.39E+00	4.84E-02	1.23E-01	0.00E+00	1.71E-01
Chromium	1.02E+02	0.00E+00	7.50E-03	7.65E-01	4.18E-01	3.92E-02	0.00E+00	4.57E-01
Cobalt	1.30E+01	0.00E+00	2.00E-02	2.60E-01	5.33E-02	1.33E-02	0.00E+00	6.66E-02
Lead	5.59E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	9.22E+00	2.29E+00	4.72E-01	0.00E+00	2.76E+00
Titanium	5.91E+02	0.00E+00	1.00E+00	5.91E+02	2.42E+00	3.03E+01	0.00E+00	3.27E+01
Zinc	2.66E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.07E+02	1.09E+00	5.49E+00	0.00E+00	6.58E+00
PCBs								
Aroclor 1260	7.26E-01	0.00E+00	6.44E-04	4.67E-04	2.98E-03	2.40E-05	0.00E+00	3.00E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC29-19 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Cadmium	1.18E+01	--	1.71E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	2.16E+00	2.28E-02	3.73E-02	0.00E+00	6.01E-02
Chromium	1.02E+02	--	4.57E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	6.92E+00	1.97E-01	1.19E-01	0.00E+00	3.16E-01
Cobalt	1.30E+01	--	6.66E-02	Uptake Factor	1.00E-01	1.30E+00	2.51E-02	2.24E-02	0.00E+00	4.75E-02
Lead	5.59E+02	--	2.76E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.77E+01	1.08E+00	3.05E-01	0.00E+00	1.39E+00
Titanium	5.91E+02	--	2.91E+00	Uptake Factor	1.00E+00	5.91E+02	1.14E+00	1.02E+01	0.00E+00	1.13E+01
Zinc	2.66E+02	--	6.58E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.32E+02	5.14E-01	2.28E+00	0.00E+00	2.79E+00
PCBs										
Aroclor 1260	1.30E+00	0.00E+00	5.37E-03	Biotransfer Factor	1.86E+01	1.00E-01	2.51E-03	1.73E-03	0.00E+00	4.24E-03

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC29-20 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Cadmium	1.18E+01	0.00E+00	1.71E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	2.16E+00	2.28E-02	3.73E-02	0.00E+00	6.01E-02
Chromium	1.02E+02	0.00E+00	4.57E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	6.92E+00	1.97E-01	1.19E-01	0.00E+00	3.16E-01
Cobalt	1.30E+01	0.00E+00	6.66E-02	Uptake Factor	1.00E-01	1.30E+00	2.51E-02	2.24E-02	0.00E+00	4.75E-02
Lead	5.59E+02	0.00E+00	2.76E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.77E+01	1.08E+00	3.05E-01	0.00E+00	1.39E+00
Titanium	5.91E+02	0.00E+00	3.27E+01	Uptake Factor	1.00E+00	5.91E+02	1.14E+00	1.02E+01	0.00E+00	1.13E+01
Zinc	2.66E+02	0.00E+00	6.58E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.32E+02	5.14E-01	2.28E+00	0.00E+00	2.79E+00
PCBs										
Aroclor 1260	7.26E-01	0.00E+00	3.00E-03	Biotransfer Factor	1.86E+01	5.59E-02	1.40E-03	9.65E-04	0.00E+00	2.37E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

Table EC30-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Lead	4/4	4.89E+02	1.10E+01	YES
PAHs				
Naphthalene	1/4	1.04E-01	Refer to total LMW PAHs	NO
Total LMW PAHs	1/1	1.04E-01	2.90E+01	NO
VOCS				
2-Butanone (Methyl ethyl ketone)	3/4	3.83E-02	1.00E+00	NO
Acetone	4/4	4.24E-01	1.20E+00	NO
Benzene	2/4	9.00E-04	1.20E-01	NO
Methylene chloride	4/4	1.79E-01	2.10E-01	NO
Toluene	2/4	4.70E-03	1.50E-01	NO
Total Xylenes	1/4	3.50E-03	1.00E-01	NO

Note:

mg/kg - Milligrams per kilogram.

NA - No screening value available.

Table EC30-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Lead	4/4	4.89E+02	NC

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

Table EC30-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Lead	1.20E+02	4.89E+02	**4.1E+00**

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC30-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Lead	1.70E+03	4.89E+02	2.9E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC30-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Lead	1.63E+00	3.26E+00	**4.4E+01**	**2.2E+01**

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC30-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Lead	4.70E+00	8.90E+00	5.2E-01	2.6E-01	2.7E-01	1.4E-01

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC30-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Lead	1.24E+02	4/4	4.89E+02	Exceeds

Note:

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC30-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Lead	4.89E+02	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.19E+02	4.57E+01	2.65E+01	0.00E+00	7.22E+01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC30-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Lead	4.89E+02	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	8.55E+00	2.00E+00	4.38E-01	0.00E+00	2.44E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC30-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Lead	4.89E+02	--	2.44E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.67E+01	9.45E-01	2.88E-01	0.00E+00	1.23E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC31-1 Detection Comparison to Screening Levels

Analyte	Surface Soil				Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals					
Aluminum	2/2	1.30E+04	NC	pH<5.5	NO
Arsenic	2/2	1.89E+01	NC	1.80E+01	YES
Cadmium	2/2	5.30E-01	NC	3.60E-01	YES
Chromium	2/2	5.13E+01	NC	2.60E+01	YES
Cobalt	2/2	9.70E+00	NC	1.30E+01	NO
Copper	2/2	7.12E+01	NC	2.80E+01	YES
Lead	2/2	7.58E+01	NC	1.10E+01	YES
Nickel	2/2	1.49E+02	NC	3.80E+01	YES
Titanium	2/2	2.07E+02	NC	NA	YES
Zinc	2/2	8.46E+01	NC	4.60E+01	YES
PCBs					
Aroclor 1260	2/2	2.50E-01	NC	4.10E-02	YES
PAHs					
Naphthalene	1/2	7.30E-03	NC	Refer to total LMW PAHs	NO
Total LMW PAHs	1/1	7.30E-03	NC	2.90E+01	NO
VOCS					
2-Butanone (Methyl ethyl ketone)	1/2	1.47E-02	NC	1.00E+00	NO
Acetone	2/2	1.59E-01	NC	1.20E+00	NO
Methylene chloride	2/2	7.40E-03	NC	2.10E-01	NO

Note:

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - No screening value available.

PAH - Polycyclic aromatic hydrocarbon.

VOC - Volatile organic compound.

Table EC31-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Metals		
Arsenic	2/2	1.89E+01
Cadmium	2/2	5.30E-01
Chromium	2/2	5.13E+01
Copper	2/2	7.12E+01
Lead	2/2	7.58E+01
Nickel	2/2	1.49E+02
Titanium	2/2	2.07E+02
Zinc	2/2	8.46E+01
PCBs		
Aroclor 1260	2/2	2.50E-01

Table EC31-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)

Note:

mg/kg - Milligrams per kilogram.

Table EC31-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Arsenic	1.80E+01	1.89E+01	1.1E+00
Cadmium	3.20E+01	5.30E-01	1.7E-02
Chromium	1.00E+00	5.13E+01	**5.1E+01**
Copper	7.00E+01	7.12E+01	1.0E+00
Lead	1.20E+02	7.58E+01	6.3E-01
Nickel	3.80E+01	1.49E+02	**3.9E+00**
Titanium	NA	2.07E+02	--
Zinc	1.60E+02	8.46E+01	5.3E-01
PCBs			
Aroclor 1260	4.00E+01	2.50E-01	6.3E-03

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC31-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Arsenic	6.00E+01	1.89E+01	3.2E-01
Cadmium	1.40E+02	5.30E-01	3.8E-03
Chromium	4.00E-01	5.13E+01	**1.3E+02**
Copper	8.00E+01	7.12E+01	8.9E-01
Lead	1.70E+03	7.58E+01	4.5E-02
Nickel	2.80E+02	1.49E+02	5.3E-01
Titanium	NA	2.07E+02	--
Zinc	1.20E+02	8.46E+01	7.1E-01
PCBs			
Aroclor 1260	3.30E-01	2.50E-01	7.6E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC31-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Arsenic	2.24E+00	4.51E+00	9.8E-01	4.9E-01
Cadmium	1.47E+00	6.35E+00	7.9E-01	1.8E-01
Chromium	2.66E+00	1.56E+01	**2.6E+00**	4.4E-01
Copper	4.05E+00	1.21E+01	**2.5E+00**	8.5E-01
Lead	1.63E+00	3.26E+00	**8.0E+00**	**4.0E+00**
Nickel	6.71E+00	1.86E+01	**2.4E+00**	8.8E-01
Titanium	NA	NA	--	--
Zinc	6.61E+01	1.71E+02	1.4E+00	5.2E-01
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	9.0E-01	9.0E-02

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC31-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Arsenic	1.04E+00	1.66E+00	1.1E-01	3.7E-02	6.9E-02	2.3E-02
Cadmium	7.70E-01	7.70E+00	3.2E-02	1.2E-02	3.2E-03	1.2E-03
Chromium	2.40E+00	5.82E+01	9.6E-02	7.1E-02	4.0E-03	2.9E-03
Copper	5.60E+00	9.34E+00	1.5E-01	6.9E-02	8.9E-02	4.1E-02
Lead	4.70E+00	8.90E+00	9.9E-02	5.8E-02	5.2E-02	3.1E-02
Nickel	1.70E+00	3.40E+00	4.9E-01	2.5E-01	2.5E-01	1.3E-01
Titanium	NA	NA	--	--	--	--
Zinc	7.54E+01	2.98E+02	4.3E-02	3.0E-02	1.1E-02	7.6E-03
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	1.5E-02	1.2E-02	1.5E-03	1.2E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC31-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Arsenic	9.09E+00	2/2	1.89E+01	Exceeds
Cadmium	1.70E-01	2/2	5.30E-01	Exceeds
Chromium	2.49E+01	2/2	5.13E+01	Exceeds
Copper	3.28E+01	2/2	7.12E+01	Exceeds
Lead	1.24E+02	2/2	7.58E+01	--
Nickel	1.60E+01	2/2	1.49E+02	Exceeds
Titanium	NA	2/2	2.07E+02	Exceeds
Zinc	8.39E+01	2/2	8.46E+01	Exceeds
PCBs				
Aroclor 1260	NA	2/2	2.50E-01	Exceeds

Note:

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC31-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	1.89E+01	--	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	1.92E+00	1.77E+00	4.28E-01	0.00E+00	2.19E+00
Cadmium	5.30E-01	--	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	5.00E+00	4.95E-02	1.11E+00	0.00E+00	1.16E+00
Chromium	5.13E+01	--	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.18E+00	4.79E+00	2.04E+00	0.00E+00	6.84E+00
Copper	7.12E+01	--	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.65E+01	6.65E+00	3.66E+00	0.00E+00	1.03E+01
Lead	7.58E+01	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	2.64E+01	7.08E+00	5.88E+00	0.00E+00	1.30E+01
Nickel	1.49E+02	--	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.08E+01	1.39E+01	2.39E+00	0.00E+00	1.63E+01
Titanium	2.07E+02	--	1.00E+00	2.07E+02	1.93E+01	4.61E+01	0.00E+00	6.54E+01
Zinc	8.46E+01	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.67E+02	7.91E+00	8.16E+01	0.00E+00	8.95E+01
PCBs								
Aroclor 1260	2.50E-01	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	6.21E-01	2.34E-02	1.38E-01	0.00E+00	1.61E-01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC31-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	1.89E+01	--	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	7.16E-01	7.75E-02	3.67E-02	0.00E+00	1.14E-01
Cadmium	5.30E-01	--	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	4.39E-01	2.17E-03	2.25E-02	0.00E+00	2.47E-02
Chromium	5.13E+01	--	7.50E-03	3.85E-01	2.10E-01	1.97E-02	0.00E+00	2.30E-01
Copper	7.12E+01	--	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.05E+01	2.92E-01	5.37E-01	0.00E+00	8.29E-01
Lead	7.58E+01	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	3.00E+00	3.11E-01	1.54E-01	0.00E+00	4.65E-01
Nickel	1.49E+02	--	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	4.39E+00	6.11E-01	2.25E-01	0.00E+00	8.36E-01
Titanium	2.07E+02	--	1.00E+00	5.28E+00	8.49E-01	2.71E-01	0.00E+00	1.12E+00
Zinc	8.46E+01	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.67E+01	3.47E-01	2.91E+00	0.00E+00	3.25E+00
PCBs								
Aroclor 1260	2.50E-01	0.00E+00	6.44E-04	1.61E-04	1.03E-03	8.25E-06	0.00E+00	1.03E-03

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC31-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Arsenic	1.89E+01	--	1.14E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	8.71E-02	3.65E-02	1.50E-03	0.00E+00	3.80E-02
Cadmium	5.30E-01	--	2.47E-02	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	4.77E-01	1.02E-03	8.23E-03	0.00E+00	9.26E-03
Chromium	5.13E+01	--	2.30E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	4.18E+00	9.91E-02	7.21E-02	0.00E+00	1.71E-01
Copper	7.12E+01	--	8.29E-01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.43E+01	1.38E-01	2.46E-01	0.00E+00	3.84E-01
Lead	7.58E+01	--	4.65E-01	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	7.32E+00	1.46E-01	1.26E-01	0.00E+00	2.73E-01
Nickel	1.49E+02	--	8.36E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	8.04E+00	2.88E-01	1.39E-01	0.00E+00	4.27E-01
Titanium	2.07E+02	--	1.12E+00	Uptake Factor	1.00E+00	2.07E+02	4.00E-01	3.57E+00	0.00E+00	3.97E+00
Zinc	8.46E+01	--	3.25E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.21E+02	1.63E-01	2.09E+00	0.00E+00	2.26E+00
PCBs										
Aroclor 1260	2.50E-01	0.00E+00	1.03E-03	Biotransfer Factor	1.86E+01	1.93E-02	4.83E-04	3.32E-04	0.00E+00	8.15E-04

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

TABLE EC32-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-32 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-32

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Metals																	
7440-38-2	**Arsenic**	**1.67E+01**	**J**	**4.46E+01**		**mg/kg**	**EC-32-2-SO-0.5**	**5/5**	**1.31E-01 - 1.50E+00**	**4.46E+01**	**NA**	**3.00E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-47-3	Chromium	2.19E+01		3.67E+01		mg/kg	EC-32-2-SO-0.5	2/2	9.50E-01 - 1.00E+00	3.67E+01	NA	1.80E+05	N	NA	NA	No	BSL
7440-50-8	Copper	6.64E+01		7.04E+01		mg/kg	EC-32-1-SO-0.5	2/2	2.40E+00 - 2.50E+00	7.04E+01	NA	4.70E+03	N	NA	NA	No	BSL
7440-02-0	Nickel	2.12E+01		1.71E+02		mg/kg	EC-32-2-SO-0.5	2/2	2.40E+00 - 2.50E+00	1.71E+02	NA	2.20E+03	N	NA	NA	No	BSL
7440-66-6	Zinc	7.85E+01		8.76E+01		mg/kg	EC-32-1-SO-0.5	2/2	2.40E+00 - 2.50E+00	8.76E+01	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	5.26E-02		2.78E-01		mg/kg	EC-32-1-SO-0.5	2/2	1.80E-03 - 7.38E-02	2.78E-01	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	1.47E-01		7.76E-01		mg/kg	EC-32-2-SO-0.5	2/2	7.14E-02 - 7.38E-02	7.76E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	7.63E-01		8.02E-01		mg/kg	EC-32-1-SO-0.5	2/2	7.14E-02 - 7.38E-02	8.02E-01	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	**Benzo(a)anthracene**	**1.10E-01**		**1.00E+03**		**mg/kg**	**EC-32-06-SO-0.5**	**22/22**	**2.20E-03 - 2.20E+01**	**1.00E+03**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**Benzo(a)pyrene**	**1.20E-01**		**7.20E+02**		**mg/kg**	**EC-32-06-SO-0.5**	**22/22**	**2.10E-03 - 4.30E+00**	**7.20E+02**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	**1.80E-01**		**1.30E+03**		**mg/kg**	**EC-32-06-SO-0.5**	**22/22**	**2.20E-03 - 2.20E+01**	**1.30E+03**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	Benzo(g,h,I)perylene	7.21E-01		1.01E+00		mg/kg	EC-32-2-SO-0.5	2/2	7.14E-02 - 7.38E-02	1.01E+00	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	1.73E+00		1.73E+00		mg/kg	EC-32-1-SO-0.5, EC-32-2-SO-0.5	2/2	7.14E-02 - 7.38E-02	1.73E+00	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	3.38E+00		3.68E+00		mg/kg	EC-32-2-SO-0.5	2/2	7.14E-02 - 7.38E-02	3.68E+00	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	**Dibenz[a,h]anthracene**	**2.50E-02**		**1.50E+02**		**mg/kg**	**EC-32-06-SO-0.5**	**22/22**	**2.00E-03 - 4.30E+00**	**1.50E+02**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	Fluoranthene	3.67E+00		5.74E+00		mg/kg	EC-32-1-SO-0.5	2/2	7.14E-02 - 3.69E-01	5.74E+00	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	7.39E-02		2.23E-01		mg/kg	EC-32-1-SO-0.5	2/2	1.80E-03 - 7.38E-02	2.23E-01	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	9.70E-01		1.28E+00		mg/kg	EC-32-2-SO-0.5	2/2	7.14E-02 - 7.38E-02	1.28E+00	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	2.84E-02		1.11E-01		mg/kg	EC-32-1-SO-0.5	2/2	1.80E-03 - 7.38E-02	1.11E-01	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	8.96E-01		3.59E+00		mg/kg	EC-32-1-SO-0.5	2/2	7.14E-02 - 7.38E-02	3.59E+00	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	3.44E+00		4.80E+00		mg/kg	EC-32-1-SO-0.5	2/2	7.14E-02 - 3.69E-01	4.80E+00	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value

Surrogates used: Chromium III for Chromium, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC32-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-32 - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-32

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Metals																	
7440-38-2	**Arsenic**	**2.42E+00**	**J**	**4.46E+01**		**mg/kg**	**EC-32-2-SO-0.5**	**9/9**	**1.08E-01 - 1.50E+00**	**4.46E+01**	**NA**	**3.00E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-47-3	Chromium	1.03E+01		3.67E+01		mg/kg	EC-32-2-SO-0.5	4/4	9.50E-01 - 1.00E+00	3.67E+01	NA	8.00E+04	N	NA	NA	No	BSL
7440-50-8	Copper	6.30E+00		7.04E+01		mg/kg	EC-32-1-SO-0.5	4/4	2.40E+00 - 2.50E+00	7.04E+01	NA	4.70E+03	N	NA	NA	No	BSL
7440-02-0	Nickel	4.90E+00		1.71E+02		mg/kg	EC-32-2-SO-0.5	4/4	2.40E+00 - 2.50E+00	1.71E+02	NA	2.20E+03	N	NA	NA	No	BSL
7440-66-6	Zinc	1.47E+01		8.76E+01		mg/kg	EC-32-1-SO-0.5	4/4	2.40E+00 - 2.50E+00	8.76E+01	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	8.30E-03		2.78E-01		mg/kg	EC-32-1-SO-0.5	3/4	1.80E-03 - 7.38E-02	2.78E-01	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	1.47E-01		7.76E-01		mg/kg	EC-32-2-SO-0.5	2/4	1.90E-03 - 7.38E-02	7.76E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.26E-02		8.02E-01		mg/kg	EC-32-1-SO-0.5	3/4	1.90E-03 - 7.38E-02	8.02E-01	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	**Benzo(a)anthracene**	**2.80E-03**	**J**	**1.00E+03**		**mg/kg**	**EC-32-06-SO-0.5**	**31/33**	**1.90E-03 - 2.20E+01**	**1.00E+03**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**Benzo(a)pyrene**	**1.80E-03**	**J**	**7.20E+02**		**mg/kg**	**EC-32-06-SO-0.5**	**32/33**	**1.90E-03 - 4.30E+00**	**7.20E+02**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	**3.30E-03**	**J**	**1.30E+03**		**mg/kg**	**EC-32-06-SO-0.5**	**32/33**	**1.90E-03 - 2.20E+01**	**1.30E+03**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	Benzo(g,h,I)perylene	5.84E-02		1.01E+00		mg/kg	EC-32-2-SO-0.5	3/4	1.90E-03 - 7.38E-02	1.01E+00	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	3.28E-02		1.73E+00		mg/kg	EC-32-2-SO-0.5, EC-32-1-SO-0.5	3/4	1.90E-03 - 7.38E-02	1.73E+00	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	1.25E-01		3.68E+00		mg/kg	EC-32-2-SO-0.5	3/4	1.90E-03 - 7.46E-02	3.68E+00	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	**Dibenz[a,h]anthracene**	**1.90E-03**	**J**	**1.50E+02**		**mg/kg**	**EC-32-06-SO-0.5**	**29/33**	**1.90E-03 - 4.30E+00**	**1.50E+02**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	Fluoranthene	1.22E-01		5.74E+00		mg/kg	EC-32-1-SO-0.5	3/4	1.90E-03 - 3.69E-01	5.74E+00	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	8.10E-03		2.23E-01		mg/kg	EC-32-1-SO-0.5	3/4	1.80E-03 - 7.38E-02	2.23E-01	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	4.32E-02		1.28E+00		mg/kg	EC-32-2-SO-0.5	3/4	1.90E-03 - 7.38E-02	1.28E+00	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	1.20E-02		1.11E-01		mg/kg	EC-32-1-SO-0.5	3/4	1.80E-03 - 7.38E-02	1.11E-01	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	9.10E-02		3.59E+00		mg/kg	EC-32-1-SO-0.5	3/4	1.90E-03 - 7.46E-02	3.59E+00	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	1.51E-01		4.80E+00		mg/kg	EC-32-1-SO-0.5	3/4	1.90E-03 - 3.69E-01	4.80E+00	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value

Surrogates used: Chromium III for Chromium, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC32-3

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-32 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Arsenic	39.58	--	3.00E-04	2.03E-05	0.068
Benzo(a)anthracene	245.50	--	NA	NA	NA
Benzo(a)pyrene	177.10	--	3.00E-04	1.52E-04	0.5054
Benzo(b)fluoranthene	319.40	--	NA	NA	NA
Dibenz(a,h)anthracene	36.85	--	NA	NA	NA
				Total Pathway Hazard Index	0.573

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Arsenic	39.58	--	3.00E-04	1.43E-05	0.05
Benzo(a)anthracene	245.5	--	NA	NA	NA
Benzo(a)pyrene	177.1	--	3.00E-04	8.34E-05	0.28
Benzo(b)fluoranthene	319.4	--	NA	NA	NA
Dibenz(a,h)anthracene	36.85	--	NA	NA	NA
				Total Pathway Hazard Index	0.33

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Arsenic	3.12E-08	--	1.50E-05	7.12E-09	0.0005
Benzo(a)anthracene	1.93E-07	--	NA	NA	NA
Benzo(a)pyrene	1.39E-07	--	2.00E-06	3.18E-08	0.01592
Benzo(b)fluoranthene	2.51E-07	--	NA	NA	NA
Dibenz(a,h)anthracene	2.90E-08	--	NA	NA	NA
				Total Pathway Hazard Index	0.0164

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor HI Total =	**0.9**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
0.03 dermal absorption for dioxins
0.13 for PAHs
0.1 for semivolatiles; 0.1 for metals

TABLE EC32-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-32 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Arsenic	39.58	--	1.50E+00	7.26E-06	1E-05
Benzo(a)anthracene	245.50	--	1.00E-01	7.51E-05	8E-06
Benzo(a)pyrene	177.10	--	1.00E+00	5.42E-05	5E-05
Benzo(b)fluoranthene	319.40	--	1.00E-01	9.77E-05	1E-05
Dibenz(a,h)anthracene	36.85	--	1.00E+00	1.13E-05	1E-05
				Total Pathway Cancer Risk	9E-05
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Arsenic	39.58	--	1.5E+00	5.12E-06	8E-06
Benzo(a)anthracene	245.5	--	1.0E-01	4.13E-05	4E-06
Benzo(a)pyrene	177.1	--	1.0E+00	2.98E-05	3E-05
Benzo(b)fluoranthene	319.4	--	1.0E-01	5.37E-05	5E-06
Dibenz(a,h)anthracene	36.85	--	1.0E+00	6.20E-06	6E-06
				Total Pathway Cancer Risk	5E-05
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Arsenic	3.12E-08	--	4.30E-03	2.54E-09	1E-11
Benzo(a)anthracene	1.93E-07	--	6.00E-05	1.58E-08	9E-13
Benzo(a)pyrene	1.39E-07	--	6.00E-04	1.14E-08	7E-12
Benzo(b)fluoranthene	2.51E-07	--	6.00E-05	2.05E-08	1E-12
Dibenz(a,h)anthracene	2.90E-08	--	6.00E-04	2.37E-09	1E-12
				Total Pathway Cancer Risk	2E-11
Air Concentration = Concentration in Soil/Particulate Emission Factor					
Particulate Emission Factor = 1.27×10^9 m^3/kg					RME
NA=not applicable to pathway; ND=not detected				Receptor Incremental Cancer Risk Total =	**1E-04**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

TABLE EC32-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-32 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Arsenic	27.84	--	3.00E-04	4.72E-05	0.157
Benzo(a)anthracene	221.60	--	NA	NA	NA
Benzo(a)pyrene	159.70	--	3.00E-04	4.51E-04	1.5
Benzo(b)fluoranthene	288.10	--	NA	NA	NA
Dibenz(a,h)anthracene	33.29	--	NA	NA	NA
				Total Pathway Hazard Index	1.66

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Arsenic	27.84	--	3.00E-04	3.03E-06	0.010
Benzo(a)anthracene	221.6	--	NA	NA	NA
Benzo(a)pyrene	159.7	--	3.00E-04	7.52E-05	0.25
Benzo(b)fluoranthene	288.1	--	NA	NA	NA
Dibenz(a,h)anthracene	33.29	--	NA	NA	NA
				Total Pathway Hazard Index	0.26

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Arsenic	2.19E-08	--	1.50E-05	5.00E-09	0.00033
Benzo(a)anthracene	1.74E-07	--	NA	NA	NA
Benzo(a)pyrene	1.26E-07	--	2.00E-06	2.87E-08	0.014
Benzo(b)fluoranthene	2.27E-07	--	NA	NA	NA
Dibenz(a,h)anthracene	2.62E-08	--	NA	NA	NA
				Total Pathway Hazard Index	0.01469

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor HI Total =	**2**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.

TABLE EC32-6

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-32 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Arsenic	27.84	--	1.50E+00	6.74E-07	1E-06
Benzo(a)anthracene	221.60	--	1.00E-01	8.94E-06	9E-07
Benzo(a)pyrene	159.70	--	1.00E+00	6.45E-06	6E-06
Benzo(b)fluoranthene	288.10	--	1.00E-01	1.16E-05	1E-06
Dibenz(a,h)anthracene	33.29	--	1.00E+00	1.34E-06	1E-06
				Total Pathway Cancer Risk	1E-05
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Arsenic	27.84	--	1.5E+00	1.44E-07	2E-07
Benzo(a)anthracene	221.6	--	1.0E-01	1.49E-06	1E-07
Benzo(a)pyrene	159.7	--	1.0E+00	1.07E-06	1E-06
Benzo(b)fluoranthene	288.1	--	1.0E-01	1.94E-06	2E-07
Dibenz(a,h)anthracene	33.29	--	1.0E+00	2.24E-07	2E-07
				Total Pathway Cancer Risk	2E-06
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Arsenic	2.19E-08	--	4.30E-03	7.15E-11	3E-13
Benzo(a)anthracene	1.74E-07	--	6.00E-05	5.69E-10	3E-14
Benzo(a)pyrene	1.26E-07	--	6.00E-04	4.10E-10	2E-13
Benzo(b)fluoranthene	2.27E-07	--	6.00E-05	7.40E-10	4E-14
Dibenz(a,h)anthracene	2.62E-08	--	6.00E-04	8.55E-11	5E-14
				Total Pathway Cancer Risk	7E-13

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**1E-05**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

Table EC32-9 Detection Comparison to Screening Levels

Analyte	Surface Soil				Selection of Chemicals of Potential Concern[a]
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Soil Screening Criteria[b] (mg/kg)	Terrestrial Habitats[c]
Metals					
Arsenic	5/5	4.46E+01	3.96E+01	1.80E+01	YES
Chromium	2/2	3.67E+01	NC	2.60E+01	YES
Copper	2/2	7.04E+01	NC	2.80E+01	YES
Nickel	2/2	1.71E+02	NC	3.80E+01	YES
Zinc	2/2	8.76E+01	NC	4.60E+01	YES
PAHs					
Acenaphthene	2/2	2.78E-01	NC	Refer to total LMW PAHs	NO
Acenaphthylene	2/2	7.76E-01	NC	Refer to total LMW PAHs	NO
Anthracene	2/2	8.02E-01	NC	Refer to total LMW PAHs	NO
Benzo(a)anthracene	22/22	1.00E+03	NC	Refer to total HMW PAHs	NO
Benzo(a)pyrene	22/22	7.20E+02	NC	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	22/22	1.30E+03	NC	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	2/2	1.01E+00	NC	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	2/2	1.73E+00	NC	Refer to total HMW PAHs	NO
Chrysene	2/2	3.68E+00	NC	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	22/22	1.50E+02	NC	Refer to total HMW PAHs	NO
Fluoranthene	2/2	5.74E+00	NC	Refer to total LMW PAHs	NO
Fluorene	2/2	2.23E-01	NC	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	2/2	1.28E+00	NC	Refer to total HMW PAHs	NO
Naphthalene	2/2	1.11E-01	NC	Refer to total LMW PAHs	NO
Phenanthrene	2/2	3.59E+00	NC	Refer to total LMW PAHs	NO
Pyrene	2/2	4.80E+00	NC	Refer to total HMW PAHs	NO
Total LMW PAHs	2/2	5.15E+00	NC	2.90E+01	NO
Total HMW PAHs	22/22	3.02E+03	7.43E+02	1.10E+00	YES

Note:

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - No screening value available.

PAH - Polycyclic aromatic hydrocarbon.

Table EC32-10 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Arsenic	5/5	4.46E+01	3.96E+01
Chromium	2/2	3.67E+01	NC
Copper	2/2	7.04E+01	NC
Nickel	2/2	1.71E+02	NC
Zinc	2/2	8.76E+01	NC
PAHs			
Total HMW PAHs	22/22	3.02E+03	7.43E+02

Note:

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

Table EC32-11 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Arsenic	1.80E+01	4.46E+01	**2.5E+00**	3.96E+01	**2.2E+00**
Chromium	1.00E+00	3.67E+01	**3.7E+01**	3.67E+01	**3.7E+01**
Copper	7.00E+01	7.04E+01	1.0E+00	7.04E+01	1.0E+00
Nickel	3.80E+01	1.71E+02	**4.5E+00**	1.71E+02	**4.5E+00**
Zinc	1.60E+02	8.76E+01	5.5E-01	8.76E+01	5.5E-01
PAHs					
Total HMW PAHs	2.00E+01	3.02E+03	**1.5E+02**	7.43E+02	**3.7E+01**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

wt - Weight.

Table EC32-12 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Arsenic	6.00E+01	4.46E+01	7.4E-01	3.96E+01	6.6E-01
Chromium	4.00E-01	3.67E+01	**9.2E+01**	3.67E+01	**9.2E+01**
Copper	8.00E+01	7.04E+01	8.8E-01	7.04E+01	8.8E-01
Nickel	2.80E+02	1.71E+02	6.1E-01	1.71E+02	6.1E-01
Zinc	1.20E+02	8.76E+01	7.3E-01	8.76E+01	7.3E-01
PAHs					
Total HMW PAHs	1.80E+01	3.02E+03	**1.7E+02**	7.43E+02	**4.1E+01**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

wt - Weight.

Table EC32-13 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Arsenic	2.24E+00	4.51E+00	**2.2E+00**	1.1E+00
Chromium	2.66E+00	1.56E+01	**2.1E+00**	3.5E-01
Copper	4.05E+00	1.21E+01	**2.5E+00**	8.5E-01
Nickel	6.71E+00	1.86E+01	**2.7E+00**	9.8E-01
Zinc	6.61E+01	1.71E+02	1.4E+00	5.3E-01
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	**2.4E+02**	**2.4E+01**

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC32-14 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Arsenic	2.24E+00	4.51E+00	**2.0E+00**	9.8E-01
Chromium	2.66E+00	1.56E+01	**2.1E+00**	3.5E-01
Copper	4.05E+00	1.21E+01	**2.5E+00**	8.5E-01
Nickel	6.71E+00	1.86E+01	**2.7E+00**	9.8E-01
Zinc	6.61E+01	1.71E+02	1.4E+00	5.3E-01
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	**6.0E+01**	**6.0E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC32-15 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Arsenic	1.04E+00	1.66E+00	2.3E-01	8.6E-02	1.5E-01	5.4E-02
Chromium	2.40E+00	5.82E+01	6.9E-02	5.3E-02	2.8E-03	2.2E-03
Copper	5.60E+00	9.34E+00	1.5E-01	6.8E-02	8.8E-02	4.1E-02
Nickel	1.70E+00	3.40E+00	5.7E-01	2.8E-01	2.8E-01	1.4E-01
Zinc	7.54E+01	2.98E+02	4.4E-02	3.0E-02	1.1E-02	7.6E-03
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	**4.9E+01**	**9.6E+00**	**1.0E+01**	**2.0E+00**

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC32-16 Comparison of 95UCLM Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Arsenic	1.04E+00	1.66E+00	2.1E-01	7.6E-02	1.3E-01	4.8E-02
Chromium	2.40E+00	5.82E+01	6.9E-02	5.3E-02	2.8E-03	2.2E-03
Copper	5.60E+00	9.34E+00	1.5E-01	6.8E-02	8.8E-02	4.1E-02
Nickel	1.70E+00	3.40E+00	5.7E-01	2.8E-01	2.8E-01	1.4E-01
Zinc	7.54E+01	2.98E+02	4.4E-02	3.0E-02	1.1E-02	7.6E-03
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	**1.2E+01**	**2.4E+00**	**2.5E+00**	4.8E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC32-17 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Arsenic	9.09E+00	5/5	4.46E+01	3.96E+01	Exceeds	Exceeds
Chromium	2.49E+01	2/2	3.67E+01	NC	Exceeds	--
Copper	3.28E+01	2/2	7.04E+01	NC	Exceeds	--
Nickel	1.60E+01	2/2	1.71E+02	NC	Exceeds	--
Zinc	8.39E+01	2/2	8.76E+01	NC	Exceeds	--
PAHs						
Total HMW PAHs	8.90E+00	22/22	3.02E+03	7.43E+02	Exceeds	Exceeds

Note:

95UCLM - 95 percent upper confidence limit of the mean.

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

HMW = High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

NC = Not calculated.

wt - Weight.

Table EC32-18 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	4.46E+01	--	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.53E+00	4.17E+00	7.85E-01	0.00E+00	4.95E+00
Chromium	3.67E+01	--	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.39E+00	3.43E+00	2.09E+00	0.00E+00	5.52E+00
Copper	7.04E+01	--	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.64E+01	6.58E+00	3.65E+00	0.00E+00	1.02E+01
Nickel	1.71E+02	--	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.04E+01	1.60E+01	2.31E+00	0.00E+00	1.83E+01
Zinc	8.76E+01	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.71E+02	8.19E+00	8.25E+01	0.00E+00	9.07E+01
PAHs								
Total HMW PAHs	3.02E+03	--	3.00E-01	9.06E+02	2.82E+02	2.02E+02	0.00E+00	4.84E+02

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC32-19 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	3.96E+01	0.00E+00	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.24E+00	3.70E+00	7.21E-01	0.00E+00	4.42E+00
Chromium	3.67E+01	0.00E+00	ln(dry worm conc, mg/kg) = (2.481+-0.067*ln(soil conc))	9.39E+00	3.43E+00	2.09E+00	0.00E+00	5.52E+00
Copper	7.04E+01	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.64E+01	6.58E+00	3.65E+00	0.00E+00	1.02E+01
Nickel	1.71E+02	0.00E+00	ln(dry worm conc, mg/kg) = (3.677-0.26*ln(soil conc))	1.04E+01	1.60E+01	2.31E+00	0.00E+00	1.83E+01
Zinc	8.76E+01	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.71E+02	8.19E+00	8.25E+01	0.00E+00	9.07E+01
PAHs								
Total HMW PAHs	7.43E+02	0.00E+00	3.00E-01	2.23E+02	6.95E+01	4.96E+01	0.00E+00	1.19E+02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC32-20 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	4.46E+01	--	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.16E+00	1.83E-01	5.95E-02	0.00E+00	2.42E-01
Chromium	3.67E+01	--	7.50E-03	2.75E-01	1.50E-01	1.41E-02	0.00E+00	1.65E-01
Copper	7.04E+01	--	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.04E+01	2.89E-01	5.35E-01	0.00E+00	8.23E-01
Nickel	1.71E+02	--	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	5.06E+00	7.01E-01	2.59E-01	0.00E+00	9.61E-01
Zinc	8.76E+01	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.78E+01	3.59E-01	2.96E+00	0.00E+00	3.32E+00
PAHs								
Total HMW PAHs	3.02E+03	--	1.17E-01	3.52E+02	1.24E+01	1.80E+01	0.00E+00	3.04E+01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC32-21 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	3.96E+01	0.00E+00	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.09E+00	1.62E-01	5.57E-02	0.00E+00	2.18E-01
Chromium	3.67E+01	0.00E+00	7.50E-03	2.75E-01	1.50E-01	1.41E-02	0.00E+00	1.65E-01
Copper	7.04E+01	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.04E+01	2.89E-01	5.35E-01	0.00E+00	8.23E-01
Nickel	1.71E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-2.224+0.748*ln(soil conc))	5.06E+00	7.01E-01	2.59E-01	0.00E+00	9.61E-01
Zinc	8.76E+01	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	5.78E+01	3.59E-01	2.96E+00	0.00E+00	3.32E+00
PAHs								
Total HMW PAHs	7.43E+02	0.00E+00	1.17E-01	8.67E+01	3.05E+00	4.44E+00	0.00E+00	7.49E+00

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC32-22 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Arsenic	4.46E+01	--	2.42E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.76E-01	8.62E-02	3.04E-03	0.00E+00	8.92E-02
Chromium	3.67E+01	--	1.65E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	3.27E+00	7.09E-02	5.64E-02	0.00E+00	1.27E-01
Copper	7.04E+01	--	8.23E-01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.42E+01	1.36E-01	2.46E-01	0.00E+00	3.82E-01
Nickel	1.71E+02	--	9.61E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	8.57E+00	3.30E-01	1.48E-01	0.00E+00	4.78E-01
Zinc	8.76E+01	--	3.32E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.22E+02	1.69E-01	2.10E+00	0.00E+00	2.27E+00
PAHs										
Total HMW PAHs	3.02E+03	--	3.04E+01	Biotransfer Factor	1.12E-01	3.42E+00	5.83E+00	5.90E-02	0.00E+00	5.89E+00

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC32-23 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Arsenic	3.96E+01	0.00E+00	2.18E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.60E-01	7.65E-02	2.75E-03	0.00E+00	7.92E-02
Chromium	3.67E+01	0.00E+00	1.65E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-1.4599+0.7338*ln(soil conc))	3.27E+00	7.09E-02	5.64E-02	0.00E+00	1.27E-01
Copper	7.04E+01	0.00E+00	8.23E-01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.42E+01	1.36E-01	2.46E-01	0.00E+00	3.82E-01
Nickel	1.71E+02	0.00E+00	9.61E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.2462+0.4658*ln(soil conc))	8.57E+00	3.30E-01	1.48E-01	0.00E+00	4.78E-01
Zinc	8.76E+01	0.00E+00	3.32E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.22E+02	1.69E-01	2.10E+00	0.00E+00	2.27E+00
PAHs										
Total HMW PAHs	7.43E+02	0.00E+00	7.49E+00	Biotransfer Factor	1.12E-01	8.42E-01	1.44E+00	1.45E-02	0.00E+00	1.45E+00

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC33-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Arsenic	3/3	3.87E+01	1.80E+01	YES
Copper	3/3	1.49E+01	2.80E+01	NO
Nickel	3/3	8.00E+00	3.80E+01	NO
Zinc	3/3	5.84E+01	4.60E+01	YES
PAHs				
Acenaphthene	3/3	1.60E-03	Refer to total LMW PAHs	NO
Acenaphthylene	3/3	1.09E-01	Refer to total LMW PAHs	NO
Anthracene	3/3	2.92E-02	Refer to total LMW PAHs	NO
Benzo(a)anthracene	3/3	2.72E-01	Refer to total HMW PAHs	NO
Benzo(a)pyrene	3/3	2.94E-01	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	3/3	4.83E-01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	3/3	1.34E-01	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	3/3	1.86E-01	Refer to total HMW PAHs	NO
Chrysene	3/3	3.42E-01	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	3/3	2.90E-02	Refer to total HMW PAHs	NO
Fluoranthene	3/3	4.76E-01	Refer to total LMW PAHs	NO
Fluorene	3/3	3.30E-03	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	3/3	1.59E-01	Refer to total HMW PAHs	NO
Naphthalene	3/3	2.80E-03	Refer to total LMW PAHs	NO
Phenanthrene	3/3	3.21E-02	Refer to total LMW PAHs	NO
Pyrene	3/3	4.44E-01	Refer to total HMW PAHs	NO
Total LMW PAHs	3/3	1.78E-01	2.90E+01	NO
Total HMW PAHs	3/3	2.63E+00	1.10E+00	YES

Note:

HMW - High molecular weight. mg/kg - Milligrams per kilogram. PAH - Polycyclic aromatic hydrocarbon.

LMW - Low molecular weight. NA - No screening value available.

ble EC33-2 Frequency of Detection and Exposure Point Concentratio

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Metals		
Arsenic	3/3	3.87E+01
Zinc	3/3	5.84E+01
PAHs		
Total HMW PAHs	3/3	2.63E+00

Note:

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

Table EC33-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Arsenic	1.80E+01	3.87E+01	**2.2E+00**
Zinc	1.60E+02	5.84E+01	3.7E-01
PAHs			
Total HMW PAHs	2.00E+01	2.63E+00	1.3E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

wt - Weight.

Table EC33-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Arsenic	6.00E+01	3.87E+01	6.5E-01
Zinc	1.20E+02	5.84E+01	4.9E-01
PAHs			
Total HMW PAHs	1.80E+01	2.63E+00	1.5E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

wt - Weight.

Table EC33-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Arsenic	2.24E+00	4.51E+00	**1.9E+00**	9.6E-01
Zinc	6.61E+01	1.71E+02	1.2E+00	4.5E-01
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	2.1E-01	2.1E-02

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC33-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Arsenic	1.04E+00	1.66E+00	2.1E-01	7.4E-02	1.3E-01	4.7E-02
Zinc	7.54E+01	2.98E+02	3.5E-02	2.9E-02	8.8E-03	7.2E-03
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	4.3E-02	8.3E-03	8.8E-03	1.7E-03

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC33-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Arsenic	9.09E+00	3/3	3.87E+01	Exceeds
Zinc	8.39E+01	3/3	5.84E+01	No
PAHs				
Total HMW PAHs	8.90E+00	3/3	2.63E+00	No

Note:

BTV - 95% Upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

HMW = High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC33-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	3.87E+01	--	ln(dry worm conc, mg/kg) = (-1.421+0.706*ln(soil conc))	3.19E+00	3.62E+00	7.10E-01	0.00E+00	4.33E+00
Zinc	5.84E+01	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.25E+02	5.46E+00	7.23E+01	0.00E+00	7.77E+01
PAHs								
Total HMW PAHs	2.63E+00	--	3.00E-01	7.89E-01	2.46E-01	1.76E-01	0.00E+00	4.21E-01

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC33-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Arsenic	3.87E+01	--	ln(dry plant conc, mg/kg) = (-1.992+0.564*ln(soil conc))	1.07E+00	1.59E-01	5.50E-02	0.00E+00	2.14E-01
Zinc	5.84E+01	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.62E+01	2.39E-01	2.37E+00	0.00E+00	2.61E+00
PAHs								
Total HMW PAHs	2.63E+00	--	1.17E-01	3.07E-01	1.08E-02	1.57E-02	0.00E+00	2.65E-02

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC33-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Arsenic	3.87E+01	--	2.14E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-4.8471+0.8188*ln(soil conc))	1.57E-01	7.48E-02	2.70E-03	0.00E+00	7.75E-02
Zinc	5.84E+01	--	2.61E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.18E+02	1.13E-01	2.04E+00	0.00E+00	2.15E+00
PAHs										
Total HMW PAHs	2.63E+00	--	2.65E-02	Biotransfer Factor	1.12E-01	2.98E-03	5.08E-03	5.14E-05	0.00E+00	5.13E-03

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

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Table EC34-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
PAHs				
Naphthalene	1/3	2.30E-03	Refer to total LMW PAHs	NO
Total LMW PAHs	1/1	2.30E-03	2.90E+01	NO
VOCS				
Benzene	1/3	6.50E-04	1.20E-01	NO

Note:

mg/kg - Milligrams per kilogram.

TABLE EC36-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-36 - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-36

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	9.92E-08		2.19E-05		mg/kg	EC-36-6-SO-0.5	21/21	0.00E+00 - 0.00E+00	2.19E-05	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	3.06E-06		2.19E-05		mg/kg	EC-36-6-SO-0.5	21/21	5.14E-07 - 5.14E-07	2.19E-05	NA	2.20E-05	C	NA	NA	No	BSL
Metals																	
7440-38-2	**Arsenic**	**8.80E-01**		**8.10E+00**		**mg/kg**	**EC-36-6-SO-0.5**	**7/7**	**1.40E+00 - 1.70E+00**	**8.10E+00**	**NA**	**3.00E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-43-9	Cadmium	3.70E-01		1.02E+01		mg/kg	EC-36-5-SO-0.5	6/7	4.60E-01 - 5.60E-01	1.02E+01	NA	9.80E+01	N	NA	NA	No	BSL
7440-47-3	**Chromium**	**3.90E+00**		**2.11E+01**		**mg/kg**	**EC-36-2-SO-0.5**	**7/7**	**9.20E-01 - 1.10E+00**	**2.11E+01**	**NA**	**6.30E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	Copper	2.00E+00		1.21E+02		mg/kg	EC-36-6-SO-0.5	7/7	2.30E+00 - 2.80E+00	1.21E+02	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	**Lead**	**3.50E+00**		**1.15E+03**		**mg/kg**	**EC-36-6-SO-0.5**	**10/10**	**1.42E-01 - 1.10E+00**	**1.15E+03**	**NA**	**5.50E+02**	**G**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	Mercury	7.10E-02		2.40E-01		mg/kg	EC-36-2-SO-0.5	4/7	1.90E-01 - 2.60E-01	2.40E-01	NA	1.20E+01	N	NA	NA	No	BSL
7439-97-6	Mercury	7.10E-02		2.40E-01		mg/kg	EC-36-2-SO-0.5	4/7	1.90E-01 - 2.60E-01	2.40E-01	NA	3.50E+01	N	NA	NA	No	BSL
7440-66-6	Zinc	6.00E+00	B	6.22E+02		mg/kg	EC-36-6-SO-0.5	7/7	2.30E+00 - 2.80E+00	6.22E+02	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	3.90E-04		5.13E-02		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.55E-02	5.13E-02	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	9.00E-04		1.06E-01		mg/kg	EC-36-2-SO-0.5	7/7	1.70E-03 - 7.34E-02	1.06E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.90E-03		1.66E-01		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.55E-02	1.66E-01	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	1.70E-02	K	5.23E-01	J	mg/kg	EC-36-5-SO-0.5	6/7	1.70E-03 - 7.55E-02	5.23E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	1.87E-02		5.34E-01		mg/kg	EC-36-2-SO-0.5	6/7	2.10E-03 - 7.75E-02	5.34E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	2.77E-02		7.67E-01		mg/kg	EC-36-2-SO-0.5	6/7	2.10E-03 - 7.75E-02	7.67E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	1.39E-02		3.67E-01		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.55E-02	3.67E-01	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	8.30E-03		2.91E-01		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.75E-02	2.91E-01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	2.43E-02		6.56E-01	J	mg/kg	EC-36-5-SO-0.5	6/7	2.10E-03 - 7.75E-02	6.56E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	3.60E-03		8.66E-02		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.55E-02	8.66E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	3.34E-02		1.03E+00		mg/kg	EC-36-2-SO-0.5	6/7	2.10E-03 - 7.75E-02	1.03E+00	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	7.60E-04		8.05E-02	J	mg/kg	EC-36-5-SO-0.5	6/7	1.70E-03 - 2.10E-03	8.05E-02	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	1.28E-02		3.27E-01		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.55E-02	3.27E-01	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	8.90E-04		9.80E-03		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 2.10E-03	9.80E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	9.30E-03		8.34E-01		mg/kg	EC-36-2-SO-0.5	6/7	1.70E-03 - 7.75E-02	8.34E-01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	3.03E-02		1.29E+00	J	mg/kg	EC-36-5-SO-0.5	6/7	2.10E-03 - 7.75E-02	1.29E+00	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers:
B = Indicates analyte detected in associated method blank
J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Chromium IV for Chromium, Mercuric Chloride for Mercury, Methyl Mercury for Mercury, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC36-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-36 - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-36

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	**WHO TEQ (ND=0)**	**9.92E-08**		**2.31E-04**		**mg/kg**	**EC-36-09-SO-29**	**44/44**	**0.00E+00 - 0.00E+00**	**2.31E-04**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
WHOTEQ	**WHO TEQ (ND=DL)**	**6.26E-07**		**2.31E-04**		**mg/kg**	**EC-36-09-SO-29**	**44/44**	**5.94E-07 - 5.94E-07**	**2.31E-04**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
Metals																	
7440-38-2	**Arsenic**	**6.60E-01**		**8.10E+00**		**mg/kg**	**EC-36-6-SO-0.5**	**14/14**	**1.30E+00 - 1.70E+00**	**8.10E+00**	**NA**	**3.00E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-43-9	Cadmium	3.70E-01		1.02E+01		mg/kg	EC-36-5-SO-0.5	7/14	4.40E-01 - 5.60E-01	1.02E+01	NA	9.80E+01	N	NA	NA	No	BSL
7440-47-3	**Chromium**	**3.30E+00**		**2.11E+01**		**mg/kg**	**EC-36-2-SO-0.5**	**14/14**	**8.80E-01 - 1.10E+00**	**2.11E+01**	**NA**	**6.30E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
7440-50-8	Copper	8.40E-01		1.21E+02		mg/kg	EC-36-6-SO-0.5	14/14	2.20E+00 - 2.80E+00	1.21E+02	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	**Lead**	**7.90E-01**		**1.15E+03**		**mg/kg**	**EC-36-6-SO-0.5**	**20/20**	**9.84E-02 - 1.10E+00**	**1.15E+03**	**NA**	**5.50E+02**	**G**	**NA**	**NA**	**Yes**	**ASL**
7439-97-6	Mercury	7.10E-02		2.40E-01		mg/kg	EC-36-2-SO-0.5	4/14	1.80E-01 - 2.60E-01	2.40E-01	NA	1.20E+01	N	NA	NA	No	BSL
7439-97-6	Mercury	7.10E-02		2.40E-01		mg/kg	EC-36-2-SO-0.5	4/14	1.80E-01 - 2.60E-01	2.40E-01	NA	3.50E+01	N	NA	NA	No	BSL
7440-66-6	Zinc	1.10E+00	B	6.22E+02		mg/kg	EC-36-6-SO-0.5	14/14	2.20E+00 - 2.80E+00	6.22E+02	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	3.90E-04		5.13E-02		mg/kg	EC-36-2-SO-0.5	7/14	1.70E-03 - 7.55E-02	5.13E-02	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	5.00E-04		1.06E-01		mg/kg	EC-36-2-SO-0.5	13/14	1.70E-03 - 7.34E-02	1.06E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.90E-03		1.66E-01		mg/kg	EC-36-2-SO-0.5	7/14	1.70E-03 - 7.55E-02	1.66E-01	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	1.70E-02	K	5.23E-01	J	mg/kg	EC-36-5-SO-0.5	7/14	1.70E-03 - 7.55E-02	5.23E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	7.20E-04		5.34E-01		mg/kg	EC-36-2-SO-0.5	8/14	1.70E-03 - 7.75E-02	5.34E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	1.10E-03		7.67E-01		mg/kg	EC-36-2-SO-0.5	8/14	1.70E-03 - 7.75E-02	7.67E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	1.60E-03		3.67E-01		mg/kg	EC-36-2-SO-0.5	8/14	1.70E-03 - 7.55E-02	3.67E-01	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	8.30E-03		2.91E-01		mg/kg	EC-36-2-SO-0.5	7/14	1.70E-03 - 7.75E-02	2.91E-01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	2.43E-02		6.56E-01	J	mg/kg	EC-36-5-SO-0.5	7/14	1.70E-03 - 7.75E-02	6.56E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	3.60E-03		8.66E-02		mg/kg	EC-36-2-SO-0.5	7/14	1.70E-03 - 7.55E-02	8.66E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	7.50E-04		1.03E+00		mg/kg	EC-36-2-SO-0.5	8/14	1.70E-03 - 7.75E-02	1.03E+00	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	7.60E-04		8.05E-02	J	mg/kg	EC-36-5-SO-0.5	7/14	1.70E-03 - 2.10E-03	8.05E-02	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	1.00E-03		3.27E-01		mg/kg	EC-36-2-SO-0.5	8/14	1.70E-03 - 7.55E-02	3.27E-01	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	8.90E-04		9.80E-03		mg/kg	EC-36-2-SO-0.5	7/14	1.70E-03 - 2.10E-03	9.80E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	9.30E-03		8.34E-01		mg/kg	EC-36-2-SO-0.5	7/14	1.70E-03 - 7.75E-02	8.34E-01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	7.40E-04		1.29E+00	J	mg/kg	EC-36-5-SO-0.5	8/14	1.70E-03 - 7.75E-02	1.29E+00	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes
Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers:
B = Indicates analyte detected in associated method blank
J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Chromium IV for Chromium, Mercuric Chloride for Mercury, Methyl Mercury for Mercury, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC36-3

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-36 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Arsenic	7.381	--	3.00E-04	6.32E-06	0.021
Chromium	18.46	--	3.00E-03	1.58E-05	0.005
Lead	301	--	NA	NA	NA
				Total Pathway Hazard Index	2.6E-02
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Arsenic	7.381	--	3.00E-04	8.02E-07	0.0027
Chromium	18.46	--	3.00E-03	1.67E-06	0.0006
Lead	301	--	NA	NA	NA
				Total Pathway Hazard Index	3.2E-03
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Arsenic	5.81E-09	--	1.50E-05	1.33E-09	8.8E-05
Chromium	1.45E-08	--	1.00E-04	3.32E-09	3.3E-05
Lead	2.37E-07	--	NA	NA	NA
				Total Pathway Hazard Index	1.2E-04

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

	RME
Receptor HI Total =	**0.03**

NA=not applicable to pathway; ND=not detected

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
0.03 dermal absorption for dioxins
0.13 for PAHs
0.1 for semivolatiles

TABLE EC36-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-36 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Arsenic	7.381	--	1.50E+00	2.26E-06	3E-06
Chromium	18.46	--	5.00E-01	5.64E-06	3E-06
Lead	301	--	NA	NA	NA
				Total Pathway Cancer Risk	6E-06
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Arsenic	7.381	--	1.50E+00	2.87E-07	4E-07
Chromium	18.46	--	5.00E-01	5.97E-07	3E-07
Lead	301	--	NA	NA	NA
				Total Pathway Cancer Risk	7E-07
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Arsenic	5.81E-09	--	4.30E-06	4.74E-10	2E-15
Chromium	1.45E-08	--	8.40E-05	1.19E-09	1E-13
Lead	2.37E-07	--	NA	NA	NA
				Total Pathway Cancer Risk	1E-13

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**7E-06**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

TABLE EC36-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-36 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Arsenic	5.536	--	3.00E-04	1.56E-05	0.052
Chromium	15.23	--	3.00E-03	4.30E-05	0.014
Lead	217.2	--	NA	NA	NA
Dioxin TEQ	1.77E-05	1	7.00E-10	5.00E-11	0.07
				Total Pathway Hazard Index	0.14

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Arsenic	5.536	--	3.00E-04	6.02E-07	0.0020
Chromium	15.23	--	3.00E-03	1.38E-06	0.0005
Lead	217.2	--	NA	NA	NA
Dioxin TEQ	0.0000177	1	7.00E-10	1.92E-12	0.003
				Total Pathway Hazard Index	0.005

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Arsenic	4.36E-09	--	1.50E-05	9.95E-10	6.6E-05
Chromium	1.20E-08	--	1.00E-04	2.74E-09	2.7E-05
Lead	1.71E-07	--	NA	NA	NA
Dioxin TEQ	1.39E-14	1	4.00E-08	3.18E-15	8.0E-08
				Total Pathway Hazard Index	9.38E-05

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

	RME
Receptor HI Total =	**0.1**

NA=not applicable to pathway; ND=not detected

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.

TABLE EC36-6

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-36 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Arsenic	5.536	--	1.50E+00	2.23E-07	3E-07
Chromium	15.23	--	5.00E-01	6.15E-07	3E-07
Lead	217.2	--	NA	NA	NA
Dioxin TEQ	1.77E-05	1	1.30E+05	7.14E-13	9E-08
				Total Pathway Cancer Risk	7E-07
Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Arsenic	5.536	--	1.50E+00	7.16E-09	1E-08
Chromium	15.23	--	5.00E-01	2.37E-08	1E-08
Lead	217.2	--	NA	NA	NA
Dioxin TEQ	0.0000177	1	1.30E+05	2.75E-14	4E-09
				Total Pathway Cancer Risk	3E-08
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Arsenic	4.36E-09	--	4.30E-06	1.42E-11	6E-17
Chromium	1.20E-08	--	8.40E-05	3.91E-11	3E-15
Lead	1.71E-07	--	NA	NA	NA
Dioxin TEQ	1.39E-14	1	3.8E-02	4.55E-17	2E-18
				Total Pathway Cancer Risk	3E-15

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**8E-07**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

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Table EC36-11 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Arsenic	7/7	8.10E+00	1.80E+01	NO
Cadmium	6/7	1.02E+01	3.60E-01	YES
Chromium	7/7	2.11E+01	2.60E+01	NO
Copper	7/7	1.21E+02	2.80E+01	YES
Lead	10/10	1.15E+03	1.10E+01	YES
Mercury	4/7	2.40E-01	1.30E-02	YES
Zinc	7/7	6.22E+02	4.60E+01	YES
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	21/21	6.25E-05	3.15E-06	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	21/21	6.25E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	21/21	2.19E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	21/21	2.19E-05	3.15E-06	YES
PAHs				
Acenaphthene	6/7	5.13E-02	Refer to total LMW PAHs	NO
Acenaphthylene	7/7	1.06E-01	Refer to total LMW PAHs	NO
Anthracene	6/7	1.66E-01	Refer to total LMW PAHs	NO
Benzo(a)anthracene	6/7	5.23E-01	Refer to total HMW PAHs	NO
Benzo(a)pyrene	6/7	5.34E-01	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	6/7	7.67E-01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	6/7	3.67E-01	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	6/7	2.91E-01	Refer to total HMW PAHs	NO
Chrysene	6/7	6.56E-01	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	6/7	8.66E-02	Refer to total HMW PAHs	NO
Fluoranthene	6/7	1.03E+00	Refer to total LMW PAHs	NO
Fluorene	6/7	8.05E-02	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	6/7	3.27E-01	Refer to total HMW PAHs	NO
Naphthalene	6/7	9.80E-03	Refer to total LMW PAHs	NO
Phenanthrene	6/7	8.34E-01	Refer to total LMW PAHs	NO
Pyrene	6/7	1.29E+00	Refer to total HMW PAHs	NO
Total LMW PAHs	7/7	1.23E+00	2.90E+01	NO
Total HMW PAHs	6/6	4.92E+00	1.10E+00	YES

Note:

Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EPA 2008).

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - No screening value available.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

Table EC36-12 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Cadmium	6/7	1.02E+01	1.36E+01
Copper	7/7	1.21E+02	1.26E+02
Lead	10/10	1.15E+03	5.06E+02
Mercury	4/7	2.40E-01	1.77E-01
Zinc	7/7	6.22E+02	3.71E+02
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=0)	21/21	6.25E-05	2.16E-05
Dioxin TEQ Birds EPA2008 (ND=DL)	21/21	6.25E-05	2.12E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	21/21	2.19E-05	9.35E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	21/21	2.19E-05	1.08E-05
PAHs			
Total HMW PAHs	7/7	4.92E+00	4.21E+00

Note:

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

DL - Detection limit.

Table EC36-13 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Cadmium	3.20E+01	1.02E+01	3.2E-01	1.02E+01	3.2E-01
Copper	7.00E+01	1.21E+02	**1.7E+00**	1.21E+02	**1.7E+00**
Lead	1.20E+02	1.15E+03	**9.6E+00**	5.06E+02	**4.2E+00**
Mercury	3.00E-01	2.40E-01	8.0E-01	1.77E-01	5.9E-01
Zinc	1.60E+02	6.22E+02	**3.9E+00**	3.71E+02	**2.3E+00**
Dioxins					
Dioxin TEQ Mammals EPA2008	NA	2.19E-05	--	9.35E-06	--
Dioxin TEQ Mammals EPA2008	NA	2.19E-05	--	1.08E-05	--
PAHs					
Total HMW PAHs	2.00E+01	4.92E+00	2.5E-01	4.21E+00	2.1E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC36-14 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Cadmium	1.40E+02	1.02E+01	7.3E-02	1.02E+01	7.3E-02
Copper	8.00E+01	1.21E+02	**1.5E+00**	1.21E+02	**1.5E+00**
Lead	1.70E+03	1.15E+03	6.8E-01	5.06E+02	3.0E-01
Mercury	1.00E-01	2.40E-01	**2.4E+00**	1.77E-01	**1.8E+00**
Zinc	1.20E+02	6.22E+02	**5.2E+00**	3.71E+02	**3.1E+00**
Dioxins					
Dioxin TEQ Mammals EPA2008 (ND	5.00E-01	2.19E-05	4.4E-05	9.35E-06	1.9E-05
Dioxin TEQ Mammals EPA2008 (ND	5.00E-01	2.19E-05	4.4E-05	1.08E-05	2.2E-05
PAHs					
Total HMW PAHs	1.80E+01	4.92E+00	2.7E-01	4.21E+00	2.3E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC36-15 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Cadmium	1.47E+00	6.35E+00	**8.6E+00**	**2.0E+00**
Copper	4.05E+00	1.21E+01	**3.8E+00**	1.3E+00
Lead	1.63E+00	3.26E+00	**9.8E+01**	**4.9E+01**
Mercury	4.50E-01	9.00E-01	2.6E-01	1.3E-01
Zinc	6.61E+01	1.71E+02	**3.3E+00**	1.3E+00
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	1.4E+00	1.4E-01
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	1.4E+00	1.4E-01
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	3.9E-01	3.9E-02

Note:

Bold represents a hazard quotient greater than 1.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC36-16 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Cadmium	1.47E+00	6.35E+00	**8.6E+00**	**2.0E+00**
Copper	4.05E+00	1.21E+01	**3.8E+00**	1.3E+00
Lead	1.63E+00	3.26E+00	**4.6E+01**	**2.3E+01**
Mercury	4.50E-01	9.00E-01	2.4E-01	1.2E-01
Zinc	6.61E+01	1.71E+02	**2.5E+00**	9.7E-01
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	4.9E-01	4.9E-02
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	4.8E-01	4.8E-02
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	3.4E-01	3.4E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC36-17 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Cadmium	7.70E-01	7.70E+00	2.0E-01	7.1E-02	2.0E-02	7.1E-03
Copper	5.60E+00	9.34E+00	2.1E-01	8.9E-02	1.2E-01	5.3E-02
Lead	4.70E+00	8.90E+00	1.2E+00	5.6E-01	6.1E-01	3.0E-01
Mercury	1.32E+01	NA	7.3E-04	9.5E-05	--	--
Zinc	7.54E+01	2.98E+02	1.5E-01	4.8E-02	3.8E-02	1.2E-02
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	9.4E-02	4.4E-02	9.4E-03	4.4E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	9.4E-02	4.4E-02	9.4E-03	4.4E-03
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	8.1E-02	1.6E-02	1.6E-02	3.2E-03

Note:

Bold represents a hazard quotient greater than 1.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

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Table EC36-18 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Cadmium	1.70E-01	6/7	1.02E+01	1.02E+01	Exceeds	Exceeds
Copper	3.28E+01	7/7	1.21E+02	1.21E+02	Exceeds	Exceeds
Lead	1.24E+02	10/10	1.15E+03	5.06E+02	Exceeds	Exceeds
Mercury	1.10E-01	4/7	2.40E-01	1.77E-01	Exceeds	Exceeds
Zinc	8.39E+01	7/7	6.22E+02	3.71E+02	Exceeds	Exceeds
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	NA	21/21	6.25E-05	2.16E-05	Exceeds	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	21/21	6.25E-05	2.12E-05	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	21/21	2.19E-05	9.35E-06	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	21/21	2.19E-05	1.08E-05	Exceeds	Exceeds
PAHs						
Total HMW PAHs	8.90E+00	7/7	4.92E+00	4.21E+00	No	No

Note:

95UCLM - 95 Percent upper confidence limit of the mean.

BTV - 95 Percent upper threshold limit for suface soil background values.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC36-19 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.02E+01	--	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	5.25E+01	9.53E-01	1.17E+01	0.00E+00	1.26E+01
Copper	1.21E+02	--	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.89E+01	1.13E+01	4.21E+00	0.00E+00	1.55E+01
Lead	1.15E+03	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	2.37E+02	1.07E+02	5.28E+01	0.00E+00	1.60E+02
Mercury	2.40E-01	--	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.26E-01	2.24E-02	9.49E-02	0.00E+00	1.17E-01
Zinc	6.22E+02	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	7.06E+02	5.81E+01	1.57E+02	0.00E+00	2.15E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	6.25E-05	--	1.00E+00	6.25E-05	5.84E-06	1.39E-05	0.00E+00	1.98E-05
Dioxin TEQ Birds EPA2008 (ND=DL)	6.25E-05	--	1.00E+00	6.25E-05	5.84E-06	1.39E-05	0.00E+00	1.98E-05
PAHs								
Total HMW PAHs	4.92E+00	--	3.00E-01	1.47E+00	4.59E-01	3.28E-01	0.00E+00	7.88E-01

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC36-20 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.02E+01	0.00E+00	ln(dry worm conc, mg/kg) = (2.114+0.795*ln(soil conc))	5.25E+01	9.53E-01	1.17E+01	0.00E+00	1.26E+01
Copper	1.21E+02	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.89E+01	1.13E+01	4.21E+00	0.00E+00	1.55E+01
Lead	5.06E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.22E+02	4.73E+01	2.72E+01	0.00E+00	7.45E+01
Mercury	1.77E-01	0.00E+00	ln(dry worm conc, mg/kg) = (-0.684+0.118*ln(soil conc))	4.11E-01	1.65E-02	9.15E-02	0.00E+00	1.08E-01
Zinc	3.71E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	5.95E+02	3.47E+01	1.32E+02	0.00E+00	1.67E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	2.16E-05	0.00E+00	1.00E+00	2.16E-05	2.02E-06	4.80E-06	0.00E+00	6.82E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	2.12E-05	0.00E+00	1.00E+00	2.12E-05	1.98E-06	4.71E-06	0.00E+00	6.69E-06
PAHs								
Total HMW PAHs	4.21E+00	0.00E+00	3.00E-01	1.26E+00	3.94E-01	2.81E-01	0.00E+00	6.75E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC36-21 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.02E+01	--	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	2.21E+00	4.18E-02	1.13E-01	0.00E+00	1.55E-01
Copper	1.21E+02	--	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.29E+01	4.96E-01	6.62E-01	0.00E+00	1.16E+00
Lead	1.15E+03	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	1.38E+01	4.72E+00	7.08E-01	0.00E+00	5.42E+00
Mercury	2.40E-01	--	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.70E-01	9.84E-04	8.71E-03	0.00E+00	9.69E-03
Zinc	6.22E+02	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.72E+02	2.55E+00	8.80E+00	0.00E+00	1.13E+01
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	2.19E-05	--	3.87E-03	8.47E-08	8.96E-08	4.34E-09	0.00E+00	9.39E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	2.19E-05	--	3.87E-03	8.47E-08	8.96E-08	4.34E-09	0.00E+00	9.39E-08
PAHs								
Total HMW PAHs	4.92E+00	--	1.17E-01	5.73E-01	2.02E-02	2.94E-02	0.00E+00	4.95E-02

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC36-22 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Cadmium	1.02E+01	0.00E+00	ln(dry plant conc, mg/kg) = (-0.476+0.546*ln(soil conc))	2.21E+00	4.18E-02	1.13E-01	0.00E+00	1.55E-01
Copper	1.21E+02	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.29E+01	4.96E-01	6.62E-01	0.00E+00	1.16E+00
Lead	5.06E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	8.72E+00	2.08E+00	4.47E-01	0.00E+00	2.52E+00
Mercury	1.77E-01	0.00E+00	ln(dry plant conc, mg/kg) = (-0.996+0.544*ln(soil conc))	1.44E-01	7.26E-04	7.38E-03	0.00E+00	8.11E-03
Zinc	3.71E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.29E+02	1.52E+00	6.60E+00	0.00E+00	8.12E+00
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	9.35E-06	0.00E+00	3.87E-03	3.62E-08	3.84E-08	1.86E-09	0.00E+00	4.02E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.08E-05	0.00E+00	3.87E-03	4.20E-08	4.44E-08	2.15E-09	0.00E+00	4.66E-08
PAHs								
Total HMW PAHs	4.21E+00	0.00E+00	1.17E-01	4.91E-01	1.73E-02	2.52E-02	0.00E+00	4.24E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC36-23 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Cadmium	1.02E+01	--	1.55E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	2.01E+00	1.97E-02	3.47E-02	0.00E+00	5.44E-02
Copper	1.21E+02	--	1.16E+00	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.54E+01	2.34E-01	2.66E-01	0.00E+00	4.99E-01
Lead	1.15E+03	--	5.42E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	2.43E+01	2.22E+00	4.20E-01	0.00E+00	2.64E+00
Mercury	2.40E-01	--	9.69E-03	Uptake Factor	1.92E-01	4.61E-02	4.64E-04	7.95E-04	0.00E+00	1.26E-03
Zinc	6.22E+02	--	1.13E+01	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.41E+02	1.20E+00	2.43E+00	0.00E+00	3.63E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (N	2.19E-05	--	9.39E-08	Biotransfer Factor	8.36E-01	7.85E-08	4.22E-08	1.35E-09	0.00E+00	4.36E-08
Dioxin TEQ Mammals EPA2008 (N	2.19E-05	--	9.39E-08	Biotransfer Factor	8.36E-01	7.85E-08	4.22E-08	1.35E-09	0.00E+00	4.36E-08
PAHs										
Total HMW PAHs	4.92E+00	--	4.95E-02	Biotransfer Factor	1.12E-01	5.57E-03	9.50E-03	9.60E-05	0.00E+00	9.59E-03

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC36-24 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Cadmium	1.02E+01	0.00E+00	1.55E-01	Log Linear	ln(dry mammal conc, mg/kg) = (-0.4306+0.4865*ln(soil conc))	2.01E+00	1.97E-02	3.47E-02	0.00E+00	5.44E-02
Copper	1.21E+02	0.00E+00	1.16E+00	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.54E+01	2.34E-01	2.66E-01	0.00E+00	4.99E-01
Lead	5.06E+02	0.00E+00	2.52E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.69E+01	9.78E-01	2.92E-01	0.00E+00	1.27E+00
Mercury	1.77E-01	0.00E+00	8.11E-03	Uptake Factor	1.92E-01	3.40E-02	3.42E-04	5.86E-04	0.00E+00	9.28E-04
Zinc	3.71E+02	0.00E+00	8.12E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.35E+02	7.16E-01	2.33E+00	0.00E+00	3.05E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (	9.35E-06	0.00E+00	4.02E-08	Biotransfer Factor	8.36E-01	3.36E-08	1.81E-08	5.80E-10	0.00E+00	1.87E-08
Dioxin TEQ Mammals EPA2008 (	1.08E-05	0.00E+00	4.66E-08	Biotransfer Factor	8.36E-01	3.89E-08	2.09E-08	6.72E-10	0.00E+00	2.16E-08
PAHs										
Total HMW PAHs	4.21E+00	0.00E+00	4.24E-02	Biotransfer Factor	1.12E-01	4.77E-03	8.14E-03	8.23E-05	0.00E+00	8.22E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC50-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern[a]
	Frequency	Maximum (mg/kg)	Soil Screening Criteria[b] (mg/kg)	Terrestrial Habitats[c]
PCBs				
Aroclor 1260	1/6	5.80E-02	4.10E-02	YES
PAHs				
Acenaphthene	6/6	2.27E-02	Refer to total LMW PAHs	NO
Acenaphthylene	6/6	1.09E-02	Refer to total LMW PAHs	NO
Anthracene	6/6	9.46E-02	Refer to total LMW PAHs	NO
Benzo(a)anthracene	6/6	2.29E-01	Refer to total HMW PAHs	NO
Benzo(a)pyrene	6/6	2.45E-01	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	6/6	4.38E-01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	6/6	8.46E-02	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	6/6	1.79E-01	Refer to total HMW PAHs	NO
Chrysene	6/6	2.61E-01	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	6/6	5.43E-02	Refer to total HMW PAHs	NO
Fluoranthene	6/6	5.52E-01	Refer to total LMW PAHs	NO
Fluorene	6/6	2.14E-02	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	6/6	9.77E-02	Refer to total HMW PAHs	NO
Naphthalene	6/6	2.19E-02	Refer to total LMW PAHs	NO
Phenanthrene	6/6	3.54E-01	Refer to total LMW PAHs	NO
Pyrene	6/6	4.87E-01	Refer to total HMW PAHs	NO
Total LMW PAHs	6/6	5.12E-01	2.90E+01	NO
Total HMW PAHs	6/6	2.48E+00	1.10E+00	YES
VOCS				
2-Butanone (Methyl ethyl ketone)	3/6	1.56E-02	1.00E+00	NO
Acetone	5/6	1.57E-01	1.20E+00	NO
Methylene chloride	6/6	8.00E-02	2.10E-01	NO

Note:

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

VOC - Volatile organic compound.

Table EC50-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
PCBs			
Aroclor 1260	1/6	5.80E-02	NC
PAHs			
Total HMW PAHs	6/6	2.48E+00	3.39E+00

Note:

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NC - Not calculated.

PAH - Polycyclic aromatic hydrocarbon.

Table EC50-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
PCBs					
Aroclor 1260	4.00E+01	5.80E-02	1.5E-03	5.80E-02	1.5E-03
PAHs					
Total HMW PAHs	2.00E+01	2.48E+00	1.2E-01	2.48E+00	1.2E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

wt - Weight.

Table EC50-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
PCBs					
Aroclor 1260	3.30E-01	5.80E-02	1.8E-01	5.80E-02	1.8E-01
PAHs					
Total HMW PAHs	1.80E+01	2.48E+00	1.4E-01	2.48E+00	1.4E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

wt - Weight.

Table EC50-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	1.4E-01	1.4E-02
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	2.0E-01	2.0E-02

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC50-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	3.5E-03	2.8E-03	3.5E-04	2.8E-04
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	4.1E-02	7.9E-03	8.3E-03	1.6E-03

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TRV - Toxicity reference value.

Table EC50-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
PCBs						
Aroclor 1260	NA	1/6	5.80E-02	NC	Exceeds	--
PAHs						
Total HMW PAHs	8.90E+00	6/6	2.48E+00	2.48E+00	No	No

Note:

95UCLM - 95 Percent upper confidence limit of the mean.

BTV - 95 Percent upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC50-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs								
Aroclor 1260	5.80E-02	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	8.50E-02	5.42E-03	1.89E-02	0.00E+00	2.43E-02
PAHs								
Total HMW PAHs	2.48E+00	--	3.00E-01	7.43E-01	2.31E-01	1.65E-01	0.00E+00	3.97E-01

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC50-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs								
Aroclor 1260	5.80E-02	0.00E+00	6.44E-04	3.73E-05	2.38E-04	1.91E-06	0.00E+00	2.40E-04
PAHs								
Total HMW PAHs	2.48E+00	--	1.17E-01	2.89E-01	1.01E-02	1.48E-02	0.00E+00	2.49E-02

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC50-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
PCBs										
Aroclor 1260	5.80E-02	0.00E+00	2.40E-04	Biotransfer Factor	1.86E+01	4.47E-03	1.12E-04	7.71E-05	0.00E+00	1.89E-04
PAHs										
Total HMW PAHs	2.48E+00	--	2.49E-02	Biotransfer Factor	1.12E-01	2.80E-03	4.78E-03	4.84E-05	0.00E+00	4.83E-03

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

PAH - Polycyclic aromatic hydrocarbon.

wt - Weight.

Table EC52-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	3/3	1.24E+04	pH<5.5	NO
Antimony	2/3	2.60E+00	2.70E-01	YES
Copper	3/3	1.67E+01	2.80E+01	NO
Lead	3/3	4.65E+01	1.10E+01	YES
Manganese	3/3	1.82E+03	2.20E+02	YES
Zinc	3/3	5.82E+01	4.60E+01	YES

Note:

mg/kg - Milligrams per kilogram.

Table EC52-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Metals		
Antimony	2/3	2.60E+00
Lead	3/3	4.65E+01
Manganese	3/3	1.82E+03
Zinc	3/3	5.82E+01

Note:

mg/kg - Milligrams per kilogram.

Table EC52-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Antimony	5.00E+00	2.60E+00	5.2E-01
Lead	1.20E+02	4.65E+01	3.9E-01
Manganese	2.20E+02	1.82E+03	**8.3E+00**
Zinc	1.60E+02	5.82E+01	3.6E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC52-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Antimony	7.80E+01	2.60E+00	3.3E-02
Lead	1.70E+03	4.65E+01	2.7E-02
Manganese	4.50E+02	1.82E+03	**4.0E+00**
Zinc	1.20E+02	5.82E+01	4.9E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC52-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Lead	1.63E+00	3.26E+00	**5.1E+00**	**2.5E+00**
Manganese	1.79E+02	3.77E+02	1.0E+00	5.0E-01
Zinc	6.61E+01	1.71E+02	1.2E+00	4.5E-01

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC52-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	6.3E-01	8.5E-01	6.3E-02	8.5E-02
Lead	4.70E+00	8.90E+00	6.5E-02	4.1E-02	3.5E-02	2.2E-02
Manganese	5.15E+01	1.46E+02	6.0E-01	1.0E-01	2.1E-01	3.7E-02
Zinc	7.54E+01	2.98E+02	3.4E-02	2.9E-02	8.7E-03	7.2E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC52-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Antimony	9.50E-01	2/3	2.60E+00	Exceeds
Lead	1.24E+02	3/3	4.65E+01	No
Manganese	7.00E+02	3/3	1.82E+03	Exceeds
Zinc	8.39E+01	3/3	5.82E+01	No

Note:

95UCLM - 95 Percent upper confidence limit of the mean.

BTV - 95 Percent upper threshold limit for suface soil background values.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

wt - Weight.

Table EC52-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	2.60E+00	--	1.00E+00	2.60E+00	2.43E-01	5.79E-01	0.00E+00	8.21E-01
Lead	4.65E+01	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.78E+01	4.35E+00	3.97E+00	0.00E+00	8.31E+00
Manganese	1.82E+03	--	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	7.45E+01	1.70E+02	1.66E+01	0.00E+00	1.87E+02
Zinc	5.82E+01	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	3.24E+02	5.44E+00	7.22E+01	0.00E+00	7.76E+01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC52-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	2.60E+00	--	2.00E-01	5.20E-01	1.07E-02	2.67E-02	0.00E+00	3.73E-02
Lead	4.65E+01	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	2.28E+00	1.91E-01	1.17E-01	0.00E+00	3.08E-01
Manganese	1.82E+03	--	2.50E-01	4.55E+02	7.46E+00	2.33E+01	0.00E+00	3.08E+01
Zinc	5.82E+01	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.61E+01	2.39E-01	2.36E+00	0.00E+00	2.60E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC52-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	2.60E+00	--	3.73E-02	Uptake Factor	1.00E+00	2.60E+00	5.02E-03	4.49E-02	0.00E+00	4.99E-02
Lead	4.65E+01	--	3.08E-01	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	5.89E+00	8.98E-02	1.02E-01	0.00E+00	1.92E-01
Manganese	1.82E+03	--	3.08E+01	Uptake Factor	5.87E-02	1.07E+02	3.52E+00	1.84E+00	0.00E+00	5.36E+00
Zinc	5.82E+01	--	2.60E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.18E+02	1.12E-01	2.04E+00	0.00E+00	2.15E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

TABLE EC57B-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-57B - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-57B

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	**WHO TEQ (ND=0)**	**2.08E-06**		**2.73E-05**		**mg/kg**	**EC-57B-4-SO-0.5**	**20/20**	**0.00E+00 - 0.00E+00**	**2.73E-05**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
WHOTEQ	**WHO TEQ (ND=DL)**	**2.12E-06**		**7.90E-05**		**mg/kg**	**EC-57B-3-SO-0.5**	**20/20**	**6.18E-07 - 6.18E-07**	**7.90E-05**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
Explosives																	
118-96-7	2,4,6-Trinitrotoluene	9.90E-02	J	1.50E-01	J	mg/kg	EC-57B-5-SO-0.5	3/5	2.40E-01 - 2.50E-01	1.50E-01	NA	5.10E+01	N	NA	NA	No	BSL
606-20-2	2,6-Dinitrotoluene	7.00E-02	J	7.00E-02	J	mg/kg	EC-57B-1-SO-0.5	1/5	1.90E-01 - 2.00E-01	7.00E-02	NA	1.50E+00	C	NA	NA	No	BSL
Metals																	
7429-90-5	Aluminum	1.69E+03		1.42E+04		mg/kg	EC-57B-5-SO-0.5	5/5	3.57E+01 - 1.49E+02	1.42E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-36-0	Antimony	4.30E+00	L	3.31E+01	L	mg/kg	EC-57B-1-SO-0.5	5/5	8.90E-01 - 3.70E+00	3.31E+01	NA	4.70E+01	N	NA	NA	No	BSL
7440-50-8	Copper	3.20E+01	K	8.74E+01	K	mg/kg	EC-57B-3-SO-0.5	5/5	2.20E+00 - 9.30E+00	8.74E+01	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	Lead	2.15E+02		4.34E+02		mg/kg	EC-57B-5-SO-0.5	5/5	8.90E-01 - 4.90E+00	4.34E+02	NA	5.50E+02	G	NA	NA	No	BSL
7439-96-5	**Manganese**	**4.85E+02**		**5.99E+04**		**mg/kg**	**EC-57B-5-SO-0.5**	**12/12**	**4.65E-01 - 5.65E+02**	**5.99E+04**	**NA**	**2.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	Zinc	1.58E+02		3.21E+03		mg/kg	EC-57B-2-SO-0.5	5/5	2.20E+00 - 9.30E+00	3.21E+03	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	3.80E-02		7.13E-01		mg/kg	EC-57B-4-SO-0.5	5/5	1.80E-03 - 3.55E-01	7.13E-01	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	9.02E-02		6.62E-01		mg/kg	EC-57B-3-SO-0.5	5/5	1.80E-03 - 3.55E-01	6.62E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.68E-01		2.08E+00		mg/kg	EC-57B-4-SO-0.5	5/5	6.93E-02 - 3.55E-01	2.08E+00	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	7.30E-02		9.71E+00		mg/kg	EC-57B-4-SO-0.5	17/17	2.10E-03 - 3.55E-01	9.71E+00	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	**Benzo(a)pyrene**	**6.90E-02**		**9.57E+00**		**mg/kg**	**EC-57B-3-SO-0.5**	**17/17**	**2.10E-03 - 3.55E-01**	**9.57E+00**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	Benzo(b)fluoranthene	9.60E-02		1.36E+01		mg/kg	EC-57B-3-SO-0.5	17/17	2.10E-03 - 6.73E-01	1.36E+01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	2.70E-01		7.18E+00		mg/kg	EC-57B-4-SO-0.5	5/5	6.93E-02 - 3.55E-01	7.18E+00	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	6.75E-01		5.59E+00		mg/kg	EC-57B-3-SO-0.5	5/5	6.93E-02 - 3.55E-01	5.59E+00	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	8.24E-01		1.40E+01		mg/kg	EC-57B-4-SO-0.5	5/5	7.09E-02 - 3.55E-01	1.40E+01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	9.40E-03		2.00E+00		mg/kg	EC-57B-4-SO-0.5	17/17	1.80E-03 - 3.55E-01	2.00E+00	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	1.25E+00		1.70E+01		mg/kg	EC-57B-4-SO-0.5	5/5	7.09E-02 - 3.55E-01	1.70E+01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	5.27E-02		7.47E-01		mg/kg	EC-57B-4-SO-0.5	5/5	1.80E-03 - 3.55E-01	7.47E-01	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	5.10E-02		5.81E+00		mg/kg	EC-57B-4-SO-0.5	17/17	2.10E-03 - 3.55E-01	5.81E+00	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	2.12E-02		1.91E-01		mg/kg	EC-57B-4-SO-0.5	5/5	1.70E-03 - 6.93E-02	1.91E-01	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	8.23E-01		9.30E+00		mg/kg	EC-57B-4-SO-0.5	5/5	7.09E-02 - 3.55E-01	9.30E+00	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	9.89E-01		1.57E+01		mg/kg	EC-57B-4-SO-0.5	5/5	7.09E-02 - 3.55E-01	1.57E+01	NA	2.30E+03	N	NA	NA	No	BSL
PCB Aroclors																	
11096-82-5	Aroclor 1260	5.30E-02		1.80E-01		mg/kg	EC-57B-1-SO-0.5	5/5	3.30E-02 - 3.80E-02	1.80E-01	NA	9.90E-01	C	NA	NA	No	BSL
SVOCS																	
121-14-2	2,4-Dinitrotoluene	1.50E+00	J	1.50E+00	J	mg/kg	EC-57B-1-SO-0.5	1/5	1.90E-01 - 2.00E-01	1.50E+00	NA	7.40E+00	C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level, NSL = No Screening Toxicity Level, NUT = Essential Nutrient

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value; L = Reported concentration is below the CRQL (non-metals)/Reported concentration is between the MDL

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC57B-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-57B - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-57B

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	**WHO TEQ (ND=0)**	**1.59E-08**		**7.48E-05**		**mg/kg**	**EC-57B-06-SO-29**	**39/39**	**0.00E+00 - 0.00E+00**	**7.48E-05**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
WHOTEQ	**WHO TEQ (ND=DL)**	**2.99E-07**		**7.90E-05**		**mg/kg**	**EC-57B-3-SO-0.5**	**39/39**	**6.98E-06 - 6.98E-06**	**7.90E-05**	**NA**	**2.20E-05**	**C**	**NA**	**NA**	**Yes**	**ASL**
Explosives																	
118-96-7	2,4,6-Trinitrotoluene	9.90E-02	J	1.50E-01	J	mg/kg	EC-57B-5-SO-0.5	3/10	2.40E-01 - 2.50E-01	1.50E-01	NA	5.10E+01	N	NA	NA	No	BSL
606-20-2	2,6-Dinitrotoluene	7.00E-02	J	7.00E-02	J	mg/kg	EC-57B-1-SO-0.5	1/10	1.90E-01 - 2.00E-01	7.00E-02	NA	1.50E+00	C	NA	NA	No	BSL
Metals																	
7429-90-5	Aluminum	1.52E+03		1.42E+04		mg/kg	EC-57B-5-SO-0.5	10/10	3.48E+01 - 4.13E+02	1.42E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-36-0	Antimony	1.10E+00	L	3.31E+01	L	mg/kg	EC-57B-1-SO-0.5	9/10	8.70E-01 - 3.70E+00	3.31E+01	NA	4.70E+01	N	NA	NA	No	BSL
7440-50-8	Copper	3.60E+00		8.74E+01	K	mg/kg	EC-57B-3-SO-0.5	10/10	2.20E+00 - 9.30E+00	8.74E+01	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	Lead	6.20E+00		4.34E+02		mg/kg	EC-57B-5-SO-0.5	10/10	8.70E-01 - 4.90E+00	4.34E+02	NA	5.50E+02	G	NA	NA	No	BSL
7439-96-5	**Manganese**	**2.19E+01**		**5.99E+04**		**mg/kg**	**EC-57B-5-SO-0.5**	**24/24**	**9.56E-02 - 5.65E+02**	**5.99E+04**	**NA**	**2.60E+03**	**N**	**NA**	**NA**	**Yes**	**ASL**
7440-66-6	Zinc	6.00E+00		3.21E+03		mg/kg	EC-57B-2-SO-0.5	10/10	2.20E+00 - 9.30E+00	3.21E+03	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	5.00E-03		7.13E-01		mg/kg	EC-57B-4-SO-0.5	9/10	1.70E-03 - 3.55E-01	7.13E-01	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	2.00E-03		6.62E-01		mg/kg	EC-57B-3-SO-0.5	10/10	1.70E-03 - 3.55E-01	6.62E-01	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.10E-03	J	2.08E+00		mg/kg	EC-57B-4-SO-0.5	10/10	1.70E-03 - 3.55E-01	2.08E+00	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	**Benzo(a)anthracene**	**4.30E-03**		**3.50E+01**		**mg/kg**	**EC-57B-06-SO-29**	**45/46**	**1.70E-03 - 4.70E-01**	**3.50E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
50-32-8	**Benzo(a)pyrene**	**4.20E-03**		**2.70E+01**		**mg/kg**	**EC-57B-06-SO-29**	**45/46**	**1.70E-03 - 4.70E-01**	**2.70E+01**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
205-99-2	**Benzo(b)fluoranthene**	**7.90E-03**		**3.80E+01**		**mg/kg**	**EC-57B-06-SO-29**	**45/46**	**1.70E-03 - 6.73E-01**	**3.80E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
191-24-2	Benzo(g,h,I)perylene	6.00E-03		7.18E+00		mg/kg	EC-57B-4-SO-0.5	10/10	1.70E-03 - 3.55E-01	7.18E+00	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	4.90E-03		5.59E+00		mg/kg	EC-57B-3-SO-0.5	10/10	1.70E-03 - 3.55E-01	5.59E+00	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	8.90E-03		1.40E+01		mg/kg	EC-57B-4-SO-0.5	10/10	1.70E-03 - 3.55E-01	1.40E+01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	**Dibenz|a,h|anthracene**	**1.40E-03**	**J**	**4.70E+00**		**mg/kg**	**EC-57B-06-SO-29**	**42/46**	**1.70E-03 - 3.55E-01**	**4.70E+00**	**NA**	**2.10E+00**	**C**	**NA**	**NA**	**Yes**	**ASL**
206-44-0	Fluoranthene	1.09E-02		1.70E+01		mg/kg	EC-57B-4-SO-0.5	10/10	1.70E-03 - 3.55E-01	1.70E+01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	6.90E-03		7.47E-01		mg/kg	EC-57B-4-SO-0.5	9/10	1.70E-03 - 3.55E-01	7.47E-01	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	**Indeno(1,2,3-c,d)pyrene**	**5.70E-03**		**2.20E+01**		**mg/kg**	**EC-57B-06-SO-29**	**45/46**	**1.70E-03 - 4.70E-01**	**2.20E+01**	**NA**	**2.10E+01**	**C**	**NA**	**NA**	**Yes**	**ASL**
91-20-3	Naphthalene	6.20E-04	J	1.91E-01		mg/kg	EC-57B-4-SO-0.5	10/10	1.60E-03 - 6.93E-02	1.91E-01	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	4.40E-03		9.30E+00		mg/kg	EC-57B-4-SO-0.5	10/10	1.70E-03 - 3.55E-01	9.30E+00	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	1.05E-02		1.57E+01		mg/kg	EC-57B-4-SO-0.5	10/10	1.70E-03 - 3.55E-01	1.57E+01	NA	2.30E+03	N	NA	NA	No	BSL
PCB Aroclors																	
11096-82-5	Aroclor 1260	5.30E-02		1.80E-01		mg/kg	EC-57B-1-SO-0.5	5/10	3.20E-02 - 3.80E-02	1.80E-01	NA	9.90E-01	C	NA	NA	No	BSL
SVOCS																	
121-14-2	2,4-Dinitrotoluene	1.50E+00	J	1.50E+00	J	mg/kg	EC-57B-1-SO-0.5	1/10	1.90E-01 - 2.00E-01	1.50E+00	NA	7.40E+00	C	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level, NSL = No Screening Toxicity Level, NUT = Essential Nutrient

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value; L = Reported concentration is below the CRQL (non-metals)/Reported concentration is between the MDL

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE 57B-3

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-57B Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Manganese	29594	--	2.40E-02	2.53E-02	1.1
Benzo(a)pyrene	4.94	--	3.00E-04	4.23E-06	0.0141
Total Tetrachlorodibenzo-p-dioxin	1.1E-05	1	7.00E-10	9.50E-12	0.014
				Total Pathway Hazard Index	1.08

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Manganese	29594	--	9.60E-04	NA	NA
Benzo(a)pyrene	4.943	--	3.00E-04	2.33E-06	0.008
Total Tetrachlorodibenzo-p-dioxin	0.0000111	1	7.00E-10	1.21E-12	1.7E-03
				Total Pathway Hazard Index	0.009

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Manganese	2.33E-05	--	5.00E-05	5.32E-06	0.11
Benzo(a)pyrene	3.89E-09	--	2.00E-06	8.89E-10	0.00044
Total Tetrachlorodibenzo-p-dioxin	8.74E-15	1	4.00E-08	2.00E-15	5.0E-08
				Total Pathway Hazard Index	0.11

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

	RME
Receptor HI Total =	**1**

NA=not applicable to pathway; ND=not detected

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
0.03 dermal absorption for dioxins
0.13 for PAHs
0.1 for semivolatiles

TABLE 57B-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-57B Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Manganese	29594	--	NA	NA	NA
Benzo(a)pyrene	4.94	--	1.00E+00	1.51E-06	2E-06
Total Tetrachlorodibenzo-p-dioxin	1.1E-05	1	1.30E+05	3.39E-12	4E-07
				Total Pathway Cancer Risk	2E-06

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Manganese	29594	--	NA	NA	NA
Benzo(a)pyrene	4.943	--	1.0E+00	8.32E-07	8E-07
Total Tetrachlorodibenzo-p-dioxin	0.0000111	1	1.30E+05	4.31E-13	6E-08
				Total Pathway Cancer Risk	9E-07

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Manganese	2.33E-05	--	NA	NA	NA
Benzo(a)pyrene	3.89E-09	--	6.00E-04	3.17E-10	2E-13
Total Tetrachlorodibenzo-p-dioxin	8.74E-15	1	3.8E-02	7.13E-16	3E-17
				Total Pathway Cancer Risk	2E-13

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

	RME
Receptor Incremental Cancer Risk Total =	**3E-06**

NA=not applicable to pathway; ND=not detected

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

TABLE 57B-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-57B Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway					
Manganese	15228	--	2.40E-02	4.30E-02	1.8
Benzo(a)anthracene	8.83	--	NA	NA	NA
Benzo(a)pyrene	4.47	--	3.00E-04	1.26E-05	0.042
Benzo(b)fluoranthene	6.45	--	NA	NA	NA
Dibenz(a,h)anthracene	0.93	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	6.88	--	NA	NA	NA
Total Tetrachlorodibenzo-p-dioxin	1.0E-05	1	7.00E-10	2.91E-11	4.16E-02
				Total Pathway Hazard Index	1.88

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Manganese	15228	--	9.60E-04	NA	NA
Benzo(a)anthracene	8.83	--	NA	NA	NA
Benzo(a)pyrene	4.468	--	3.00E-04	2.10E-06	0.007
Benzo(b)fluoranthene	6.447	--	NA	NA	NA
Dibenz(a,h)anthracene	0.925	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	6.882	--	NA	NA	NA
Total Tetrachlorodibenzo-p-dioxin	0.0000103	1	7.00E-10	1.12E-12	1.60E-03
				Total Pathway Hazard Index	0.0

TABLE 57B-5

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-57B Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Manganese	1.20E-05	--	5.00E-05	2.74E-06	0.05
Benzo(a)anthracene	6.95E-09	--	NA	NA	NA
Benzo(a)pyrene	3.52E-09	--	2.00E-06	8.03E-10	0.00040
Benzo(b)fluoranthene	5.08E-09	--	NA	NA	NA
Dibenz(a,h)anthracene	7.28E-10	--	NA	NA	NA
Indeno(1,2,3-cd)pyrene	5.42E-09	--	NA	NA	NA
Total Tetrachlorodibenzo-p-dioxin	8.11E-15	1	4.00E-08	1.85E-15	4.6E-08
				Total Pathway Hazard Index	0.06

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor HI Total =	**2**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.

TABLE 57B-6

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-57B Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway					
Manganese	15228	--	NA	NA	NA
Benzo(a)anthracene	8.83	--	1.00E-01	3.56E-07	4E-08
Benzo(a)pyrene	4.47	--	1.00E+00	1.80E-07	2E-07
Benzo(b)fluoranthene	6.45	--	1.00E-01	2.60E-07	3E-08
Dibenz(a,h)anthracene	0.93	--	1.00E+00	3.73E-08	4E-08
Indeno(1,2,3-cd)pyrene	6.88	--	1.00E-01	2.78E-07	3E-08
Total Tetrachlorodibenzo-p-dioxin	1.0E-05	1	1.30E+05	4.16E-13	5E-08
				Total Pathway Cancer Risk	4E-07

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Manganese	15228	--	NA	NA	NA
Benzo(a)anthracene	8.83	--	1.0E-01	5.94E-08	6E-09
Benzo(a)pyrene	4.468	--	1.0E+00	3.01E-08	3E-08
Benzo(b)fluoranthene	6.447	--	1.0E-01	4.34E-08	4E-09
Dibenz(a,h)anthracene	0.925	--	1.0E+00	6.22E-09	6E-09
Indeno(1,2,3-cd)pyrene	6.882	--	1.0E-01	4.63E-08	5E-09
Total Tetrachlorodibenzo-p-dioxin	0.0000103	1	1.30E+05	1.60E-14	2E-09
				Total Pathway Cancer Risk	5E-08

TABLE 57B-6

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-57B Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface and Subsurface Soil (0-6 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface and Subsurface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	TEFs for dioxins and furans	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	TEFs for dioxins and furans	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Manganese	1.20E-05	--	NA	NA	NA
Benzo(a)anthracene	6.95E-09	--	6.00E-05	2.27E-11	1E-15
Benzo(a)pyrene	3.52E-09	--	6.00E-04	1.15E-11	7E-15
Benzo(b)fluoranthene	5.08E-09	--	6.00E-05	1.66E-11	1E-15
Dibenz(a,h)anthracene	7.28E-10	--	6.00E-04	2.38E-12	1E-15
Indeno(1,2,3-cd)pyrene	5.42E-09	--	6.00E-05	1.77E-11	1E-15
Total Tetrachlorodibenzo-p-dioxin	8.11E-15	1	3.8E-02	2.65E-17	1E-18
				Total Pathway Cancer Risk	1E-14

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**4E-07**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

Table EC57B-13 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	5/5	1.42E+04	pH<5.5	NO
Antimony	5/5	3.31E+01	2.70E-01	YES
Copper	5/5	8.74E+01	2.80E+01	YES
Lead	5/5	4.34E+02	1.10E+01	YES
Manganese	12/12	5.99E+04	2.20E+02	YES
Zinc	5/5	3.21E+03	4.60E+01	YES
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	20/20	5.83E-05	3.15E-06	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	20/20	1.06E-04	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	20/20	2.73E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	20/20	7.90E-05	3.15E-06	YES
PCBs				
Aroclor 1260	5/5	1.80E-01	4.10E-02	YES
PAHs				
Acenaphthene	5/5	7.13E-01	Refer to total LMW PAHs	NO
Acenaphthylene	5/5	6.62E-01	Refer to total LMW PAHs	NO
Anthracene	5/5	2.08E+00	Refer to total LMW PAHs	NO
Benzo(a)anthracene	17/17	9.71E+00	Refer to total HMW PAHs	NO
Benzo(a)pyrene	17/17	9.57E+00	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	17/17	1.36E+01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	5/5	7.18E+00	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	5/5	5.59E+00	Refer to total HMW PAHs	NO
Chrysene	5/5	1.40E+01	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	17/17	2.00E+00	Refer to total HMW PAHs	NO
Fluoranthene	5/5	1.70E+01	Refer to total LMW PAHs	NO
Fluorene	5/5	7.47E-01	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	17/17	5.81E+00	Refer to total HMW PAHs	NO
Naphthalene	5/5	1.91E-01	Refer to total LMW PAHs	NO
Phenanthrene	5/5	9.30E+00	Refer to total LMW PAHs	NO
Pyrene	5/5	1.57E+01	Refer to total HMW PAHs	NO
Total LMW PAHs	5/5	1.35E+01	2.90E+01	NO
Total HMW PAHs	17/17	9.03E+01	1.10E+00	YES
Explosives				
2,4,6-Trinitrotoluene	3/5	1.50E-01	7.50E+00	NO
2,4-Dinitrotoluene	1/5	1.50E+00	6.00E+00	NO
2,6-Dinitrotoluene	1/5	7.00E-02	4.00E+00	NO

Note:

Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EPA 2008).

DL - Detection limit.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

Table EC57B-14 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Antimony	5/5	3.31E+01	2.48E+01
Copper	5/5	8.74E+01	8.00E+01
Lead	5/5	4.34E+02	3.76E+02
Manganese	12/12	5.99E+04	2.96E+04
Zinc	5/5	3.21E+03	2.26E+03
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=0)	20/20	5.83E-05	1.92E-05
Dioxin TEQ Birds EPA2008 (ND=DL)	20/20	1.06E-04	3.54E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	20/20	2.73E-05	1.11E-05
Dioxin TEQ Mammals EPA2008 (ND=DL)	20/20	7.90E-05	2.41E-05
PCBs			
Aroclor 1260	5/5	1.80E-01	1.68E-01
PAHs			
Total HMW PAHs	17/17	9.03E+01	8.32E+01

Note:

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

DL - Detection limit.

TEQ - Toxicity equivalent quotient.

Table EC57B-15 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	5.00E+00	3.31E+01	**6.6E+00**	2.48E+01	**5.0E+00**
Copper	7.00E+01	8.74E+01	1.2E+00	8.00E+01	1.1E+00
Lead	1.20E+02	4.34E+02	**3.6E+00**	3.76E+02	**3.1E+00**
Manganese	2.20E+02	5.99E+04	**2.7E+02**	2.96E+04	**1.3E+02**
Zinc	1.60E+02	3.21E+03	**2.0E+01**	2.26E+03	**1.4E+01**
Dioxins					
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	2.73E-05	--	1.11E-05	--
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	7.90E-05	--	2.41E-05	--
PCBs					
Aroclor 1260	4.00E+01	1.80E-01	4.5E-03	1.68E-01	4.2E-03
PAHs					
Total HMW PAHs	2.00E+01	9.03E+01	**4.5E+00**	8.32E+01	**4.2E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC57B-16 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	7.80E+01	3.31E+01	4.2E-01	2.48E+01	3.2E-01
Copper	8.00E+01	8.74E+01	1.1E+00	8.00E+01	1.0E+00
Lead	1.70E+03	4.34E+02	2.6E-01	3.76E+02	2.2E-01
Manganese	4.50E+02	5.99E+04	**1.3E+02**	2.96E+04	**6.6E+01**
Zinc	1.20E+02	3.21E+03	**2.7E+01**	2.26E+03	**1.9E+01**
Dioxins					
Dioxin TEQ Mammals EPA2008 (ND=0)	5.00E-01	2.73E-05	5.5E-05	1.11E-05	2.2E-05
Dioxin TEQ Mammals EPA2008 (ND=D	5.00E-01	7.90E-05	1.6E-04	2.41E-05	4.8E-05
PCBs					
Aroclor 1260	3.30E-01	1.80E-01	5.5E-01	1.68E-01	5.1E-01
PAHs					
Total HMW PAHs	1.80E+01	9.03E+01	**5.0E+00**	8.32E+01	**4.6E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC57B-17 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Copper	4.05E+00	1.21E+01	**3.0E+00**	9.9E-01
Lead	1.63E+00	3.26E+00	**4.0E+01**	**2.0E+01**
Manganese	1.79E+02	3.77E+02	**3.2E+01**	**1.5E+01**
Zinc	6.61E+01	1.71E+02	**8.6E+00**	**3.3E+00**
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	1.3E+00	1.3E-01
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	**2.4E+00**	2.4E-01
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	5.8E-01	5.8E-02
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	**7.2E+00**	7.2E-01

Note:

Bold represents a hazard quotient greater than 1.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC57B-18 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Copper	4.05E+00	1.21E+01	**2.8E+00**	9.3E-01
Lead	1.63E+00	3.26E+00	**3.5E+01**	**1.7E+01**
Manganese	1.79E+02	3.77E+02	**1.6E+01**	**7.6E+00**
Zinc	6.61E+01	1.71E+02	**6.8E+00**	**2.6E+00**
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	4.3E-01	4.3E-02
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	8.0E-01	8.0E-02
PCBs				
Aroclor 1260	1.80E-01	1.80E+00	5.3E-01	5.3E-02
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	**6.7E+00**	6.7E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC57B-19 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	**8.1E+00**	**1.1E+01**	8.1E-01	1.1E+00
Copper	5.60E+00	9.34E+00	1.7E-01	7.5E-02	1.0E-01	4.5E-02
Lead	4.70E+00	8.90E+00	4.7E-01	2.4E-01	2.5E-01	1.2E-01
Manganese	5.15E+01	1.46E+02	**2.0E+01**	**3.4E+00**	**7.0E+00**	1.2E+00
Zinc	7.54E+01	2.98E+02	4.6E-01	1.2E-01	1.2E-01	3.0E-02
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	1.2E-01	5.5E-02	1.2E-02	5.5E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	3.4E-01	1.6E-01	3.4E-02	1.6E-02
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	1.1E-02	8.6E-03	1.1E-03	8.6E-04
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	**1.5E+00**	2.9E-01	3.0E-01	5.9E-02

Note:

Bold represents a hazard quotient greater than 1.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC57B-20 Comparison of 95UCLM Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	**6.0E+00**	**8.0E+00**	6.0E-01	8.0E-01
Copper	5.60E+00	9.34E+00	1.6E-01	7.2E-02	9.5E-02	4.3E-02
Lead	4.70E+00	8.90E+00	4.1E-01	2.1E-01	2.2E-01	1.1E-01
Manganese	5.15E+01	1.46E+02	**9.7E+00**	**1.7E+00**	**3.4E+00**	6.0E-01
Zinc	7.54E+01	2.98E+02	3.6E-01	9.3E-02	9.1E-02	2.4E-02
Dioxins						
Dioxin TEQ Mammals EPA2008 (NI	1.00E-06	1.00E-05	4.8E-02	2.2E-02	4.8E-03	2.2E-03
Dioxin TEQ Mammals EPA2008 (NI	1.00E-06	1.00E-05	1.0E-01	4.8E-02	1.0E-02	4.8E-03
PCBs						
Aroclor 1260	6.80E-02	6.80E-01	1.0E-02	8.1E-03	1.0E-03	8.1E-04
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	1.4E+00	2.6E-01	2.8E-01	5.4E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

DL - Detection limit.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC57B-21 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Antimony	9.50E-01	5/5	3.31E+01	2.48E+01	Exceeds	Exceeds
Copper	3.28E+01	5/5	8.74E+01	8.00E+01	Exceeds	Exceeds
Lead	1.24E+02	5/5	4.34E+02	3.76E+02	Exceeds	Exceeds
Manganese	7.00E+02	12/12	5.99E+04	2.96E+04	Exceeds	Exceeds
Zinc	8.39E+01	5/5	3.21E+03	2.26E+03	Exceeds	Exceeds
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	NA	20/20	5.83E-05	1.92E-05	Exceeds	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	20/20	1.06E-04	3.54E-05	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	20/20	2.73E-05	1.11E-05	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	20/20	7.90E-05	2.41E-05	Exceeds	Exceeds
PCBs						
Aroclor 1260	NA	5/5	1.80E-01	1.68E-01	Exceeds	Exceeds
PAHs						
Total HMW PAHs	8.90E+00	17/17	9.03E+01	8.32E+01	Exceeds	Exceeds

Note:

95UCLM - 95 Percent upper confidence limit of the mean.

BTV - 95 Percent upper threshold limit for suface soil background values.

DL - Detection limit.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC57B-22 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	3.31E+01	--	1.00E+00	3.31E+01	3.09E+00	7.36E+00	0.00E+00	1.05E+01
Copper	8.74E+01	--	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.74E+01	8.17E+00	3.87E+00	0.00E+00	1.20E+01
Lead	4.34E+02	--	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.08E+02	4.06E+01	2.40E+01	0.00E+00	6.46E+01
Manganese	5.99E+04	--	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	8.07E+02	5.60E+03	1.80E+02	0.00E+00	5.78E+03
Zinc	3.21E+03	--	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	1.21E+03	3.00E+02	2.69E+02	0.00E+00	5.69E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	5.83E-05	--	1.00E+00	5.83E-05	5.44E-06	1.30E-05	0.00E+00	1.84E-05
Dioxin TEQ Birds EPA2008 (ND=DL)	1.06E-04	--	1.00E+00	1.06E-04	9.89E-06	2.36E-05	0.00E+00	3.34E-05
PCBs								
Aroclor 1260	1.80E-01	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	3.97E-01	1.68E-02	8.83E-02	0.00E+00	1.05E-01
PAHs								
Total HMW PAHs	9.03E+01	--	3.00E-01	2.71E+01	8.44E+00	6.03E+00	0.00E+00	1.45E+01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

wt - Weight.

Table EC57B-23 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	2.48E+01	0.00E+00	1.00E+00	2.48E+01	2.31E+00	5.51E+00	0.00E+00	7.82E+00
Copper	8.00E+01	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	1.70E+01	7.48E+00	3.78E+00	0.00E+00	1.13E+01
Lead	3.76E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	9.62E+01	3.51E+01	2.14E+01	0.00E+00	5.65E+01
Manganese	2.96E+04	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	4.99E+02	2.77E+03	1.11E+02	0.00E+00	2.88E+03
Zinc	2.26E+03	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	1.08E+03	2.11E+02	2.40E+02	0.00E+00	4.50E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.92E-05	0.00E+00	1.00E+00	1.92E-05	1.80E-06	4.27E-06	0.00E+00	6.07E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	3.54E-05	0.00E+00	1.00E+00	3.54E-05	3.31E-06	7.89E-06	0.00E+00	1.12E-05
PCBs								
Aroclor 1260	1.68E-01	0.00E+00	ln(dry worm conc, mg/kg) = (1.410+1.361*LN(soil conc))	3.61E-01	1.57E-02	8.04E-02	0.00E+00	9.61E-02
PAHs								
Total HMW PAHs	8.32E+01	0.00E+00	3.00E-01	2.50E+01	7.78E+00	5.55E+00	0.00E+00	1.33E+01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC57B-24 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	3.31E+01	--	2.00E-01	6.62E+00	1.36E-01	3.39E-01	0.00E+00	4.75E-01
Copper	8.74E+01	--	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.14E+01	3.58E-01	5.82E-01	0.00E+00	9.41E-01
Lead	4.34E+02	--	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	8.00E+00	1.78E+00	4.10E-01	0.00E+00	2.19E+00
Manganese	5.99E+04	--	2.50E-01	1.50E+04	2.46E+02	7.67E+02	0.00E+00	1.01E+03
Zinc	3.21E+03	--	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	4.27E+02	1.32E+01	2.19E+01	0.00E+00	3.50E-01
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	2.73E-05	--	3.87E-03	1.06E-07	1.12E-07	5.43E-09	0.00E+00	1.18E-07
Dioxin TEQ Mammals EPA2008 (ND=DL)	7.90E-05	--	3.87E-03	3.06E-07	3.24E-07	1.57E-08	0.00E+00	3.40E-07
PCBs								
Aroclor 1260	1.80E-01	0.00E+00	6.44E-04	1.16E-04	7.38E-04	5.94E-06	0.00E+00	7.44E-04
PAHs								
Total HMW PAHs	9.03E+01	--	1.17E-01	1.05E+01	3.70E-01	5.40E-01	0.00E+00	9.10E-01

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC57B-25 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	2.48E+01	0.00E+00	2.00E-01	4.95E+00	1.01E-01	2.54E-01	0.00E+00	3.55E-01
Copper	8.00E+01	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	1.10E+01	3.28E-01	5.62E-01	0.00E+00	8.90E-01
Lead	3.76E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	7.37E+00	1.54E+00	3.78E-01	0.00E+00	1.92E+00
Manganese	2.96E+04	0.00E+00	2.50E-01	7.40E+03	1.21E+02	3.79E+02	0.00E+00	5.01E+02
Zinc	2.26E+03	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	3.51E+02	9.25E+00	1.80E+01	0.00E+00	2.72E+01
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	1.11E-05	0.00E+00	3.87E-03	4.32E-08	4.57E-08	2.21E-09	0.00E+00	4.79E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	2.41E-05	0.00E+00	3.87E-03	9.33E-08	9.88E-08	4.78E-09	0.00E+00	1.04E-07
PCBs								
Aroclor 1260	1.68E-01	0.00E+00	6.44E-04	1.08E-04	6.89E-04	5.54E-06	0.00E+00	6.94E-04
PAHs								
Total HMW PAHs	8.32E+01	0.00E+00	1.17E-01	9.70E+00	3.41E-01	4.97E-01	0.00E+00	8.39E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.
BAF - Bioaccumulation factor.
DL - Detection limit.
HMW - High molecular weight.
mg/kg - Milligrams per kilogram.
mg/L - Milligrams per liter.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.
TEQ - Toxicity equivalent quotient.
wt - Weight.

Table EC57B-26 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	3.31E+01	--	4.75E-01	Uptake Factor	1.00E+00	3.31E+01	6.39E-02	5.71E-01	0.00E+00	6.35E-01
Copper	8.74E+01	--	9.41E-01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.47E+01	1.69E-01	2.53E-01	0.00E+00	4.22E-01
Lead	4.34E+02	--	2.19E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.58E+01	8.38E-01	2.73E-01	0.00E+00	1.11E+00
Manganese	5.99E+04	--	1.01E+03	Uptake Factor	5.87E-02	3.52E+03	1.16E+02	6.07E+01	0.00E+00	1.76E+02
Zinc	3.21E+03	--	3.50E+01	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.59E+02	6.20E+00	2.74E+00	0.00E+00	8.94E+00
Dioxins										
Dioxin TEQ Mammals EPA2008	2.73E-05	--	1.18E-07	Biotransfer Factor	8.36E-01	9.82E-08	5.28E-08	1.69E-09	0.00E+00	5.45E-08
Dioxin TEQ Mammals EPA2008	7.90E-05	--	3.40E-07	Biotransfer Factor	8.36E-01	2.84E-07	1.53E-07	4.90E-09	0.00E+00	1.58E-07
PCBs										
Aroclor 1260	1.80E-01	0.00E+00	7.44E-04	Biotransfer Factor	1.86E+01	1.39E-02	3.48E-04	2.39E-04	0.00E+00	5.87E-04
PAHs										
Total HMW PAHs	9.03E+01	--	9.10E-01	Biotransfer Factor	1.12E-01	1.02E-01	1.75E-01	1.77E-03	0.00E+00	1.76E-01

Note:

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC57B-27 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	2.48E+01	0.00E+00	3.55E-01	Uptake Factor	1.00E+00	2.48E+01	4.78E-02	4.27E-01	0.00E+00	4.75E-01
Copper	8.00E+01	0.00E+00	8.90E-01	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	1.45E+01	1.55E-01	2.50E-01	0.00E+00	4.05E-01
Lead	3.76E+02	0.00E+00	1.92E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.48E+01	7.25E-01	2.56E-01	0.00E+00	9.82E-01
Manganese	2.96E+04	0.00E+00	5.01E+02	Uptake Factor	5.87E-02	1.74E+03	5.72E+01	3.00E+01	0.00E+00	8.71E+01
Zinc	2.26E+03	0.00E+00	2.72E+01	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.55E+02	4.36E+00	2.67E+00	0.00E+00	7.02E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (	1.11E-05	0.00E+00	4.79E-08	Biotransfer Factor	8.36E-01	4.00E-08	2.15E-08	6.90E-10	0.00E+00	2.22E-08
Dioxin TEQ Mammals EPA2008 (	2.41E-05	0.00E+00	1.04E-07	Biotransfer Factor	8.36E-01	8.65E-08	4.65E-08	1.49E-09	0.00E+00	4.80E-08
PCBs										
Aroclor 1260	1.68E-01	0.00E+00	6.94E-04	Biotransfer Factor	1.86E+01	1.29E-02	3.25E-04	2.23E-04	0.00E+00	5.48E-04
PAHs										
Total HMW PAHs	8.32E+01	0.00E+00	8.39E-01	Biotransfer Factor	1.12E-01	9.43E-02	1.61E-01	1.63E-03	0.00E+00	1.62E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

DL - Detection limit.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

TABLE 57C-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-57C - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-57C

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	2.53E-06		1.07E-05		mg/kg	EC-57C-2-SO-0.5	4/4	0.00E+00 - 0.00E+00	1.07E-05	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	7.98E-06		1.29E-05		mg/kg	EC-57C-4-SO-0.5	4/4	7.20E-07 - 7.20E-07	1.29E-05	NA	2.20E-05	C	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	2.50E-03		8.40E-03		mg/kg	EC-57C-2-SO-0.5	4/4	1.70E-03 - 1.90E-03	8.40E-03	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	4.50E-03		1.97E-02		mg/kg	EC-57C-3-SO-0.5	4/4	1.70E-03 - 1.90E-03	1.97E-02	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.24E-02		8.34E-02		mg/kg	EC-57C-1-SO-0.5	4/4	1.70E-03 - 1.90E-03	8.34E-02	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	7.89E-02		5.22E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.90E-03 - 7.80E-02	5.22E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	7.84E-02		5.73E-01		mg/kg	EC-57C-1-SO-0.5	4/4	7.01E-02 - 7.80E-02	5.73E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	1.31E-01		6.71E-01		mg/kg	EC-57C-1-SO-0.5	4/4	7.01E-02 - 7.80E-02	6.71E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	6.27E-02	J	3.41E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.90E-03 - 7.80E-02	3.41E-01	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	3.36E-02		2.59E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.90E-03 - 7.80E-02	2.59E-01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	9.95E-02		6.16E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.90E-03 - 7.80E-02	6.16E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	1.87E-02		1.08E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.80E-03 - 7.01E-02	1.08E-01	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	1.30E-01		6.86E-01		mg/kg	EC-57C-1-SO-0.5	4/4	7.01E-02 - 7.80E-02	6.86E-01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	3.00E-03		9.80E-03		mg/kg	EC-57C-2-SO-0.5	4/4	1.70E-03 - 1.90E-03	9.80E-03	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	5.93E-02		3.16E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.90E-03 - 7.80E-02	3.16E-01	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	2.30E-03		6.40E-03		mg/kg	EC-57C-2-SO-0.5	4/4	1.70E-03 - 1.90E-03	6.40E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	6.00E-02		3.29E-01		mg/kg	EC-57C-1-SO-0.5	4/4	1.90E-03 - 7.76E-02	3.29E-01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	1.45E-01		9.03E-01		mg/kg	EC-57C-1-SO-0.5	4/4	7.01E-02 - 7.76E-02	9.03E-01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Dioxin TEQ, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC57C-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-57C - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-57C

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	1.78E-06		1.07E-05		mg/kg	EC-57C-2-SO-0.5	8/8	0.00E+00 - 0.00E+00	1.07E-05	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	7.98E-06		1.39E-05		mg/kg	EC-57C-2-SO-02	8/8	7.21E-07 - 7.21E-07	1.39E-05	NA	2.20E-05	C	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	4.80E-04	J	1.21E-02	J	mg/kg	EC-57C-3-SO-02	7/8	1.70E-03 - 2.10E-03	1.21E-02	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	1.20E-03	J	1.97E-02		mg/kg	EC-57C-3-SO-0.5	8/8	1.70E-03 - 2.10E-03	1.97E-02	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	1.00E-03	J	1.11E-01		mg/kg	EC-57C-3-SO-02	8/8	1.70E-03 - 8.38E-02	1.11E-01	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	7.30E-03		5.22E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	5.22E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	2.60E-03	J	5.73E-01		mg/kg	EC-57C-1-SO-0.5	14/14	1.80E-03 - 8.38E-02	5.73E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	1.25E-02	J	6.71E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	6.71E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	5.20E-03	L	3.41E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	3.41E-01	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	4.30E-03	J	2.60E-01		mg/kg	EC-57C-3-SO-02	8/8	1.80E-03 - 8.38E-02	2.60E-01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	9.50E-03		6.16E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	6.16E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	1.80E-03	L	1.08E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 7.01E-02	1.08E-01	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	9.50E-03		6.86E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	6.86E-01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	8.40E-04	J	1.79E-02	J	mg/kg	EC-57C-3-SO-02	7/8	1.70E-03 - 2.10E-03	1.79E-02	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	5.60E-03	L	3.16E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	3.16E-01	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	9.20E-04	J	7.10E-03	J	mg/kg	EC-57C-3-SO-02	8/8	1.70E-03 - 2.10E-03	7.10E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	4.50E-03		4.20E-01		mg/kg	EC-57C-3-SO-02	8/8	1.80E-03 - 8.38E-02	4.20E-01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	9.20E-03		9.03E-01		mg/kg	EC-57C-1-SO-0.5	8/8	1.80E-03 - 8.38E-02	9.03E-01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value
L = Reported concentration is below the CRQL (non-metals)/Reported concentration is between the MDL

Surrogates used: 2,3,7,8-TCDD for Dioxin TEQ, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

Table EC57C-6 Detection Comparison to Screening Levels

Analyte	Surface Soil			Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	4/4	1.55E-05	3.15E-06	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	4/4	1.59E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	4/4	1.07E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	4/4	1.29E-05	3.15E-06	YES
PAHs				
Acenaphthene	4/4	8.40E-03	Refer to total LMW PAHs	NO
Acenaphthylene	4/4	1.97E-02	Refer to total LMW PAHs	NO
Anthracene	4/4	8.34E-02	Refer to total LMW PAHs	NO
Benzo(a)anthracene	4/4	5.22E-01	Refer to total HMW PAHs	NO
Benzo(a)pyrene	4/4	5.73E-01	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	4/4	6.71E-01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	4/4	3.41E-01	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	4/4	2.59E-01	Refer to total HMW PAHs	NO
Chrysene	4/4	6.16E-01	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	4/4	1.08E-01	Refer to total HMW PAHs	NO
Fluoranthene	4/4	6.86E-01	Refer to total LMW PAHs	NO
Fluorene	4/4	9.80E-03	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	4/4	3.16E-01	Refer to total HMW PAHs	NO
Naphthalene	4/4	6.40E-03	Refer to total LMW PAHs	NO
Phenanthrene	4/4	3.29E-01	Refer to total LMW PAHs	NO
Pyrene	4/4	9.03E-01	Refer to total HMW PAHs	NO
Total LMW PAHs	4/4	4.28E-01	2.90E+01	NO
Total HMW PAHs	4/4	4.57E+00	1.10E+00	YES

Note:

DL - Detection limit

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - No screening value available.

ND - Nondetect.

NE - Not evaluated.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - toxicity equivalent quotient

µg/L - Micrograms per liter.

Table EC57C-7 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Dioxins		
Dioxin TEQ Birds EPA2008 (ND=DL)	4/4	1.59E-05
Dioxin TEQ Mammals EPA2008 (ND=DL)	4/4	1.29E-05
PAHs		
Total HMW PAHs	4/4	4.57E+00

Note:

-- - No detectable concentrations or the chemical was not analyzed for.

DL - Detection limit

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

µg/L - Micrograms per liter.

Table EC57C-8 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	1.59E-05	--
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	1.29E-05	--
PAHs			
Total HMW PAHs	2.00E+01	4.57E+00	2.29E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC57C-9 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=DL)	5.00E-01	1.59E-05	3.18E-05
Dioxin TEQ Mammals EPA2008 (ND=DL)	5.00E-01	1.29E-05	2.58E-05
PAHs			
Total HMW PAHs	1.80E+01	4.57E+00	2.54E-01

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC57C-10 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	3.50E-01	3.50E-02
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	3.59E-01	3.59E-02
PAHs				
Total HMW PAHs	2.00E+00	2.00E+01	3.66E-01	3.66E-02

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC57C-11 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
Chemical	**NOAEL**	**LOAEL**	**Deer Mouse**	**Red Fox**	**Deer Mouse**	**Red Fox**
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	4.58E-02	2.13E-02	4.58E-03	2.13E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	5.55E-02	2.57E-02	5.55E-03	2.57E-03
PAHs						
Total HMW PAHs	6.15E-01	3.01E+00	7.49E-02	1.45E-02	1.53E-02	2.96E-03

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC57C-12 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil	
		Frequency of Detection	Maximum EPC (mg/kg dry wt)
PAHs			
Total HMW PAHs	8.90E+00	4/4	4.57E+00

Note:

BTV - 95% Upper Threshold Limit (UTL) for Suface Soil Background Values

EPC - exposure point concentration

mg/kg - milligrams per kilogram

PAH - polycyclic aromatic hydrocarbon

wt - weight

Table EC57C-13 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.55E-05	0.00E+00	1.00E+00	1.55E-05	1.45E-06	3.45E-06	0.00E+00	4.90E-06
Dioxin TEQ Birds EPA2008 (ND=DL	1.59E-05	0.00E+00	1.00E+00	1.59E-05	1.49E-06	3.54E-06	0.00E+00	5.03E-06
PAHs								
Total HMW PAHs	4.57E+00	0.00E+00	3.00E-01	1.37E+00	4.27E-01	3.05E-01	0.00E+00	7.32E-01

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

Table EC57C-14 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	1.07E-05	0.00E+00	3.87E-03	4.13E-08	4.37E-08	2.12E-09	0.00E+00	4.58E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.29E-05	0.00E+00	3.87E-03	5.00E-08	5.29E-08	2.56E-09	0.00E+00	5.55E-08
PAHs								
Total HMW PAHs	4.57E+00	0.00E+00	1.17E-01	5.33E-01	1.87E-02	2.73E-02	0.00E+00	4.61E-02

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC57C-15 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins										
Dioxin TEQ Mammals EPA2008 (ND=0)	1.07E-05	0.00E+00	4.58E-08	Biotransfer Factor	8.36E-01	3.83E-08	2.06E-08	6.61E-10	0.00E+00	2.13E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.29E-05	0.00E+00	5.55E-08	Biotransfer Factor	8.36E-01	4.64E-08	2.49E-08	8.00E-10	0.00E+00	2.57E-08
PAHs										
Total HMW PAHs	4.57E+00	0.00E+00	4.61E-02	Biotransfer Factor	1.12E-01	5.18E-03	8.83E-03	8.93E-05	0.00E+00	8.92E-03

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

RL - Reporting limit.

SVOC - Semivolatile organic compound.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC57D-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Selection of Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	5/5	1.22E+04	pH<5.5	NO
Antimony	5/5	4.20E+00	2.70E-01	YES
Copper	5/5	1.88E+03	2.80E+01	YES
Lead	5/5	4.57E+02	1.10E+01	YES
Manganese	18/18	2.06E+04	2.20E+02	YES
Zinc	5/5	6.25E+02	4.60E+01	YES
Explosives				
2,4,6-Trinitrotoluene	1/5	4.10E-02	7.50E+00	NO

Note:

mg/kg - Milligrams per kilogram.

Table EC57D-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)
Metals			
Antimony	5/5	4.20E+00	3.21E+00
Copper	5/5	1.88E+03	1.88E+03
Lead	5/5	4.57E+02	3.26E+02
Manganese	18/18	2.06E+04	8.84E+03
Zinc	5/5	6.25E+02	6.25E+02

Note:

95UCLM - 95 percent upper confidence level of the mean.

mg/kg - Milligrams per kilogram.

Table EC57D-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	5.00E+00	4.20E+00	8.40E-01	3.21E+00	6.42E-01
Copper	7.00E+01	1.88E+03	**2.69E+01**	1.88E+03	**2.69E+01**
Lead	1.20E+02	4.57E+02	**3.81E+00**	3.26E+02	**2.72E+00**
Manganese	2.20E+02	2.06E+04	**9.36E+01**	8.84E+03	**4.02E+01**
Zinc	1.60E+02	6.25E+02	**3.91E+00**	6.25E+02	**3.91E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

TRV - Toxicity reference value.

wt - Weight.

Table EC57D-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Metals					
Antimony	7.80E+01	4.20E+00	5.38E-02	3.21E+00	4.11E-02
Copper	8.00E+01	1.88E+03	**2.35E+01**	1.88E+03	**2.35E+01**
Lead	1.70E+03	4.57E+02	2.69E-01	3.26E+02	1.92E-01
Manganese	4.50E+02	2.06E+04	**4.58E+01**	8.84E+03	**1.96E+01**
Zinc	1.20E+02	6.25E+02	**5.21E+00**	6.25E+02	**5.21E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

TRV - Toxicity reference value.

wt - Weight.

Table EC57D-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Copper	4.05E+00	1.21E+01	**4.55E+01**	**1.52E+01**
Lead	1.63E+00	3.26E+00	**4.16E+01**	**2.08E+01**
Manganese	1.79E+02	3.77E+02	**1.12E+01**	**5.34E+00**
Zinc	6.61E+01	1.71E+02	**3.26E+00**	**1.26E+00**

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC57D-6 Comparison of 95UCLM Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]	95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Copper	4.05E+00	1.21E+01	**4.55E+01**	**1.52E+01**
Lead	1.63E+00	3.26E+00	**3.04E+01**	**1.52E+01**
Manganese	1.79E+02	3.77E+02	**4.88E+00**	**2.32E+00**
Zinc	6.61E+01	1.71E+02	**3.26E+00**	**1.26E+00**

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC57D-7 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
Chemical	**NOAEL**	**LOAEL**	**Deer Mouse**	**Red Fox**	**Deer Mouse**	**Red Fox**
Metals						
Antimony	5.90E-02	5.90E-01	**1.02E+00**	**1.37E+00**	1.02E-01	1.37E-01
Copper	5.60E+00	9.34E+00	**1.72E+00**	7.19E-01	**1.03E+00**	4.31E-01
Lead	4.70E+00	8.90E+00	4.88E-01	2.47E-01	2.58E-01	1.31E-01
Manganese	5.15E+01	1.46E+02	**6.77E+00**	**1.18E+00**	**2.39E+00**	4.16E-01
Zinc	7.54E+01	2.98E+02	1.51E-01	4.82E-02	3.82E-02	1.22E-02

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC57D-8 Comparison of 95UCLM Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Antimony	5.90E-02	5.90E-01	7.80E-01	**1.04E+00**	7.80E-02	1.04E-01
Copper	5.60E+00	9.34E+00	**1.72E+00**	7.19E-01	**1.03E+00**	4.31E-01
Lead	4.70E+00	8.90E+00	3.59E-01	1.85E-01	1.89E-01	9.78E-02
Manganese	5.15E+01	1.46E+02	**2.90E+00**	5.05E-01	**1.03E+00**	1.79E-01
Zinc	7.54E+01	2.98E+02	1.51E-01	4.82E-02	3.82E-02	1.22E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NOAEL - No observed adverse effect level.

TRV - Toxicity reference value.

Table EC57D-9 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Antimony	9.50E-01	5/5	4.20E+00	3.21E+00	Exceeds	Exceeds
Copper	3.28E+01	5/5	1.88E+03	1.88E+03	Exceeds	Exceeds
Lead	1.24E+02	5/5	4.57E+02	3.26E+02	Exceeds	Exceeds
Manganese	7.00E+02	18/18	2.06E+04	8.84E+03	Exceeds	Exceeds
Zinc	8.39E+01	5/5	6.25E+02	6.25E+02	Exceeds	Exceeds

Note:

95UCLM - 95 percent upper confidence limit of mean

BTV - 95% Upper Threshold Limit (UTL) for Suface Soil Background Values

EPC - exposure point concentration

mg/kg - milligrams per kilogram

wt - weight

Table EC57D-10 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	4.20E+00	0.00E+00	1.00E+00	4.20E+00	3.92E-01	9.35E-01	0.00E+00	1.33E+00
Copper	1.88E+03	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	3.91E+01	1.76E+02	8.69E+00	0.00E+00	1.84E+02
Lead	4.57E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	1.13E+02	4.27E+01	2.51E+01	0.00E+00	6.78E+01
Manganese	2.06E+04	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	3.90E+02	1.93E+03	8.67E+01	0.00E+00	2.01E+03
Zinc	6.25E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	7.07E+02	5.84E+01	1.57E+02	0.00E+00	2.16E+02

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC57D-11 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	3.21E+00	0.00E+00	1.00E+00	3.21E+00	3.00E-01	7.14E-01	0.00E+00	1.01E+00
Copper	1.88E+03	0.00E+00	ln(dry worm conc, mg/kg) = (1.675+0.264*ln(soil conc))	3.91E+01	1.76E+02	8.69E+00	0.00E+00	1.84E+02
Lead	3.26E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	8.58E+01	3.05E+01	1.91E+01	0.00E+00	4.96E+01
Manganese	8.84E+03	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.19E+02	8.26E+02	4.87E+01	0.00E+00	8.74E+02
Zinc	6.25E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	7.07E+02	5.84E+01	1.57E+02	0.00E+00	2.16E+02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC57D-12 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	4.20E+00	0.00E+00	2.00E-01	8.40E-01	1.72E-02	4.31E-02	0.00E+00	6.03E-02
Copper	1.88E+03	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	3.81E+01	7.71E+00	1.95E+00	0.00E+00	9.66E+00
Lead	4.57E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	8.23E+00	1.87E+00	4.22E-01	0.00E+00	2.30E+00
Manganese	2.06E+04	0.00E+00	2.50E-01	5.15E+03	8.45E+01	2.64E+02	0.00E+00	3.48E+02
Zinc	6.25E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.72E+02	2.56E+00	8.82E+00	0.00E+00	1.14E+01

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC57D-13 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	3.21E+00	0.00E+00	2.00E-01	6.42E-01	1.32E-02	3.29E-02	0.00E+00	4.60E-02
Copper	1.88E+03	0.00E+00	ln(dry plant conc, mg/kg) = (0.669+0.394*ln(soil conc))	3.81E+01	7.71E+00	1.95E+00	0.00E+00	9.66E+00
Lead	3.26E+02	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	6.81E+00	1.34E+00	3.49E-01	0.00E+00	1.69E+00
Manganese	8.84E+03	0.00E+00	2.50E-01	2.21E+03	3.62E+01	1.13E+02	0.00E+00	1.49E+02
Zinc	6.25E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	1.72E+02	2.56E+00	8.82E+00	0.00E+00	1.14E+01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC57D-14 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	4.20E+00	0.00E+00	6.03E-02	Uptake Factor	1.00E+00	4.20E+00	8.11E-03	7.25E-02	0.00E+00	8.06E-02
Copper	1.88E+03	0.00E+00	9.66E+00	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	2.29E+01	3.63E+00	3.95E-01	0.00E+00	4.03E+00
Lead	4.57E+02	0.00E+00	2.30E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.62E+01	8.83E-01	2.79E-01	0.00E+00	1.16E+00
Manganese	2.06E+04	0.00E+00	3.48E+02	Uptake Factor	5.87E-02	1.21E+03	3.98E+01	2.09E+01	0.00E+00	6.07E+01
Zinc	6.25E+02	0.00E+00	1.14E+01	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.41E+02	1.21E+00	2.43E+00	0.00E+00	3.63E+00

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

Table EC57D-15 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	3.21E+00	0.00E+00	4.60E-02	Uptake Factor	1.00E+00	3.21E+00	6.20E-03	5.54E-02	0.00E+00	6.16E-02
Copper	1.88E+03	0.00E+00	9.66E+00	Log Linear	ln(dry mammal conc, mg/kg) = (2.042+0.1444*ln(soil conc))	2.29E+01	3.63E+00	3.95E-01	0.00E+00	4.03E+00
Lead	3.26E+02	0.00E+00	1.69E+00	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	1.39E+01	6.30E-01	2.41E-01	0.00E+00	8.70E-01
Manganese	8.84E+03	0.00E+00	1.49E+02	Uptake Factor	5.87E-02	5.19E+02	1.71E+01	8.95E+00	0.00E+00	2.60E+01
Zinc	6.25E+02	0.00E+00	1.14E+01	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.41E+02	1.21E+00	2.43E+00	0.00E+00	3.63E+00

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

wt - Weight.

TABLE EC58B-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-58B - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-58B

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	2.02E-06		6.21E-06		mg/kg	EC-58B-A-SO-0.5	5/5	0.00E+00 - 0.00E+00	6.21E-06	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	9.49E-06		1.35E-05		mg/kg	EC-58B-2B-SO-0.5	5/5	6.85E-07 - 6.85E-07	1.35E-05	NA	2.20E-05	C	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	1.30E-03	J	5.00E-03		mg/kg	EC-58B-2B-SO-0.5	5/5	1.80E-03 - 2.10E-03	5.00E-03	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	3.40E-03		1.63E-02		mg/kg	EC-58B-2B-SO-0.5	5/5	1.80E-03 - 2.10E-03	1.63E-02	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	6.40E-03		2.21E-02		mg/kg	EC-58B-2B-SO-0.5	5/5	1.80E-03 - 2.10E-03	2.21E-02	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	1.82E-02	J	1.00E-01		mg/kg	EC-58B-1B-SO-0.5	5/5	1.80E-03 - 8.51E-02	1.00E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	1.63E-02	J	1.20E-01		mg/kg	EC-58B-2B-SO-0.5	5/5	2.10E-03 - 8.51E-02	1.20E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	2.78E-02	J	1.90E-01		mg/kg	EC-58B-2B-SO-0.5	5/5	2.10E-03 - 8.51E-02	1.90E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	9.30E-03	J	4.82E-02	J	mg/kg	EC-58B-1B-SO-0.5	5/5	1.90E-03 - 8.51E-02	4.82E-02	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	9.40E-03	J	7.81E-02		mg/kg	EC-58B-2B-SO-0.5	5/5	2.10E-03 - 8.51E-02	7.81E-02	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	1.91E-02		1.33E-01		mg/kg	EC-58B-2B-SO-0.5	5/5	1.80E-03 - 8.51E-02	1.33E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	3.30E-03	J	1.41E-02	J	mg/kg	EC-58B-1B-SO-0.5	5/5	1.80E-03 - 2.10E-03	1.41E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	3.26E-02	J	2.00E-01		mg/kg	EC-58B-2B-SO-0.5	5/5	2.10E-03 - 8.51E-02	2.00E-01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	2.00E-03	J	6.10E-03		mg/kg	EC-58B-2B-SO-0.5	5/5	1.80E-03 - 2.10E-03	6.10E-03	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	8.90E-03	J	5.42E-02	J	mg/kg	EC-58B-1B-SO-0.5	5/5	1.80E-03 - 8.51E-02	5.42E-02	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	1.70E-03	J	2.80E-03		mg/kg	EC-58B-1B-SO-0.5	5/5	1.80E-03 - 2.10E-03	2.80E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	1.88E-02		1.06E-01		mg/kg	EC-58B-2B-SO-0.5	5/5	2.10E-03 - 8.32E-02	1.06E-01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	2.77E-02	J	1.74E-01		mg/kg	EC-58B-2B-SO-0.5	5/5	2.10E-03 - 8.51E-02	1.74E-01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions: C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Dioxin TEQ, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC58B-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-58B - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-58B

CAS Number	Chemical	Minimum [1] Concentration	Minimum Qualifier	Maximum [1] Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration [2] Used for Screening	Background [3] Value	Screening [4] Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for [5] Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	2.02E-06		9.16E-06		mg/kg	EC-58B-1B-SO-02	9/9	0.00E+00 - 0.00E+00	9.16E-06	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	9.49E-06		1.41E-05		mg/kg	EC-58B-4B-SO-07	9/9	6.96E-07 - 6.96E-07	1.41E-05	NA	2.20E-05	C	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	1.10E-03	J	1.26E-02		mg/kg	EC-58B-3B-SO-02	9/9	1.80E-03 - 2.10E-03	1.26E-02	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	3.40E-03		3.94E-02		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 2.10E-03	3.94E-02	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	6.40E-03		6.92E-02		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 2.10E-03	6.92E-02	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	1.82E-02	J	4.56E-01		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 8.51E-02	4.56E-01	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	1.63E-02	J	6.50E-01		mg/kg	EC-58B-4B-SO-99	15/15	1.80E-03 - 8.51E-02	6.50E-01	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	2.78E-02	J	6.60E-01		mg/kg	EC-58B-4B-SO-07	9/9	2.10E-03 - 8.51E-02	6.60E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	9.30E-03	J	1.53E-01		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 8.51E-02	1.53E-01	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	9.40E-03	J	3.17E-01		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 8.51E-02	3.17E-01	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	1.91E-02		5.79E-01		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 8.51E-02	5.79E-01	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	3.30E-03	J	6.11E-02	J	mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 7.79E-02	6.11E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	3.26E-02	J	5.79E-01		mg/kg	EC-58B-4B-SO-07	9/9	2.10E-03 - 8.51E-02	5.79E-01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	2.00E-03	J	2.24E-02		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 2.10E-03	2.24E-02	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	8.90E-03	J	1.45E-01		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 8.51E-02	1.45E-01	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	1.60E-03	J	8.00E-03		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 2.10E-03	8.00E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	1.88E-02		2.71E-01		mg/kg	EC-58B-4B-SO-07	9/9	1.80E-03 - 8.32E-02	2.71E-01	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	2.77E-02	J	8.38E-01		mg/kg	EC-58B-4B-SO-07	9/9	2.10E-03 - 8.51E-02	8.38E-01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cance risk level of 1E-06.
(5) Rationale Codes

Selection Reason: ASL = Above Screening Toxicity Level
Deletion Reason: BSL = Below Screening Toxicity Level
NSL = No Screening Toxicity Level
NUT = Essential Nutrient

Definitions:
C = Carcinogenic
COPC = Chemical of Potential Concern
N = Non-Carcinogenic
NA = Not Applicable
mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Dioxin TEQ, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC58C-1
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-58C - SURFACE SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Surface soil
Exposure Medium: Surface soil
Exposure Point: EC-58C

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	1.02E-06		7.64E-06		mg/kg	EC-58C-A-SO-0.5	4/4	0.00E+00 - 0.00E+00	7.64E-06	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	1.05E-05		1.30E-05		mg/kg	EC-58C-1-SO-0.5	4/4	9.74E-07 - 9.74E-07	1.30E-05	NA	2.20E-05	C	NA	NA	No	BSL
Metals																	
7429-90-5	Aluminum	8.46E+03		2.01E+04	J	mg/kg	EC-58C-C-SO-0.5	4/4	4.63E+01 - 4.74E+01	2.01E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-36-0	Antimony	4.10E-01	J	2.50E+00		mg/kg	EC-58C-C-SO-0.5	4/4	1.20E+00 - 1.20E+00	2.50E+00	NA	4.70E+01	N	NA	NA	No	BSL
7440-50-8	Copper	8.80E+00		2.68E+01		mg/kg	EC-58C-A-SO-0.5	4/4	2.90E+00 - 3.00E+00	2.68E+01	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	Lead	1.84E+01		9.56E+01		mg/kg	EC-58C-A-SO-0.5	4/4	1.20E+00 - 1.20E+00	9.56E+01	NA	5.50E+02	G	NA	NA	No	BSL
7439-96-5	Manganese	9.63E+01		3.68E+02	J	mg/kg	EC-58C-C-SO-0.5	4/4	2.90E+00 - 3.00E+00	3.68E+02	NA	2.60E+03	N	NA	NA	No	BSL
7440-66-6	Zinc	3.33E+01		1.16E+02		mg/kg	EC-58C-A-SO-0.5	4/4	2.90E+00 - 3.00E+00	1.16E+02	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	1.00E-03	J	1.90E-03	J	mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	1.90E-03	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	1.90E-03	J	1.01E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	1.01E-02	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	2.70E-03		1.13E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	1.13E-02	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	1.76E-02		6.40E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	6.40E-02	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	1.71E-02		6.76E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	6.76E-02	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	3.00E-02		1.82E-01		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.77E-02	1.82E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	1.73E-02		6.32E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	6.32E-02	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	1.09E-02		4.10E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	4.10E-02	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	2.44E-02		8.43E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	8.43E-02	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	4.20E-03		1.77E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	1.77E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	3.31E-02		1.11E-01		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.77E-02	1.11E-01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	8.90E-04	J	3.00E-03		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	3.00E-03	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	1.50E-02		5.81E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	5.81E-02	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	8.30E-04	J	5.30E-03		mg/kg	EC-58C-C-SO-0.5	3/4	2.00E-03 - 8.00E-03	5.30E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	1.21E-02		3.65E-02		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.00E-03	3.65E-02	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	3.11E-02		1.37E-01		mg/kg	EC-58C-C-SO-0.5	4/4	2.00E-03 - 8.77E-02	1.37E-01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Toxicity Level; NUT = Essential Nutrient

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram
Data Qualifiers: J = Indicates an estimated value

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

TABLE EC58C-2
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
CURTIS BAY - EC-58C - TOTAL SOIL - INDUSTRIAL

Scenario Timeframe: Current-Industrial
Medium: Total soil
Exposure Medium: Total soil
Exposure Point: EC-58C

CAS Number	Chemical	Minimum (1) Concentration	Minimum Qualifier	Maximum (1) Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Concentration (2) Used for Screening	Background (3) Value	Screening (4) Toxicity Value		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	Rationale for (5) Contaminant Deletion or Selection
Dioxins																	
WHOTEQ	WHO TEQ (ND=0)	1.02E-06		7.64E-06		mg/kg	EC-58C-A-SO-0.5	7/7	0.00E+00 - 0.00E+00	7.64E-06	NA	2.20E-05	C	NA	NA	No	BSL
WHOTEQ	WHO TEQ (ND=DL)	1.03E-05		1.30E-05		mg/kg	EC-58C-1-SO-0.5	7/7	8.34E-07 - 8.34E-07	1.30E-05	NA	2.20E-05	C	NA	NA	No	BSL
Metals																	
7429-90-5	Aluminum	1.99E+03		2.01E+04	J	mg/kg	EC-58C-C-SO-0.5	7/7	3.86E+01 - 4.39E+02	2.01E+04	NA	1.10E+05	N	NA	NA	No	BSL
7440-36-0	Antimony	4.10E-01	J	2.50E+00		mg/kg	EC-58C-C-SO-0.5	4/7	9.60E-01 - 1.20E+00	2.50E+00	NA	4.70E+01	N	NA	NA	No	BSL
7440-50-8	Copper	1.80E+00	J	2.68E+01		mg/kg	EC-58C-A-SO-0.5	7/7	2.40E+00 - 3.00E+00	2.68E+01	NA	4.70E+03	N	NA	NA	No	BSL
7439-92-1	Lead	2.30E+00		9.56E+01		mg/kg	EC-58C-A-SO-0.5	7/7	9.60E-01 - 1.20E+00	9.56E+01	NA	5.50E+02	G	NA	NA	No	BSL
7439-96-5	Manganese	1.98E+01		3.68E+02	J	mg/kg	EC-58C-C-SO-0.5	7/7	2.40E+00 - 3.00E+00	3.68E+02	NA	2.60E+03	N	NA	NA	No	BSL
7440-66-6	Zinc	5.60E+00		1.16E+02		mg/kg	EC-58C-A-SO-0.5	7/7	2.40E+00 - 3.00E+00	1.16E+02	NA	3.50E+04	N	NA	NA	No	BSL
PAHs																	
83-32-9	Acenaphthene	6.20E-04	J	1.90E-03	J	mg/kg	EC-58C-C-SO-0.5	5/7	1.80E-03 - 8.00E-03	1.90E-03	NA	4.50E+03	N	NA	NA	No	BSL
208-96-8	Acenaphthylene	4.40E-04	J	1.01E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	1.01E-02	NA	4.50E+03	N	NA	NA	No	BSL
120-12-7	Anthracene	6.60E-04	K	1.13E-02		mg/kg	EC-58C-C-SO-0.5	6/7	1.80E-03 - 8.00E-03	1.13E-02	NA	2.30E+04	N	NA	NA	No	BSL
56-55-3	Benzo(a)anthracene	1.70E-03	J	6.40E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	6.40E-02	NA	2.10E+01	C	NA	NA	No	BSL
50-32-8	Benzo(a)pyrene	1.80E-03		6.76E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	6.76E-02	NA	2.10E+00	C	NA	NA	No	BSL
205-99-2	Benzo(b)fluoranthene	3.10E-03		1.82E-01		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.77E-02	1.82E-01	NA	2.10E+01	C	NA	NA	No	BSL
191-24-2	Benzo(g,h,I)perylene	6.30E-04	J	6.32E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	6.32E-02	NA	2.30E+03	N	NA	NA	No	BSL
207-08-9	Benzo(k)fluoranthene	1.10E-03	J	4.10E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	4.10E-02	NA	2.10E+02	C	NA	NA	No	BSL
218-01-9	Chrysene	2.30E-03		8.43E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	8.43E-02	NA	2.10E+03	C	NA	NA	No	BSL
53-70-3	Dibenz[a,h]anthracene	1.10E-03	K	1.77E-02		mg/kg	EC-58C-C-SO-0.5	5/7	1.80E-03 - 8.00E-03	1.77E-02	NA	2.10E+00	C	NA	NA	No	BSL
206-44-0	Fluoranthene	2.60E-03		1.11E-01		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.77E-02	1.11E-01	NA	3.00E+03	N	NA	NA	No	BSL
86-73-7	Fluorene	6.20E-04	J	3.00E-03		mg/kg	EC-58C-C-SO-0.5	5/7	1.80E-03 - 8.00E-03	3.00E-03	NA	3.00E+03	N	NA	NA	No	BSL
193-39-5	Indeno(1,2,3-c,d)pyrene	1.60E-03	J	5.81E-02		mg/kg	EC-58C-C-SO-0.5	6/7	1.80E-03 - 8.00E-03	5.81E-02	NA	2.10E+01	C	NA	NA	No	BSL
91-20-3	Naphthalene	8.20E-04	J	5.30E-03		mg/kg	EC-58C-C-SO-0.5	5/7	1.80E-03 - 8.00E-03	5.30E-03	NA	8.60E+00	C	NA	NA	No	BSL
85-01-8	Phenanthrene	9.50E-04	J	3.65E-02		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.00E-03	3.65E-02	NA	2.30E+04	N	NA	NA	No	BSL
129-00-0	Pyrene	2.60E-03		1.37E-01		mg/kg	EC-58C-C-SO-0.5	7/7	1.80E-03 - 8.77E-02	1.37E-01	NA	2.30E+03	N	NA	NA	No	BSL

(1) Minimum/maximum detected concentration.
(2) Maximum concentration used as screening value.
(3) Background values are not included as part of the COPC selection process.
(4) USEPA Regional Screening Levels for industrial soil, USEPA, November 2020. For non-carcinogens, value shown is equal to an HQ of 0.1. For carcinogens the value shown is equal to a cancer risk level of 1E-06. Lead soil screening value taken from MDE July 1, 2020.
(5) Rationale Codes — Selection Reason: ASL = Above Screening Toxicity Level; Deletion Reason: BSL = Below Screening Toxicity Level; NSL = No Screening Toxicity Level; NUT = Essential Nutrient

Definitions: C = Carcinogenic; COPC = Chemical of Potential Concern; N = Non-Carcinogenic; NA = Not Applicable; mg/kg = milligrams per kilogram

Data Qualifiers: J = Indicates an estimated value; L = Reported concentration is below the CRQL (non-metals)/Reported concentration is between the MDL

Surrogates used: 2,3,7,8-TCDD for Total TCDDS, Acenaphthene for Acenaphthylene, Anthracene for Phenanthrene, Pyrene for Benzo(g,h,I)perylene.

Table EC58B-6 Detection Comparison to Screening Levels

Analyte	Surface Soil			Sediment			Surface Water			Selection of Chemicals of Potential Concern[a]	
	Frequency	Maximum (mg/kg)	Soil Screening Criteria[b] (mg/kg)	Frequency	Maximum (mg/kg)	Sediment Screening Criteria[b] (mg/kg)	Frequency	Maximum (µg/L)	Screening Criteria[b] (µg/L)	Terrestrial Habitats[c]	Aquatic Habitats[d]
Metals											
Aluminum	--	--	pH<5.5	4/4	7.64E+03	2.50E+04	--	--	8.70E+01	NO	NO
Antimony	--	--	2.70E-01	4/4	1.70E+00	2.00E+00	--	--	3.00E+01	NO	NO
Arsenic	--	--	1.80E+01	3/3	7.30E+00	9.80E+00	--	--	5.00E+00	NO	NO
Barium	--	--	3.30E+02	3/3	4.89E+01	2.00E+01	--	--	4.00E+00	NO	YES
Beryllium	--	--	2.10E+01	3/3	4.40E-01	NA	--	--	6.60E-01	NO	YES
Cadmium	--	--	3.60E-01	2/3	2.50E-01	9.90E-01	--	--	2.50E-01	NO	NO
Calcium	--	--	NA	3/3	1.31E+03	NA	--	--	1.16E+05	NO	NO
Chromium	--	--	2.60E+01	3/3	1.91E+01	4.34E+01	--	--	8.50E+01	NO	NO
Cobalt	--	--	1.30E+01	3/3	4.40E+00	5.00E+01	--	--	2.30E+01	NO	NO
Copper	--	--	2.80E+01	4/4	5.69E+01	3.16E+01	--	--	9.00E+00	NO	YES
Iron	--	--	NA	3/3	2.10E+04	2.00E+04	--	--	3.00E+02	NO	NO
Lead	--	--	1.10E+01	4/4	1.48E+02	3.58E+01	--	--	2.50E+00	NO	YES
Magnesium	--	--	NA	3/3	7.97E+02	NA	--	--	8.20E+04	NO	NO
Manganese	--	--	2.20E+02	4/4	1.24E+03	4.60E+02	--	--	1.20E+02	NO	YES
Nickel	--	--	3.80E+01	3/3	8.30E+00	2.27E+01	--	--	5.20E+01	NO	NO
Potassium	--	--	NA	3/3	5.14E+02	NA	--	--	5.30E+04	NO	NO
Selenium	--	--	5.20E-01	2/3	1.80E+00	2.00E+00	--	--	1.00E+00	NO	NO
Sodium	--	--	NA	3/3	2.95E+01	NA	--	--	6.80E+05	NO	NO
Vanadium	--	--	7.80E+00	3/3	3.02E+01	NA	--	--	2.00E+01	NO	YES
Zinc	--	--	4.60E+01	4/4	1.20E+02	1.21E+02	--	--	1.20E+02	NO	NO
Dioxins											
Dioxin TEQ Birds EPA2008 (ND=0)	5/5	3.23E-06	3.15E-06	1/1	1.34E-06	8.50E-07	1/1	4.53E-09	3.10E-09	YES	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	5/5	1.34E-05	3.15E-06	1/1	1.60E-05	8.50E-07	1/1	9.76E-05	3.10E-09	YES	YES
Dioxin TEQ Fish EPA2008 (ND=0)	--	--	3.15E-06	1/1	6.45E-07	8.50E-07	1/1	4.53E-09	3.10E-09	NO	YES
Dioxin TEQ Fish EPA2008 (ND=DL)	--	--	3.15E-06	1/1	1.44E-05	8.50E-07	1/1	8.56E-05	3.10E-09	NO	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	5/5	6.21E-06	3.15E-06	1/1	2.05E-06	8.50E-07	1/1	1.36E-08	3.10E-09	YES	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	5/5	1.35E-05	3.15E-06	1/1	1.35E-05	8.50E-07	1/1	7.23E-05	3.10E-09	YES	YES
PAHs											
Acenaphthene	5/5	5.00E-03	Refer to total LMW PAHs	4/4	5.50E-03	Refer to total PAHs	1/1	3.20E-01	5.80E+00	NO	YES
Acenaphthylene	5/5	1.63E-02	Refer to total LMW PAHs	4/4	5.36E-02	Refer to total PAHs	--	--	1.30E+01	NO	YES
Anthracene	5/5	2.21E-02	Refer to total LMW PAHs	4/4	3.35E-02	Refer to total PAHs	1/1	9.80E-02	1.20E-02	NO	YES
Benzo(a)anthracene	5/5	1.00E-01	Refer to total HMW PAHs	4/4	1.82E-01	Refer to total PAHs	1/1	2.10E-02	1.80E-02	NO	YES
Benzo(a)pyrene	5/5	1.20E-01	Refer to total HMW PAHs	4/4	1.97E-01	Refer to total PAHs	--	--	1.50E-02	NO	YES
Benzo(b)fluoranthene	5/5	1.90E-01	Refer to total HMW PAHs	4/4	3.48E-01	Refer to total PAHs	1/1	3.90E-02	2.60E+00	NO	YES
Benzo(g,h,i)perylene	5/5	4.82E-02	Refer to total HMW PAHs	4/4	6.72E-02	Refer to total PAHs	1/1	2.30E-02	1.20E-02	NO	YES
Benzo(k)fluoranthene	5/5	7.81E-02	Refer to total HMW PAHs	4/4	1.12E-01	Refer to total PAHs	--	--	6.00E-02	NO	YES
Chrysene	5/5	1.33E-01	Refer to total HMW PAHs	4/4	2.31E-01	Refer to total PAHs	1/1	2.70E-02	4.70E+00	NO	YES
Dibenzo(a,h)anthracene	5/5	1.41E-02	Refer to total HMW PAHs	4/4	2.07E-02	Refer to total PAHs	--	--	1.20E-02	NO	YES
Fluoranthene	5/5	2.00E-01	Refer to total LMW PAHs	4/4	3.70E-01	Refer to total PAHs	1/1	1.20E-01	4.00E-02	NO	YES
Fluorene	5/5	6.10E-03	Refer to total LMW PAHs	4/4	1.56E-02	Refer to total PAHs	1/1	2.20E-01	3.00E+00	NO	YES
Indeno(1,2,3-cd)pyrene	5/5	5.42E-02	Refer to total HMW PAHs	4/4	7.62E-02	Refer to total PAHs	--	--	1.20E-02	NO	YES
Naphthalene	5/5	2.80E-03	Refer to total LMW PAHs	4/4	4.60E-03	Refer to total PAHs	1/1	1.20E-01	1.10E+00	NO	YES

Table EC58B-6 Detection Comparison to Screening Levels

Analyte	Surface Soil			Sediment			Surface Water			Selection of Chemicals of Potential Concern[a]	
	Frequency	Maximum (mg/kg)	Soil Screening Criteria[b] (mg/kg)	Frequency	Maximum (mg/kg)	Sediment Screening Criteria[b] (mg/kg)	Frequency	Maximum (µg/L)	Screening Criteria[b] (µg/L)	Terrestrial Habitats[c]	Aquatic Habitats[d]
Phenanthrene	5/5	1.06E-01	Refer to total LMW PAHs	4/4	1.30E-01	Refer to total PAHs	1/1	1.40E-01	4.00E-01	NO	YES
Pyrene	5/5	1.74E-01	Refer to total HMW PAHs	4/4	3.15E-01	Refer to total PAHs	1/1	8.00E-02	2.50E-02	NO	YES
Total PAHs	5/5	1.22E+00	Refer to total HMW/LMW PAHs	4/4	2.16E+00	1.61E+00	1/1	1.21E+00	NA	NO	YES
Total LMW PAHs	5/5	1.57E-01	2.90E+01	4/4	2.43E-01	Refer to total PAHs	1/1	8.98E-01	NA	NO	YES
Total HMW PAHs	5/5	1.02E+00	1.10E+00	4/4	1.82E+00	Refer to total PAHs	1/1	3.10E-01	NA	NO	YES

Note:
Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EPA 2008).
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
NA - No screening value available.
PAH - Polycyclic aromatic hydrocarbon.
µg/L - Micrograms per liter.

Table EC58B-7 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil			Sediment			Surface Water (Total Concentration)		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Frequency	Maximum (µg/L)	95UCLM (µg/L)
Metals									
Barium	--	NO COPC	NO COPC	3/3	4.89E+01	5.68E+01	--	--	--
Beryllium	--	NO COPC	NO COPC	3/3	4.40E-01	4.60E-01	--	--	--
Copper	--	NO COPC	NO COPC	4/4	5.69E+01	8.42E+01	--	--	--
Lead	--	NO COPC	NO COPC	4/4	1.48E+02	2.26E+02	--	--	--
Manganese	--	NO COPC	NO COPC	4/4	1.24E+03	1.54E+02	--	--	--
Vanadium	--	NO COPC	NO COPC	3/3	3.02E+01	3.16E+01	--	--	--
Dioxins									
Dioxin TEQ Birds EPA2008 (ND=0)	5/5	3.23E-06	2.63E-06	1/1	1.34E-06	1.34E-06	1/1	4.53E-09	4.53E-09
Dioxin TEQ Birds EPA2008 (ND=DL)	5/5	1.34E-05	1.33E-05	1/1	1.60E-05	1.60E-05	1/1	9.76E-05	9.76E-05
Dioxin TEQ Fish EPA2008 (ND=0)	--	NO COPC	NO COPC	1/1	6.45E-07	6.45E-07	1/1	4.53E-09	4.53E-09
Dioxin TEQ Fish EPA2008 (ND=DL)	--	NO COPC	NO COPC	1/1	1.44E-05	1.44E-05	1/1	8.56E-05	8.56E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	5/5	6.21E-06	6.05E-06	1/1	2.05E-06	2.05E-06	1/1	1.36E-08	1.36E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	5/5	1.35E-05	1.36E-05	1/1	1.35E-05	1.35E-05	1/1	7.23E-05	7.23E-05
PAHs									
Total PAHs	5/5	NO COPC	NO COPC	4/4	2.16E+00	1.13E+00	1/1	1.21E+00	1.21E+00
Total LMW PAHs	5/5	NO COPC	NO COPC	4/4	2.43E-01	7.35E-02	1/1	8.98E-01	8.98E-01
Total HMW PAHs	5/5	NO COPC	NO COPC	4/4	1.82E+00	1.05E+00	1/1	3.10E-01	3.10E-01

Note:

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

-- - No detectable concentrations or the chemical was not analyzed for.

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

µg/L - Micrograms per liter.

Table EC58B-8 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Dioxins					
Dioxin TEQ Birds EPA2008 (ND=0)	NA	3.23E-06	--	2.63E-06	--
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	1.34E-05	--	1.33E-05	--
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	6.21E-06	--	6.05E-06	--
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	1.35E-05	--	1.35E-05	--

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC58B-9 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	Invertebrate Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC	95UCLM EPC (mg/kg dry wt)[a]	Hazard Quotient for 95UCLM EPC
Dioxins					
Dioxin TEQ Birds EPA2008 (ND=0)	5.00E-01	3.23E-06	6.46E-06	2.63E-06	5.26E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	5.00E-01	1.34E-05	2.69E-05	1.33E-05	2.66E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	5.00E-01	6.21E-06	1.24E-05	6.05E-06	1.21E-05
Dioxin TEQ Mammals EPA2008 (ND=DL)	5.00E-01	1.35E-05	2.69E-05	1.35E-05	2.69E-05

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

Dioxin TEQ - Dioxin toxicity equivalent quotient.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC58B-10 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs			Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs		
			Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds	Terrestrial Omnivorous Birds	Piscivorous Birds	Piscivorous Birds
Chemical	**NOAEL**	**LOAEL**	**American Robin**	**Osprey (benthos)**	**Osprey (fish)**	**American Robin**	**Osprey (benthos)**	**Osprey (fish)**
Metals								
Barium	2.08E+01	4.17E+01	NO COPC	1.33E-01	9.87E-03	NO COPC	6.65E-02	4.93E-03
Beryllium	NA	NA	NO COPC	--	--	NO COPC	--	--
Copper	4.05E+00	1.21E+01	NO COPC	**3.93E+00**	5.90E-02	NO COPC	**1.32E+00**	1.98E-02
Lead	1.63E+00	3.26E+00	NO COPC	6.96E-01	3.81E-01	NO COPC	3.48E-01	1.91E-01
Manganese	1.79E+02	3.77E+02	NO COPC	3.93E-01	2.91E-02	NO COPC	1.87E-01	1.38E-02
Vanadium	3.44E-01	6.88E-01	NO COPC	**4.98E+00**	3.69E-01	NO COPC	**2.49E+00**	1.84E-01
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	7.29E-02	3.31E-02	1.37E-03	7.29E-03	3.31E-03	1.37E-04
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	3.04E-01	3.98E-01	**2.08E+01**	3.04E-02	3.98E-02	**2.08E+00**
PAHs								
Total LMW PAHs	5.62E+03	5.62E+04	NO COPC	2.08E-06	1.07E-04	NO COPC	2.08E-07	1.07E-05
Total HMW PAHs	2.00E+00	2.00E+01	NO COPC	1.40E-02	1.08E-01	NO COPC	1.40E-03	1.08E-02

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC58B-11 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
Chemical	**NOAEL**	**LOAEL**	**Deer Mouse**	**Red Fox**	**Deer Mouse**	**Red Fox**
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	2.67E-02	1.24E-02	2.67E-03	1.24E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	7.17E-02	3.32E-02	7.17E-03	3.32E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC58B-12 Comparison of 95UCLM Modeled Wildlife Doses to Mammals to Mammalian TRVs

Chemical	Mammalian TRVs (mg/kg-bw day)		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs[a]		95UCLM Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs[a]	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
	NOAEL	LOAEL	Deer Mouse	Red Fox	Deer Mouse	Red Fox
Metals						
Barium	5.18E+01	8.27E+01	NO COPC	NO COPC	NO COPC	NO COPC
Beryllium	5.32E-01	6.73E-01	NO COPC	NO COPC	NO COPC	NO COPC
Copper	5.60E+00	9.34E+00	NO COPC	NO COPC	NO COPC	NO COPC
Lead	4.70E+00	8.90E+00	NO COPC	NO COPC	NO COPC	NO COPC
Manganese	5.15E+01	1.46E+02	NO COPC	NO COPC	NO COPC	NO COPC
Vanadium	4.16E+00	8.31E+00	NO COPC	NO COPC	NO COPC	NO COPC
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	2.60E-02	1.21E-02	2.60E-03	1.21E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	7.17E-02	3.32E-02	7.17E-03	3.32E-03
PAHs						
Total LMW PAHs	6.56E+01	3.28E+02	NO COPC	NO COPC	NO COPC	NO COPC
Total HMW PAHs	6.15E-01	3.01E+00	NO COPC	NO COPC	NO COPC	NO COPC

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC58B-13 Comparison of Exposure Point Concentrations in Sediment to Benthic Organism TRVs

Chemical	Sediment TEC TRV (mg/kg)	Sediment PEC TRV (mg/kg)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC Compared to TEC	Hazard Quotient for Maximum EPC Compared to PEC	95UCLM EPC[a] (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC Compared to TEC	Hazard Quotient for 95UCLM EPC Compared to PEC
Metals								
Barium	1.30E+02	NA	4.89E+01	3.76E-01	--	4.89E+01	3.76E-01	--
Beryllium	1.10E+00	3.00E+01	4.40E-01	4.00E-01	1.47E-02	4.40E-01	4.00E-01	1.47E-02
Copper	3.16E+01	1.49E+02	5.69E+01	**1.80E+00**	3.82E-01	5.69E+01	**1.80E+00**	3.82E-01
Lead	3.58E+01	1.28E+02	1.48E+02	**4.13E+00**	**1.16E+00**	1.48E+02	**4.13E+00**	**1.16E+00**
Manganese	4.60E+02	1.10E+03	1.24E+03	**2.70E+00**	**1.13E+00**	1.54E+02	3.35E-01	1.40E-01
Vanadium	4.20E+01	2.50E+02	3.02E+01	7.19E-01	1.21E-01	3.02E+01	7.19E-01	1.21E-01
Dioxins								
Dioxin TEQ Fish EPA2008 (ND=0)	8.50E-07	NA	6.45E-07	7.59E-01	--	6.45E-07	7.59E-01	--
Dioxin TEQ Fish EPA2008 (ND=DL)	8.50E-07	NA	1.44E-05	**1.69E+01**	--	1.44E-05	**1.69E+01**	--
PAHs								
Total PAHs	1.61E+00	2.28E+01	2.16E+00	**1.34E+00**	9.48E-02	1.13E+00	6.99E-01	4.94E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

LOAEL - Lowest observed adverse effect level.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

Table EC58B-14 Comparison of Exposure Point Concentrations in Surface Water to Chronic Aquatic Organism TRVs

Chemical	Chronic Surface Water Toxicity Reference Value (µg/L)	Total Concentrations			
		Maximum EPC (µg/L)	Hazard Quotient for Maximum EPC	95UCLM EPC (µg/L)[a]	Hazard Quotient for 95UCLM EPC
Dioxins					
Dioxin TEQ Fish EPA2008 (ND=0)	1.00E-05	4.53E-09	4.53E-04	4.53E-09	4.53E-04
Dioxin TEQ Fish EPA2008 (ND=DL)	1.00E-05	8.56E-05	**8.56E+00**	8.56E-05	**8.56E+00**
PAHs					
Acenaphthene	2.30E+01	3.20E-01	1.39E-02	3.20E-01	1.39E-02
Anthracene	7.30E-01	9.80E-02	1.34E-01	9.80E-02	1.34E-01
Benzo(a)anthracene	2.70E-02	2.10E-02	7.78E-01	2.10E-02	7.78E-01
Fluoranthene	6.16E+00	1.20E-01	1.95E-02	1.20E-01	1.95E-02
Fluorene	3.90E+00	2.20E-01	5.64E-02	2.20E-01	5.64E-02
Naphthalene	1.20E+01	1.20E-01	1.00E-02	1.20E-01	1.00E-02
Phenanthrene	6.30E+00	1.40E-01	2.22E-02	1.40E-01	2.22E-02

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

µg/L - Micrograms per liter.

EPC - Exposure point concentration.

Table EC58B-15 Comparison of Exposure Point Concentrations in Surface Water to Acute Aquatic Organism TRVs

Chemical	Acute Surface Water Toxicity Reference Value (µg/L)	Total Concentrations			
		Maximum EPC (µg/L)	Hazard Quotient for Maximum EPC	95UCLM EPC (µg/L)[a]	Hazard Quotient for 95UCLM EPC
Dioxins					
Dioxin TEQ Fish EPA2008 (ND=0)	1.00E-01	4.53E-09	4.53E-08	4.53E-09	4.53E-08
Dioxin TEQ Fish EPA2008 (ND=DL)	1.00E-01	8.56E-05	8.56E-04	8.56E-05	8.56E-04
PAHs					
Acenaphthene	8.00E+01	3.20E-01	4.00E-03	3.20E-01	4.00E-03
Anthracene	1.30E+01	9.80E-02	7.54E-03	9.80E-02	7.54E-03
Benzo(a)anthracene	4.90E-01	2.10E-02	4.29E-02	2.10E-02	4.29E-02
Fluoranthene	3.36E+01	1.20E-01	3.57E-03	1.20E-01	3.57E-03
Fluorene	7.00E+01	2.20E-01	3.14E-03	2.20E-01	3.14E-03
Naphthalene	1.90E+02	1.20E-01	6.32E-04	1.20E-01	6.32E-04
Phenanthrene	3.00E+01	1.40E-01	4.67E-03	1.40E-01	4.67E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

µg/L - Micrograms per liter.

EPC - Exposure point concentration.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC58B-16 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	NA	5/5	3.23E-06	2.63E-06	Exceeds	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	5/5	1.34E-05	1.33E-05	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	5/5	6.21E-06	6.05E-06	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	5/5	1.35E-05	1.35E-05	Exceeds	Exceeds

Note:
95UCLM - 95 percent upper confidence limit of mean
BTV - 95% Upper Threshold Limit (UTL) for Suface Soil Background Values
EPC - exposure point concentration
mg/kg - milligrams per kilogram
RL - reporting limit
TEQ - toxicity equivalent quotient
wt - weight

Table EC58B-17 Comparison of Background Sediment Concentrations to Site Sediment Concentrations

Chemical	Background* (mg/kg)	Site Sediment		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Barium	3.04E+01	3/3	4.89E+01	Exceeds
Beryllium	2.90E-01	3/3	4.40E-01	Exceeds
Copper	5.83E+00	4/4	5.69E+01	Exceeds
Lead	1.52E+01	4/4	1.48E+02	Exceeds
Manganese	9.29E+01	4/4	1.24E+03	Exceeds
Vanadium	1.31E+01	3/3	3.02E+01	Exceeds
Dioxins				
Dioxin TEQ Fish EPA2008 (ND=0)	8.50E-07	1/1	6.45E-07	--
Dioxin TEQ Fish EPA2008 (ND=DL)	8.50E-07	1/1	1.44E-05	Exceeds
PAHs				
Acenaphthene	9.71E-03	4/4	5.50E-03	--
Acenaphthylene	1.32E-03	4/4	5.36E-02	Exceeds
Anthracene	2.01E-02	4/4	3.35E-02	Exceeds
Benzo(a)anthracene	4.67E-02	4/4	1.82E-01	Exceeds
Benzo(a)pyrene	4.32E-02	4/4	1.97E-01	Exceeds
Benzo(b)fluoranthene	7.44E-02	4/4	3.48E-01	Exceeds
Benzo(g,h,i)perylene	2.57E-02	4/4	6.72E-02	Exceeds
Benzo(k)fluoranthene	2.79E-02	4/4	1.12E-01	Exceeds
Chrysene	6.18E-02	4/4	2.31E-01	Exceeds
Dibenzo(a,h)anthracene	8.77E-03	4/4	2.07E-02	Exceeds
Fluoranthene	9.76E-02	4/4	3.70E-01	Exceeds
Fluorene	1.01E-02	4/4	1.56E-02	Exceeds
Indeno(1,2,3-cd)pyrene	3.24E-02	4/4	7.62E-02	Exceeds
Naphthalene	2.17E-03	4/4	4.60E-03	Exceeds

Table EC58B-17 Comparison of Background Sediment Concentrations to Site Sediment Concentrations

Chemical	Background* (mg/kg)	Site Sediment		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Phenanthrene	9.61E-02	4/4	1.30E-01	Exceeds
Pyrene	7.78E-02	4/4	3.15E-01	Exceeds
Total PAHs	6.35E-01	4/4	2.16E+00	Exceeds
Total LMW PAHs	1.39E-01	4/4	2.43E-01	Exceeds
Total HMW PAHs	4.96E-01	4/4	1.82E+00	Exceeds

Note:

*Background Value shown is 95UCLM of background sample collected by EA in April 2019 calculated with the ISM Calculator for 1-sided Upper Confidence Limit for the Mean.

95UCLM - 95 percent upper confidence limit of mean

EPC - exposure point concentration

mg/kg - milligrams per kilogram

ND - nondetect

PAH - polycyclic aromatic hydrocarbon

RL - reporting limit

TEQ - toxicity equivalent quotient

wt - weight

Table EC58B-18 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	3.23E-06	4.53E-12	1.00E+00	3.23E-06	3.02E-07	7.19E-07	6.34E-13	1.02E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	1.34E-05	9.76E-08	1.00E+00	1.34E-05	1.25E-06	2.99E-06	1.37E-08	4.26E-06

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

VOC - Volatile organic compound.

wt - Weight.

Table EC58B-19 Wildlife Exposure Modeling of 95UCLM Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Insect/Worm) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	2.63E-06	4.53E-12	1.00E+00	2.63E-06	2.46E-07	5.85E-07	6.34E-13	8.31E-07
Dioxin TEQ Birds EPA2008 (ND=DL)	1.33E-05	9.76E-08	1.00E+00	1.33E-05	1.24E-06	2.96E-06	1.37E-08	4.22E-06

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-20 Wildlife Exposure Modeling of Maximum Doses to Piscivorous Birds (Osprey [benthos]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	Maximum Sediment Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Modeled Food Item (Benthos) Uptake			Maximum Case Scenario Doses			
			BSAF/Uptake Factor		Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals									
Barium	4.89E+01	--	1.00E+00	Uptake Factor	4.89E+01	2.05E-01	2.57E+00	0.00E+00	2.77E+00
Beryllium	4.40E-01	--	1.00E+00	Uptake Factor	4.40E-01	1.85E-03	2.31E-02	0.00E+00	2.49E-02
Copper	5.69E+01	--	5.25E+00	Uptake Factor	2.99E+02	2.39E-01	1.57E+01	0.00E+00	1.59E+01
Lead	1.48E+02	--	6.60E-02	Uptake Factor	9.77E+00	6.22E-01	5.13E-01	0.00E+00	1.13E+00
Manganese	1.24E+03	--	1.00E+00	Uptake Factor	1.24E+03	5.21E+00	6.51E+01	0.00E+00	7.03E+01
Vanadium	3.02E+01	--	1.00E+00	Uptake Factor	3.02E+01	1.27E-01	1.59E+00	0.00E+00	1.71E+00
Dioxins									
Dioxin TEQ Birds EPA2008 (ND=0)	1.34E-06	4.53E-12	5.44E-01	BSAF	8.72E-06	5.61E-09	4.58E-07	2.36E-13	4.64E-07
Dioxin TEQ Birds EPA2008 (ND=DL)	1.60E-05	9.76E-08	5.44E-01	BSAF	1.05E-04	6.73E-08	5.49E-06	5.08E-09	5.57E-06
PAHs									
Total LMW PAHs	2.43E-01	8.98E-04	6.95E-02	BSAF	2.02E-01	1.02E-03	1.06E-02	4.67E-05	1.17E-02
Total HMW PAHs	1.82E+00	3.10E-04	1.78E-02	BSAF	3.89E-01	7.65E-03	2.04E-02	1.61E-05	2.81E-02

Note:

BSAF - Biota-sediment accumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-21 Wildlife Exposure Modeling of 95UCLM Doses to Piscivorous Birds (Osprey [benthos]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	95UCLM Sediment Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Modeled Food Item (Benthos) Uptake			95UCLM Case Scenario Doses			
			BSAF/Uptake Factor		95UCLM Food Item Tissue Concentration (mg/L dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals									
Barium	4.89E+01	--	1.00E+00	Uptake Factor	4.89E+01	2.05E-01	2.57E+00	0.00E+00	2.77E+00
Beryllium	4.40E-01	--	1.00E+00	Uptake Factor	4.40E-01	1.85E-03	2.31E-02	0.00E+00	2.49E-02
Copper	5.69E+01	--	5.25E+00	Uptake Factor	2.99E+02	2.39E-01	1.57E+01	0.00E+00	1.59E+01
Lead	1.48E+02	--	6.60E-02	Uptake Factor	9.77E+00	6.22E-01	5.13E-01	0.00E+00	1.13E+00
Manganese	1.54E+02	--	1.00E+00	Uptake Factor	1.54E+02	6.47E-01	8.09E+00	0.00E+00	8.74E+00
Vanadium	3.02E+01	--	1.00E+00	Uptake Factor	3.02E+01	1.27E-01	1.59E+00	0.00E+00	1.71E+00
Dioxins									
Dioxin TEQ Birds EPA2008 (ND=0)	1.34E-06	4.53E-12	5.44E-01	BSAF	1.25E-06	5.61E-09	6.56E-08	2.36E-13	7.12E-08
Dioxin TEQ Birds EPA2008 (ND=DL)	1.60E-05	9.76E-08	5.44E-01	BSAF	1.50E-05	6.73E-08	7.87E-07	5.08E-09	8.59E-07
PAHs									
Total LMW PAHs	7.35E-02	8.98E-04	6.95E-02	BSAF	8.78E-03	3.09E-04	4.61E-04	4.67E-05	8.16E-04
Total HMW PAHs	1.05E+00	3.10E-04	1.78E-02	BSAF	3.22E-02	4.43E-03	1.69E-03	1.61E-05	6.13E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BSAF - Biota-sediment accumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-22 Wildlife Exposure Modeling of Maximum Doses to Piscivorous Birds (Osprey [fish]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	Maximum Sediment Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Fish) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Barium	4.89E+01	--	1.60E+01	0.00E+00	2.05E-01	0.00E+00	0.00E+00	2.05E-01
Beryllium	4.40E-01	--	2.48E+02	0.00E+00	1.85E-03	0.00E+00	0.00E+00	1.85E-03
Copper	5.69E+01	--	1.86E+03	0.00E+00	2.39E-01	0.00E+00	0.00E+00	2.39E-01
Lead	1.48E+02	--	1.80E+02	0.00E+00	6.22E-01	0.00E+00	0.00E+00	6.22E-01
Manganese	1.24E+03	--	1.60E+03	0.00E+00	5.21E+00	0.00E+00	0.00E+00	5.21E+00
Vanadium	3.02E+01	--	4.00E+00	0.00E+00	1.27E-01	0.00E+00	0.00E+00	1.27E-01
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.34E-06	4.53E-12	5.68E+04	2.57E-07	5.61E-09	1.35E-08	2.36E-13	1.91E-08
Dioxin TEQ Birds EPA2008 (ND=DL)	1.60E-05	9.76E-08	5.68E+04	5.55E-03	6.73E-08	2.91E-04	5.08E-09	2.91E-04
PAHs								
Total LMW PAHs	2.43E-01	8.98E-04	1.28E+04	1.15E+01	1.02E-03	6.03E-01	4.67E-05	6.04E-01
Total HMW PAHs	1.82E+00	3.10E-04	1.28E+04	3.96E+00	7.65E-03	2.08E-01	1.61E-05	2.16E-01

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-23 Wildlife Exposure Modeling of 95UCLM Doses to Piscivorous Birds (Osprey [fish]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	95UCLM Sediment Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Fish) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/L dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Barium	4.89E+01	--	1.60E+01	0.00E+00	2.05E-01	0.00E+00	0.00E+00	2.05E-01
Beryllium	4.40E-01	--	2.48E+02	0.00E+00	1.85E-03	0.00E+00	0.00E+00	1.85E-03
Copper	5.69E+01	--	1.86E+03	0.00E+00	2.39E-01	0.00E+00	0.00E+00	2.39E-01
Lead	1.48E+02	--	1.80E+02	0.00E+00	6.22E-01	0.00E+00	0.00E+00	6.22E-01
Manganese	1.54E+02	--	1.60E+03	0.00E+00	6.47E-01	0.00E+00	0.00E+00	6.47E-01
Vanadium	3.02E+01	--	4.00E+00	0.00E+00	1.27E-01	0.00E+00	0.00E+00	1.27E-01
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.34E-06	4.53E-12	5.68E+04	2.57E-07	5.61E-09	1.35E-08	2.36E-13	1.91E-08
Dioxin TEQ Birds EPA2008 (ND=DL)	1.60E-05	9.76E-08	5.68E+04	5.55E-03	6.73E-08	2.91E-04	5.08E-09	2.91E-04
PAHs								
Total LMW PAHs	7.35E-02	8.98E-04	1.28E+04	1.15E+01	3.09E-04	6.03E-01	4.67E-05	6.03E-01
Total HMW PAHs	1.05E+00	3.10E-04	1.28E+04	3.96E+00	4.43E-03	2.08E-01	1.61E-05	2.13E-01

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-24 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	6.21E-06	1.36E-11	3.87E-03	2.41E-08	2.55E-08	1.23E-09	2.58E-12	2.67E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.35E-05	7.23E-08	3.87E-03	5.22E-08	5.52E-08	2.68E-09	1.37E-08	7.17E-08

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-25 Wildlife Exposure Modeling of 95UCLM Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Food Item (Plant) Uptake		95UCLM Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	6.05E-06	1.36E-11	3.87E-03	2.34E-08	2.48E-08	1.20E-09	2.58E-12	2.60E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.35E-05	7.23E-08	3.87E-03	5.22E-08	5.52E-08	2.68E-09	1.37E-08	7.17E-08

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58B-26 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins										
Dioxin TEQ Mammals EPA2008 (ND=0)	6.21E-06	1.36E-11	2.67E-08	Biotransfer Factor	8.36E-01	2.23E-08	1.20E-08	3.85E-10	1.16E-12	1.24E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.35E-05	7.23E-08	7.17E-08	Biotransfer Factor	8.36E-01	5.99E-08	2.60E-08	1.03E-09	6.14E-09	3.32E-08

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

Table EC58B-27 Wildlife Exposure Modeling of 95UCLM Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	95UCLM Soil Concentration (mg/kg dry wt.)[a]	95UCLM Total Water Concentration (mg/L)[a]	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		95UCLM Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	95UCLM Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Dioxins										
Dioxin TEQ Mammals EPA2008 (ND=0)	6.05E-06	1.36E-11	2.60E-08	Biotransfer Factor	8.36E-01	2.17E-08	1.17E-08	3.75E-10	1.16E-12	1.21E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.35E-05	7.23E-08	7.17E-08	Biotransfer Factor	8.36E-01	5.99E-08	2.60E-08	1.03E-09	6.14E-09	3.32E-08

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM. If the 95UCLM is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

95UCLM - 95 percent upper confidence level of the mean.

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58C-1 Detection Comparison to Screening Levels

Analyte	Surface Soil			Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Soil Screening Criteria (mg/kg)	Terrestrial Habitats
Metals				
Aluminum	4/4	2.01E+04	pH<5.5	NO
Antimony	4/4	2.50E+00	2.70E-01	YES
Copper	4/4	2.68E+01	2.80E+01	NO
Lead	4/4	9.56E+01	1.10E+01	YES
Manganese	4/4	3.68E+02	2.20E+02	YES
Zinc	4/4	1.16E+02	4.60E+01	YES
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	4/4	1.10E-05	3.15E-06	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	4/4	1.62E-05	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	4/4	7.64E-06	3.15E-06	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	4/4	1.30E-05	3.15E-06	YES
PAHs				
Acenaphthene	4/4	1.90E-03	Refer to total LMW PAHs	NO
Acenaphthylene	4/4	1.01E-02	Refer to total LMW PAHs	NO
Anthracene	4/4	1.13E-02	Refer to total LMW PAHs	NO
Benzo(a)anthracene	4/4	6.40E-02	Refer to total HMW PAHs	NO
Benzo(a)pyrene	4/4	6.76E-02	Refer to total HMW PAHs	NO
Benzo(b)fluoranthene	4/4	1.82E-01	Refer to total HMW PAHs	NO
Benzo(g,h,i)perylene	4/4	6.32E-02	Refer to total HMW PAHs	NO
Benzo(k)fluoranthene	4/4	4.10E-02	Refer to total HMW PAHs	NO
Chrysene	4/4	8.43E-02	Refer to total HMW PAHs	NO
Dibenzo(a,h)anthracene	4/4	1.77E-02	Refer to total HMW PAHs	NO
Fluoranthene	4/4	1.11E-01	Refer to total LMW PAHs	NO
Fluorene	4/4	3.00E-03	Refer to total LMW PAHs	NO
Indeno(1,2,3-cd)pyrene	4/4	5.81E-02	Refer to total HMW PAHs	NO
Naphthalene	3/4	5.30E-03	Refer to total LMW PAHs	NO
Phenanthrene	4/4	3.65E-02	Refer to total LMW PAHs	NO
Pyrene	4/4	1.37E-01	Refer to total HMW PAHs	NO
Total LMW PAHs	4/4	6.81E-02	2.90E+01	NO
Total HMW PAHs	4/4	7.50E-01	1.10E+00	NO

Note:
Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EPA 2008).
HMW - High molecular weight.
LMW - Low molecular weight.
mg/kg - Milligrams per kilogram.
ND - Nondetect.
PAH - Polycyclic aromatic hydrocarbon.

Table EC58C-2 Frequency of Detection and Exposure Point Concentrations

Analyte	Surface Soil	
	Frequency	Maximum (mg/kg)
Metals		
Antimony	4/4	2.50E+00
Lead	4/4	9.56E+01
Manganese	4/4	3.68E+02
Zinc	4/4	1.16E+02
Dioxins		
Dioxin TEQ Birds EPA2008 (ND=0)	4/4	1.10E-05
Dioxin TEQ Birds EPA2008 (ND=DL)	4/4	1.62E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	4/4	7.64E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	4/4	1.30E-05

Note:
mg/kg - Milligrams per kilogram.
TEQ - Toxicity equivalent quotient.

Table EC58C-3 Comparison of Exposure Point Concentrations in Soil to Plant TRVs

Chemical	Plant Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Antimony	5.00E+00	2.50E+00	5.00E-01
Lead	1.20E+02	9.56E+01	7.97E-01
Manganese	2.20E+02	3.68E+02	**1.67E+00**
Zinc	1.60E+02	1.16E+02	7.25E-01
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=0)	NA	1.10E-05	--
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	1.62E-05	--
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	7.64E-06	--
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	1.30E-05	--

Note:

Bold represents a hazard quotient greater than 1.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC58C-4 Comparison of Exposure Point Concentrations in Soil to Soil Invertebrate TRVs

Chemical	~~Invertebrate~~ Toxicity Reference Value (mg/kg dry wt)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC
Metals			
Antimony	7.80E+01	2.50E+00	3.21E-02
Lead	1.70E+03	9.56E+01	5.62E-02
Manganese	4.50E+02	3.68E+02	8.18E-01
Zinc	1.20E+02	1.16E+02	9.67E-01
Dioxins			
Dioxin TEQ Birds EPA2008 (ND=0)	5.00E-01	1.10E-05	2.20E-05
Dioxin TEQ Birds EPA2008 (ND=DL)	5.00E-01	1.62E-05	3.24E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	5.00E-01	7.64E-06	1.53E-05
Dioxin TEQ Mammals EPA2008 (ND=DL)	5.00E-01	1.30E-05	2.59E-05

Note:

Bold represents a hazard quotient greater than 1.

Dioxin TEQ - Dioxin toxicity equivalent quotient.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

wt - Weight.

Table EC58C-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs	Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs
			Terrestrial Omnivorous Birds	Terrestrial Omnivorous Birds
	NOAEL	LOAEL	American Robin	American Robin
Metals				
Antimony	NA	NA	--	--
Lead	1.63E+00	3.26E+00	**9.83E+00**	**4.92E+00**
Manganese	1.79E+02	3.77E+02	2.23E-01	1.06E-01
Zinc	6.61E+01	1.71E+02	**1.53E+00**	5.91E-01
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	2.48E-01	2.48E-02
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	3.66E-01	3.66E-02

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern following screening.

NOAEL - No observed adverse effect level.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC58C-6 Comparison of Maximum Modeled Wildlife Doses to Mammals to Mammalian TRVs

	Mammalian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Terrestrial Herbivorous Mammals	Predatory Mammals	Terrestrial Herbivorous Mammals	Predatory Mammals
Chemical	**NOAEL**	**LOAEL**	**Deer Mouse**	**Red Fox**	**Deer Mouse**	**Red Fox**
Metals						
Antimony	5.90E-02	5.90E-01	6.08E-01	8.13E-01	6.08E-02	8.13E-02
Lead	4.70E+00	8.90E+00	1.21E-01	6.90E-02	6.37E-02	3.65E-02
Manganese	5.15E+01	1.46E+02	1.21E-01	2.10E-02	4.27E-02	7.44E-03
Zinc	7.54E+01	2.98E+02	5.22E-02	3.14E-02	1.32E-02	7.95E-03
Dioxins						
Dioxin TEQ Mammals EPA2008 (ND=0)	1.00E-06	1.00E-05	3.29E-02	1.52E-02	3.29E-03	1.52E-03
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.00E-06	1.00E-05	5.57E-02	2.58E-02	5.57E-03	2.58E-03

Note:

Bold represents a hazard quotient greater than 1.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NOAEL - No observed adverse effect level.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table EC58C-7 Comparison of Background Surface Soil Concentrations to Site Surface Soil Concentrations

Chemical	Surface Soil BTV (mg/kg dry wt)	Site Surface Soil		Maximum Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	
Metals				
Antimony	9.50E-01	4/4	2.50E+00	Exceeds
Iron	1.80E+04	0	NO COPC	Exceeds
Lead	1.24E+02	4/4	9.56E+01	--
Manganese	7.00E+02	4/4	3.68E+02	--
Zinc	8.39E+01	4/4	1.16E+02	Exceeds
Dioxins				
Dioxin TEQ Birds EPA2008 (ND=0)	NA	4/4	1.10E-05	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	4/4	1.62E-05	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	NA	4/4	7.64E-06	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL)	NA	4/4	1.30E-05	Exceeds

Note:
95UCLM - 95 percent upper confidence limit of mean
BTV - 95% Upper Threshold Limit (UTL) for Suface Soil Background Values
EPC - exposure point concentration
mg/kg - milligrams per kilogram
TEQ - toxicity equivalent quotient
wt - weight

Table EC58C-8 Wildlife Exposure Modeling of Maximum Doses to Omnivorous Birds (American Robin) from Media

Exposure Parameters

Soil Ingestion Rate:	9.35E-02	kg dry wt./kg bw-day
Food Ingestrion Rate:	2.23E-01	kg dry wt./kg bw-day
Water Ingestion Rate:	1.40E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Insect/Worm) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	2.50E+00	0.00E+00	1.00E+00	2.50E+00	2.34E-01	5.56E-01	0.00E+00	7.90E-01
Lead	9.56E+01	0.00E+00	ln(dry worm conc, mg/kg) = (-0.218+0.807*ln(soil conc))	3.19E+01	8.93E+00	7.09E+00	0.00E+00	1.60E+01
Manganese	3.68E+02	0.00E+00	ln(dry worm conc, mg/kg) = (-0.809+0.682*ln(soil conc))	2.50E+01	3.44E+01	5.57E+00	0.00E+00	4.00E+01
Zinc	1.16E+02	0.00E+00	ln(dry worm conc, mg/kg) = (4.449+0.328*ln(soil conc))	4.07E+02	1.08E+01	9.05E+01	0.00E+00	1.01E+02
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	1.10E-05	0.00E+00	1.00E+00	1.10E-05	1.03E-06	2.45E-06	0.00E+00	3.47E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	1.62E-05	0.00E+00	1.00E+00	1.62E-05	1.52E-06	3.61E-06	0.00E+00	5.12E-06

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

Table EC58C-9 Wildlife Exposure Modeling of Maximum Doses to Herbivorous Mammals (Deer Mouse) from Media

Exposure Parameters

Soil Ingestion Rate:	4.10E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.13E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	1.90E-01	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Plant) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/kg dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Antimony	2.50E+00	0.00E+00	2.00E-01	5.00E-01	1.03E-02	2.56E-02	0.00E+00	3.59E-02
Lead	9.56E+01	0.00E+00	ln(dry plant conc, mg/kg) = (-1.328+0.561*ln(soil conc))	3.42E+00	3.92E-01	1.75E-01	0.00E+00	5.67E-01
Manganese	3.68E+02	0.00E+00	2.50E-01	9.20E+01	1.51E+00	4.72E+00	0.00E+00	6.22E+00
Zinc	1.16E+02	0.00E+00	ln(dry plant conc, mg/kg) = (1.575+0.555*ln(soil conc))	6.76E+01	4.76E-01	3.46E+00	0.00E+00	3.94E+00
Dioxins								
Dioxin TEQ Mammals EPA2008 (ND=0)	7.64E-06	0.00E+00	3.87E-03	2.96E-08	3.13E-08	1.52E-09	0.00E+00	3.29E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.30E-05	0.00E+00	3.87E-03	5.02E-08	5.31E-08	2.57E-09	0.00E+00	5.57E-08

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table EC58C-10 Wildlife Exposure Modeling of Maximum Doses to Predatory Mammals (Red Fox) from Media

Exposure Parameters

Soil Ingestion Rate:	1.93E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	1.73E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	8.50E-02	L/kg bw-day

Chemical	Maximum Soil Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Maximum Dose to Small Mammal (mg/kg bw-day)	Model Type	Food Item (Small Mammal) Uptake		Maximum Case Scenario Doses			
					Uptake Factor (mg/kg dry wt./mg/kg dry wt.) or Small Mammal Biotransfer Factor (mg/kg bw-day to mg/kg)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Soil (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals										
Antimony	2.50E+00	0.00E+00	3.59E-02	Uptake Factor	1.00E+00	2.50E+00	4.83E-03	4.31E-02	0.00E+00	4.80E-02
Lead	9.56E+01	0.00E+00	5.67E-01	Log Linear	ln(dry mammal conc, mg/kg) = (0.0761+0.4422*ln(soil conc))	8.11E+00	1.85E-01	1.40E-01	0.00E+00	3.25E-01
Manganese	3.68E+02	0.00E+00	6.22E+00	Uptake Factor	5.87E-02	2.16E+01	7.11E-01	3.73E-01	0.00E+00	1.08E+00
Zinc	1.16E+02	0.00E+00	3.94E+00	Log Linear	ln(dry mammal conc, mg/kg) = (4.4713+0.0738*ln(soil conc))	1.24E+02	2.24E-01	2.14E+00	0.00E+00	2.37E+00
Dioxins										
Dioxin TEQ Mammals EPA2008 (ND=0)	7.64E-06	0.00E+00	3.29E-08	Biotransfer Factor	8.36E-01	2.75E-08	1.48E-08	4.74E-10	0.00E+00	1.52E-08
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.30E-05	0.00E+00	5.57E-08	Biotransfer Factor	8.36E-01	4.65E-08	2.50E-08	8.03E-10	0.00E+00	2.58E-08

Note:

BAF - Bioaccumulation factor.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

Table GW-1
Curtis Bay Depot Groundwater

					Background Wells																							
				Location Name	BG-MW-01		BG-MW-01		EC-03-04		EC-21-41		EC-21-41		EC-22-06		EC-25-29		EC-25-29		EC-27-03		EC-28-16		EC-28-17		EC-29-01		EC-29-11	
				Sample Name	BG-MW-01		BG-MW-01-GW		EC-03-04-GW		EC-21-41-GW		GW-FD1-100515 EC-21-41-GW		EC-22-06-GW		EC-25-29-GW		GW-FD2-093015 EC-25-29-GW		EC-27-03-GW		EC-28-16-GW		EC-28-17-GW		EC-29-2-GW		EC-29-11-GW	
				Parent Sample Code																										
				Sample Date	10/8/2015		9/5/2013		10/2/2015		10/5/2015		10/5/2015		10/7/2015		9/30/2015		9/30/2015		10/2/2015		10/6/2015		10/6/2015		8/30/2013		10/6/2015	
Analyte	Fraction	CAS	MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
E218.6																														
Chromium, Hexavalent	D	18540-29-9	0.1	µg/L	4	U																	4	U	4	U				
Chromium, Hexavalent	T	18540-29-9	0.1	µg/L	4	U																	4	U	4	U				
SW846 7196A																														
Chromium, Hexavalent	T	18540-29-9	0.1	mg/L																										
EPA 6850																														
Perchlorate		14797-73-0	15	µg/L	0.6	J											4	U	4	U										
SW846 6020A																														
Aluminum	D	7429-90-5		mg/L	0.0205				0.002	U	**0.104**	J	**0.114**	J	**0.283**	J	0.002	UJ	0.002	UJ	**0.0211**		0.002	U	0.002	U			0.002	U
Aluminum	T	7429-90-5		mg/L	0.0642		0.21		0.0542		**0.156**		**0.15**		**0.306**	J	0.028	J	0.0334	J	**0.292**		**0.104**		**0.14**		**0.16**		0.002	U
Antimony	D	7440-36-0	0.006	mg/L	0.001	U					0.001	U	0.001	U	0.001	UJ	0.001	U	0.001	U										
Antimony	T	7440-36-0	0.006	mg/L	0.001	U	0.0022	U			0.001	U	0.001	U	0.001	UJ	0.001	UJ	0.001	UJ										
Arsenic	D	7440-38-2	0.01	mg/L	0.001	U																	0.000815	J	**0.00192**	J				
Arsenic	T	7440-38-2	0.01	mg/L	0.001	U	0.003	U			0.0004	J	0.001	U									0.000881	J	**0.00209**	J				
Barium	T	7440-39-3	2	mg/L							0.0296		0.0292																	
Beryllium	T	7440-41-7	0.004	mg/L							0.001	U	0.001	U																
Cadmium	D	7440-43-9	0.005	mg/L	0.001	U			0.001	U											0.001	U	0.001	U	0.001	U			0.001	U
Cadmium	T	7440-43-9	0.005	mg/L	0.001	U	0.0011	U	0.001	U	0.0004	J	0.000351	J							0.001	U	0.001	U	0.001	U	0.0011	U	0.001	U
Calcium	T	7440-70-2		mg/L							2.34		2.33																	
Chromium	D	7440-47-3	0.1	mg/L	0.0036	J			0.00139	J											0.001	U	0.001	U	0.001	U			0.000577	J
Chromium	T	7440-47-3	0.1	mg/L	0.0317		0.007		0.00157	J	0.0009	J	0.00108	J							0.00143	J	0.000426	J	0.00058	J	0.0026		0.000702	J
Cobalt	D	7440-48-4		mg/L	0.014				0.00127	J											0.0012	J	0.0015	J	0.00497	J			0.00134	J
Cobalt	T	7440-48-4		mg/L	0.0142		0.015		0.00139	J	0.0085		0.00833								0.00149	J	0.00148	J	0.00484	J	0.013		0.00135	J
Copper	D	7440-50-8	1.3	mg/L	0.0059						0.0027	J	0.00267	J	0.00219	J	0.001	U	0.001	U			0.001	U	0.001	U				
Copper	T	7440-50-8	1.3	mg/L	0.0264		0.0039	J			0.0018	J	0.00201	J	0.00185	J	0.001	UJ	0.001	UJ			0.001	U	0.00117	J				
Iron	T	7439-89-6		mg/L							4.39		4.42																	
Lead	D	7439-92-1	0.015	mg/L	0.001	U			0.001	U	0.001	J	**0.00104**	J	0.001	UJ	0.001	UJ	0.001	UJ	0.001	U	0.001	U	0.001	U			0.001	U
Lead	T	7439-92-1	0.015	mg/L	0.001	J	0.0022	U	0.001	U	**0.0017**	J	**0.00151**	J	0.001	UJ	0.001	UJ	0.001	UJ	0.001	U	0.001	UJ	0.001	UJ	0.0022	U	0.001	UJ
Magnesium	T	7439-95-4		mg/L							2.95		2.93																	
Manganese	D	7439-96-5		mg/L	0.0502						**0.202**		**0.221**		**0.292**		**0.0643**		**0.0657**											
Manganese	T	7439-96-5		mg/L	0.0496		0.058				**0.29**		**0.293**		**0.245**		**0.0627**		**0.0644**											
Nickel	D	7440-02-0		mg/L	0.0211																		0.00219	J	0.00738					
Nickel	T	7440-02-0		mg/L	0.0408		0.02				0.0186		0.0182										0.00202	J	0.00718					
Potassium	T	7440-09-7		mg/L							1.1		1.08																	
Selenium	T	7782-49-2	0.05	mg/L							0.0025	U	0.00122	J																
Silver	T	7440-22-4		mg/L			0.0022	U			0.001	U	0.001	U																
Sodium	T	7440-23-5		mg/L							5.33		5.3																	
Thallium	T	7440-28-0	0.002	mg/L							0.001	U	0.001	U																
Titanium	D	7440-32-6		mg/L	0.002	U			0.000502	J											0.002	U	0.002	U	0.002	U			0.002	U
Titanium	T	7440-32-6		mg/L	0.0012	J	0.0023	J	**0.00151**	J											**0.00284**	J	0.00116	J	**0.00167**	J	0.0056	U	0.002	U
Vanadium	T	7440-62-2		mg/L							0.001	J	0.00103	J																
Zinc	D	7440-66-6		mg/L	0.0186				0.00217	J	**0.0415**		**0.0458**		**0.0316**	J	0.00384	J	0.00384	J	0.00376	J	0.00508		0.0165				0.00718	
Zinc	T	7440-66-6		mg/L	0.0458		0.013		0.0025	U	**0.0495**		**0.0517**		0.0269	J	0.00415	J	0.0043	J	0.0112		0.00513		0.0163		**0.047**		0.00653	
SW846 7470A																														
Mercury	D	7439-97-6	0.002	mg/L	0.0001	U																								
Mercury	T	7439-97-6	0.002	mg/L	0.0001	U	0.0005	U			0.0001	U	0.0001	U																
SW846 8015C																														
Ethanol		64-17-5		mg/L			1	U																			1	U		
Ethanol		64-17-5		µg/L	1000	U			1000	U											1000	U	1000	U	1000	U			1000	U
Methanol		67-56-1		mg/L			1	U																			1	U		
Methanol		67-56-1		µg/L	1000	U			1000	U											1000	U	1000	U	1000	U			1000	U
SW846 8082A																														
Aroclor 1016		12674-11-2		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U		
Aroclor 1221		11104-28-2		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U		
Aroclor 1232		11141-16-5		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U		
Aroclor 1242		53469-21-9		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U		
Aroclor 1248		12672-29-6		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U		
Aroclor 1254		11097-69-1		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U		
Aroclor 1260		11096-82-5		µg/L	0.25	U	0.95	U			0.25	U	0.25	U	0.25	U	0.25	U	0.25	U			0.25	U	0.25	U	0.94	U	0.25	U
SW846 8151A																														
2,4,5-T		93-76-5		µg/L	0.1	U	0.19	UJ																			0.19	U	0.1	U
2,4,5-TP		93-72-1	50	µg/L	0.1	U	0.19	UJ																			0.19	U	0.1	U
2,4-D		94-75-7	70	µg/L	0.1	U	0.19	UJ																			0.19	U	0.1	U
2,4-DB		94-82-6		µg/L	0.1	U	0.19	UJ																			0.19	U	0.1	U
Dalapon		75-99-0	200	µg/L	0.1	U	0.19	UJ																			0.19	U	0.1	U
Dicamba		1918-00-9		µg/L	0.1	U	0.19	UJ																			0.19	U	0.1	U
Dichloroprop		120-36-5		µg/L	0.1	U	0.19	UJ																			0.19	U	**1.01**	J
Dinoseb		88-85-7	7	µg/L	0.1	U	0.67	UJ																			0.65	U	0.1	U
MCPA		94-74-6		µg/L	10	U	38.1	UJ																			37.2	U	10	U
MCPP		93-65-2		µg/L	10	U	38.1	UJ																			37.2	U	10	U

Table GW-1
Curtis Bay Depot Groundwater

					Background Wells																									
				Location Name	BG-MW-01		BG-MW-01		EC-03-04		EC-21-41		EC-21-41		EC-22-06		EC-25-29		EC-25-29		EC-27-03		EC-28-16		EC-28-17		EC-29-01		EC-29-11	
				Sample Name	BG-MW-01		BG-MW-01-GW		EC-03-04-GW		EC-21-41-GW		GW-FD1-100515 EC-21-41-GW		EC-22-06-GW		EC-25-29-GW		GW-FD2-093015 EC-25-29-GW		EC-27-03-GW		EC-28-16-GW		EC-28-17-GW		EC-29-2-GW		EC-29-11-GW	
				Parent Sample Code																										
				Sample Date	10/8/2015		9/5/2013		10/2/2015		10/5/2015		10/5/2015		10/7/2015		9/30/2015		9/30/2015		10/2/2015		10/6/2015		10/6/2015		8/30/2013		10/6/2015	
Analyte	Fraction	CAS	MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Pentachlorophenol		87-86-5	1	µg/L			0.19	UJ																			0.19	U		
SW846 8260B																														
2-Butanone		78-93-3		µg/L			5	U																			5	U		
Acetone		67-64-1		µg/L			5	U																			5	U		
Benzene		71-43-2	5	µg/L			1	U																			1	U		
Carbon tetrachloride		56-23-5	5	µg/L			1	U																			1	U		
Ethylbenzene		100-41-4	700	µg/L			1	U																			1	U		
Methylene chloride		75-09-2	5	µg/L			1	U																			1	U		
Naphthalene		91-20-3		µg/L			1	U																			1	U		
Tetrachloroethene		127-18-4	5	µg/L			1	U																			1	U		
Toluene		108-88-3	1000	µg/L			1	U																			1	U		
Trichloroethene [1]		79-01-6	5	µg/L			1.4																				1	U		
Xylenes (total)		1330-20-7	10000	µg/L			3	U																			3	U		
SW846 8260C																														
1,1,1,2-Tetrachloroethane		630-20-6		µg/L							0.5	U	0.5	U																
1,1,1-Trichloroe hane		71-55-6	200	µg/L							0.5	U	0.5	U																
1,1,2,2-Tetrachloroethane		79-34-5		µg/L							0.5	U	0.5	U																
1,1,2-Trichloroe hane		79-00-5	5	µg/L							0.5	U	0.5	U																
1,1-Dichloroethane		75-34-3		µg/L							0.5	U	0.5	U																
1,1-Dichloroethene		75-35-4	7	µg/L							0.5	U	0.5	U																
1,2,3-Trichloropropane		96-18-4		µg/L							0.5	U	0.5	U																
1,2-Dibromo-3-chloropropane		96-12-8	0.2	µg/L							1	U	1	U																
1,2-Dibromoethane		106-93-4	0.05	µg/L							0.5	U	0.5	U																
1,2-Dichlorobenzene		95-50-1	600	µg/L							0.5	U	0.5	U																
1,2-Dichloroethane		107-06-2	5	µg/L							0.5	U	0.5	U																
1,2-Dichloropropane		78-87-5	5	µg/L							0.5	U	0.5	U																
1,4-Dichlorobenzene		106-46-7	75	µg/L							0.5	U	0.5	U																
2-Butanone		78-93-3		µg/L	1	U			1	UJ	1	U	1	U							1	U	1	U	1	U			1	U
2-Hexanone		591-78-6		µg/L							1	U	1	U																
4-Methyl-2-pentanone		108-10-1		µg/L							1	U	1	U																
Acetone		67-64-1		µg/L	2	U			2	UJ	2	U	2	U							2	U	2	U	2	U			2	U
Acrylonitrile		107-13-1		µg/L							1	U	1	U																
Benzene		71-43-2	5	µg/L	0.5	U			0.5	UJ	0.5	U	0.5	U							0.5	U	0.5	U	0.5	U			0.5	U
Bromochloromethane		74-97-5		µg/L							0.5	U	0.5	U																
Bromodichloromethane		75-27-4	80	µg/L							0.5	U	0.5	U																
Bromoform		75-25-2	80	µg/L							0.5	U	0.5	U																
Bromomethane		74-83-9		µg/L							0.5	U	0.5	U																
Carbon disulfide		75-15-0		µg/L							1	U	1	U																
Carbon tetrachloride		56-23-5	5	µg/L	0.5	U			0.5	UJ	0.5	U	0.5	U							0.5	U	0.5	U	0.5	U			0.5	U
Chlorobenzene		108-90-7	100	µg/L							0.5	U	0.5	U																
Chloroethane		75-00-3		µg/L							0.5	U	0.5	U																
Chloroform		67-66-3	80	µg/L							0.5	UJ	0.5	UJ																
Chloromethane		74-87-3		µg/L							0.5	U	0.5	U																
cis-1,2-Dichloroethene		156-59-2	70	µg/L							0.5	U	0.5	U																
cis-1,3-Dichloropropene		10061-01-5		µg/L							0.5	U	0.5	U																
Dibromochlorome hane		124-48-1	80	µg/L							0.5	U	0.5	U																
Dibromomethane		74-95-3		µg/L							0.5	U	0.5	U																
Ethylbenzene		100-41-4	700	µg/L	0.5	U			0.5	UJ	0.5	U	0.5	U							0.5	U	0.5	U	0.5	U			0.5	U
Iodomethane		74-88-4		µg/L							2	U	2	U																
Methyl tert-butyl ether		1634-04-4		µg/L							0.5	U	0.5	U																
Methylene chloride		75-09-2	5	µg/L	0.5	U			0.5	UJ	0.5	U	0.5	U							0.5	U	0.5	U	0.5	U			0.5	U
mp-Xylene		108383/ 106423		µg/L	1.5	U			1.5	UJ											1	U	1	U	1	U			1	U
Naphthalene		91-20-3		µg/L	0.5	U															0.5	U							0.5	U
o-Xylene		95-47-6		µg/L	0.5	U			0.5	UJ											0.5	U	0.5	U	0.5	U			0.5	U
Styrene		100-42-5	100	µg/L							0.5	U	0.5	U																
Tetrachloroethene		127-18-4	5	µg/L	0.5	U					0.5	U	0.5	U							0.5	U							0.5	U
Toluene		108-88-3	1000	µg/L	0.5	U			0.5	UJ	0.5	U	0.5	U							0.5	U	0.5	U	0.5	U			0.5	U
trans-1,2-Dichloroethene		156-60-5	100	µg/L							0.5	U	0.5	U																
trans-1,3-Dichloropropene		10061-02-6		µg/L							0.5	U	0.5	U																
trans-1,4-Dichloro-2-butene		110-57-6		µg/L							1	U	1	U																
Trichloroethene [1]		79-01-6	5	µg/L	**10**						0.5	U	0.5	U							0.5	U							0.5	U
Trichlorofluoromethane		75-69-4		µg/L							0.5	U	0.5	U																
Vinyl Acetate		108-05-4		µg/L							1	U	1	U																
Vinyl chloride		75-01-4	2	µg/L							0.5	U	0.5	U																
Xylenes (total)		1330-20-7	10000	µg/L							1.5	U	1.5	U																
SW846 8270D/8270 SIM																														
Acenaphthene		83-32-9		µg/L	0.05	U	0.047	U			**0.31**		**0.33**		0.05	UJ	0.05	U	0.05	U										
Acenaphthylene		208-96-8		µg/L	0.05	U	0.047	U			0.023	J	0.05	U	0.05	U	0.05	U	0.05	U										
Anthracene		120-12-7		µg/L	0.05	U	0.047	U			**0.27**		**0.26**		0.05	U	0 018	J	0.05	U										

Table GW-1
Curtis Bay Depot Groundwater

					Background Wells																											
				Location Name	BG-MW-01		BG-MW-01		EC-03-04		EC-21-41		EC-21-41		EC-22-06		EC-25-29		EC-25-29		EC-27-03		EC-28-16		EC-28-17		EC-29-01		EC-29-11			
				Sample Name	BG-MW-01		BG-MW-01-GW		EC-03-04-GW		EC-21-41-GW		GW-FD1-100515 EC-21-41-GW		EC-22-06-GW		EC-25-29-GW		GW-FD2-093015 EC-25-29-GW		EC-27-03-GW		EC-28-16-GW		EC-28-17-GW		EC-29-2-GW		EC-29-11-GW			
				Parent Sample Code																												
				Sample Date	10/8/2015		9/5/2013		10/2/2015		10/5/2015		10/5/2015		10/7/2015		9/30/2015		9/30/2015		10/2/2015		10/6/2015		10/6/2015		8/30/2013		10/6/2015			
Analyte	Fraction	CAS	MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Benzo(a)anthracene		56-55-3		µg/L	0.05	U	0.047	U			**0.23**		**0.22**		0.05	U	0 028	J	0.05	U												
Benzo(a)pyrene		50-32-8	0.2	µg/L	0.05	U	0.047	U			**0.18**		**0.14**		0.05	U	0 025	J	0.05	U												
Benzo(b)fluoranthene		205-99-2		µg/L	0.05	U	0.047	U			**0.27**		**0.28**		0.05	U	0 028	J	0.05	U												
Benzo(ghi)perylene		191-24-2		µg/L	0.05	U	0.047	U			**0.13**		**0.11**		0.05	U	0.05	U	0.05	U												
Benzo(k)fluoran hene		207-08-9		µg/L	0.05	U	0.047	U			**0.11**		**0.064**	J	0.05	U	0.05	U	0.05	U												
Chrysene		218-01-9		µg/L	0.05	U	0.047	U			**0.24**		**0.22**		0.05	U	0 024	J	0.05	U												
Dibenz(a,h)anthracene		53-70-3		µg/L	0.05	U	0.047	U			0.05	U	0.033	J	0.05	U	0.02	J	0.05	U												
Fluoranthene		206-44-0		µg/L	0.05	U	0.047	U			**0.71**		**0.76**		0.05	U	0 039	J	0.05	U												
Fluorene		86-73-7		µg/L	0.05	U	0.047	U			**0.5**		**0.54**		0.05	UJ	0.05	U	0.05	U												
Indeno(1,2,3-cd)pyrene		193-39-5		µg/L	0.05	U	0.047	U			**0.19**		**0.16**		0.05	U	0 035	J	0.05	U												
Naphthalene		91-20-3		µg/L	0.028	J	0.033	J			**1.7**		**1.9**		0.05	U	0 025	J	0.023	J	0.05	U	0.05	U	0.05	U					0.05	U
Pentachlorophenol		87-86-5	1	µg/L	0.1	U	0.94	UJ															0.1	U	0.1	U						
Phenanthrene		85-01-8		µg/L	0.05	U	0.047	U			**1.6**		**1.7**		0.05	U	0 034	J	0.05	U												
Pyrene		129-00-0		µg/L	0.05	U	0.047	U			**0.55**		**0.54**		0.05	U	0.04	J	0.05	U												
SW846 8290																																
1,2,3,4,6,7,8,9-OCDD		3268-87-9		pg/L	253	J					154	J	179	J	145	J	171	J	175	J												
1,2,3,4,6,7,8,9-OCDF		39001-02-0		pg/L	12.8	J					**15.5**	J	**18.9**	J	**14.7**	J	**14.9**	J	**17.8**	J												
1,2,3,4,6,7,8-HpCDD		35822-46-9		pg/L	41.3	J					**46.3**	J	**43.1**	J	**46.4**	J	36.8	J	**41.5**	J												
1,2,3,4,6,7,8-HpCDF		67562-39-4		pg/L	6.12	J					**8.74**	J	**7.34**	J	**6.46**	J	**7.95**	J	4.44	J												
1,2,3,4,7,8,9-HpCDF		55673-89-7		pg/L	1.34	U					**2.07**	J	**1.38**	J	1.21	U	0 935	J	**3.03**	J												
1,2,3,4,7,8-HxCDD		39227-28-6		pg/L	1.78	J					0.507	U	1.29	U	**1.91**	J	**3.62**	J	0.966	U												
1,2,3,4,7,8-HxCDF		70648-26-9		pg/L	1.57	J					**2.18**	J	**2.39**	J	1.45	J	1.3	J	1.37	J												
1,2,3,6,7,8-HxCDD		57653-85-7		pg/L	2.29	J					**6.62**	J	2.2	J	**3.01**	J	**2.43**	J	**3.85**	J												
1,2,3,6,7,8-HxCDF		57117-44-9		pg/L	0.849	J					**1.37**	J	**1.63**	J	0.508	U	0 591	U	0.684	U												
1,2,3,7,8,9-HxCDD		19408-74-3		pg/L	1.41	J					**1.97**	J	**2.54**	J	0.973	U	0.695	U	**2.98**	J												
1,2,3,7,8,9-HxCDF		72918-21-9		pg/L	1.1	J					0.748	U	1.06	U	**1.52**	J	0.743	U	0.866	U												
1,2,3,7,8-PeCDD		40321-76-4		pg/L	0.93	U					1.68	U	2.27	U	1.63	U	0 949	U	**1.97**	J												
1,2,3,7,8-PeCDF		57117-41-6		pg/L	0.787	U					0.79	U	**1.17**	J	2.4	U	0.685	U	1.43	U												
2,3,4,6,7,8-HxCDF		60851-34-5		pg/L	0.925	J					0.672	U	0.89	U	**2.59**	J	0.624	U	0.752	U												
2,3,4,7,8-PeCDF		57117-31-4		pg/L	0.776	U					0.691	U	**1.9**	J	2.27	U	0.63	U	1.25	U												
2,3,7,8-TCDD		1746-01-6	30	pg/L	0.703	U					1.75	J	2.22	U	1.31	U	1.67	U	1.05	U												
2,3,7,8-TCDF		51207-31-9		pg/L	0.896	U					4.01	J	4.68	U	4.32	U	3.37	U	2.99	U												
Total Heptachlorodibenzofuran		38998-75-3		pg/L	20	J					**25.8**		17	J	1.19	U	0 586	U	17.1	J												
Total Heptachlorodibenzo-p-dioxin		37871-00-4		pg/L	75.9						**77.9**		43.1		1.44	U	68.3		0.507	U												
Total Hexachlorodibenzofuran		55684-94-1		pg/L	12.7	J					8.03	J	7.28	J	3.91	J	0.646	U	0.754	U												
Total Hexachlorodibenzo-p-dioxin		34465-46-8		pg/L	15.9	J					0.512	U	1.29	U	1.03	U	0.735	U	2.98	J												
Total Pentachlorodibenzofuran		30402-15-4		pg/L	0.782	U					0.738	U	0.852	U	2.33	U	0.656	U	1.34	U												
Total Pentachlorodibenzo-p-dioxin		36088-22-9		pg/L	0.93	U					1.68	U	2.27	U	1.63	U	0 949	U	1.58	U												
Total Tetrachlorodibenzofuran		55722-27-5		pg/L	0.896	U					4.01	U	4.68	U	4.32	U	3.37	U	2.99	U												
Total Tetrachlorodibenzo-p-dioxin		41903-57-5		pg/L	0.703	U					1.75	U	2.22	U	1.31	U	1.67	U	1.05	U												
SW846 8330B																																
2,4,6-Trinitrotoluene		118-96-7		µg/L	0.2	U	0.2	U			0.2	U	0.2	U	0.2	U	0.2	U	0.2	U			0.2	U	0.2	U						
2,4-Dinitrotoluene		121-14-2		µg/L	0.2	U	0.2	U			0.2	U	0.2	U	0.2	U	0.2	U	0.2	U			0.2	U	0.2	U						
2,6-Dinitrotoluene		606-20-2		µg/L	0.2	U	0.2	U			0.2	U	0.2	U	0.2	U	0.2	U	0.2	U			0.2	U	0.2	U						
Nitroglycerin		55-63-0		µg/L	1	U	1.5	U			1	U	1	U																		
USACE																																
Nitroguanidine		556-88-7		µg/L	5	U	5	U			25	UJ	25	UJ																		

Notes: 1. TCE only detected in background well.
2. This is not the same location as the soil sample location EC-32-07. Location name re-use was inadvertent.
Blank cells indicate that the parameter was not analyzed.

USEPA MCL	USEPA Maximum Contaminant Level (2009)
GW	groundwater
mg/L	milligrams per liter
µg/L	micrograms per liter
pg/L	picograms per liter
B	possible blank contamination
J	value is an estimated quantity
U	analyte was not detected at the limit of detection
UJ	analyte was not detected and the assocatiated detection limit is an estimate and may be inaccurate or imprecise
Grey shaded cells	Result is greater than the USEPA MCL
Bold results	For data collected in 2015, the result is greater than the backgound well sample collected in 2015
Red results	For data collected in 2013, the result is greater than the backgound well sample collected in 2013
Pink indicates not detected	

Table GW-1
Curtis Bay Depot Groundwater

					Location Name	EC-30-02		EC-30-04		EC-31-06		EC-32-07-GW [2]		EC-33-02		EC-33-09		EC-33-09		EC-34-04		EC-35-02		EC-36-03		EC-36-06		EC-49-14		EC-52-16		EC-52-17		EC-57D-12		EC-58C-02	
					Sample Name	EC-30-1-GW		EC-30 -2-GW		EC-31-06-GW		EC-32-07-GW		EC-33-2-GW		EC-33-09-GW		EC-33-09-GW-RE		EC-34-04-GW		EC-35-1-GW		EC-36-2-GW		EC-36-1-GW		EC-49-14-GW		EC-52-16-GW		EC-52-17-GW		EC-57D-12-GW		EC-58C-02-GW	
					Parent Sample Code																																
					Sample Date	8/30/2013		9/3/2013		10/7/2015		10/7/2015		9/3/2013		10/2/2015		10/8/2015		9/30/2015		7/22/2013		8/26/2013		8/26/2013		10/1/2015		10/1/2015		10/5/2015		9/30/2015		10/5/2015	
Analyte	Fraction	CAS	MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
E218.6																																				
Chromium, Hexavalent	D	18540-29-9	0.1	µg/L							4	UJ	4	UJ					4	UJ																
Chromium, Hexavalent	T	18540-29-9	0.1	µg/L							4	UJ	4	UJ					4	U																
SW846 7196A																																				
Chromium, Hexavalent	T	18540-29-9	0.1	mg/L											0.01	U																				
EPA 6850																																				
Perchlorate		14797-73-0	15	µg/L																									**0.67**	J						
SW846 6020A																																				
Aluminum	D	7429-90-5		mg/L							**0.0208**	J																	0.002	U	0.0159	J	0.002	UJ	0.002	UJ	0.02	J
Aluminum	T	7429-90-5		mg/L							**0.18**	J																	0.029		0.0618	J	**0.0783**		**1.41**	J	**0.093**	
Antimony	D	7440-36-0	0.006	mg/L																									0.001	U	0.001	U	0.001	U	**0.006**		0.001	U
Antimony	T	7440-36-0	0.006	mg/L																									0.001	U	0.001	UJ	0.001	U	**0.004**	J	0.001	U
Arsenic	D	7440-38-2	0.01	mg/L							0.001	UJ	0.0008	J			**0.0018**	J																				
Arsenic	T	7440-38-2	0.01	mg/L							0.00079	J	0.001	J	0.003	U	**0.002**	J											0.003	U	0.0024				0.001	U	0.0008	J				
Barium	T	7440-39-3	2	mg/L																															0.0218	J	0.0315					
Beryllium	T	7440-41-7	0.004	mg/L																															0.001	U	0.001	U				
Cadmium	D	7440-43-9	0.005	mg/L							0.001	UJ																														
Cadmium	T	7440-43-9	0.005	mg/L							0.001	UJ																	0.001	U	0.0011	U			0.001	UJ	0.001	U				
Calcium	T	7440-70-2		mg/L																															0.713		5.98					
Chromium	D	7440-47-3	0.1	mg/L							0.001	UJ																														
Chromium	T	7440-47-3	0.1	mg/L							0.00067	J																	0.009		0 012				0.001	UJ	0.0016	J				
Cobalt	D	7440-48-4		mg/L							0.00915																															
Cobalt	T	7440-48-4		mg/L							0.00815	J																							0.00938	J	0.0078					
Copper	D	7440-50-8	1.3	mg/L							0.001	UJ	0.001	UJ			0.001	U																	0.001	U	0.00503	J	0.0017	J	0.001	J	0.001	U
Copper	T	7440-50-8	1.3	mg/L							0.00224	J	0.0013	J	0.003	B	0.001	U											0.005		0.0057				0.001	U	0.00478	J	0.0014	J	0.002	J	0.001	U
Iron	T	7439-89-6		mg/L																															3.49		8.45					
Lead	D	7439-92-1	0.015	mg/L							0.001	UJ																							0.001	U	0.001	U	0.001	UJ	0.001	UJ	0.001	UJ
Lead	T	7439-92-1	0.015	mg/L	0.0042		0.0016	J	0.001	UJ																			0.007		0.0075				0.001	U	0.001	U	0.001	U	7E-04	J	0.001	U
Magnesium	T	7439-95-4		mg/L																															1.63		4.47					
Manganese	D	7439-96-5		mg/L																															**0.0599**		**0.0693**		**1.03**		0.018		**3.04**	
Manganese	T	7439-96-5		mg/L																															**0.0562**		**0.0674**		**1.03**		0.021		**2.8**	
Nickel	D	7440-02-0		mg/L							0.0148	J	0.0131	J			0.0025	J																								
Nickel	T	7440-02-0		mg/L							0.012	J	0.0114	J	0.006	U	0.0021	J																	0.0119	J	0.0093					
Potassium	T	7440-09-7		mg/L																															0.536		0.615					
Selenium	T	7782-49-2	0.05	mg/L																															0.00349	J	0.0025	U				
Silver	T	7440-22-4		mg/L																															0.001	UJ	0.001	U				
Sodium	T	7440-23-5		mg/L																															2.68		2.79					
Thallium	T	7440-28-0	0.002	mg/L																															0.001	U	0.001	U				
Titanium	D	7440-32-6		mg/L							0.002	UJ																														
Titanium	T	7440-32-6		mg/L							**0.00297**	J																														
Vanadium	T	7440-62-2		mg/L																															0.001	U	0.0016	J				
Zinc	D	7440-66-6		mg/L							**0.0193**	J	0.0149	J			0.0063																		0 0123		0.00563	J	**0.03**		0.003	J	0.01	
Zinc	T	7440-66-6		mg/L							0.0159	J	0.014	J	0.023	B	0.0059												0.018		0.025				0 0139		0.00558	J	0.0316		0.006	J	0.008	
SW846 7470A																																										
Mercury	D	7439-97-6	0.002	mg/L																																						
Mercury	T	7439-97-6	0.002	mg/L																									5E-04	U	0.0005	U					0.0001	U	0.0001	U				
SW846 8015C																																										
Ethanol		64-17-5		mg/L	1	U	1	U																																		
Ethanol		64-17-5		µg/L							1000	U																														
Methanol		67-56-1		mg/L	1	U	1	U																																		
Methanol		67-56-1		µg/L							1000	U																														
SW846 8082A																																										
Aroclor 1016		12674-11-2		µg/L							0.25	U																													0.25	U
Aroclor 1221		11104-28-2		µg/L							0.25	U																													0.25	U
Aroclor 1232		11141-16-5		µg/L							0.25	U																													0.25	U
Aroclor 1242		53469-21-9		µg/L							0.25	U																													0.25	U
Aroclor 1248		12672-29-6		µg/L							0.25	U																													0.25	U
Aroclor 1254		11097-69-1		µg/L							0.25	U																													0.25	U
Aroclor 1260		11096-82-5		µg/L							0.25	U																													0.25	U
SW846 8151A																																										
2,4,5-T		93-76-5		µg/L																																						
2,4,5-TP		93-72-1	50	µg/L																																						
2,4-D		94-75-7	70	µg/L																																						
2,4-DB		94-82-6		µg/L																																						
Dalapon		75-99-0	200	µg/L																																						
Dicamba		1918-00-9		µg/L																																						
Dichloroprop		120-36-5		µg/L																																						
Dinoseb		88-85-7	7	µg/L																																						
MCPA		94-74-6		µg/L																																						
MCPP		93-65-2		µg/L																																						

Table GW-1
Curtis Bay Depot Groundwater

				Location Name	EC-30-02		EC-30-04		EC-31-06		EC-32-07-GW [2]		EC-33-02		EC-33-09		EC-33-09		EC-34-04		EC-35-02		EC-36-03		EC-36-06		EC-49-14		EC-52-16		EC-52-17		EC-57D-12		EC-58C-02	
				Sample Name	EC-30-1-GW		EC-30 -2-GW		EC-31-06-GW		EC-32-07-GW		EC-33-2-GW		EC-33-09-GW		EC-33-09-GW-RE		EC-34-04-GW		EC-35-1-GW		EC-36-2-GW		EC-36-1-GW		EC-49-14-GW		EC-52-16-GW		EC-52-17-GW		EC-57D-12-GW		EC-58C-02-GW	
				Parent Sample Code																																
				Sample Date	8/30/2013		9/3/2013		10/7/2015		10/7/2015		9/3/2013		10/2/2015		10/8/2015		9/30/2015		7/22/2013		8/26/2013		8/26/2013		10/1/2015		10/1/2015		10/5/2015		9/30/2015		10/5/2015	
Analyte	Fraction	CAS	MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Pentachlorophenol		87-86-5	1	µg/L																																
SW846 8260B																																				
2-Butanone		78-93-3		µg/L	5	U	5	U																												
Acetone		67-64-1		µg/L	5	U	5	U																												
Benzene		71-43-2	5	µg/L	1	U	1	U													1	U														
Carbon tetrachloride		56-23-5	5	µg/L	1	U	1	U																												
Ethylbenzene		100-41-4	700	µg/L	1	U	1	U													1	U														
Methylene chloride		75-09-2	5	µg/L	1	U	1	U																												
Naphthalene		91-20-3		µg/L	1	U	1	U													1	U														
Tetrachloroethene		127-18-4	5	µg/L	1	U	1	U																												
Toluene		108-88-3	1000	µg/L	1	U	1	U													1	U														
Trichloroethene [1]		79-01-6	5	µg/L	1	U	1	U																												
Xylenes (total)		1330-20-7	10000	µg/L	3	U	3	U													3	U														
SW846 8260C																																				
1,1,1,2-Tetrachloroethane		630-20-6		µg/L																									0.5	U	0.5	U				
1,1,1-Trichloroe hane		71-55-6	200	µg/L																									0.5	U	0.5	U				
1,1,2,2-Tetrachloroethane		79-34-5		µg/L																									0.5	U	0.5	U				
1,1,2-Trichloroe hane		79-00-5	5	µg/L																									0.5	U	0.5	U				
1,1-Dichloroethane		75-34-3		µg/L																									0.5	U	0.5	U				
1,1-Dichloroethene		75-35-4	7	µg/L																									0.5	U	0.5	U				
1,2,3-Trichloropropane		96-18-4		µg/L																									0.5	U	0.5	U				
1,2-Dibromo-3-chloropropane		96-12-8	0.2	µg/L																									1	U	1	U				
1,2-Dibromoethane		106-93-4	0.05	µg/L																									0.5	U	0.5	U				
1,2-Dichlorobenzene		95-50-1	600	µg/L																									0.5	U	0.5	U				
1,2-Dichloroethane		107-06-2	5	µg/L																									0.5	U	0.5	U				
1,2-Dichloropropane		78-87-5	5	µg/L																									0.5	U	0.5	U				
1,4-Dichlorobenzene		106-46-7	75	µg/L																									0.5	U	0.5	U				
2-Butanone		78-93-3		µg/L					1	U																			1	U	1	U				
2-Hexanone		591-78-6		µg/L																									1	U	1	U				
4-Methyl-2-pentanone		108-10-1		µg/L																									1	U	1	U				
Acetone		67-64-1		µg/L					2	U																			2	U	2	U				
Acrylonitrile		107-13-1		µg/L																									1	U	1	U				
Benzene		71-43-2	5	µg/L					0.5	U									0.5	U									0.5	U	0.5	U				
Bromochloromethane		74-97-5		µg/L																									0.5	U	0.5	U				
Bromodichloromethane		75-27-4	80	µg/L																									0.5	U	0.5	U				
Bromoform		75-25-2	80	µg/L																									0.5	U	0.5	U				
Bromomethane		74-83-9		µg/L																									0.5	U	0.5	U				
Carbon disulfide		75-15-0		µg/L																									1	U	1	U				
Carbon tetrachloride		56-23-5	5	µg/L					0.5	U																			0.5	U	0.5	U				
Chlorobenzene		108-90-7	100	µg/L																									0.5	U	0.5	U				
Chloroethane		75-00-3		µg/L																									0.5	U	0.5	U				
Chloroform		67-66-3	80	µg/L																									0.5	UJ	0.5	UJ				
Chloromethane		74-87-3		µg/L																									0.5	U	0.5	U				
cis-1,2-Dichloroethene		156-59-2	70	µg/L																									0.5	U	0.5	U				
cis-1,3-Dichloropropene		10061-01-5		µg/L																									0.5	U	0.5	U				
Dibromochlorome hane		124-48-1	80	µg/L																									0.5	U	0.5	U				
Dibromomethane		74-95-3		µg/L																									0.5	U	0.5	U				
Ethylbenzene		100-41-4	700	µg/L					0.5	U									0.5	U									0.5	U	0.5	U				
Iodomethane		74-88-4		µg/L																									2	U	2	U				
Methyl tert-butyl ether		1634-04-4		µg/L																									0.5	U	0.5	U				
Methylene chloride		75-09-2	5	µg/L					0.5	U																			0.5	U	0.5	U				
mp-Xylene		108383/ 106423		µg/L					1	U									1.5	U																
Naphthalene		91-20-3		µg/L																																
o-Xylene		95-47-6		µg/L					0.5	U									0.5	U																
Styrene		100-42-5	100	µg/L																									0.5	U	0.5	U				
Tetrachloroethene		127-18-4	5	µg/L																									0.5	U	0.5	U				
Toluene		108-88-3	1000	µg/L					0.5	U									0.5	U									0.5	U	0.5	U				
trans-1,2-Dichloroethene		156-60-5	100	µg/L																									0.5	U	0.5	U				
trans-1,3-Dichloropropene		10061-02-6		µg/L																									0.5	U	0.5	U				
trans-1,4-Dichloro-2-butene		110-57-6		µg/L																									1	U	1	U				
Trichloroethene [1]		79-01-6	5	µg/L																									0.5	U	0.5	U				
Trichlorofluoromethane		75-69-4		µg/L																									0.5	U	0.5	U				
Vinyl Acetate		108-05-4		µg/L																									1	U	1	U				
Vinyl chloride		75-01-4	2	µg/L																									0.5	U	0.5	U				
Xylenes (total)		1330-20-7	10000	µg/L																									1.5	U	1.5	U				
SW846 8270D/8270 SIM																																				
Acenaphthene		83-32-9		µg/L							0.05	UJ	0.047	U	0.05	U			0.05	U			0.047	U	0.047	U	0.05	U							0.05	U
Acenaphthylene		208-96-8		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Anthracene		120-12-7		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.018		0 047	U	0.05	U							0.05	U

Table GW-1
Curtis Bay Depot Groundwater

				Location Name	EC-30-02		EC-30-04		EC-31-06		EC-32-07-GW [2]		EC-33-02		EC-33-09		EC-33-09		EC-34-04		EC-35-02		EC-36-03		EC-36-06		EC-49-14		EC-52-16		EC-52-17		EC-57D-12		EC-58C-02	
				Sample Name	EC-30-1-GW		EC-30 -2-GW		EC-31-06-GW		EC-32-07-GW		EC-33-2-GW		EC-33-09-GW		EC-33-09-GW-RE		EC-34-04-GW		EC-35-1-GW		EC-36-2-GW		EC-36-1-GW		EC-49-14-GW		EC-52-16-GW		EC-52-17-GW		EC-57D-12-GW		EC-58C-02-GW	
				Parent Sample Code																																
				Sample Date	8/30/2013		9/3/2013		10/7/2015		10/7/2015		9/3/2013		10/2/2015		10/8/2015		9/30/2015		7/22/2013		8/26/2013		8/26/2013		10/1/2015		10/1/2015		10/5/2015		9/30/2015		10/5/2015	
Analyte	Fraction	CAS	MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Benzo(a)anthracene		56-55-3		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.02	J							0.05	U
Benzo(a)pyrene		50-32-8	0.2	µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Benzo(b)fluoranthene		205-99-2		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.029	J							0.05	U
Benzo(ghi)perylene		191-24-2		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Benzo(k)fluoran hene		207-08-9		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Chrysene		218-01-9		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Dibenz(a,h)anthracene		53-70-3		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Fluoranthene		206-44-0		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
Fluorene		86-73-7		µg/L							0.05	UJ	0.047	U	0.05	U			0.021	J			0.047	U	0 047	U	0.05	U							0.05	U
Indeno(1,2,3-cd)pyrene		193-39-5		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.034	J							0.05	U
Naphthalene		91-20-3		µg/L					0.05	U	**0.037**	J	0.047	U	0.026	J			**0.13**				0.047	U	0 047	U	**0.03**	J							0.025	J
Pentachlorophenol		87-86-5	1	µg/L					0.1	U	0.1	U	0.95	U	0.1	U																				
Phenanthrene		85-01-8		µg/L							0.05	U	0.047	U	0.05	U			0.025	J			0.047	U	0 047	U	0.05	U							0.05	U
Pyrene		129-00-0		µg/L							0.05	U	0.047	U	0.05	U			0.05	U			0.047	U	0 047	U	0.05	U							0.05	U
SW846 8290																																				
1,2,3,4,6,7,8,9-OCDD		3268-87-9		pg/L															181	J			64.4	J	63.6	U	195	J							177	J
1,2,3,4,6,7,8,9-OCDF		39001-02-0		pg/L															**24.5**	J			63.2	U	63.6	U	**15.8**	J							**22.6**	J
1,2,3,4,6,7,8-HpCDD		35822-46-9		pg/L															**47.5**	J			31.7	U	31.9	U	**44.1**	J							**46**	J
1,2,3,4,6,7,8-HpCDF		67562-39-4		pg/L															**6.36**	J			31.7	U	31.9	U	**7.34**	J							**10.1**	J
1,2,3,4,7,8,9-HpCDF		55673-89-7		pg/L															1.45	U			31.7	U	31.9	U	2.16	U							**2.66**	J
1,2,3,4,7,8-HxCDD		39227-28-6		pg/L															2.15	U			31.7	U	31.9	U	2.07	U							**2.44**	J
1,2,3,4,7,8-HxCDF		70648-26-9		pg/L															1.72	U			31.7	U	31.9	U	1.35	U							**2.84**	J
1,2,3,6,7,8-HxCDD		57653-85-7		pg/L															**5.04**	J			31.7	U	31.9	U	2.2	U							**2.82**	J
1,2,3,6,7,8-HxCDF		57117-44-9		pg/L															1.6	U			31.7	U	31.9	U	1.29	U							**3.09**	J
1,2,3,7,8,9-HxCDD		19408-74-3		pg/L															2.12	U			31.7	U	31.9	U	**3.38**	J							**3.76**	J
1,2,3,7,8,9-HxCDF		72918-21-9		pg/L															2.13	U			31.7	U	31.9	U	1.81	U							1.05	U
1,2,3,7,8-PeCDD		40321-76-4		pg/L															**4.63**	J			31.7	U	31.9	U	5.26	U							**3.1**	J
1,2,3,7,8-PeCDF		57117-41-6		pg/L															2.42	U			31.7	U	31.9	U	3.37	U							**3.17**	J
2,3,4,6,7,8-HxCDF		60851-34-5		pg/L															1.67	U			31.7	U	31.9	U	1.35	U							**1.44**	J
2,3,4,7,8-PeCDF		57117-31-4		pg/L															**4.29**	J			31.7	U	31.9	U	2.97	U							1.43	U
2,3,7,8-TCDD		1746-01-6	30	pg/L															4.15	U			6.32	U	6.36	U	4.27	U							1.22	U
2,3,7,8-TCDF		51207-31-9		pg/L															2.72	U			6.32	U	6.36	U	2.39	U							2.91	U
Total Heptachlorodibenzofuran		38998-75-3		pg/L															17	J			31.7	U	31.9	U	2.02	U							**21**	J
Total Heptachlorodibenzo-p-dioxin		37871-00-4		pg/L															1.55	U			31.7	U	31.9	U	**82.1**								**85**	
Total Hexachlorodibenzofuran		55684-94-1		pg/L															1.76	U			31.7	U	31.9	U	1.42	U							0.884	U
Total Hexachlorodibenzo-p-dioxin		34465-46-8		pg/L															2.24	U			31.7	U	31.9	U	2.07	U							1.18	U
Total Pentachlorodibenzofuran		30402-15-4		pg/L															2.21	U			31.7	U	31.9	U	3.16	U							1.52	U
Total Pentachlorodibenzo-p-dioxin		36088-22-9		pg/L															2.91	U			31.7	U	31.9	U	5.26	U							2.36	U
Total Tetrachlorodibenzofuran		55722-27-5		pg/L															2.72	U			6.32	U	6.36	U	2.39	U							2.91	U
Total Tetrachlorodibenzo-p-dioxin		41903-57-5		pg/L															4.15	U			6.32	U	6.36	U	4.27	U							1.22	U
SW846 8330B																																				
2,4,6-Trinitrotoluene		118-96-7		µg/L															0.23	U							0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,4-Dinitrotoluene		121-14-2		µg/L															0.23	U							0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
2,6-Dinitrotoluene		606-20-2		µg/L															0.23	U							0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nitroglycerin		55-63-0		µg/L															1.2	U									1	U	1	U				
USACE																																				
Nitroguanidine		556-88-7		µg/L															5	U									5	U	25	UJ				

Notes: 1. TCE only detected in background well.
2. This is not the same location as the soil sample location EC-32-07. Location
Blank cells indicate that the parameter was not analyzed.

USEPA MCL	USEPA Maximum Contaminant Level (200
GW	groundwater
mg/L	milligrams per liter
µg/L	micrograms per liter
pg/L	picograms per liter
B	possible blank contamination
J	value is an estimated quantity
U	analyte was not detected at the limit of det
UJ	analyte was not detected and the associati
Grey shaded cells	Result is greater than the USEPA MCL
Bold results	For data collected in 2015, the result is gre
Red results	For data collected in 2013, the result is gre
Pink indicates not detected	

Table GW-1
Curtis Bay Depot Groundwater

Table GW-2
Curtis Bay Depot Groundwater Data Summary

					Location Name																	
					Sample Name																	
					Parent Sample Code																	
					Sample Date																	
Analyte	Fraction	CAS	MCL	Units	Analyte	Fraction	CAS #	MCL	Units	# Detects	# Samples	Location of Maximum	Minimum Concentration		Maximum Detected Concentration		Maximum (including non-detects)		Average Concentration [1]		MCL with TEF (listed as necessary)	
E218.6					**E218.6**																	
Chromium, Hexavalent	D	18540-29-9	0.1	µg/L	Chromium, Hexavalent	D	18540-29-9	0.1	µg/L	0	5		NA		NA		NA		NA			
Chromium, Hexavalent	T	18540-29-9	0.1	µg/L	Chromium, Hexavalent	T	18540-29-9	0.1	µg/L	0	5		NA		NA		NA		NA			
SW846 7196A					**SW846 7196A**																	
Chromium, Hexavalent	T	18540-29-9	0.1	mg/L	Chromium, Hexavalent	T	18540-29-9	0.1	mg/L	0	1		NA		NA		NA		NA			
EPA 6850					**EPA 6850**																	
Perchlorate		14797-73-0	15	µg/L	Perchlorate		14797-73-0	15	µg/L	1	2	EC-49-14	0.67		0.67		4	U	2.9			
SW846 6020A					**SW846 6020A**																	
Aluminum	D	7429-90-5		mg/L	Aluminum	D	7429-90-5		mg/L	7	16	EC-22-06	0.002	U	0.28		0.28		0.037			
Aluminum	T	7429-90-5		mg/L	Aluminum	T	7429-90-5		mg/L	16	17	EC-57D-12	0.002	U	1.4		1.4		0.19			
Antimony	D	7440-36-0	0.006	mg/L	Antimony	D	7440-36-0	0.006	mg/L	1	10	EC-57D-12	0.001	U	0.0056		0.0056		0.0015			
Antimony	T	7440-36-0	0.006	mg/L	Antimony	T	7440-36-0	0.006	mg/L	1	10	EC-57D-12	0.001	U	0.0041		0.0041		0.0013			
Arsenic	D	7440-38-2	0.01	mg/L	Arsenic	D	7440-38-2	0.01	mg/L	4	5	EC-28-17	0.00080		0.0019		0.0019		0.0013			
Arsenic	T	7440-38-2	0.01	mg/L	Arsenic	T	7440-38-2	0.01	mg/L	8	12	EC-28-17	0.00044		0.0021		0.0030	U	0.0015			
Barium	T	7440-39-3	2	mg/L	Barium	T	7440-39-3	2	mg/L	4	4	EC-28-17	0.02		0.032		0.032		0.028			
Beryllium	T	7440-41-7	0.004	mg/L	Beryllium	T	7440-41-7	0.004	mg/L	0	4		NA		NA		NA		NA			
Cadmium	D	7440-43-9	0.005	mg/L	Cadmium	D	7440-43-9	0.005	mg/L	0	6		NA		NA		NA		NA			
Cadmium	T	7440-43-9	0.005	mg/L	Cadmium	T	7440-43-9	0.005	mg/L	2	13	EC-21-41	0.00035		0.00035		0.0011	U	0.00092			
Calcium	T	7440-70-2		mg/L	Calcium	T	7440-70-2		mg/L	4	4	EC-28-17	0.713		6.0		6.0		2.8			
Chromium	D	7440-47-3	0.1	mg/L	Chromium	D	7440-47-3	0.1	mg/L	2	6	EC-03-04	0.00058		0.00139		0.001	U	0.001			
Chromium	T	7440-47-3	0.1	mg/L	Chromium	T	7440-47-3	0.1	mg/L	12	13	EC-36-06	0.00043		0.012		0.012		0.003			
Cobalt	D	7440-48-4		mg/L	Cobalt	D	7440-48-4		mg/L	6	6	EC-31-06	0.0012		0.0092		0.0092		0.003			
Cobalt	T	7440-48-4		mg/L	Cobalt	T	7440-48-4		mg/L	11	11	EC-29-11	0.0013		0.0014		0.0014		0.006			
Copper	D	7440-50-8	1.3	mg/L	Copper	D	7440-50-8	1.3	mg/L	6	15	EC-52-16	0.001	U	0.0050		0.0050		0.002			
Copper	T	7440-50-8	1.3	mg/L	Copper	T	7440-50-8	1.3	mg/L	12	18	EC-36-06	0.001	U	0.0057		0.0057		0.002			
Iron	T	7439-89-6		mg/L	Iron	T	7439-89-6		mg/L	4	4	EC-52-17	3.49		8.45		8.45		5.19			
Lead	D	7439-92-1	0.015	mg/L	Lead	D	7439-92-1	0.015	mg/L	2	16	EC-21-41	0.00098		0.0010		0.0010	U	0.001			
Lead	T	7439-92-1	0.015	mg/L	Lead	T	7439-92-1	0.015	mg/L	7	21	EC-36-06	0.00067		0.0075		0.0075		0.002			
Magnesium	T	7439-95-4		mg/L	Magnesium	T	7439-95-4		mg/L	4	4	EC-52-17	1.63		4.5		4.5		3.0			
Manganese	D	7439-96-5		mg/L	Manganese	D	7439-96-5		mg/L	10	10	EC-58C-02	0.0178		3.0		3.0		0.51			
Manganese	T	7439-96-5		mg/L	Manganese	T	7439-96-5		mg/L	10	10	EC-58C-02	0.0213		2.8		2.8		0.49			
Nickel	D	7440-02-0		mg/L	Nickel	D	7440-02-0		mg/L	5	5	EC-31-06	0.00219		0.015		0.015		0.008			
Nickel	T	7440-02-0		mg/L	Nickel	T	7440-02-0		mg/L	9	10	EC-21-41	0.00202		0.019		0.019		0.01			
Potassium	T	7440-09-7		mg/L	Potassium	T	7440-09-7		mg/L	4	4	EC-21-41	0.536		1.1		1.1		0.83			
Selenium	T	7782-49-2	0.05	mg/L	Selenium	T	7782-49-2	0.05	mg/L	2	4	EC-52-16	0.00122		0.0035		0.0035		0.002			
Silver	T	7440-22-4		mg/L	Silver	T	7440-22-4		mg/L	0	4		NA		NA		NA		NA			
Sodium	T	7440-23-5		mg/L	Sodium	T	7440-23-5		mg/L	4	4	EC-21-41	2.7		5.3		5.3		4.03			
Thallium	T	7440-28-0	0.002	mg/L	Thallium	T	7440-28-0	0.002	mg/L	0	4		NA		NA		NA		NA			
Titanium	D	7440-32-6		mg/L	Titanium	D	7440-32-6		mg/L	1	6	EC-03-04	0.00050		0.00050		0.0020	U	0.002			
Titanium	T	7440-32-6		mg/L	Titanium	T	7440-32-6		mg/L	5	7	EC-31-06	0.0012		0.0030		0.0056	U	0.003			
Vanadium	T	7440-62-2		mg/L	Vanadium	T	7440-62-2		mg/L	3	4	EC-52-17	0.00098		0.0016		0.0016		0.0012			
Zinc	D	7440-66-6		mg/L	Zinc	D	7440-66-6		mg/L	18	18	EC-21-41	0.0022		0.046		0.046		0.015			
Zinc	T	7440-66-6		mg/L	Zinc	T	7440-66-6		mg/L	21	22	EC-21-41	0.0025		0.052		0.052		0.018			
SW846 7470A					**SW846 7470A**																	
Mercury	D	7439-97-6	0.002	mg/L	Mercury	D	7439-97-6	0.002	mg/L	0	0		NA		NA		NA		NA			
Mercury	T	7439-97-6	0.002	mg/L	Mercury	T	7439-97-6	0.002	mg/L	0	6		NA		NA		NA		NA			
SW846 8015C					**SW846 8015C**																	
Ethanol		64-17-5		mg/L	Ethanol		64-17-5		mg/L	0	3		NA		NA		NA		NA			
Ethanol		64-17-5		µg/L	Ethanol		64-17-5		µg/L	0	6		NA		NA		NA		NA			
Methanol		67-56-1		mg/L	Methanol		67-56-1		mg/L	0	3		NA		NA		NA		NA			
Methanol		67-56-1		µg/L	Methanol		67-56-1		µg/L	0	6		NA		NA		NA		NA			
SW846 8082A					**SW846 8082A**																	
Aroclor 1016		12674-11-2		µg/L	Aroclor 1016		12674-11-2		µg/L	0	10		NA		NA		NA		NA			
Aroclor 1221		11104-28-2		µg/L	Aroclor 1221		11104-28-2		µg/L	0	10		NA		NA		NA		NA			
Aroclor 1232		11141-16-5		µg/L	Aroclor 1232		11141-16-5		µg/L	0	10		NA		NA		NA		NA			
Aroclor 1242		53469-21-9		µg/L	Aroclor 1242		53469-21-9		µg/L	0	10		NA		NA		NA		NA			
Aroclor 1248		12672-29-6		µg/L	Aroclor 1248		12672-29-6		µg/L	0	10		NA		NA		NA		NA			
Aroclor 1254		11097-69-1		µg/L	Aroclor 1254		11097-69-1		µg/L	0	10		NA		NA		NA		NA			
Aroclor 1260		11096-82-5		µg/L	Aroclor 1260		11096-82-5		µg/L	0	11		NA		NA		NA		NA			
SW846 8151A					**SW846 8151A**																	
2,4,5-T		93-76-5		µg/L	2,4,5-T		93-76-5		µg/L	0	2		NA		NA		NA		NA			
2,4,5-TP		93-72-1	50	µg/L	2,4,5-TP		93-72-1	50	µg/L	0	2		NA		NA		NA		NA			
2,4-D		94-75-7	70	µg/L	2,4-D		94-75-7	70	µg/L	0	2		NA		NA		NA		NA			
2,4-DB		94-82-6		µg/L	2,4-DB		94-82-6		µg/L	0	2		NA		NA		NA		NA			
Dalapon		75-99-0	200	µg/L	Dalapon		75-99-0	200	µg/L	0	2		NA		NA		NA		NA			
Dicamba		1918-00-9		µg/L	Dicamba		1918-00-9		µg/L	0	2		NA		NA		NA		NA			
Dichloroprop		120-36-5		µg/L	Dichloroprop		120-36-5		µg/L	1	2	EC-29-11	0.19		1.01		1.01					
Dinoseb		88-85-7	7	µg/L	Dinoseb		88-85-7	7	µg/L	0	2		NA		NA		NA		NA			
MCPA		94-74-6		µg/L	MCPA		94-74-6		µg/L	0	2		NA		NA		NA		NA			
MCPP		93-65-2		µg/L	MCPP		93-65-2		µg/L	0	2		NA		NA		NA		NA			

Table GW-1					Table GW-2															
Curtis Bay Depot Groundwater					Curtis Bay Depot Groundwater Data Summary															
			Location Name																	
			Sample Name																	
			Parent Sample Code																	
			Sample Date																	
Analyte	Fraction	CAS	MCL	Units	Analyte	Fraction	CAS #	MCL	Units	# Detects	# Samples	Location of Maximum	Minimum Concentration		Maximum Detected Concentration	Maximum (including non-detects)		Average Concentration [1]	MCL with TEF (listed as necessary)
Pentachlorophenol		87-86-5	1	µg/L	Pentachlorophenol		87-86-5	1	µg/L	0	1		NA		NA	NA		NA	
SW846 8260B					**SW846 8260B**															
2-Butanone		78-93-3		µg/L	2-Butanone		78-93-3		µg/L	0	3		NA		NA	NA		NA	
Acetone		67-64-1		µg/L	Acetone		67-64-1		µg/L	0	3		NA		NA	NA		NA	
Benzene		71-43-2	5	µg/L	Benzene		71-43-2	5	µg/L	0	4		NA		NA	NA		NA	
Carbon tetrachloride		56-23-5	5	µg/L	Carbon tetrachloride		56-23-5	5	µg/L	0	3		NA		NA	NA		NA	
Ethylbenzene		100-41-4	700	µg/L	Ethylbenzene		100-41-4	700	µg/L	0	4		NA		NA	NA		NA	
Methylene chloride		75-09-2	5	µg/L	Methylene chloride		75-09-2	5	µg/L	0	3		NA		NA	NA		NA	
Naphthalene		91-20-3		µg/L	Naphthalene		91-20-3		µg/L	0	4		NA		NA	NA		NA	
Tetrachloroethene		127-18-4	5	µg/L	Tetrachloroethene		127-18-4	5	µg/L	0	3		NA		NA	NA		NA	
Toluene		108-88-3	1000	µg/L	Toluene		108-88-3	1000	µg/L	0	4		NA		NA	NA		NA	
Trichloroethene [1]		79-01-6	5	µg/L	Trichloroethene		79-01-6	5	µg/L	0	3		NA		NA	NA		NA	
Xylenes (total)		1330-20-7	10000	µg/L	Xylenes (total)		1330-20-7	10000	µg/L	0	4		NA		NA	NA		NA	
SW846 8260C					**SW846 8260C**															
1,1,1,2-Tetrachloroethane		630-20-6		µg/L	1,1,1,2-Tetrachloroethane		630-20-6		µg/L	0	4		NA		NA	NA		NA	
1,1,1-Trichloroe hane		71-55-6	200	µg/L	1,1,1-Trichloroethane		71-55-6	200	µg/L	0	4		NA		NA	NA		NA	
1,1,2,2-Tetrachloroethane		79-34-5		µg/L	1,1,2,2-Tetrachloroethane		79-34-5		µg/L	0	4		NA		NA	NA		NA	
1,1,2-Trichloroe hane		79-00-5	5	µg/L	1,1,2-Trichloroethane		79-00-5	5	µg/L	0	4		NA		NA	NA		NA	
1,1-Dichloroethane		75-34-3		µg/L	1,1-Dichloroethane		75-34-3		µg/L	0	4		NA		NA	NA		NA	
1,1-Dichloroethene		75-35-4	7	µg/L	1,1-Dichloroethene		75-35-4	7	µg/L	0	4		NA		NA	NA		NA	
1,2,3-Trichloropropane		96-18-4		µg/L	1,2,3-Trichloropropane		96-18-4		µg/L	0	4		NA		NA	NA		NA	
1,2-Dibromo-3-chloropropane		96-12-8	0.2	µg/L	1,2-Dibromo-3-chloropropane		96-12-8	0.2	µg/L	0	4		NA		NA	NA		NA	
1,2-Dibromoethane		106-93-4	0.05	µg/L	1,2-Dibromoethane		106-93-4	0.05	µg/L	0	4		NA		NA	NA		NA	
1,2-Dichlorobenzene		95-50-1	600	µg/L	1,2-Dichlorobenzene		95-50-1	600	µg/L	0	4		NA		NA	NA		NA	
1,2-Dichloroethane		107-06-2	5	µg/L	1,2-Dichloroethane		107-06-2	5	µg/L	0	4		NA		NA	NA		NA	
1,2-Dichloropropane		78-87-5	5	µg/L	1,2-Dichloropropane		78-87-5	5	µg/L	0	4		NA		NA	NA		NA	
1,4-Dichlorobenzene		106-46-7	75	µg/L	1,4-Dichlorobenzene		106-46-7	75	µg/L	0	4		NA		NA	NA		NA	
2-Butanone		78-93-3		µg/L	2-Butanone		78-93-3		µg/L	0	10		NA		NA	NA		NA	
2-Hexanone		591-78-6		µg/L	2-Hexanone		591-78-6		µg/L	0	4		NA		NA	NA		NA	
4-Methyl-2-pentanone		108-10-1		µg/L	4-Methyl-2-pentanone		108-10-1		µg/L	0	4		NA		NA	NA		NA	
Acetone		67-64-1		µg/L	Acetone		67-64-1		µg/L	0	10		NA		NA	NA		NA	
Acrylonitrile		107-13-1		µg/L	Acrylonitrile		107-13-1		µg/L	0	4		NA		NA	NA		NA	
Benzene		71-43-2	5	µg/L	Benzene		71-43-2	5	µg/L	0	11		NA		NA	NA		NA	
Bromochloromethane		74-97-5		µg/L	Bromochloromethane		74-97-5		µg/L	0	4		NA		NA	NA		NA	
Bromodichloromethane		75-27-4	80	µg/L	Bromodichloromethane		75-27-4	80	µg/L	0	4		NA		NA	NA		NA	
Bromoform		75-25-2	80	µg/L	Bromoform		75-25-2	80	µg/L	0	4		NA		NA	NA		NA	
Bromomethane		74-83-9		µg/L	Bromomethane		74-83-9		µg/L	0	4		NA		NA	NA		NA	
Carbon disulfide		75-15-0		µg/L	Carbon disulfide		75-15-0		µg/L	0	4		NA		NA	NA		NA	
Carbon tetrachloride		56-23-5	5	µg/L	Carbon tetrachloride		56-23-5	5	µg/L	0	10		NA		NA	NA		NA	
Chlorobenzene		108-90-7	100	µg/L	Chlorobenzene		108-90-7	100	µg/L	0	4		NA		NA	NA		NA	
Chloroethane		75-00-3		µg/L	Chloroethane		75-00-3		µg/L	0	4		NA		NA	NA		NA	
Chloroform		67-66-3	80	µg/L	Chloroform		67-66-3	80	µg/L	0	4		NA		NA	NA		NA	
Chloromethane		74-87-3		µg/L	Chloromethane		74-87-3		µg/L	0	4		NA		NA	NA		NA	
cis-1,2-Dichloroethene		156-59-2	70	µg/L	cis-1,2-Dichloroethene		156-59-2	70	µg/L	0	4		NA		NA	NA		NA	
cis-1,3-Dichloropropene		10061-01-5		µg/L	cis-1,3-Dichloropropene		10061-01-5		µg/L	0	4		NA		NA	NA		NA	
Dibromochlorome hane		124-48-1	80	µg/L	Dibromochloromethane		124-48-1	80	µg/L	0	4		NA		NA	NA		NA	
Dibromomethane		74-95-3		µg/L	Dibromomethane		74-95-3		µg/L	0	4		NA		NA	NA		NA	
Ethylbenzene		100-41-4	700	µg/L	Ethylbenzene		100-41-4	700	µg/L	0	11		NA		NA	NA		NA	
Iodomethane		74-88-4		µg/L	Iodomethane		74-88-4		µg/L	0	4		NA		NA	NA		NA	
Methyl tert-butyl ether		1634-04-4		µg/L	Methyl tert-butyl ether		1634-04-4		µg/L	0	4		NA		NA	NA		NA	
Methylene chloride		75-09-2	5	µg/L	Methylene chloride		75-09-2	5	µg/L	0	10		NA		NA	NA		NA	
mp-Xylene		108383/ 106423		µg/L	mp-Xylene		108383/ 106423		µg/L	0	7		NA		NA	NA		NA	
Naphthalene		91-20-3		µg/L	Naphthalene		91-20-3		µg/L	0	2		NA		NA	NA		NA	
o-Xylene		95-47-6		µg/L	o-Xylene		95-47-6		µg/L	0	7		NA		NA	NA		NA	
Styrene		100-42-5	100	µg/L	Styrene		100-42-5	100	µg/L	0	4		NA		NA	NA		NA	
Tetrachloroethene		127-18-4	5	µg/L	Tetrachloroethene		127-18-4	5	µg/L	0	6		NA		NA	NA		NA	
Toluene		108-88-3	1000	µg/L	Toluene		108-88-3	1000	µg/L	0	11		NA		NA	NA		NA	
trans-1,2-Dichloroethene		156-60-5	100	µg/L	trans-1,2-Dichloroethene		156-60-5	100	µg/L	0	4		NA		NA	NA		NA	
trans-1,3-Dichloropropene		10061-02-6		µg/L	trans-1,3-Dichloropropene		10061-02-6		µg/L	0	4		NA		NA	NA		NA	
trans-1,4-Dichloro-2-butene		110-57-6		µg/L	trans-1,4-Dichloro-2-butene		110-57-6		µg/L	0	4		NA		NA	NA		NA	
Trichloroethene [1]		79-01-6	5	µg/L	Trichloroethene		79-01-6	5	µg/L	0	6		NA		NA	NA		NA	
Trichlorofluoromethane		75-69-4		µg/L	Trichlorofluoromethane		75-69-4		µg/L	0	4		NA		NA	NA		NA	
Vinyl Acetate		108-05-4		µg/L	Vinyl Acetate		108-05-4		µg/L	0	4		NA		NA	NA		NA	
Vinyl chloride		75-01-4	2	µg/L	Vinyl chloride		75-01-4	2	µg/L	0	4		NA		NA	NA		NA	
Xylenes (total)		1330-20-7	10000	µg/L	Xylenes (total)		1330-20-7	10000	µg/L	0	4		NA		NA	NA		NA	
SW846 8270D/8270 SIM					**SW846 8270D/8270 SIM**															
Acenaphthene		83-32-9		µg/L	Acenaph hene		83-32-9		µg/L	2	13	EC-21-41	0.047	U	0.33	0.33		0.091	
Acenaphthylene		208-96-8		µg/L	Acenaph hylene		208-96-8		µg/L	1	13	EC-21-41	0.023		0.023	0.05	U	0.047	
Anthracene		120-12-7		µg/L	Anthracene		120-12-7		µg/L	4	13	EC-21-41	0.018		0.27	0.27		0.078	

Table GW-1
Curtis Bay Depot Groundwater

Table GW-2
Curtis Bay Depot Groundwater Data Summary

Location Name																			
Sample Name																			
Parent Sample Code																			
Sample Date										# Detects	# Samples	Location of Maximum	Minimum Concentration		Maximum Detected Concentration		Maximum (including non-detects)		Average Concentration [1]	MCL with TEF (listed as necessary)
Analyte	Fraction	CAS	MCL	Units	Analyte	Fraction	CAS #	MCL	Units											
Benzo(a)anthracene		56-55-3		µg/L	Benzo(a)anthracene		56-55-3		µg/L	4	13	EC-21-41	0.020		0.23		0.23		0.072	
Benzo(a)pyrene		50-32-8	0.2	µg/L	Benzo(a)pyrene		50-32-8	0.2	µg/L	3	13	EC-21-41	0.025		0.18		0.18		0.064	
Benzo(b)fluoranthene		205-99-2		µg/L	Benzo(b)fluoranthene		205-99-2		µg/L	4	13	EC-21-41	0.028		0.28		0.28		0.081	
Benzo(ghi)perylene		191-24-2		µg/L	Benzo(ghi)perylene		191-24-2		µg/L	2	13	EC-21-41	0.047	U	0.13		0.13		0.060	
Benzo(k)fluoran hene		207-08-9		µg/L	Benzo(k)fluoranthene		207-08-9		µg/L	2	13	EC-21-41	0.047	U	0.11		0.11		0.055	
Chrysene		218-01-9		µg/L	Chrysene		218-01-9		µg/L	3	13	EC-21-41	0.024		0.24		0.24		0.075	
Dibenz(a,h)anthracene		53-70-3		µg/L	Dibenz(a,h)an hracene		53-70-3		µg/L	2	13	EC-21-41	0.02		0.033		0.05	U	0.046	0 02
Fluoranthene		206-44-0		µg/L	Fluoranthene		206-44-0		µg/L	3	13	EC-21-41	0.039		0.76		0.76		0.15	
Fluorene		86-73-7		µg/L	Fluorene		86-73-7		µg/L	3	13	EC-21-41	0.021		0.54		0.54		0.12	
Indeno(1,2,3-cd)pyrene		193-39-5		µg/L	Indeno(1,2,3-cd)pyrene		193-39-5		µg/L	4	13	EC-21-41	0.034		0.19		0.19		0.066	
Naphthalene		91-20-3		µg/L	Naphthalene		91-20-3		µg/L	9	18	EC-21-41	0.023		1.9		1.9		0.24	
Pentachlorophenol		87-86-5	1	µg/L	Pentachlorophenol		87-86-5	1	µg/L	0	6		NA		NA		NA			
Phenanthrene		85-01-8		µg/L	Phenanthrene		85-01-8		µg/L	4	13	EC-21-41	0.025		1.7		1.7		0.29	
Pyrene		129-00-0		µg/L	Pyrene		129-00-0		µg/L	3	13	EC-21-41	0.040		0.55		0.55		0.12	
SW846 8290					**SW846 8290**															
1,2,3,4,6,7,8,9-OCDD		3268-87-9		pg/L	1,2,3,4,6,7,8,9-OCDD		3268-87-9		pg/L	9	10	EC-49-14	63.6		195		195		151	900,000
1,2,3,4,6,7,8,9-OCDF		39001-02-0		pg/L	1,2,3,4,6,7,8,9-OCDF		39001-02-0		pg/L	8	10	EC-34-04	14.7		24.5		63.6	U	27.2	
1,2,3,4,6,7,8-HpCDD		35822-46-9		pg/L	1,2,3,4,6,7,8-HpCDD		35822-46-9		pg/L	8	10	EC-34-04	31.7		47.5		47.5		41.5	3,000
1,2,3,4,6,7,8-HpCDF		67562-39-4		pg/L	1,2,3,4,6,7,8-HpCDF		67562-39-4		pg/L	8	10	EC-58C-02	4.44		10.1		31.9	U	12.2	
1,2,3,4,7,8,9-HpCDF		55673-89-7		pg/L	1,2,3,4,7,8,9-HpCDF		55673-89-7		pg/L	5	10	EC-25-29	0.935		3.03		31.9	U	7.8	
1,2,3,4,7,8-HxCDD		39227-28-6		pg/L	1,2,3,4,7,8-HxCDD		39227-28-6		pg/L	3	10	EC-25-29	0.507		3.62		31.9	U	7.9	
1,2,3,4,7,8-HxCDF		70648-26-9		pg/L	1,2,3,4,7,8-HxCDF		70648-26-9		pg/L	6	10	EC-58C-02	1.3		2.84		31.9	U	7.8	
1,2,3,6,7,8-HxCDD		57653-85-7		pg/L	1,2,3,6,7,8-HxCDD		57653-85-7		pg/L	7	10	EC-21-41	2.2		6.62		31.9	U	9.2	
1,2,3,6,7,8-HxCDF		57117-44-9		pg/L	1,2,3,6,7,8-HxCDF		57117-44-9		pg/L	3	10	EC-58C-02	0.508		3.09		31.9	U	7.4	
1,2,3,7,8,9-HxCDD		19408-74-3		pg/L	1,2,3,7,8,9-HxCDD		19408-74-3		pg/L	5	10	EC-58C-02	0.695		3.76		31.9	U	8.2	
1,2,3,7,8,9-HxCDF		72918-21-9		pg/L	1,2,3,7,8,9-HxCDF		72918-21-9		pg/L	1	10	EC-22-06	0.743	U	1.52		31.9	U	7.4	
1,2,3,7,8-PeCDD		40321-76-4		pg/L	1,2,3,7,8-PeCDD		40321-76-4		pg/L	3	10	EC-34-04	0.949		4.63		31.9	U	8.5	
1,2,3,7,8-PeCDF		57117-41-6		pg/L	1,2,3,7,8-PeCDF		57117-41-6		pg/L	2	10	EC-58C-02	0.685		3.17		31.9	U	7.9	
2,3,4,6,7,8-HxCDF		60851-34-5		pg/L	2,3,4,6,7,8-HxCDF		60851-34-5		pg/L	2	10	EC-22-06	0.624		2.59		31.9	U	7.4	
2,3,4,7,8-PeCDF		57117-31-4		pg/L	2,3,4,7,8-PeCDF		57117-31-4		pg/L	2	10	EC-34-04	0.63		4.29		31.9	U	7.9	
2,3,7,8-TCDD		1746-01-6	30	pg/L	2,3,7,8-TCDD		1746-01-6	30	pg/L	1	10	EC-21-41	1.05	U	1.9		6.36	U	3.0	
2,3,7,8-TCDF		51207-31-9		pg/L	2,3,7,8-TCDF		51207-31-9		pg/L	1	10	EC-21-41	2.39	U	4.01		6.36	U	4.0	
Total Heptachlorodibenzofuran		38998-75-3		pg/L	Total Heptachlorodibenzofuran		38998-75-3		pg/L	5	10	EC-21-41	0.586		25.8		31.9	U	16.5	
Total Heptachlorodibenzo-p-dioxin		37871-00-4		pg/L	Total Heptachlorodibenzo-p-dioxin		37871-00-4		pg/L	5	10	EC-58C-02	0.507		85		85		42.3	3,000
Total Hexachlorodibenzofuran		55684-94-1		pg/L	Total Hexachlorodibenzofuran		55684-94-1		pg/L	3	10	EC-21-41	0.646		8.03		31.9	U	8.8	
Total Hexachlorodibenzo-p-dioxin		34465-46-8		pg/L	Total Hexachlorodibenzo-p-dioxin		34465-46-8		pg/L	1	10	EC-25-29	0.512		2.98		31.9	U	7.6	
Total Pentachlorodibenzofuran		30402-15-4		pg/L	Total Pentachlorodibenzofuran		30402-15-4		pg/L	0	10	NA	NA		NA		NA		NA	
Total Pentachlorodibenzo-p-dioxin		36088-22-9		pg/L	Total Pentachlorodibenzo-p-dioxin		36088-22-9		pg/L	0	10	NA	NA		NA		NA		NA	
Total Tetrachlorodibenzofuran		55722-27-5		pg/L	Total Tetrachlorodibenzofuran		55722-27-5		pg/L	0	10	NA	NA		NA		NA		NA	
Total Tetrachlorodibenzo-p-dioxin		41903-57-5		pg/L	Total Tetrachlorodibenzo-p-dioxin		41903-57-5		pg/L	0	10	NA	NA		NA		NA		NA	
SW846 8330B					**SW846 8330B**															
2,4,6-Trinitrotoluene		118-96-7		µg/L	2,4,6-Trinitrotoluene		118-96-7		µg/L	0	13	NA	NA		NA		NA		NA	
2,4-Dinitrotoluene		121-14-2		µg/L	2,4-Dinitrotoluene		121-14-2		µg/L	0	13	NA	NA		NA		NA		NA	
2,6-Dinitrotoluene		606-20-2		µg/L	2,6-Dinitrotoluene		606-20-2		µg/L	0	13	NA	NA		NA		NA		NA	
Nitroglycerin		55-63-0		µg/L	Nitroglycerin		55-63-0		µg/L	0	5	NA	NA		NA		NA		NA	
USACE					**USACE**															
Nitroguanidine		556-88-7		µg/L	Nitroguanidine		556-88-7		µg/L	0	5	NA	NA		NA		NA		NA	

Notes: 1. TCE only detected in background well.

2. This is not the same location as the soil sample location EC-32-07. Location

Blank cells indicate that the parameter was not analyzed.

Notes:

1. Calculated using he detection limit for non-detects.

MCL=maximum contaminant limit

Table SED-1												
Curtis Bay Depot Sediment Results												
			Location		EC-TRIB-1		EC-TRIB-2		EC-TRIB-2		EC-TRIB-3	
			Sample Name		EC-Trib-1-SD		EC-Trib-2-SD		EC-Trib-FD1-SD		EC-Trib-3-SD	
		Parent Sample Name							EC-TRIB-2-SD			
			Sample Date		9/28/2015		9/28/2015		9/28/2015		9/28/2015	
Parameter Name	CAS	USEPA RSL	BKGD SS	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
SW846 6020A												
Aluminum	7429-90-5	110000	14159	mg/kg	**6040**		**13700**		**9850**		**9490**	
Antimony	7440-36-0	47	0.95	mg/kg	0.279	UJ	0.598	UJ	**0.508**	J	0.366	J
Arsenic	7440-38-2	3	9.09	mg/kg	3.62		*94.1*		*178*		*17.6*	
Cadmium	7440-43-9	98	0.17	mg/kg	0.0562	J	*0.765*	J	*0.604*	J	*0.305*	J
Chromium	7440-47-3	6.3	24.9	mg/kg	8.82	J	21.4	J	14	J	19.7	J
Cobalt	7440-48-4	35	10.2	mg/kg	2.68		9.45		8.02		2.67	
Copper	7440-50-8	4700	32.83	mg/kg	**6.1**		***33.7***		***35.9***		**10.2**	
Lead	7439-92-1	800	123.9	mg/kg	**13.5**	J	**47.1**	J	**47.2**	J	**19.3**	J
Manganese	7439-96-5	2600	699.8	mg/kg	25.1	J	146	J	82.2	J	128	J
Nickel	7440-02-0	2200	15.95	mg/kg	**4.65**		**14.2**		**12.9**		**5.25**	
Titanium	7440-32-6			mg/kg	138		229		167		514	
Zinc	7440-66-6	35000	83.92	mg/kg	26.2	J	*147*	J	*173*	J	49	J
SW846 7196A												
Chromium, Hexavalent	18540-29-9	6.3	10	mg/kg	0.619	UJ	1.2	UJ	1.14	UJ	0.625	UJ
SW846 7471B												
Mercury	7439-97-6	4.6	0.11	mg/kg	0.0376		0.0838		0.0709		0.0266	
SW846 8015C												
Ethanol	64-17-5			µg/kg	1300	U	2500	U	2400	U	1300	U
Methanol	67-56-1	1.2E+08		µg/kg	1300	U	2500	U	2400	U	1300	U
SW846 8082A												
Aroclor 1016	12674-11-2	5100		µg/kg	11	U	20	U	20	U	11	U
Aroclor 1221	11104-28-2	830		µg/kg	11	U	20	U	20	U	11	U
Aroclor 1232	11141-16-5	720		µg/kg	11	U	20	U	20	U	11	U
Aroclor 1242	53469-21-9	950		µg/kg	11	U	20	U	20	U	11	U
Aroclor 1248	12672-29-6	950		µg/kg	11	U	20	U	20	U	11	U
Aroclor 1254	11097-69-1	970		µg/kg	11	U	20	U	20	U	11	U
Aroclor 1260	11096-82-5	990		µg/kg	11	U	20	U	20	U	11	U
SW846 8151A												
2,4,5-T	93-76-5	820000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
2,4,5-TP	93-72-1	660000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
2,4-D	94-75-7	960000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
2,4-DB	94-82-6	660000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
Dalapon	75-99-0	2500000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
Dicamba	1918-00-9	2500000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
Dichloroprop	120-36-5			µg/kg	5.4	U	10	U	9.9	U	5.4	U
Dinoseb	88-85-7	82000		µg/kg	5.4	U	10	U	9.9	U	5.4	U
MCPA	94-74-6	41000		µg/kg	540	U	1000	U	990	U	540	U
MCPP	93-65-2	82000		µg/kg	540	U	1000	U	990	U	540	U
SW846 8260C												
2-Butanone	78-93-3	19000000		µg/kg	3	U	5.7	U	5.6	U	2.9	U
Acetone	67-64-1	67000000		µg/kg	12	U	23	U	22	U	12	U
Benzene	71-43-2	5100		µg/kg	1.4	U	2.7	U	2.7	U	1.4	U
Carbon tetrachloride	56-23-5	2900		µg/kg	1.4	U	2.7	U	2.7	U	1.4	U
Ethylbenzene	100-41-4	25000		µg/kg	1.4	U	2.7	U	2.7	U	1.4	U
Methylene chloride	75-09-2	320000		µg/kg	6	U	11	U	11	U	5.9	U
mp-Xylene	108383/ 106423			µg/kg	3	U	5.7	U	5.6	U	2.9	U
o-Xylene	95-47-6	280000		µg/kg	1.4	UJ	2.7	U	2.7	U	1.4	U
Tetrachloroethene	127-18-4	39000		µg/kg	1.4	U	2.7	U	2.7	U	1.4	U
Toluene	108-88-3	4700000		µg/kg	1.4	U	2.7	U	2.7	U	1.4	U
Trichloroethene	79-01-6	1900		µg/kg	6	U	11	U	11	U	5.9	U
SW846 8270D												
Acenaphthene	83-32-9	4500000	41.5	µg/kg	2.2	U	6.2	U	6	U	0.85	J

Table SED-1												
Curtis Bay Depot Sediment Results												
			Location		EC-TRIB-1		EC-TRIB-2		EC-TRIB-2		EC-TRIB-3	
			Sample Name		EC-Trib-1-SD		EC-Trib-2-SD		EC-Trib-FD1-SD		EC-Trib-3-SD	
		Parent Sample Name							EC-TRIB-2-SD			
			Sample Date		9/28/2015		9/28/2015		9/28/2015		9/28/2015	
Parameter Name	CAS	USEPA RSL	BKGD SS	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Acenaphthylene	208-96-8	2300000	363	µg/kg	2.4	J	6.2	U	6	U	2.2	U
Anthracene	120-12-7	23000000	154	µg/kg	1.6	J	6.2	U	6	U	2.6	J
Benzo(a)anthracene	56-55-3	21000	1035	µg/kg	10		7.2	J	6	J	10	
Benzo(a)pyrene	50-32-8	2100	1036	µg/kg	17		5.8	J	7.5	J	11	
Benzo(b)fluoranthene	205-99-2	21000	1116	µg/kg	32		8.2	J	12		18	
Benzo(ghi)perylene	191-24-2	2300000	708	µg/kg	16		5.8	J	6.4	J	8.2	
Benzo(k)fluoranthene	207-08-9	210000	476	µg/kg	11		4.7	J	3.6	J	6	
Chrysene	218-01-9	2100000	842	µg/kg	17		7.3	J	9.2	J	12	
Dibenz(a,h)anthracene	53-70-3	2100	152	µg/kg	5.8		6.2	U	6	U	2.8	J
Fluoranthene	206-44-0	3000000	1488	µg/kg	14		12	J	15		19	
Fluorene	86-73-7	3000000	40	µg/kg	2.2	U	6.2	U	6	U	2.2	U
Indeno(1,2,3-cd)pyrene	193-39-5	21000	928	µg/kg	24		7.4	J	9.4	J	12	
Naphthalene	91-20-3	8600	13.3	µg/kg	2.2	U	6.2	U	2.7	J	2.2	U
Pentachlorophenol	87-86-5	4000		µg/kg	4.2	U	12	U	12	U	4.2	U
Phenanthrene	85-01-8	2300000	500	µg/kg	13		9.4	J	6.9	J	14	
Pyrene	129-00-0	2300000	1117	µg/kg	13		8.9	J	13		21	
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	3268-87-9	74400		pg/g	8150	J	5890	J	6730	J	5040	J
1,2,3,4,6,7,8,9-OCDF	39001-02-0	74400		pg/g	2.2	J	6.38	J	6.52	J	9.05	
1,2,3,4,6,7,8-HpCDD	35822-46-9	2460		pg/g	94.4		60.1		58.2		34.2	
1,2,3,4,6,7,8-HpCDF	67562-39-4	2210		pg/g	1.04	J	2.58	J	5.6	J	3.57	J
1,2,3,4,7,8,9-HpCDF	55673-89-7	2210		pg/g	3.11	UJ	4.21	U	0.727	J	3.66	UJ
1,2,3,4,7,8-HxCDD	39227-28-6	223		pg/g	0.528	J	0.78	J	0.783	J	0.471	J
1,2,3,4,7,8-HxCDF	70648-26-9	219		pg/g	3.11	U	0.709	J	1.18	J	0.468	J
1,2,3,6,7,8-HxCDD	57653-85-7	223		pg/g	1.46	J	1.38	J	1.51	J	0.854	J
1,2,3,6,7,8-HxCDF	57117-44-9	219		pg/g	3.11	U	0.496	J	0.979	J	0.371	J
1,2,3,7,8,9-HxCDD	19408-74-3	223		pg/g	1.53	J	1.62	J	1.59	J	0.915	J
1,2,3,7,8,9-HxCDF	72918-21-9	223		pg/g	3.11	UJ	4.21	U	3.35	U	3.66	UJ
1,2,3,7,8-PeCDD	40321-76-4	22.3		pg/g	0.323	J	0.411	J	0.466	J	0.3	J
1,2,3,7,8-PeCDF	57117-41-6	744		pg/g	0.177	J	0.379	J	0.386	J	0.218	J
2,3,4,6,7,8-HxCDF	60851-34-5	223		pg/g	3.11	U	0.557	J	1.01	J	0.563	J
2,3,4,7,8-PeCDF	57117-31-4	74.4		pg/g	0.3	J	0.603	J	0.702	J	0.707	J
2,3,7,8-TCDD	1746-01-6	21.6		pg/g	0.2	J	0.0546	U	0.0455	U	0.144	J
2,3,7,8-TCDF	51207-31-9	219		pg/g	0.234	J	0.385	J	0.269	J	0.299	J
Total Heptachlorodibenzofuran	38998-75-3	2210		pg/g	1.62	J	3.67	J	8.52		8.45	
Total Heptachlorodibenzo-p-dioxin	37871-00-4	2170		pg/g	253		141		141		84.9	
Total Hexachlorodibenzofuran	55684-94-1	223		pg/g	1.44	J	4.6		8.29		6.4	
Total Hexachlorodibenzo-p-dioxin	34465-46-8	223		pg/g	61.1		18.7		17.5		12.2	
Total Pentachlorodibenzofuran	30402-15-4	744		pg/g	1.66	J	5.15		5.53		7.32	
Total Pentachlorodibenzo-p-dioxin	36088-22-9	22.3		pg/g	3.99		2.7	J	1.93	J	2.49	J
Total Tetrachlorodibenzofuran	55722-27-5	219		pg/g	2.07		8.06		4.19		4.96	
Total Tetrachlorodibenzo-p-dioxin	41903-57-5	21.6		pg/g	0.762		0.607	J	0.0455	U	0.652	J
SW846 8330B												
2,4,6-Trinitrotoluene	118-96-7	51		mg/kg	0.11	UJ	0.15	UJ	0.099	UJ	0.085	UJ
2,4-Dinitrotoluene	121-14-2	7.4		mg/kg	0.11	UJ	0.15	UJ	0.099	UJ	0.085	UJ
2,6-Dinitrotoluene	606-20-2	1.5		mg/kg	0.051	UJ	0.073	UJ	0.05	UJ	0.043	UJ
Nitroglycerin	55-63-0	8.2		mg/kg	0.26	UJ	0.37	UJ	0.25	UJ	0.22	UJ
USACE												
Nitroguanidine	556-88-7	8200000		µg/kg	24	U	37	U	28	U	24	U
Notes:												
µg/kg - micrograms per kilogram												
mg/kg - milligrams per kilogram												
pg/kg - picograms per kilogram												
J - estimated value												
U - not detected, limit of detection (LOD) shown												
UJ - not detected, LOD is estimated												
Q - validator qualifier												
USEPA RSL - USEPA Regional Screening Level - Industrial Soil HQ = 0.1, May 2020												
Background Surface Soil - Upper Tolerance Limit as developed in the Work Plan Addendum No. 1, June 2015												
Results exceeding the USEPA RSL are shaded gray												
Pink indicates not detected												

Table SED-2

Sediment: Data Summary and Selection of COPCs

					HHRA Selection of COPCs									
Parameter Name	CAS	USEPA RSL	BKGD SS	Units	Minimum		Maximum Detected Concentration		Maximum (including non-detects)		Location of Maximum Detected Concentration	# Detects	# Samples	Maximum Exceeds Industrial Soil RSL?	COPC?
SW846 6020A															
Aluminum	7429-90-5	110000	14159	mg/kg	6040		13700		13700		EC-TRIB-2	4	4	NO	NO
Antimony	7440-36-0	47	0.95	mg/kg	0.279		0.508		0.598	U	EC-TRIB-2	2	4	NO	NO
Arsenic	7440-38-2	3	9.09	mg/kg	3.62		178		178		EC-TRIB-2	4	4	YES	YES
Cadmium	7440-43-9	98	0.17	mg/kg	0.0562		0.765		0.765		EC-TRIB-2	4	4	NO	NO
Chromium	7440-47-3	6.3	24.9	mg/kg	8.82		21.4		21.4		EC-TRIB-2	4	4	YES	NO
Cobalt	7440-48-4	35	10.2	mg/kg	2.67		9.45		9.45		EC-TRIB-2	4	4	NO	NO
Copper	7440-50-8	4700	32.83	mg/kg	6.1		35.9		35.9		EC-TRIB-2	4	4	NO	NO
Lead	7439-92-1	800	123.9	mg/kg	13.5		47.2		47.2		EC-TRIB-2	4	4	NO	NO
Manganese	7439-96-5	2600	699.8	mg/kg	25.1		146		146		EC-TRIB-2	4	4	NO	NO
Nickel	7440-02-0	2200	15.95	mg/kg	4.65		14.2		14.2		EC-TRIB-2	4	4	NO	NO
Titanium	7440-32-6			mg/kg	138		514		514		EC-TRIB-3	4	4	NA	NO
Zinc	7440-66-6	35000	83.92	mg/kg	26.2		173		173		EC-TRIB-2	4	4	NO	NO
SW846 7196A															
Chromium, Hexavalent	18540-29-9	6.3	10	mg/kg	NA				NA			0	4	NA	NO
SW846 7471B															
Mercury	7439-97-6	4.6	0.11	mg/kg	0.0266				0.0838		EC-TRIB-2	4	4	NO	NO
SW846 8015C															
Ethanol	64-17-5			µg/kg	NA		NA		NA			0	4	NA	NO
Methanol	67-56-1	1.2E+08		µg/kg	NA		NA		NA			0	4	NA	NO
SW846 8082A															
Aroclor 1016	12674-11-2	5100		µg/kg	NA		NA		NA			0	4	NA	NO
Aroclor 1221	11104-28-2	830		µg/kg	NA		NA		NA			0	4	NA	NO
Aroclor 1232	11141-16-5	720		µg/kg	NA		NA		NA			0	4	NA	NO
Aroclor 1242	53469-21-9	950		µg/kg	NA		NA		NA			0	4	NA	NO
Aroclor 1248	12672-29-6	950		µg/kg	NA		NA		NA			0	4	NA	NO
Aroclor 1254	11097-69-1	970		µg/kg	NA		NA		NA			0	4	NA	NO
Aroclor 1260	11096-82-5	990		µg/kg	NA		NA		NA			0	4	NA	NO
SW846 8151A															
2,4,5-T	93-76-5	820000		µg/kg	NA		NA		NA			0	4	NA	NO
2,4,5-TP	93-72-1	660000		µg/kg	NA		NA		NA			0	4	NA	NO
2,4-D	94-75-7	960000		µg/kg	NA		NA		NA			0	4	NA	NO
2,4-DB	94-82-6	660000		µg/kg	NA		NA		NA			0	4	NA	NO
Dalapon	75-99-0	2500000		µg/kg	NA		NA		NA			0	4	NA	NO
Dicamba	1918-00-9	2500000		µg/kg	NA		NA		NA			0	4	NA	NO
Dichloroprop	120-36-5			µg/kg	NA		NA		NA			0	4	NA	NO
Dinoseb	88-85-7	82000		µg/kg	NA		NA		NA			0	4	NA	NO
MCPA	94-74-6	41000		µg/kg	NA		NA		NA			0	4	NA	NO
MCPP	93-65-2	82000		µg/kg	NA		NA		NA			0	4	NA	NO
SW846 8260C							NA		NA			0	4		
2-Butanone	78-93-3	19000000		µg/kg	NA		NA		NA			0	4	NA	NO
Acetone	67-64-1	67000000		µg/kg	NA		NA		NA			0	4	NA	NO
Benzene	71-43-2	5100		µg/kg	NA		NA		NA			0	4	NA	NO
Carbon tetrachloride	56-23-5	2900		µg/kg	NA		NA		NA			0	4	NA	NO
Ethylbenzene	100-41-4	25000		µg/kg	NA		NA		NA			0	4	NA	NO
Methylene chloride	75-09-2	320000		µg/kg	NA		NA		NA			0	4	NA	NO
mp-Xylene	108383/ 106423			µg/kg	NA		NA		NA			0	4	NA	NO
o-Xylene	95-47-6	280000		µg/kg	NA		NA		NA			0	4	NA	NO
Tetrachloroethene	127-18-4	39000		µg/kg	NA		NA		NA			0	4	NA	NO
Toluene	108-88-3	4700000		µg/kg	NA		NA		NA			0	4	NA	NO
Trichloroethene	79-01-6	1900		µg/kg	NA		NA		NA			0	4	NA	NO
SW846 8270D															
Acenaphthene	83-32-9	4500000	41.5	µg/kg	0.85		0.85		6.2		EC-TRIB-2	1	4	NO	NO

Table SED-2

Sediment: Data Summary and Selection of COPCs

					HHRA Selection of COPCs										
Parameter Name	CAS	USEPA RSL	BKGD SS	Units	Minimum		Maximum Detected Concentration		Maximum (including non-detects)		Location of Maximum Detected Concentration	# Detects	# Samples	Maximum Exceeds Industrial Soil RSL?	COPC?
Acenaphthylene	208-96-8	2300000	363	µg/kg	2.2	U	2.4		6.2	U	EC-TRIB-2	1	4	NO	NO
Anthracene	120-12-7	23000000	154	µg/kg	1.6		2.6		6.2	U	EC-TRIB-2	2	4	NO	NO
Benzo(a)anthracene	56-55-3	21000	1035	µg/kg	6		10		10		EC-TRIB-3	4	4	NO	NO
Benzo(a)pyrene	50-32-8	2100	1036	µg/kg	5.8		17		17		EC-TRIB-1	4	4	NO	NO
Benzo(b)fluoranthene	205-99-2	21000	1116	µg/kg	8.2		32		32		EC-TRIB-1	4	4	NO	NO
Benzo(ghi)perylene	191-24-2	2300000	708	µg/kg	5.8		16		16		EC-TRIB-1	4	4	NO	NO
Benzo(k)fluoranthene	207-08-9	210000	476	µg/kg	3.6		11		11		EC-TRIB-1	4	4	NO	NO
Chrysene	218-01-9	2100000	842	µg/kg	7.3		17		17		EC-TRIB-1	4	4	NO	NO
Dibenz(a,h)anthracene	53-70-3	2100	152	µg/kg	2.8		5.8		6.2	U	EC-TRIB-1	2	4	NO	NO
Fluoranthene	206-44-0	3000000	1488	µg/kg	12		19		19		EC-TRIB-3	4	4	NO	NO
Fluorene	86-73-7	3000000	40	µg/kg	NA		NA		NA			0	4	NA	NO
Indeno(1,2,3-cd)pyrene	193-39-5	21000	928	µg/kg	7.4		24		24		EC-TRIB-1	4	4	NO	NO
Naphthalene	91-20-3	8600	13.3	µg/kg	2.2	U	2.7		6.2	U	EC-TRIB-2	1	4	NO	NO
Pentachlorophenol	87-86-5	4000		µg/kg	NA		NA		NA			0	4	NA	NO
Phenanthrene	85-01-8	2300000	500	µg/kg	6.9		14		14		EC-TRIB-3	4	4	NO	NO
Pyrene	129-00-0	2300000	1117	µg/kg	8.9		21		21		EC-TRIB-3	4	4	NO	NO
SW846 8290															
1,2,3,4,6,7,8,9-OCDD	3268-87-9	74400		pg/g	5040		8150		8150		EC-TRIB-1	4	4	NO	NO
1,2,3,4,6,7,8,9-OCDF	39001-02-0	74400		pg/g	2.2		9.05		9.05		EC-TRIB-3	4	4	NO	NO
1,2,3,4,6,7,8-HpCDD	35822-46-9	2460		pg/g	34.2		94.4		94.4		EC-TRIB-1	4	4	NO	NO
1,2,3,4,6,7,8-HpCDF	67562-39-4	2210		pg/g	1.04		5.6		5.6		EC-TRIB-2	4	4	NO	NO
1,2,3,4,7,8,9-HpCDF	55673-89-7	2210		pg/g	0.727		0.727		4.21	U	EC-TRIB-2	1	4	NO	NO
1,2,3,4,7,8-HxCDD	39227-28-6	223		pg/g	0.471		0.783		0.783		EC-TRIB-2	4	4	NO	NO
1,2,3,4,7,8-HxCDF	70648-26-9	219		pg/g	0.468		1.18		3.11	U	EC-TRIB-2	3	4	NO	NO
1,2,3,6,7,8-HxCDD	57653-85-7	223		pg/g	0.854		1.51		1.51		EC-TRIB-2	4	4	NO	NO
1,2,3,6,7,8-HxCDF	57117-44-9	219		pg/g	0.371		0.979		3.11	U	EC-TRIB-2	3	4	NO	NO
1,2,3,7,8,9-HxCDD	19408-74-3	223		pg/g	0.915		1.62		1.62		EC-TRIB-2	4	4	NO	NO
1,2,3,7,8,9-HxCDF	72918-21-9	223		pg/g	NA		NA		NA			0	4	NA	NO
1,2,3,7,8-PeCDD	40321-76-4	22.3		pg/g	0.3		0.466		0.466		EC-TRIB-2	4	4	NO	NO
1,2,3,7,8-PeCDF	57117-41-6	744		pg/g	0.177		0.386		0.386		EC-TRIB-2	4	4	NO	NO
2,3,4,6,7,8-HxCDF	60851-34-5	223		pg/g	0.557		1.01		3.11	U	EC-TRIB-2	3	4	NO	NO
2,3,4,7,8-PeCDF	57117-31-4	74.4		pg/g	0.3		0.707		0.707		EC-TRIB-3	4	4	NO	NO
2,3,7,8-TCDD	1746-01-6	21.6		pg/g	0.0455	U	0.2		0.2		EC-TRIB-1	2	4	NO	NO
2,3,7,8-TCDF	51207-31-9	219		pg/g	0.234		0.385		0.385		EC-TRIB-2	4	4	NO	NO
Total Heptachlorodibenzofuran	38998-75-3	2210		pg/g	1.62		8.52		8.52		EC-TRIB-2	4	4	NO	NO
Total Heptachlorodibenzo-p-dioxin	37871-00-4	2170		pg/g	84.9		253		253		EC-TRIB-1	4	4	NO	NO
Total Hexachlorodibenzofuran	55684-94-1	223		pg/g	1.44		8.29		8.29		EC-TRIB-2	4	4	NO	NO
Total Hexachlorodibenzo-p-dioxin	34465-46-8	223		pg/g	12.2		61.1		61.1		EC-TRIB-1	4	4	NO	NO
Total Pentachlorodibenzofuran	30402-15-4	744		pg/g	1.66		7.32		7.32		EC-TRIB-3	4	4	NO	NO
Total Pentachlorodibenzo-p-dioxin	36088-22-9	22.3		pg/g	1.93		3.99		3.99		EC-TRIB-1	4	4	NO	NO
Total Tetrachlorodibenzofuran	55722-27-5	219		pg/g	2.07		8.06		8.06		EC-TRIB-2	4	4	NO	NO
Total Tetrachlorodibenzo-p-dioxin	41903-57-5	21.6		pg/g	0.0455	U	0.762		0.762		EC-TRIB-1	3	4	NO	NO
SW846 8330B															
2,4,6-Trinitrotoluene	118-96-7	51		mg/kg	NA		NA		NA		NA	0	4	NA	NO
2,4-Dinitrotoluene	121-14-2	7.4		mg/kg	NA		NA		NA		NA	0	4	NA	NO
2,6-Dinitrotoluene	606-20-2	1.5		mg/kg	NA		NA		NA		NA	0	4	NA	NO
Nitroglycerin	55-63-0	8.2		mg/kg	NA		NA		NA		NA	0	4	NA	NO
USACE															
Nitroguanidine	556-88-7	8200000		µg/kg	NA		NA		NA		NA	0	4	NA	NO

Notes:

COPC=chemical of potential concern

HHRA=human health risk assessment

Table SW-1
Curtis Bay Surface Water

					Location	EC-TRIB-1		EC-TRIB-2		EC-TRIB-2		EC-TRIB-3	
					Sample Name	EC-Trib-1-SW		EC-Trib-2-SW		EC-Trib-FD1-SW		EC-Trib-3-SW	
					Parent Sample Name					EC-TRIB-2-SW			
					Sample Date	9/28/2015		9/28/2015		9/28/2015		9/28/2015	
Parameter Name	CAS #	USEPA AWQC - Human Health	USEPA MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
E218.6												
Chromium, Hexavalent**	18540-29-9			µg/L	4	U	4	U	4	UJ	4	UJ
SW846 6020A												
Aluminum*	7429-90-5		0.05	mg/L	0.314	J	2.58	J	3.44	J	2.15	J
Antimony	7440-36-0	0.0056	0.006	mg/L	0.000607	J	0.001	UJ	0.001	UJ	0.000473	J
Arsenic	7440-38-2	0.000018	0.01	mg/L	0.005	J	**0.08**		**0.07**		**0.01**	
Cadmium	7440-43-9		0.005	mg/L	0.001	UJ	0.001	UJ	0.001	UJ	0.001	UJ
Chromium	7440-47-3		0.1	mg/L	0.000884	J	0.00305	J	0.00471	J	0.00556	J
Cobalt	7440-48-4			mg/L	0.0017	J	0.0106	J	0.0105	J	0.000949	J
Copper	7440-50-8	1	1.3	mg/L	0.00172	J	0.00262	J	0.00374	J	0.0051	J
Lead	7439-92-1		0.015	mg/L	0.00178	J	0.00369	J	0.00522	J	0.00345	J
Manganese*	7439-96-5	0.05		mg/L	0.409		1.39		1.38		0.231	
Nickel	7440-02-0	0.61		mg/L	0.00265	J	0.0109	J	0.0111	J	0.00251	J
Titanium	7440-32-6			mg/L	0.00653		0.034		0.0526		0.0552	
Zinc*	7440-66-6	5		mg/L	0.0238	J	0.0256	J	0.0362	J	0.013	J
SW846 7470A												
Mercury	7439-97-6		0.002	mg/L	0.0001	U	0.0001	U	0.0001	U	0.0001	U
SW846 8015C												
Ethanol	64-17-5			µg/L	1000	U	1000	U	1000	U	1000	U
Methanol	67-56-1			µg/L	1000	U	1000	U	1000	U	1000	U
SW846 8082A												
Aroclor 1016	12674-11-2		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
Aroclor 1221	11104-28-2		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
Aroclor 1232	11141-16-5		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
Aroclor 1242	53469-21-9		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
Aroclor 1248	12672-29-6		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
Aroclor 1254	11097-69-1		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
Aroclor 1260	11096-82-5		0.5	µg/L	0.25	UJ	0.25	UJ	0.25	UJ	0.25	UJ
SW846 8151A												
2,4,5-T	93-76-5			µg/L	0.1	U	0.1	U	0.1	U	0.1	U
2,4,5-TP	93-72-1		50	µg/L	0.1	U	0.1	U	0.1	U	0.1	U
2,4-D	94-75-7		70	µg/L	0.1	U	0.1	U	0.1	U	0.1	U
2,4-DB	94-82-6			µg/L	0.1	U	0.1	U	0.1	U	0.1	U
Dalapon	75-99-0		200	µg/L	0.1	U	0.1	U	0.1	U	0.1	U
Dicamba	1918-00-9			µg/L	0.1	U	0.1	U	0.1	U	0.1	U
Dichloroprop	120-36-5			µg/L	0.1	U	0.1	U	0.1	U	0.1	U
Dinoseb	88-85-7		7	µg/L	0.1	U	0.1	U	0.1	U	0.1	U
MCPA	94-74-6			µg/L	10	U	10	U	10	U	10	U
MCPP	93-65-2			µg/L	10	U	10	U	10	U	10	U
SW846 8260C												
2-Butanone	78-93-3			µg/L	1	U	1	U	1	U	1	U
Acetone	67-64-1			µg/L	3.8		2	U	2	U	2.3	
Benzene	71-43-2		5	µg/L	0.5	U	0.5	U	0.5	U	0.5	U

Table SW-1
Curtis Bay Surface Water

					Location	EC-TRIB-1		EC-TRIB-2		EC-TRIB-2		EC-TRIB-3	
					Sample Name	EC-Trib-1-SW		EC-Trib-2-SW		EC-Trib-FD1-SW		EC-Trib-3-SW	
					Parent Sample Name					EC-TRIB-2-SW			
					Sample Date	9/28/2015		9/28/2015		9/28/2015		9/28/2015	
Parameter Name	CAS #	USEPA AWQC - Human Health	USEPA MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Carbon tetrachloride	56-23-5		5	µg/L	0.5	U	0.5	U	0.5	U	0.5	U
Ethylbenzene	100-41-4		700	µg/L	0.5	U	0.5	U	0.5	U	0.5	U
Methylene chloride	75-09-2		5	µg/L	0.5	U	0.5	U	0.5	U	0.5	U
mp-Xylene	108383/ 106423			µg/L	1.5	U	1.5	U	1.5	U	1	U
Naphthalene	91-20-3			µg/L	0.5	U	0.5	U	0.5	U	0.5	U
o-Xylene	95-47-6			µg/L	0.5	U	0.5	U	0.5	U	0.5	U
Tetrachloroethene	127-18-4		5	µg/L	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	108-88-3		1000	µg/L	0.5	U	0.54	J	0.5	J	0.5	U
Trichloroethene	79-01-6		5	µg/L	0.5	U	0.5	U	0.5	U	0.5	U
SW846 8270D												
Acenaphthene	83-32-9			µg/L	0.05	U	0.05	U	0.05	U	0.05	U
Acenaphthylene	208-96-8			µg/L	0.05	U	0.05	U	0.05	U	0.05	U
Anthracene	120-12-7			µg/L	0.05	U	0.05	U	0.05	U	0.05	U
Benzo(a)anthracene	56-55-3		0.2	µg/L	0.024	J	0.05	U	0.05	U	0.023	J
Benzo(a)pyrene	50-32-8		0.2	µg/L	0.024	J	0.05	U	0.05	U	0.026	J
Benzo(b)fluoranthene	205-99-2		0.2	µg/L	0.026	J	0.05	U	0.05	U	0.026	J
Benzo(ghi)perylene	191-24-2		0.2	µg/L	0.048	J	0.05	U	0.05	U	0.032	J
Benzo(k)fluoranthene	207-08-9		0.2	µg/L	0.026	J	0.05	U	0.05	U	0.022	J
Chrysene	218-01-9		0.2	µg/L	0.05	U	0.05	U	0.05	U	0.022	J
Dibenz(a,h)anthracene	53-70-3		0.2	µg/L	0.05	U	0.05	U	0.05	U	0.026	J
Fluoranthene	206-44-0		0.2	µg/L	0.033	J	0.05	U	0.05	U	0.05	U
Fluorene	86-73-7			µg/L	0.05	U	0.05	U	0.05	U	0.05	U
Indeno(1,2,3-cd)pyrene	193-39-5		0.2	µg/L	0.036	J	0.05	U	0.05	U	0.034	J
Naphthalene	91-20-3		0.2	µg/L	0.022	J	0.05	U	0.05	U	0.05	U
Pentachlorophenol	87-86-5		1	µg/L							0.1	U
Phenanthrene	85-01-8			µg/L	0.05	U	0.05	U	0.05	U	0.05	U
Pyrene	129-00-0		0.2	µg/L	0.03	J	0.05	U	0.05	U	0.05	U
SW846 8290												
1,2,3,4,6,7,8,9-OCDD	3268-87-9		900000	pg/L	176	J	655	J	1940	J	329	J
1,2,3,4,6,7,8,9-OCDF	39001-02-0		900000	pg/L	9.41	J	8.79	U	5.27	U	3.81	U
1,2,3,4,6,7,8-HpCDD	35822-46-9		3000	pg/L	23.4	UJ	23.7	UJ	16.1	J	23.5	UJ
1,2,3,4,6,7,8-HpCDF	67562-39-4			pg/L	23.4	UJ	23.7	UJ	23.6	U	0.868	U
1,2,3,4,7,8,9-HpCDF	55673-89-7			pg/L	0.986	U	3.01	U	1.15	U	0.953	U
1,2,3,4,7,8-HxCDD	39227-28-6			pg/L	1.63	U	4.12	U	1.65	U	0.762	U
1,2,3,4,7,8-HxCDF	70648-26-9			pg/L	0.825	U	2.24	U	1.02	U	0.779	U
1,2,3,6,7,8-HxCDD	57653-85-7			pg/L	1.67	U	4.1	U	1.65	U	0.777	U
1,2,3,6,7,8-HxCDF	57117-44-9			pg/L	0.794	U	2.03	U	0.961	U	0.778	U
1,2,3,7,8,9-HxCDD	19408-74-3			pg/L	1.55	U	3.88	U	1.56	U	0.726	U
1,2,3,7,8,9-HxCDF	72918-21-9			pg/L	0.938	U	3.01	U	1.22	U	0.944	U
1,2,3,7,8-PeCDD	40321-76-4			pg/L	2.61	U	6.42	U	2.65	U	1.86	U
1,2,3,7,8-PeCDF	57117-41-6			pg/L	1.76	U	4.36	U	1.95	U	1.68	U
2,3,4,6,7,8-HxCDF	60851-34-5			pg/L	0.782	U	2.28	U	0.996	U	0.764	U
2,3,4,7,8-PeCDF	57117-31-4			pg/L	1.68	U	4.33	U	1.97	U	1.61	U
2,3,7,8-TCDD	1746-01-6		30	pg/L	2.32	U	3.82	U	1.75	U	2.29	U
2,3,7,8-TCDF	51207-31-9			pg/L	3.34	U	5.07	U	3.09	U	4.11	UJ

Table SW-1
Curtis Bay Surface Water

				Location	EC-TRIB-1		EC-TRIB-2		EC-TRIB-2		EC-TRIB-3	
				Sample Name	EC-Trib-1-SW		EC-Trib-2-SW		EC-Trib-FD1-SW		EC-Trib-3-SW	
				Parent Sample Name					EC-TRIB-2-SW			
				Sample Date	9/28/2015		9/28/2015		9/28/2015		9/28/2015	
Parameter Name	CAS #	USEPA AWQC - Human Health	USEPA MCL	Units	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Total Heptachlorodibenzofuran	38998-75-3		3000	pg/L	0.916	U	2.65	U	2.97	J	0.908	U
Total Heptachlorodibenzo-p-dioxin	37871-00-4		3000	pg/L	6.79	J	3.12	U	37.1		4.6	J
Total Hexachlorodibenzofuran	55684-94-1			pg/L	0.83	U	2.34	U	1.04	U	0.81	U
Total Hexachlorodibenzo-p-dioxin	34465-46-8			pg/L	1.61	U	4.03	U	1.62	U	0.755	U
Total Pentachlorodibenzofuran	30402-15-4			pg/L	1.72	U	4.34	U	1.96	U	1.65	U
Total Pentachlorodibenzo-p-dioxin	36088-22-9			pg/L	2.61	U	6.42	U	2.65	U	1.86	U
Total Tetrachlorodibenzofuran	55722-27-5			pg/L	11		5.07	U	3.09	U	4.11	U
Total Tetrachlorodibenzo-p-dioxin	41903-57-5			pg/L	2.32	U	3.82	U	1.75	U	2.29	U
SW846 8330B												
2,4,6-Trinitrotoluene	118-96-7			µg/L	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ
2,4-Dinitrotoluene	121-14-2			µg/L	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ
2,6-Dinitrotoluene	606-20-2			µg/L	0.2	UJ	0.2	UJ	0.2	UJ	0.2	UJ
Nitroglycerin	55-63-0			µg/L	1	UJ	1	UJ	1	UJ	1	UJ
USACE												
Nitroguanidine	556-88-7			µg/L	25	UJ	25	UJ	25	UJ	25	UJ

Notes: *Secondary MCL listed

µg/L - micrograms per liter

mg/L - milligrams per liter

pg/L - picograms per liter

J - estimated value

U - not detected, limit of detection (LOD) shown

UJ - not detected, LOD is estimated

Q - validator qualifier

USEPA MCL - USEPA Maximum Contaminant Level, November 2015

USEPA AWQC Human Health - USEPA Ambient Water Quality Criteria for human health, consumption of water and organisms

Results greater than the MCL are bolded

Results greater than the AWQC are shaded

**Samples for Chromium, Hexavalent analysis were re-collected on 10/8/2015 due to holding time issues with the original samples

Pink indicates not detected

Table SW-2
Surface Water: Data Summary and Selection of COPCs

					HHRA Selection of COPCs									
Parameter Name	CAS #	USEPA AWQC - Human Health	USEPA MCL	Units	Minimum	Maximum Detected Concentration	Maximum (including non-detects)	Location of Maximum Detected Concentration	# Detects	# Samples	Maximum Exceeds USEPA AWQC - Human Health?	Maximum Exceeds USEPA MCL?	COPC?	Rationale
E218.6														
Chromium, Hexavalent**	18540-29-9			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 6020A														
Aluminum*	7429-90-5		0.05	mg/L	0.314	3.44	3.44	EC-TRIB-2	4	4	NA	YES	NO	No health-based criterion; MCL is aesthetic; naturally occurring element in water
Antimony	7440-36-0	0.0056	0.006	mg/L	0.000473	0.000607	0.001 UJ	EC-TRIB-1	2	4	NO	NO	NA	No, max < SL
Arsenic	7440-38-2	0.000018	0.01	mg/L	0.00471	0.08	0.08	EC-TRIB-2	4	4	YES	YES	NO	No, criteria are for drinking water, and will be investigated as part of site-wide investigation
Cadmium	7440-43-9		0.005	mg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Chromium	7440-47-3		0.1	mg/L	0.000884	0.00556	0.00556	EC-TRIB-3	4	4	NA	NO	NO	No, max < SL
Cobalt	7440-48-4			mg/L	0.000949	0.0106	0.0106	EC-TRIB-2	4	4	NA	NA	NO	no criterion
Copper	7440-50-8	1	1.3	mg/L	0.00172	0.0051	0.0051	EC-TRIB-3	4	4	NO	NO	NO	No, max < SL
Lead	7439-92-1		0.015	mg/L	0.00178	0.00522	0.00522	EC-TRIB-2	4	4	NA	NO	NO	No, max < SL
Manganese*	7439-96-5	0.05		mg/L	0.231	1.39	1.39	EC-TRIB-2	4	4	YES	NA	NO	No, manganese criterion is secondary (aesthetic)
Nickel	7440-02-0	0.61		mg/L	0.00251	0.0111	0.0111	EC-TRIB-2	4	4	NO	NA	NO	No, max < SL
Titanium	7440-32-6			mg/L	0.00653	0.0552	0.0552	EC-TRIB-3	4	4	NA	NA		no criterion
Zinc*	7440-66-6	5		mg/L	0.013	0.0362	0.0362	EC-TRIB-2	4	4	NO	NA	NO	No, max < SL
SW846 7470A														
Mercury	7439-97-6		0.002	mg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 8015C														
Ethanol	64-17-5			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Methanol	67-56-1			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 8082A														
Aroclor 1016	12674-11-2		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Aroclor 1221	11104-28-2		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Aroclor 1232	11141-16-5		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Aroclor 1242	53469-21-9		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Aroclor 1248	12672-29-6		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Aroclor 1254	11097-69-1		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Aroclor 1260	11096-82-5		0.5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 8151A														
2,4,5-T	93-76-5			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,4,5-TP	93-72-1		50	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,4-D	94-75-7		70	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,4-DB	94-82-6			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Dalapon	75-99-0		200	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Dicamba	1918-00-9			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Dichloroprop	120-36-5			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Dinoseb	88-85-7		7	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
MCPA	94-74-6			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
MCPP	93-65-2			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 8260C														
2-Butanone	78-93-3			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Acetone	67-64-1			µg/L	2	3.8	3.8	EC-TRIB-1	4	4	NA	NA		no criterion
Benzene	71-43-2		5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Carbon tetrachloride	56-23-5		5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Ethylbenzene	100-41-4		700	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Methylene chloride	75-09-2		5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
mp-Xylene	108383/ 106423			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Naphthalene	91-20-3			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
o-Xylene	95-47-6			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Tetrachloroethene	127-18-4		5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Toluene	108-88-3		1000	µg/L	0.5 U	0.54	0.54	EC-TRIB-2	2	4	NA	NO	NO	No, max < SL
Trichloroethene	79-01-6		5	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 8270D														
Acenaphthene	83-32-9			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Acenaphthylene	208-96-8			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Anthracene	120-12-7			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Benzo(a)anthracene	56-55-3		0.2	µg/L	0.023	0.024	0.05 U	EC-TRIB-1	2	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Benzo(a)pyrene	50-32-8		0.2	µg/L	0.024	0.026	0.05 U	EC-TRIB-3	2	4	NA	NO	NO	No, max < SL
Benzo(b)fluoranthene	205-99-2		0.2	µg/L	0.026	0.026	0.05 U	EC-TRIB-1	2	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Benzo(ghi)perylene	191-24-2		0.2	µg/L	0.032	0.048	0.05 U	EC-TRIB-1	2	4	NA	NO	NO	No, max < benzo(a)pyrene SL

Table SW-2
Surface Water: Data Summary and Selection of COPCs

					HHRA Selection of COPCs									
Parameter Name	CAS #	USEPA AWQC - Human Health	USEPA MCL	Units	Minimum	Maximum Detected Concentration	Maximum (including non-detects)	Location of Maximum Detected Concentration	# Detects	# Samples	Maximum Exceeds USEPA AWQC - Human Health?	Maximum Exceeds USEPA MCL?	COPC?	Rationale
E218.6														
Chromium, Hexavalent**	18540-29-9			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Benzo(k)fluoranthene	207-08-9		0.2	µg/L	0.022	0.026	0.05 U	EC-TRIB-1	2	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Chrysene	218-01-9		0.2	µg/L	0.022	0.022	0.05 U	EC-TRIB-3	1	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Dibenz(a,h)anthracene	53-70-3		0.2	µg/L	0.026	0.026	0.05 U	EC-TRIB-3	1	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Fluoranthene	206-44-0		0.2	µg/L	0.033	0.033	0.05 U	EC-TRIB-1	1	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Fluorene	86-73-7			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Indeno(1,2,3-cd)pyrene	193-39-5		0.2	µg/L	0.034	0.036	0.05 U	EC-TRIB-1	2	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Naphthalene	91-20-3		0.2	µg/L	0.022	0.022	0.05 U	EC-TRIB-1	1	4	NA	NO	NO	No, max < benzo(a)pyrene SL
Pentachlorophenol	87-86-5		1	µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Phenanthrene	85-01-8			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Pyrene	129-00-0		0.2	µg/L	0.03	0.03	0.05 U		1	4	NA	NO	NO	No, max < benzo(a)pyrene SL
SW846 8290														
1,2,3,4,6,7,8,9-OCDD	3268-87-9		900000	pg/L	176	1940	1940	EC-TRIB-2	4	4	NA	NO	NO	No, max < SL
1,2,3,4,6,7,8,9-OCDF	39001-02-0		900000	pg/L	3.81 U	9.41	9.41	EC-TRIB-1	1	4	NA	NO	NO	No, max < SL
1,2,3,4,6,7,8-HpCDD	35822-46-9		3000	pg/L	16.1	16.1	23.7 UJ	EC-TRIB-2	1	4	NA	NO	NO	No, max < SL
1,2,3,4,6,7,8-HpCDF	67562-39-4			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,4,7,8,9-HpCDF	55673-89-7			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,4,7,8-HxCDD	39227-28-6			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,4,7,8-HxCDF	70648-26-9			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,6,7,8-HxCDD	57653-85-7			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,6,7,8-HxCDF	57117-44-9			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,7,8,9-HxCDD	19408-74-3			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,7,8,9-HxCDF	72918-21-9			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,7,8-PeCDD	40321-76-4			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
1,2,3,7,8-PeCDF	57117-41-6			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,3,4,6,7,8-HxCDF	60851-34-5			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,3,4,7,8-PeCDF	57117-31-4			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,3,7,8-TCDD	1746-01-6		30	pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,3,7,8-TCDF	51207-31-9			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Total Heptachlorodibenzofuran	38998-75-3		3000	pg/L	0.908 U	2.97	2.97	EC-TRIB-2	1	4	NA	NO	NO	No, max < SL
Total Heptachlorodibenzo-p-dioxin	37871-00-4		3000	pg/L	3.12	37.1	37.1	EC-TRIB-2	3	4	NA	NO	NO	No, max < SL
Total Hexachlorodibenzofuran	55684-94-1			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Total Hexachlorodibenzo-p-dioxin	34465-46-8			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Total Pentachlorodibenzofuran	30402-15-4			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Total Pentachlorodibenzo-p-dioxin	36088-22-9			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Total Tetrachlorodibenzofuran	55722-27-5			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Total Tetrachlorodibenzo-p-dioxin	41903-57-5			pg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
SW846 8330B														
2,4,6-Trinitrotoluene	118-96-7			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,4-Dinitrotoluene	121-14-2			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
2,6-Dinitrotoluene	606-20-2			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
Nitroglycerin	55-63-0			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected
USACE														
Nitroguanidine	556-88-7			µg/L	NA	NA	NA	NA	0	4	NA	NA	NO	not detected

Notes: *Secondary MCL listed
SL=screening level
COPC=chemical of potential concern
HHRA=human health risk assessment

Table SED-3 Detection Comparison to Screening Levels

Analyte	Sediment			Surface Water			Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Sediment Screening Criteria[b] (mg/kg)	Frequency	Maximum (µg/L)	Screening Criteria (µg/L)	Aquatic Habitats
Metals							
Aluminum	3/3	1.37E+04	2.50E+04	4/4	3.44E+03	8.70E+01	YES
Antimony	2/3	5.08E-01	2.00E+00	2/4	6.07E-01	3.00E+01	NO
Arsenic	6/6	1.78E+02	9.80E+00	4/4	7.68E+01	5.00E+00	YES
Cadmium	3/3	7.65E-01	9.90E-01	--	--	2.50E-01	NO
Chromium	3/3	2.14E+01	4.34E+01	4/4	5.56E+00	8.50E+01	NO
Cobalt	3/3	9.45E+00	5.00E+01	4/4	1.06E+01	2.30E+01	NO
Copper	3/3	3.59E+01	3.16E+01	4/4	5.10E+00	9.00E+00	NO
Lead	6/6	4.94E+01	3.58E+01	4/4	5.22E+00	2.50E+00	YES
Manganese	--	--	4.60E+02	4/4	1.39E+03	1.20E+02	YES
Mercury	3/3	8.38E-02	1.80E-01	--	--	2.60E-02	YES
Nickel	3/3	1.42E+01	2.27E+01	4/4	1.11E+01	5.20E+01	NO
Titanium	3/3	5.14E+02	NA	4/4	5.52E+01	NA	YES
Zinc	3/3	1.73E+02	1.21E+02	4/4	3.62E+01	1.20E+02	NO
Dioxins							
Dioxin TEQ Birds EPA2008 (ND=0)	3/3	2.92E-06	8.50E-07	4/4	2.10E-07	3.10E-09	YES
Dioxin TEQ Birds EPA2008 (ND=DL)	3/3	3.40E-06	8.50E-07	4/4	2.18E-05	3.10E-09	YES
Dioxin TEQ Fish EPA2008 (ND=0)	3/3	2.39E-06	8.50E-07	4/4	2.10E-07	3.10E-09	YES
Dioxin TEQ Fish EPA2008 (ND=DL)	3/3	2.87E-06	8.50E-07	4/4	1.61E-05	3.10E-09	YES
Dioxin TEQ Mammals EPA2008 (ND=0)	3/3	4.39E-06	8.50E-07	4/4	7.43E-07	3.10E-09	YES
Dioxin TEQ Mammals EPA2008 (ND=DL)	3/3	4.60E-06	8.50E-07	4/4	1.47E-05	3.10E-09	YES
PAHs							
Acenaphthene	1/3	8.50E-04	Refer to total PAHs	--	--	5.80E+00	YES
Acenaphthylene	1/3	2.40E-03	Refer to total PAHs	--	--	1.30E+01	YES
Anthracene	2/3	2.60E-03	Refer to total PAHs	--	--	1.20E-02	YES
Benzo(a)anthracene	3/3	1.00E-02	Refer to total PAHs	2/4	2.40E-02	1.80E-02	YES
Benzo(a)pyrene	3/3	1.70E-02	Refer to total PAHs	2/4	2.60E-02	1.50E-02	YES
Benzo(b)fluoranthene	3/3	3.20E-02	Refer to total PAHs	2/4	2.60E-02	2.60E+00	YES
Benzo(g,h,i)perylene	3/3	1.60E-02	Refer to total PAHs	2/4	4.80E-02	1.20E-02	YES
Benzo(k)fluoranthene	3/3	1.10E-02	Refer to total PAHs	2/4	2.60E-02	6.00E-02	YES
Chrysene	3/3	1.70E-02	Refer to total PAHs	1/4	2.20E-02	4.70E+00	YES
Dibenzo(a,h)anthracene	2/3	5.80E-03	Refer to total PAHs	1/4	2.60E-02	1.20E-02	YES
Fluoranthene	3/3	1.90E-02	Refer to total PAHs	1/4	3.30E-02	4.00E-02	YES

Table SED-3 Detection Comparison to Screening Levels

Analyte	Sediment			Surface Water			Chemicals of Potential Concern
	Frequency	Maximum (mg/kg)	Sediment Screening Criteria[b] (mg/kg)	Frequency	Maximum (µg/L)	Screening Criteria (µg/L)	Aquatic Habitats
Indeno(1,2,3-cd)pyrene	3/3	2.40E-02	Refer to total PAHs	2/4	3.60E-02	1.20E-02	YES
Naphthalene	1/3	2.70E-03	Refer to total PAHs	1/4	2.20E-02	1.10E+00	YES
Phenanthrene	3/3	1.40E-02	Refer to total PAHs	--	--	4.00E-01	YES
Pyrene	3/3	2.10E-02	Refer to total PAHs	1/4	3.00E-02	2.50E-02	YES
Total PAHs	3/3	1.77E-01	1.61E+00	2/4	2.69E-01	NA	YES
Total LMW PAHs	3/3	1.75E-02	Refer to total PAHs	1/4	2.20E-02	NA	YES
Total HMW PAHs	3/3	1.30E-01	Refer to total PAHs	2/4	2.11E-01	NA	YES
VOCS							
Acetone	--	--	6.50E-02	2/4	3.80E+00	1.50E+03	NO
Toluene	--	--	1.00E-02	2/4	5.40E-01	2.00E+00	NO

Note:

Dioxin TEQ - Dioxin toxicity equivalent quotient calculated based on the *Framework for Application of the Toxicity Equivalent Methodology for Polychlorinated Dioxins, Furans, and Biphenyls in Ecological Risk Assessment* (EPA 2008).

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

NA - No screening value available.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

VOC - Volatile organic compound.

µg/L - Micrograms per liter.

Table SED-4 Frequency of Detection and Exposure Point Concentrations

Analyte	Sediment			Surface Water (Total Concentration)		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Frequency	Maximum (µg/L)	95UCLM (µg/L)
Metals						
Aluminum	3/3	1.37E+04	1.37E+04	4/4	3.44E+03	3.44E+03
Arsenic	6/6	1.78E+02	5.36E+01	4/4	7.68E+01	7.68E+01
Lead	6/6	4.94E+01	6.11E+01	4/4	5.22E+00	5.22E+00
Manganese	--	--	--	4/4	1.39E+03	1.39E+03
Mercury	3/3	8.38E-02	8.38E-02	--	--	--
Titanium	3/3	5.14E+02	5.14E+02	4/4	5.52E+01	5.52E+01
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	3/3	2.92E-06	2.92E-06	4/4	2.10E-07	2.10E-07
Dioxin TEQ Birds EPA2008 (ND=DL)	3/3	3.40E-06	3.40E-06	4/4	2.18E-05	2.18E-05
Dioxin TEQ Fish EPA2008 (ND=0)	3/3	2.39E-06	2.39E-06	4/4	2.10E-07	2.10E-07
Dioxin TEQ Fish EPA2008 (ND=DL)	3/3	2.87E-06	2.87E-06	4/4	1.61E-05	1.61E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	3/3	4.39E-06	4.39E-06	4/4	7.43E-07	7.43E-07
Dioxin TEQ Mammals EPA2008 (ND=DL)	3/3	4.60E-06	4.60E-06	4/4	1.47E-05	1.47E-05
PAHs						
Acenaphthene	1/3	8.50E-04	8.50E-04	--	--	--
Acenaphthylene	1/3	2.40E-03	2.40E-03	--	--	--
Anthracene	2/3	2.60E-03	2.60E-03	--	--	--
Benzo(a)anthracene	3/3	1.00E-02	1.00E-02	2/4	2.40E-02	2.40E-02
Benzo(a)pyrene	3/3	1.70E-02	1.70E-02	2/4	2.60E-02	2.60E-02
Benzo(b)fluoranthene	3/3	3.20E-02	3.20E-02	2/4	2.60E-02	2.60E-02
Benzo(g,h,i)perylene	3/3	1.60E-02	1.60E-02	2/4	4.80E-02	4.80E-02
Benzo(k)fluoranthene	3/3	1.10E-02	1.10E-02	2/4	2.60E-02	2.60E-02
Chrysene	3/3	1.70E-02	1.70E-02	1/4	2.20E-02	2.20E-02
Dibenzo(a,h)anthracene	2/3	5.80E-03	5.80E-03	1/4	2.60E-02	2.60E-02

Table SED-4 Frequency of Detection and Exposure Point Concentrations

Analyte	Sediment			Surface Water (Total Concentration)		
	Frequency	Maximum (mg/kg)	95UCLM (mg/kg)	Frequency	Maximum (µg/L)	95UCLM (µg/L)
Fluoranthene	3/3	1.90E-02	1.90E-02	1/4	3.30E-02	3.30E-02
Fluorene	--	2.40E-02	--	--	--	--
Indeno(1,2,3-cd)pyrene	3/3	2.70E-03	2.40E-02	2/4	3.60E-02	3.60E-02
Naphthalene	1/3	1.40E-02	2.70E-03	1/4	2.20E-02	2.20E-02
Phenanthrene	3/3	2.10E-02	1.40E-02	--	--	--
Pyrene	3/3	0.00E+00	2.10E-02	1/4	3.00E-02	3.00E-02
Total PAHs	3/3	1.77E-01	1.77E-01	2/4	2.69E-01	2.69E-01
Total LMW PAHs	3/3	1.75E-02	1.75E-02	1/4	2.20E-02	2.20E-02
Total HMW PAHs	3/3	1.30E-01	1.30E-01	2/4	2.11E-01	2.11E-01

Note:

-- - No detectable concentrations or the chemical was not analyzed for.

95UCLM - 95 percent upper confidence level of the mean.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

µg/L - Micrograms per liter.

Table SED-5 Comparison of Maximum Modeled Wildlife Doses to Birds to Avian TRVs

Chemical	Avian TRVs (mg/kg-bw day)		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to NOAELs		Maximum Case Scenario Hazard Quotients Based on Comparison of Doses to LOAELs	
			Piscivorous Birds	Piscivorous Birds	Piscivorous Birds	Piscivorous Birds
	NOAEL	LOAEL	Osprey (benthos)	Osprey (fish)	Osprey (benthos)	Osprey (fish)
Metals						
Aluminum	1.10E+02	NA	**7.08E+00**	5.44E-01	--	--
Arsenic	2.24E+00	4.51E+00	8.65E-01	3.64E-01	4.30E-01	1.81E-01
Lead	1.63E+00	3.26E+00	2.32E-01	1.58E-01	1.16E-01	7.89E-02
Manganese	1.79E+02	3.77E+02	4.04E-04	6.53E-01	1.92E-04	3.10E-01
Mercury	4.50E-01	9.00E-01	2.88E-02	7.82E-04	1.44E-02	3.91E-04
Titanium	NA	NA	--	--	--	--
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	1.40E-05	1.40E-04	7.24E-02	4.56E-02	7.24E-03	4.56E-03
Dioxin TEQ Birds EPA2008 (ND=DL)	1.40E-05	1.40E-04	8.43E-02	**4.65E+00**	8.43E-03	4.65E-01
PAHs						
Total LMW PAHs	5.62E+03	5.62E+04	1.49E-07	2.64E-06	1.49E-08	2.64E-07
Total HMW PAHs	2.00E+00	2.00E+01	1.01E-03	7.11E-02	1.01E-04	7.11E-03

Note:

Bold represents a hazard quotient greater than 1.

HMW - High molecular weight.

LMW - Low molecular weight.

LOAEL - Lowest observed adverse effect level.

mg/kg-bw day - Milligrams per kilogram of body weight per day.

NA - Toxicity reference value not available.

ND - Nondetect.

NO COPC - Analyte was not retained as a chemical of potential concern fol

NOAEL - No observed adverse effect level.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table SED-6 Comparison of Exposure Point Concentrations in Sediment to Benthic Organism TRVs

Chemical	Sediment TEC TRV (mg/kg)	Sediment PEC TRV (mg/kg)	Maximum EPC (mg/kg dry wt)	Hazard Quotient for Maximum EPC Compared to TEC	Hazard Quotient for Maximum EPC Compared to PEC	95UCLM EPC[a] (mg/kg dry wt)	Hazard Quotient for 95UCLM EPC Compared to TEC	Hazard Quotient for 95UCLM EPC Compared to PEC
Metals								
Aluminum	2.55E+04	NA	1.37E+04	5.37E-01	--	1.37E+04	5.37E-01	--
Arsenic	9.79E+00	3.30E+01	1.78E+02	**1.82E+01**	**5.39E+00**	5.36E+01	**5.48E+00**	**1.62E+00**
Lead	3.58E+01	1.28E+02	4.94E+01	**1.38E+00**	3.86E-01	4.94E+01	**1.38E+00**	3.86E-01
Mercury	1.80E-01	1.06E+00	8.38E-02	4.66E-01	7.91E-02	8.38E-02	4.66E-01	7.91E-02
Titanium	NA	NA	5.14E+02	--	--	5.14E+02	--	--
Dioxins								
Dioxin TEQ Fish EPA2008 (ND=0)	8.50E-07	NA	2.39E-06	**2.81E+00**	--	2.39E-06	**2.81E+00**	--
Dioxin TEQ Fish EPA2008 (ND=DL)	8.50E-07	NA	2.87E-06	**3.37E+00**	--	2.87E-06	**3.37E+00**	--
PAHs								
Total PAHs	1.61E+00	2.28E+01	1.77E-01	1.10E-01	7.75E-03	1.77E-01	1.10E-01	7.75E-03

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

95UCLM - 95 percent upper confidence level of the mean.

EPC - Exposure point concentration.

mg/kg - Milligrams per kilogram.

NA - Toxicity reference value not available.

ND - Nondetect.

Table SED-7 Comparison of Exposure Point Concentrations in Surface Water to Chronic Aquatic Organism TRVs

Chemical	Surface Water Toxicity Reference Value (µg/L)	Total Concentrations	
		Maximum EPC (µg/L)	Hazard Quotient for Maximum EPC
Metals			
Aluminum	8.70E+01	3.44E+03	**3.95E+01**
Arsenic	1.50E+02	7.68E+01	5.12E-01
Lead	8.10E+00	5.22E+00	6.44E-01
Manganese	1.20E+02	1.39E+03	**1.16E+01**
Mercury	7.70E-01	--	--
Titanium	NA	5.52E+01	--
Dioxins			
Dioxin TEQ Fish EPA2008 (ND=0)	1.00E-05	2.10E-07	2.10E-02
Dioxin TEQ Fish EPA2008 (ND=DL)	1.00E-05	1.61E-05	**1.61E+00**
PAHs			
Acenaphthene	2.30E+01	--	--
Acenaphthylene	NA	--	--
Anthracene	7.30E-01	--	--
Benzo(a)anthracene	2.70E-02	2.40E-02	8.89E-01
Benzo(a)pyrene	1.40E-02	2.60E-02	**1.86E+00**
Benzo(b)fluoranthene	NA	2.60E-02	--
Benzo(g,h,i)perylene	NA	4.80E-02	--
Benzo(k)fluoranthene	NA	2.60E-02	--
Chrysene	NA	2.20E-02	--
Dibenzo(a,h)anthracene	NA	2.60E-02	--
Fluoranthene	6.16E+00	3.30E-02	5.36E-03
Fluorene	3.90E+00	--	--
Indeno(1,2,3-cd)pyrene	NA	3.60E-02	--
Naphthalene	1.20E+01	2.20E-02	1.83E-03
Phenanthrene	6.30E+00	--	--
Pyrene	NA	3.00E-02	--
Total PAHs	NA	2.69E-01	--
Total LMW PAHs	NA	2.20E-02	--
Total HMW PAHs	NA	2.11E-01	--

Note:

[a] If a 95UCLM does not exist for a chemical, the maximum detected concentration was substituted for the 95UCLM EPC. If the 95UCLM EPC is greater than the maximum detected concentration, the maximum detected concentration was used to calculate the 95UCLM Hazard Quotient.

Bold represents a hazard quotient greater than 1.

µg/L - Micrograms per liter.

EPC - Exposure point concentration.

HMW - High molecular weight.

LMW - Low molecular weight.

Table SED-8 Comparison of Exposure Point Concentrations in Surface Water to Acute Aquatic Organism TRVs

Chemical	Acute Surface Water Toxicity Reference Value (µg/L)	Total Concentrations	
		Maximum EPC (µg/L)	Hazard Quotient for Maximum EPC
Metals			
Aluminum	7.50E+02	3.44E+03	**4.59E+00**
Arsenic	3.40E+02	7.68E+01	2.26E-01
Lead	2.10E+02	5.22E+00	2.49E-02
Manganese	2.30E+03	1.39E+03	6.04E-01
Mercury	1.40E+00	--	--
Titanium	2.00E+03	5.52E+01	2.76E-02
Dioxins			
Dioxin TEQ Fish EPA2008 (ND=0)	1.00E-01	2.10E-07	2.10E-06
Dioxin TEQ Fish EPA2008 (ND=DL)	1.00E-01	1.61E-05	1.61E-04
PAHs			
Acenaphthene	8.00E+01	--	--
Acenaphthylene	NA	--	--
Anthracene	1.30E+01	--	--
Benzo(a)anthracene	4.90E-01	2.40E-02	4.90E-02
Benzo(a)pyrene	2.40E-01	2.60E-02	1.08E-01
Benzo(b)fluoranthene	NA	2.60E-02	--
Benzo(g,h,i)perylene	NA	4.80E-02	--
Benzo(k)fluoranthene	NA	2.60E-02	--
Chrysene	NA	2.20E-02	--
Dibenzo(a,h)anthracene	NA	2.60E-02	--
Fluoranthene	3.36E+01	3.30E-02	9.82E-04
Fluorene	7.00E+01	--	--
Indeno(1,2,3-cd)pyrene	NA	3.60E-02	--
Naphthalene	1.90E+02	2.20E-02	1.16E-04
Phenanthrene	3.00E+01	--	--
Pyrene	NA	3.00E-02	--
Total PAHs	NA	2.69E-01	--
Total LMW PAHs	NA	2.20E-02	--
Total HMW PAHs	NA	2.11E-01	--

Note:

Bold represents a hazard quotient greater than 1.

µg/L - Micrograms per liter.

EPC - Exposure point concentration.

HMW - High molecular weight.

LMW - Low molecular weight.

NA - Toxicity reference value not available.

ND - Nondetect.

PAH - polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

TRV - Toxicity reference value.

Table SED-9 Comparison of Background Sediment Concentrations to Sediment Concentrations

Chemical	Background* (mg/kg)	Site Sediment			Maximum Concentration Exceeds Background?	95UCLM Concentration Exceeds Background?
		Frequency of Detection	Maximum EPC (mg/kg dry wt)	95UCLM EPC (mg/kg dry wt)		
Metals						
Aluminum	3.34E+03	3/3	1.37E+04	1.37E+04	Exceeds	Exceeds
Arsenic	3.32E+00	6/6	1.78E+02	5.36E+01	Exceeds	Exceeds
Lead	1.52E+01	6/6	4.94E+01	4.94E+01	Exceeds	Exceeds
Mercury	1.40E-01	3/3	8.38E-02	8.38E-02	--	--
Titanium	NA	3/3	5.14E+02	5.14E+02	Exceeds	Exceeds
Dioxins						
Dioxin TEQ Birds EPA2008 (ND=0)	NA	3/3	2.92E-06	2.92E-06	Exceeds	Exceeds
Dioxin TEQ Birds EPA2008 (ND=DL)	NA	3/3	3.40E-06	3.40E-06	Exceeds	Exceeds
Dioxin TEQ Fish EPA2008 (ND=0)	8.50E-07	3/3	2.39E-06	2.39E-06	Exceeds	Exceeds
Dioxin TEQ Fish EPA2008 (ND=DL)	8.50E-07	3/3	2.87E-06	2.87E-06	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=0)	1.96E-06	3/3	4.39E-06	4.39E-06	Exceeds	Exceeds
Dioxin TEQ Mammals EPA2008 (ND=DL)	1.96E-06	3/3	4.60E-06	4.60E-06	Exceeds	Exceeds
PAHs						
Total PAHs	6.35E-01	3/3	1.77E-01	1.77E-01	--	--
Total LMW PAHs	1.39E-01	3/3	1.75E-02	1.75E-02	--	--
Total HMW PAHs	4.96E-01	3/3	1.30E-01	1.30E-01	--	--

Note:

*Background Value shown is 95UCLM of background sample collected by EA in April 2019 calculated with the ISM Calculator for 1-sided Upper Confidence Limit for the Mean.

95UCLM - 95 percent upper confidence limit of mean

EPC - exposure point concentration

mg/kg - milligrams per kilogram

ND - nondetect

PAH - polycyclic aromatic hydrocarbon

RL - reporting limit

TEQ - toxicity equivalent quotient

wt - weight

Table SED-10 Wildlife Exposure Modeling of Maximum Doses to Piscivorous Birds (Osprey [benthos]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	Maximum Sediment Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Modeled Food Item (Benthos) Uptake			Maximum Case Scenario Doses			
			BSAF/Uptake Factor		Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals									
Aluminum	1.37E+04	3.44E+00	1.00E+00	Uptake Factor	1.37E+04	5.75E+01	7.19E+02	1.79E-01	7.77E+02
Arsenic	1.78E+02	7.68E-02	1.27E-01	Uptake Factor	2.26E+01	7.48E-01	1.19E+00	3.99E-03	1.94E+00
Lead	4.94E+01	5.22E-03	6.60E-02	Uptake Factor	3.26E+00	2.07E-01	1.71E-01	2.71E-04	3.79E-01
Manganese	--	1.39E+00	1.00E+00	Uptake Factor	0.00E+00	0.00E+00	0.00E+00	7.23E-02	7.23E-02
Mercury	8.38E-02	--	2.87E+00	Uptake Factor	2.40E-01	3.52E-04	1.26E-02	0.00E+00	1.30E-02
Titanium	5.14E+02	5.52E-02	1.00E+00	Uptake Factor	5.14E+02	2.16E+00	0.00E+00	2.87E-03	2.16E+00
Dioxins									
Dioxin TEQ Birds EPA2008 (ND=0)	2.92E-06	2.10E-10	5.44E-01	BSAF	1.91E-05	1.23E-08	1.00E-06	1.09E-11	1.01E-06
Dioxin TEQ Birds EPA2008 (ND=DL)	3.40E-06	2.18E-08	5.44E-01	BSAF	2.22E-05	1.43E-08	1.16E-06	1.13E-09	1.18E-06
Dioxin TEQ Fish EPA2008 (ND=0)	2.39E-06	2.10E-10	5.44E-01	BSAF	1.56E-05	1.00E-08	8.20E-07	1.09E-11	8.30E-07
Dioxin TEQ Fish EPA2008 (ND=DL)	2.87E-06	1.61E-08	5.44E-01	BSAF	1.87E-05	1.20E-08	9.83E-07	8.38E-10	9.96E-07
Dioxin TEQ Mammals EPA2008 (ND=0)	4.39E-06	7.43E-10	5.44E-01	BSAF	2.87E-05	1.85E-08	1.51E-06	3.86E-11	1.52E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	4.60E-06	1.47E-08	5.44E-01	BSAF	3.00E-05	1.93E-08	1.58E-06	7.64E-10	1.60E-06
PAHs									
Total LMW PAHs	1.75E-02	2.20E-05	6.95E-02	BSAF	1.45E-02	7.33E-05	7.64E-04	1.14E-06	8.38E-04
Total HMW PAHs	1.30E-01	2.11E-04	1.78E-02	BSAF	2.77E-02	5.46E-04	1.46E-03	1.10E-05	2.01E-03

Note:

BSAF - Biota-sediment accumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

RL - Reporting limit.

TEQ - Toxicity equivalent quotient.

wt - Weight.

Table SED-11 Wildlife Exposure Modeling of Maximum Doses to Piscivorous Birds (Osprey [fish]) from Media

Exposure Parameters

Soil Ingestion Rate:	4.20E-03	kg dry wt./kg bw-day
Food Ingestrion Rate:	5.25E-02	kg dry wt./kg bw-day
Water Ingestion Rate:	5.20E-02	L/kg bw-day

Chemical	Maximum Sediment Concentration (mg/kg dry wt.)	Maximum Total Water Concentration (mg/L)	Food Item (Fish) Uptake		Maximum Case Scenario Doses			
			BAF/Equation (mg/L dry wt. to mg/kg dry wt.)	Maximum Food Item Tissue Concentration (mg/kg dry wt.)	Dose from Sediment (mg/kg bw-day)	Dose from Food (mg/kg bw-day)	Dose from Water (mg/kg bw-day)	Total Dose (mg/kg bw-day)
Metals								
Aluminum	1.37E+04	3.44E+00	1.08E+01	3.72E+01	5.75E+01	1.95E+00	1.79E-01	5.97E+01
Arsenic	1.78E+02	7.68E-02	1.60E+01	1.23E+00	7.48E-01	6.45E-02	3.99E-03	8.16E-01
Lead	4.94E+01	5.22E-03	1.80E+02	9.40E-01	2.07E-01	4.93E-02	2.71E-04	2.57E-01
Manganese	--	1.39E+00	1.60E+03	2.22E+03	0.00E+00	1.17E+02	7.23E-02	1.17E+02
Mercury	8.38E-02	--	7.20E+03	0.00E+00	3.52E-04	0.00E+00	0.00E+00	3.52E-04
Titanium	5.14E+02	5.52E-02	4.00E+00	2.21E-01	2.16E+00	1.16E-02	2.87E-03	2.17E+00
Dioxins								
Dioxin TEQ Birds EPA2008 (ND=0)	2.92E-06	2.10E-10	5.68E+04	1.19E-05	1.23E-08	6.27E-07	1.09E-11	6.39E-07
Dioxin TEQ Birds EPA2008 (ND=DL)	3.40E-06	2.18E-08	5.68E+04	1.24E-03	1.43E-08	6.50E-05	1.13E-09	6.51E-05
Dioxin TEQ Fish EPA2008 (ND=0)	2.39E-06	2.10E-10	5.68E+04	1.19E-05	1.00E-08	6.27E-07	1.09E-11	6.37E-07
Dioxin TEQ Fish EPA2008 (ND=DL)	2.87E-06	1.61E-08	5.68E+04	9.16E-04	1.20E-08	4.81E-05	8.38E-10	4.81E-05
Dioxin TEQ Mammals EPA2008 (ND=0)	4.39E-06	7.43E-10	5.68E+04	4.22E-05	1.85E-08	2.22E-06	3.86E-11	2.24E-06
Dioxin TEQ Mammals EPA2008 (ND=DL)	4.60E-06	1.47E-08	5.68E+04	8.35E-04	1.93E-08	4.38E-05	7.64E-10	4.38E-05
PAHs								
Total LMW PAHs	1.75E-02	2.20E-05	1.28E+04	2.81E-01	7.33E-05	1.48E-02	1.14E-06	1.48E-02
Total HMW PAHs	1.30E-01	2.11E-04	1.28E+04	2.70E+00	5.46E-04	1.42E-01	1.10E-05	1.42E-01

Note:

BAF - Bioaccumulation factor.

HMW - High molecular weight.

LMW - Low molecular weight.

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

ND - Nondetect.

PAH - Polycyclic aromatic hydrocarbon.

TEQ - Toxicity equivalent quotient.

wt - Weight.

TABLE EC21-1

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway				
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	NA	NA	NA
Benzo(a)pyrene	30.00	3.00E-04	2.57E-05	0.086
Benzo(b)fluoranthene	41.80	NA	NA	NA
Dibenz(a,h)anthracene	4.13	NA	NA	NA
Indeno(1,2,3-cd)pyrene	22.20	NA	NA	NA
			Total Pathway Hazard Index	0.086

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	NA	NA	NA
Benzo(a)pyrene	30.00	3.00E-04	1.41E-05	0.047
Benzo(b)fluoranthene	41.80	NA	NA	NA
Dibenz(a,h)anthracene	4.13	NA	NA	NA
Indeno(1,2,3-cd)pyrene	22.20	NA	NA	NA
			Total Pathway Hazard Index	0.047

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Lead	3.86E-07	NA	NA	NA
Benzo(a)anthracene	2.72E-08	NA	NA	NA
Benzo(a)pyrene	2.36E-08	2.00E-06	5.39E-09	0.0027
Benzo(b)fluoranthene	3.29E-08	NA	NA	NA
Dibenz(a,h)anthracene	3.25E-09	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.75E-08	NA	NA	NA
			Total Pathway Hazard Index	0.0027

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

	RME
NA=not applicable to pathway; ND=not detected	Receptor HI Total = **0.1**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.
0.03 dermal absorption for dioxins
0.13 for PAHs
0.1 for semivolatiles; 0.1 for metals

TABLE EC21-2

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-21 Site Worker Scenario

Scenario Timeframe: Current
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Site Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway				
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	1.00E-01	1.05E-05	1.1E-06
Benzo(a)pyrene	30.00	1.00E+00	9.17E-06	9.2E-06
Benzo(b)fluoranthene	41.80	1.00E-01	1.28E-05	1.3E-06
Dibenz(a,h)anthracene	4.13	1.00E+00	1.26E-06	1.3E-06
Indeno(1,2,3-cd)pyrene	22.20	1.00E-01	6.79E-06	6.8E-07
			Total Pathway Cancer Risk	1.3E-05

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	1.00E-01	5.80E-06	5.8E-07
Benzo(a)pyrene	30.00	1.00E+00	5.05E-06	5.0E-06
Benzo(b)fluoranthene	41.80	1.00E-01	7.03E-06	7.0E-07
Dibenz(a,h)anthracene	4.13	1.00E+00	6.95E-07	6.9E-07
Indeno(1,2,3-cd)pyrene	22.20	1.00E-01	3.73E-06	3.7E-07
			Total Pathway Cancer Risk	7.4E-06

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Lead	3.86E-07	NA	NA	NA
Benzo(a)anthracene	2.72E-08	6.00E-05	2.22E-09	1.3E-13
Benzo(a)pyrene	2.36E-08	6.00E-04	1.93E-09	1.2E-12
Benzo(b)fluoranthene	3.29E-08	6.00E-05	2.68E-09	1.6E-13
Dibenz(a,h)anthracene	3.25E-09	6.00E-04	2.65E-10	1.6E-13
Indeno(1,2,3-cd)pyrene	1.75E-08	6.00E-05	1.43E-09	8.6E-14
			Total Pathway Cancer Risk	1.7E-12

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**2E-05**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

TABLE EC21-3

CALCULATION OF NON-CANCER HAZARDS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Non-Cancer Hazard

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	Oral Chronic RfD (mg/kg-day)	RME CDI (mg/kg-day)	RME Non-Cancer Hazard Quotients
Incidental Ingestion Exposure Pathway				
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	NA	NA	NA
Benzo(a)pyrene	30.00	3.00E-04	8.48E-05	0.283
Benzo(b)fluoranthene	41.80	NA	NA	NA
Dibenz(a,h)anthracene	4.13	NA	NA	NA
Indeno(1,2,3-cd)pyrene	22.2	NA	NA	NA
			Total Pathway Hazard Index	0.28

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	Absorbed RFD for Dermal Pathway (mg/kg-day)	RME CDI [1] (mg/kg-day)	RME Non-Cancer Hazard Quotients
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	NA	NA	NA
Benzo(a)pyrene	30.00	3.00E-04	1.41E-05	0.047
Benzo(b)fluoranthene	41.80	NA	NA	NA
Dibenz(a,h)anthracene	4.13	NA	NA	NA
Indeno(1,2,3-cd)pyrene	22.2	NA	NA	NA
			Total Pathway Hazard Index	0.05

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	Inhalation Chronic RfC (mg/m^3)	RME Air Exposure Concentration (mg/m^3)	RME Non-Cancer Hazard Quotients
Lead	3.86E-07	NA	NA	NA
Benzo(a)anthracene	2.72E-08	NA	NA	NA
Benzo(a)pyrene	2.36E-08	2.00E-06	5.39E-09	0.0027
Benzo(b)fluoranthene	3.29E-08	NA	NA	NA
Dibenz(a,h)anthracene	3.25E-09	NA	NA	NA
Indeno(1,2,3-cd)pyrene	1.75E-08	NA	NA	NA
			Total Pathway Hazard Index	0.0027

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor HI Total =	**0.3**

1. Only those COPCs with available toxicity values and EPA-recommended dermal absorption fractions (from EPA, 2004) are quantified for the dermal pathway.

TABLE EC21-4

CALCULATION OF CANCER RISKS

REASONABLE MAXIMUM EXPOSURES

EC-21 Construction Worker Scenario

Scenario Timeframe: Future
Exposure Media: Surface Soil (0-0.5 foot)
Exposure Routes: Ingestion, dermal contact, inhalation
Exposure Point: Surface Soil
Receptor Population: Construction Worker
Receptor Age: Adult

Incremental Cancer Risk

Chemical of Potential Concern	RME Exposure Concentration (mg/kg)	Oral Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI (mg/kg-day)	RME Incremental Cancer Risks
Incidental Ingestion Exposure Pathway				
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	1.00E-01	1.39E-06	1.4E-07
Benzo(a)pyrene	30.00	1.00E+00	1.21E-06	1.2E-06
Benzo(b)fluoranthene	41.80	1.00E-01	1.69E-06	1.7E-07
Dibenz(a,h)anthracene	4.13	1.00E+00	1.67E-07	1.7E-07
Indeno(1,2,3-cd)pyrene	22.2	1.00E-01	8.96E-07	9.0E-08
			Total Pathway Cancer Risk	1.8E-06

Dermal Exposure Pathway	RME Exposure Concentration (mg/kg)	Dermal Cancer Slope Factor $(mg/kg\text{-}day)^{-1}$	RME CDI [1] (mg/kg-day)	RME Incremental Cancer Risks
Lead	489.9	NA	NA	NA
Benzo(a)anthracene	34.50	1.00E-01	2.32E-07	2.3E-08
Benzo(a)pyrene	30.00	1.00E+00	2.02E-07	2.0E-07
Benzo(b)fluoranthene	41.80	1.00E-01	2.81E-07	2.8E-08
Dibenz(a,h)anthracene	4.13	1.00E+00	2.78E-08	2.8E-08
Indeno(1,2,3-cd)pyrene	22.2	1.00E-01	1.49E-07	1.5E-08
			Total Pathway Cancer Risk	3.0E-07

Inhalation Pathway	RME Estimated Site Air Concentration (mg/m^3)	Inhalation Unit Risk $(mg/m^3)^{-1}$	RME Air Exposure Concentration (mg/m^3)	RME Incremental Cancer Risks
Lead	3.86E-07	NA	NA	NA
Benzo(a)anthracene	2.72E-08	6.00E-05	8.86E-11	5.3E-15
Benzo(a)pyrene	2.36E-08	6.00E-04	7.70E-11	4.6E-14
Benzo(b)fluoranthene	3.29E-08	6.00E-05	1.07E-10	6.4E-15
Dibenz(a,h)anthracene	3.25E-09	6.00E-04	1.06E-11	6.4E-15
Indeno(1,2,3-cd)pyrene	1.75E-08	6.00E-05	5.70E-11	3.4E-15
			Total Pathway Cancer Risk	6.8E-14

Air Concentration = Concentration in Soil/Particulate Emission Factor

Particulate Emission Factor = 1.27×10^9 m^3/kg

NA=not applicable to pathway; ND=not detected

	RME
Receptor Incremental Cancer Risk Total =	**2E-06**

1. Only those COPCs with EPA-recommended dermal absorption fractions are quantified for the dermal pathway.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.111/19/2020 5:49:52 PM
From File	[redacted] xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

EC16SSAroclor1260

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.031	Minimum Non-Detect	0.027
Maximum Detect	2.6	Maximum Non-Detect	0.028
Variance Detects	0.729	Percent Non-Detects	46.67%
Mean Detects	0.706	SD Detects	0.854
Median Detects	0.34	CV Detects	1.209
Skewness Detects	1.865	Kurtosis Detects	3.719
Mean of Logged Detects	-1.139	SD of Logged Detects	1.551

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.778	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.287	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.389	KM Standard Error of Mean	0.186
KM SD	0.675	95% KM (BCA) UCL	0.758
95% KM (t) UCL	0.717	95% KM (Percentile Bootstrap) UCL	0.711
95% KM (z) UCL	0.696	95% KM Bootstrap t UCL	1.073
90% KM Chebyshev UCL	0.948	95% KM Chebyshev UCL	1.201
97.5% KM Chebyshev UCL	1.552	99% KM Chebyshev UCL	2.242

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.297	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.745	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.304	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.756	k star (bias corrected MLE)	0.556
Theta hat (MLE)	0.935	Theta star (bias corrected MLE)	1.271
nu hat (MLE)	12.09	nu star (bias corrected)	8.89
Mean (detects)	0.706		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.381
Maximum	2.6	Median	0.031
SD	0.703	CV	1.843
k hat (MLE)	0.372	k star (bias corrected MLE)	0.342
Theta hat (MLE)	1.026	Theta star (bias corrected MLE)	1.116
nu hat (MLE)	11.15	nu star (bias corrected)	10.25
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (10.25, α)	4.098	Adjusted Chi Square Value (10.25, β)	3.632

95% Gamma Approximate UCL (use when n>=50)	0.954	95% Gamma Adjusted UCL (use when n<50)	1.076

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.389	SD (KM)	0.675
Variance (KM)	0.455	SE of Mean (KM)	0.186
k hat (KM)	0.333	k star (KM)	0.311
nu hat (KM)	9.992	nu star (KM)	9.327
theta hat (KM)	1.169	theta star (KM)	1.252
80% gamma percentile (KM)	0.602	90% gamma percentile (KM)	1.143
95% gamma percentile (KM)	1.76	99% gamma percentile (KM)	3.358

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.33, α)	3.526	Adjusted Chi Square Value (9.33, β)	3.099
95% Gamma Approximate KM-UCL (use when n>=50)	1.03	95% Gamma Adjusted KM-UCL (use when n<50)	1.171

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.242	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.38	Mean in Log Scale	-3.1
SD in Original Scale	0.703	SD in Log Scale	2.534
95% t UCL (assumes normality of ROS data)	0.7	95% Percentile Bootstrap UCL	0.701
95% BCA Bootstrap UCL	0.841	95% Bootstrap t UCL	1.132
95% H-UCL (Log ROS)	50.55		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.293	KM Geo Mean	0.101
KM SD (logged)	1.626	95% Critical H Value (KM-Log)	3.847
KM Standard Error of Mean (logged)	0.449	95% H-UCL (KM -Log)	2.017
KM SD (logged)	1.626	95% Critical H Value (KM-Log)	3.847
KM Standard Error of Mean (logged)	0.449		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.383	Mean in Log Scale	-2.609
SD in Original Scale	0.702	SD in Log Scale	1.962
95% t UCL (Assumes normality)	0.702	95% H-Stat UCL	5.314

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

ə Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.171

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC16TSAroclor1260

General Statistics

Total Number of Observations	19	Number of Distinct Observations	14
Number of Detects	11	Number of Non-Detects	8
Number of Distinct Detects	11	Number of Distinct Non-Detects	3
Minimum Detect	0.0088	Minimum Non-Detect	0.0096
Maximum Detect	2.6	Maximum Non-Detect	0.028
Variance Detects	0.614	Percent Non-Detects	42.11%
Mean Detects	0.518	SD Detects	0.783
Median Detects	0.31	CV Detects	1.512

Skewness Detects	2.197	Kurtosis Detects	5.183
Mean of Logged Detects	-1.969	SD of Logged Detects	1.941

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.699	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.312	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.305	KM Standard Error of Mean	0.149
KM SD	0.621	95% KM (BCA) UCL	0.558
95% KM (t) UCL	0.564	95% KM (Percentile Bootstrap) UCL	0.548
95% KM (z) UCL	0.551	95% KM Bootstrap t UCL	0.906
90% KM Chebyshev UCL	0.753	95% KM Chebyshev UCL	0.956
97.5% KM Chebyshev UCL	1.238	99% KM Chebyshev UCL	1.792

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.456	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.784	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.231	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.27	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.486	k star (bias corrected MLE)	0.414
Theta hat (MLE)	1.066	Theta star (bias corrected MLE)	1.251
nu hat (MLE)	10.7	nu star (bias corrected)	9.115
Mean (detects)	0.518		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0088	Mean	0.304
Maximum	2.6	Median	0.015
SD	0.638	CV	2.098
k hat (MLE)	0.355	k star (bias corrected MLE)	0.334
Theta hat (MLE)	0.857	Theta star (bias corrected MLE)	0.911
nu hat (MLE)	13.49	nu star (bias corrected)	12.7
Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (12.70, α)	5.69	Adjusted Chi Square Value (12.70, β)	5.284
95% Gamma Approximate UCL (use when n>=50)	0.679	95% Gamma Adjusted UCL (use when n<50)	0.731

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.305	SD (KM)	0.621
Variance (KM)	0.386	SE of Mean (KM)	0.149
k hat (KM)	0.241	k star (KM)	0.238
nu hat (KM)	9.154	nu star (KM)	9.042
theta hat (KM)	1.265	theta star (KM)	1.281
80% gamma percentile (KM)	0.435	90% gamma percentile (KM)	0.918
95% gamma percentile (KM)	1.497	99% gamma percentile (KM)	3.05

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.04, α)	3.352	Adjusted Chi Square Value (9.04, β)	3.056
95% Gamma Approximate KM-UCL (use when n>=50)	0.822	95% Gamma Adjusted KM-UCL (use when n<50)	0.902

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.304	Mean in Log Scale	-3.273
SD in Original Scale	0.639	SD in Log Scale	2.222
95% t UCL (assumes normality of ROS data)	0.558	95% Percentile Bootstrap UCL	0.566
95% BCA Bootstrap UCL	0.679	95% Bootstrap t UCL	0.929
95% H-UCL (Log ROS)	5.106		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.049	KM Geo Mean	0.0474
KM SD (logged)	1.904	95% Critical H Value (KM-Log)	4.081
KM Standard Error of Mean (logged)	0.464	95% H-UCL (KM -Log)	1.816
KM SD (logged)	1.904	95% Critical H Value (KM-Log)	4.081
KM Standard Error of Mean (logged)	0.464		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.305	Mean in Log Scale	-3.001
SD in Original Scale	0.638	SD in Log Scale	1.922
95% t UCL (Assumes normality)	0.559	95% H-Stat UCL	2.03

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

₃ Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.902

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SSAntimony

General Statistics

Total Number of Observations	34	Number of Distinct Observations	33
Number of Detects	33	Number of Non-Detects	1
Number of Distinct Detects	32	Number of Distinct Non-Detects	1
Minimum Detect	0.276	Minimum Non-Detect	0.78
Maximum Detect	80	Maximum Non-Detect	0.78
Variance Detects	254.6	Percent Non-Detects	2.941%
Mean Detects	6.645	SD Detects	15.95
Median Detects	1.44	CV Detects	2.401
Skewness Detects	3.82	Kurtosis Detects	15.28
Mean of Logged Detects	0.631	SD of Logged Detects	1.419

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.428	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.931	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.4	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.152	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	6.464	KM Standard Error of Mean	2.702
KM SD	15.51	95% KM (BCA) UCL	11.96
95% KM (t) UCL	11.04	95% KM (Percentile Bootstrap) UCL	11.02
95% KM (z) UCL	10.91	95% KM Bootstrap t UCL	21.35
90% KM Chebyshev UCL	14.57	95% KM Chebyshev UCL	18.24
97.5% KM Chebyshev UCL	23.34	99% KM Chebyshev UCL	33.35

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.792	**Anderson-Darling GOF Test**	

5% A-D Critical Value	0.811	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.23	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.162	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.502	k star (bias corrected MLE)	0.477
Theta hat (MLE)	13.22	Theta star (bias corrected MLE)	13.93
nu hat (MLE)	33.16	nu star (bias corrected)	31.48
Mean (detects)	6.645		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.449
Maximum	80	Median	1.335
SD	15.75	CV	2.442
k hat (MLE)	0.463	k star (bias corrected MLE)	0.442
Theta hat (MLE)	13.92	Theta star (bias corrected MLE)	14.59
nu hat (MLE)	31.5	nu star (bias corrected)	30.06
Adjusted Level of Significance (β)	0.0422		
Approximate Chi Square Value (30.06, α)	18.54	Adjusted Chi Square Value (30.06, β)	18.09
95% Gamma Approximate UCL (use when n>=50)	10.46	95% Gamma Adjusted UCL (use when n<50)	10.72

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	6.464	SD (KM)	15.51
Variance (KM)	240.7	SE of Mean (KM)	2.702
k hat (KM)	0.174	k star (KM)	0.178
nu hat (KM)	11.81	nu star (KM)	12.1
theta hat (KM)	37.23	theta star (KM)	36.33
80% gamma percentile (KM)	7.96	90% gamma percentile (KM)	19.48
95% gamma percentile (KM)	34.29	99% gamma percentile (KM)	75.88

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.10, α)	5.291	Adjusted Chi Square Value (12.10, β)	5.069
95% Gamma Approximate KM-UCL (use when n>=50)	14.78	95% Gamma Adjusted KM-UCL (use when n<50)	15.43

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.931	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.152	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.463	Mean in Log Scale	0.589
SD in Original Scale	15.75	SD in Log Scale	1.418
95% t UCL (assumes normality of ROS data)	11.03	95% Percentile Bootstrap UCL	11.54
95% BCA Bootstrap UCL	13.41	95% Bootstrap t UCL	20.69
95% H-UCL (Log ROS)	10.33		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.59	KM Geo Mean	1.804
KM SD (logged)	1.398	95% Critical H Value (KM-Log)	2.973
KM Standard Error of Mean (logged)	0.244	95% H-UCL (KM -Log)	9.873
KM SD (logged)	1.398	95% Critical H Value (KM-Log)	2.973
KM Standard Error of Mean (logged)	0.244		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.461	Mean in Log Scale	0.584
SD in Original Scale	15.75	SD in Log Scale	1.423

95% t UCL (Assumes normality)	11.03	95% H-Stat UCL	10.41

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

KM H-UCL	9.873

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TSAntimony

General Statistics

Total Number of Observations	67	Number of Distinct Observations	56
Number of Detects	39	Number of Non-Detects	28
Number of Distinct Detects	37	Number of Distinct Non-Detects	22
Minimum Detect	0.276	Minimum Non-Detect	0.259
Maximum Detect	80	Maximum Non-Detect	0.9
Variance Detects	218.9	Percent Non-Detects	41.79%
Mean Detects	5.747	SD Detects	14.8
Median Detects	1.23	CV Detects	2.575
Skewness Detects	4.176	Kurtosis Detects	18.39
Mean of Logged Detects	0.485	SD of Logged Detects	1.36

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.397	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.939	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.396	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.471	KM Standard Error of Mean	1.419
KM SD	11.46	95% KM (BCA) UCL	6.07
95% KM (t) UCL	5.838	95% KM (Percentile Bootstrap) UCL	6.145
95% KM (z) UCL	5.805	95% KM Bootstrap t UCL	13.34
90% KM Chebyshev UCL	7.727	95% KM Chebyshev UCL	9.655
97.5% KM Chebyshev UCL	12.33	99% KM Chebyshev UCL	17.59

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.807	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.813	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.149	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.502	k star (bias corrected MLE)	0.481
Theta hat (MLE)	11.44	Theta star (bias corrected MLE)	11.96
nu hat (MLE)	39.17	nu star (bias corrected)	37.49
Mean (detects)	5.747		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.349
Maximum	80	Median	0.4
SD	11.58	CV	3.458

k hat (MLE)	0.249	k star (bias corrected MLE)	0.248
Theta hat (MLE)	13.44	Theta star (bias corrected MLE)	13.5
nu hat (MLE)	33.4	nu star (bias corrected)	33.24
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (33.24, α)	21.05	Adjusted Chi Square Value (33.24, β)	20.84
95% Gamma Approximate UCL (use when n>=50)	5.287	95% Gamma Adjusted UCL (use when n<50)	5.341

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.471	SD (KM)	11.46
Variance (KM)	131.4	SE of Mean (KM)	1.419
k hat (KM)	0.0917	k star (KM)	0.0976
nu hat (KM)	12.29	nu star (KM)	13.07
theta hat (KM)	37.85	theta star (KM)	35.58
80% gamma percentile (KM)	2.322	90% gamma percentile (KM)	9.142
95% gamma percentile (KM)	20.17	99% gamma percentile (KM)	55.83

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.07, α)	5.941	Adjusted Chi Square Value (13.07, β)	5.835
95% Gamma Approximate KM-UCL (use when n>=50)	7.638	95% Gamma Adjusted KM-UCL (use when n<50)	7.776

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.902	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.939	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.14	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.391	Mean in Log Scale	-0.708
SD in Original Scale	11.57	SD in Log Scale	1.794
95% t UCL (assumes normality of ROS data)	5.75	95% Percentile Bootstrap UCL	5.949
95% BCA Bootstrap UCL	7.217	95% Bootstrap t UCL	10.72
95% H-UCL (Log ROS)	4.493		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.235	KM Geo Mean	0.791
KM SD (logged)	1.34	95% Critical H Value (KM-Log)	2.184
KM Standard Error of Mean (logged)	0.167	95% H-UCL (KM -Log)	2.783
KM SD (logged)	1.34	95% Critical H Value (KM-Log)	2.184
KM Standard Error of Mean (logged)	0.167		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.446	Mean in Log Scale	-0.358
SD in Original Scale	11.56	SD in Log Scale	1.471
95% t UCL (Assumes normality)	5.802	95% H-Stat UCL	3.153

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	9.655

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SSLead

General Statistics

Total Number of Observations	34	Number of Distinct Observations	34
		Number of Missing Observations	0

Minimum	7.8	Mean	433.6
Maximum	3230	Median	107.5
SD	808.2	Std. Error of Mean	138.6
Coefficient of Variation	1.864	Skewness	2.799

Normal GOF Test

Shapiro Wilk Test Statistic	0.538	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	668.1	95% Adjusted-CLT UCL (Chen-1995)	732.6
		95% Modified-t UCL (Johnson-1978)	679.2

Gamma GOF Test

A-D Test Statistic	1.949	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.806	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.194	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.159	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.56	k star (bias corrected MLE)	0.53
Theta hat (MLE)	774.2	Theta star (bias corrected MLE)	817.8
nu hat (MLE)	38.08	nu star (bias corrected)	36.05
MLE Mean (bias corrected)	433.6	MLE Sd (bias corrected)	595.4
		Approximate Chi Square Value (0.05)	23.31
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	22.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	670.5	95% Adjusted Gamma UCL (use when n<50)	685.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0967	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.15	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.054	Mean of logged Data	4.957
Maximum of Logged Data	8.08	SD of logged Data	1.461

Assuming Lognormal Distribution

95% H-UCL	900.4	90% Chebyshev (MVUE) UCL	761.1
95% Chebyshev (MVUE) UCL	929.5	97.5% Chebyshev (MVUE) UCL	1163
99% Chebyshev (MVUE) UCL	1622		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	661.5	95% Jackknife UCL	668.1
95% Standard Bootstrap UCL	653.8	95% Bootstrap-t UCL	855.6
95% Hall's Bootstrap UCL	780.2	95% Percentile Bootstrap UCL	688.7
95% BCA Bootstrap UCL	777.9		
90% Chebyshev(Mean, Sd) UCL	849.4	95% Chebyshev(Mean, Sd) UCL	1038
97.5% Chebyshev(Mean, Sd) UCL	1299	99% Chebyshev(Mean, Sd) UCL	1813

Suggested UCL to Use

95% H-UCL	900.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

EC21TSLead

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
		Number of Missing Observations	0
Minimum	0.661	Mean	228.7
Maximum	3230	Median	29.3
SD	608.9	Std. Error of Mean	74.39
Coefficient of Variation	2.663	Skewness	4.088

Normal GOF Test

Shapiro Wilk Test Statistic	0.404	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	352.8	95% Adjusted-CLT UCL (Chen-1995)	390.7
		95% Modified-t UCL (Johnson-1978)	359

Gamma GOF Test

A-D Test Statistic	4.455	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.846	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.2	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.117	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.377	k star (bias corrected MLE)	0.37
Theta hat (MLE)	606.4	Theta star (bias corrected MLE)	617.8
nu hat (MLE)	50.53	nu star (bias corrected)	49.6
MLE Mean (bias corrected)	228.7	MLE Sd (bias corrected)	375.9
		Approximate Chi Square Value (0.05)	34.43
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	34.15

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	329.4	95% Adjusted Gamma UCL (use when n<50)	332.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.201	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.075	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.414	Mean of logged Data	3.671
Maximum of Logged Data	8.08	SD of logged Data	1.817

Assuming Lognormal Distribution

95% H-UCL	378.2	90% Chebyshev (MVUE) UCL	379.3
95% Chebyshev (MVUE) UCL	464	97.5% Chebyshev (MVUE) UCL	581.5

99% Chebyshev (MVUE) UCL	812.4

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	351	95% Jackknife UCL	352.8
95% Standard Bootstrap UCL	345.4	95% Bootstrap-t UCL	494.4
95% Hall's Bootstrap UCL	427	95% Percentile Bootstrap UCL	359
95% BCA Bootstrap UCL	407.6		
90% Chebyshev(Mean, Sd) UCL	451.8	95% Chebyshev(Mean, Sd) UCL	552.9
97.5% Chebyshev(Mean, Sd) UCL	693.2	99% Chebyshev(Mean, Sd) UCL	968.9

Suggested UCL to Use

95% H-UCL	378.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

EC21SSManganese

General Statistics

Total Number of Observations	29	Number of Distinct Observations	29
		Number of Missing Observations	0
Minimum	55.9	Mean	2929
Maximum	61600	Median	293
SD	11365	Std. Error of Mean	2110
Coefficient of Variation	3.88	Skewness	5.267

Normal GOF Test

Shapiro Wilk Test Statistic	0.257	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.415	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6519	95% Adjusted-CLT UCL (Chen-1995)	8606
		95% Modified-t UCL (Johnson-1978)	6863

Gamma GOF Test

A-D Test Statistic	4.195	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.842	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.306	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.175	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.363	k star (bias corrected MLE)	0.348
Theta hat (MLE)	8079	Theta star (bias corrected MLE)	8416
nu hat (MLE)	21.03	nu star (bias corrected)	20.19
MLE Mean (bias corrected)	2929	MLE Sd (bias corrected)	4965
		Approximate Chi Square Value (0.05)	10.99
Adjusted Level of Significance	0.0407	Adjusted Chi Square Value	10.58

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	5381	95% Adjusted Gamma UCL (use when n<50)	5587

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.926	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.144	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.161	Data appear Lognormal at 5% Significance Level	

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.024	Mean of logged Data	6.138
Maximum of Logged Data	11.03	SD of logged Data	1.476

Assuming Lognormal Distribution

95% H-UCL	3280	90% Chebyshev (MVUE) UCL	2601
95% Chebyshev (MVUE) UCL	3199	97.5% Chebyshev (MVUE) UCL	4029
99% Chebyshev (MVUE) UCL	5658		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	6401	95% Jackknife UCL	6519
95% Standard Bootstrap UCL	6287	95% Bootstrap-t UCL	37237
95% Hall's Bootstrap UCL	23049	95% Percentile Bootstrap UCL	7046
95% BCA Bootstrap UCL	9491		
90% Chebyshev(Mean, Sd) UCL	9261	95% Chebyshev(Mean, Sd) UCL	12129
97.5% Chebyshev(Mean, Sd) UCL	16109	99% Chebyshev(Mean, Sd) UCL	23928

Suggested UCL to Use

95% H-UCL	3280

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

EC21TSManganese

General Statistics

Total Number of Observations	61	Number of Distinct Observations	61
		Number of Missing Observations	0
Minimum	0.759	Mean	1440
Maximum	61600	Median	130
SD	7895	Std. Error of Mean	1011
Coefficient of Variation	5.482	Skewness	7.625

Normal GOF Test

Shapiro Wilk Test Statistic	0.183	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.43	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.113	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	3129	95% Adjusted-CLT UCL (Chen-1995)	4157
		95% Modified-t UCL (Johnson-1978)	3294

Gamma GOF Test

A-D Test Statistic	6.911	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.868	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.274	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.124	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.291	k star (bias corrected MLE)	0.287
Theta hat (MLE)	4953	Theta star (bias corrected MLE)	5011
nu hat (MLE)	35.47	nu star (bias corrected)	35.06
MLE Mean (bias corrected)	1440	MLE Sd (bias corrected)	2687
		Approximate Chi Square Value (0.05)	22.52
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	22.27

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2243	95% Adjusted Gamma UCL (use when n<50)	2267

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.897	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0677	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.113	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.276	Mean of logged Data	4.889
Maximum of Logged Data	11.03	SD of logged Data	1.847

Assuming Lognormal Distribution

95% H-UCL	1476	90% Chebyshev (MVUE) UCL	1386
95% Chebyshev (MVUE) UCL	1705	97.5% Chebyshev (MVUE) UCL	2147
99% Chebyshev (MVUE) UCL	3017		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3103	95% Jackknife UCL	3129
95% Standard Bootstrap UCL	3063	95% Bootstrap-t UCL	16490
95% Hall's Bootstrap UCL	10567	95% Percentile Bootstrap UCL	3444
95% BCA Bootstrap UCL	4608		
90% Chebyshev(Mean, Sd) UCL	4473	95% Chebyshev(Mean, Sd) UCL	5846
97.5% Chebyshev(Mean, Sd) UCL	7753	99% Chebyshev(Mean, Sd) UCL	11498

Suggested UCL to Use

95% H-UCL	1476

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

EC21SSDioxin

General Statistics

Total Number of Observations	34	Number of Distinct Observations	34
		Number of Missing Observations	0
Minimum	4.0516E-7	Mean	3.7203E-5

Maximum	9.8720E-4	Median	3.6760E-6
SD	1.6818E-4	Std. Error of Mean	2.8842E-5
Coefficient of Variation	N/A	Skewness	5.797

Normal GOF Test

Shapiro Wilk Test Statistic	0.213	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.461	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.6014E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1528E-4
		95% Modified-t UCL (Johnson-1978)	9.0793E-5

Gamma GOF Test

A-D Test Statistic	5.494	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.845	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.31	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.163	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.351	k star (bias corrected MLE)	0.34
Theta hat (MLE)	1.0594E-4	Theta star (bias corrected MLE)	1.0949E-4
nu hat (MLE)	23.88	nu star (bias corrected)	23.1
MLE Mean (bias corrected)	3.7203E-5	MLE Sd (bias corrected)	6.3823E-5
		Approximate Chi Square Value (0.05)	13.17
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	12.8

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.5267E-5	95% Adjusted Gamma UCL (use when n<50)	6.7162E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.15	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-14.72	Mean of logged Data	-12.11
Maximum of Logged Data	-6.921	SD of logged Data	1.405

Assuming Lognormal Distribution

95% H-UCL	3.0543E-5	90% Chebyshev (MVUE) UCL	2.6645E-5
95% Chebyshev (MVUE) UCL	3.2392E-5	97.5% Chebyshev (MVUE) UCL	4.0369E-5
99% Chebyshev (MVUE) UCL	5.6039E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8.4644E-5	95% Jackknife UCL	8.6014E-5
95% Standard Bootstrap UCL	8.3766E-5	95% Bootstrap-t UCL	6.8319E-4
95% Hall's Bootstrap UCL	4.0598E-4	95% Percentile Bootstrap UCL	9.4589E-5
95% BCA Bootstrap UCL	1.2503E-4		
90% Chebyshev(Mean, Sd) UCL	1.2373E-4	95% Chebyshev(Mean, Sd) UCL	1.6292E-4
97.5% Chebyshev(Mean, Sd) UCL	2.1732E-4	99% Chebyshev(Mean, Sd) UCL	3.2418E-4

Suggested UCL to Use

95% H-UCL	3.0543E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.
H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.
It is therefore recommended to avoid the use of H-statistic based 95% UCLs.
Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

EC21TSDioxin

General Statistics

Total Number of Observations	67	Number of Distinct Observations	67
		Number of Missing Observations	0
Minimum	6.1600E-8	Mean	2.0090E-5
Maximum	9.8720E-4	Median	3.0086E-6
SD	1.2021E-4	Std. Error of Mean	1.4686E-5
Coefficient of Variation	N/A	Skewness	8.13

Normal GOF Test

Shapiro Wilk Test Statistic	0.157	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.436	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.4590E-5	95% Adjusted-CLT UCL (Chen-1995)	5.9832E-5
		95% Modified-t UCL (Johnson-1978)	4.7022E-5

Gamma GOF Test

A-D Test Statistic	9.812	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.853	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.292	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.118	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.349	k star (bias corrected MLE)	0.343
Theta hat (MLE)	5.7559E-5	Theta star (bias corrected MLE)	5.8511E-5
nu hat (MLE)	46.77	nu star (bias corrected)	46.01
MLE Mean (bias corrected)	2.0090E-5	MLE Sd (bias corrected)	3.4285E-5
		Approximate Chi Square Value (0.05)	31.45
Adjusted Level of Significance	0.0464	Adjusted Chi Square Value	31.18

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	2.9393E-5	95% Adjusted Gamma UCL (use when n<50)	2.9643E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0.0247	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.121	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.108	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.6	Mean of logged Data	-12.74
Maximum of Logged Data	-6.921	SD of logged Data	1.423

Assuming Lognormal Distribution

95% H-UCL	1.1985E-5	90% Chebyshev (MVUE) UCL	1.3243E-5
95% Chebyshev (MVUE) UCL	1.5700E-5	97.5% Chebyshev (MVUE) UCL	1.9110E-5
99% Chebyshev (MVUE) UCL	2.5809E-5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.4247E-5	95% Jackknife UCL	4.4590E-5
95% Standard Bootstrap UCL	4.3969E-5	95% Bootstrap-t UCL	3.3691E-4
95% Hall's Bootstrap UCL	1.8030E-4	95% Percentile Bootstrap UCL	4.8990E-5
95% BCA Bootstrap UCL	6.4934E-5		
90% Chebyshev(Mean, Sd) UCL	6.4148E-5	95% Chebyshev(Mean, Sd) UCL	8.4105E-5
97.5% Chebyshev(Mean, Sd) UCL	1.1180E-4	99% Chebyshev(Mean, Sd) UCL	1.6621E-4

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 8.4105E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SSBaA

General Statistics

Total Number of Observations	34	Number of Distinct Observations	34
		Number of Missing Observations	0
Minimum	0.0091	Mean	3.312
Maximum	36	Median	0.0549
SD	7.956	Std. Error of Mean	1.364
Coefficient of Variation	2.402	Skewness	2.86

Normal GOF Test

Shapiro Wilk Test Statistic	0.494	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.437	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.621	95% Adjusted-CLT UCL (Chen-1995)	6.271
		95% Modified-t UCL (Johnson-1978)	5.732

Gamma GOF Test

A-D Test Statistic	4.663	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.892	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.329	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.167	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.228	k star (bias corrected MLE)	0.228
Theta hat (MLE)	14.5	Theta star (bias corrected MLE)	14.54
nu hat (MLE)	15.53	nu star (bias corrected)	15.49
MLE Mean (bias corrected)	3.312	MLE Sd (bias corrected)	6.939
		Approximate Chi Square Value (0.05)	7.603
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	7.33

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.747	95% Adjusted Gamma UCL (use when n<50)	6.998

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.816	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors Lognormal GOF Test**

5% Lilliefors Critical Value	0.15	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.699	Mean of logged Data	-1.959
Maximum of Logged Data	3.584	SD of logged Data	2.504

Assuming Lognormal Distribution

95% H-UCL	24.79	90% Chebyshev (MVUE) UCL	6.714
95% Chebyshev (MVUE) UCL	8.681	97.5% Chebyshev (MVUE) UCL	11.41
99% Chebyshev (MVUE) UCL	16.77		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.556	95% Jackknife UCL	5.621
95% Standard Bootstrap UCL	5.478	95% Bootstrap-t UCL	7.513
95% Hall's Bootstrap UCL	6.155	95% Percentile Bootstrap UCL	5.741
95% BCA Bootstrap UCL	6.712		
90% Chebyshev(Mean, Sd) UCL	7.405	95% Chebyshev(Mean, Sd) UCL	9.259
97.5% Chebyshev(Mean, Sd) UCL	11.83	99% Chebyshev(Mean, Sd) UCL	16.89

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL	11.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TSBaA

General Statistics

Total Number of Observations	67	Number of Distinct Observations	55
Number of Detects	53	Number of Non-Detects	14
Number of Distinct Detects	51	Number of Distinct Non-Detects	6
Minimum Detect	0.0018	Minimum Non-Detect	0.0014
Maximum Detect	36	Maximum Non-Detect	0.0021
Variance Detects	42.59	Percent Non-Detects	20.9%
Mean Detects	2.162	SD Detects	6.526
Median Detects	0.047	CV Detects	3.019
Skewness Detects	3.726	Kurtosis Detects	15.05
Mean of Logged Detects	-2.672	SD of Logged Detects	2.489

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.395	**Normal GOF Test on Detected Observations Only**	
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.455	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.121	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.711	KM Standard Error of Mean	0.717
KM SD	5.816	95% KM (BCA) UCL	2.905
95% KM (t) UCL	2.907	95% KM (Percentile Bootstrap) UCL	2.98
95% KM (z) UCL	2.891	95% KM Bootstrap t UCL	3.834
90% KM Chebyshev UCL	3.863	95% KM Chebyshev UCL	4.838
97.5% KM Chebyshev UCL	6.191	99% KM Chebyshev UCL	8.848

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	7.083	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.907	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.301	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.135	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.212	k star (bias corrected MLE)	0.212
Theta hat (MLE)	10.21	Theta star (bias corrected MLE)	10.18
nu hat (MLE)	22.45	nu star (bias corrected)	22.51
Mean (detects)	2.162		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0018	Mean	1.712
Maximum	36	Median	0.0217
SD	5.86	CV	3.422
k hat (MLE)	0.203	k star (bias corrected MLE)	0.204
Theta hat (MLE)	8.43	Theta star (bias corrected MLE)	8.394
nu hat (MLE)	27.22	nu star (bias corrected)	27.33
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (27.33, α)	16.41	Adjusted Chi Square Value (27.33, β)	16.22
95% Gamma Approximate UCL (use when n>=50)	2.852	95% Gamma Adjusted UCL (use when n<50)	2.885

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.711	SD (KM)	5.816
Variance (KM)	33.83	SE of Mean (KM)	0.717
k hat (KM)	0.0865	k star (KM)	0.0926
nu hat (KM)	11.59	nu star (KM)	12.4
theta hat (KM)	19.78	theta star (KM)	18.48
80% gamma percentile (KM)	1.055	90% gamma percentile (KM)	4.397
95% gamma percentile (KM)	9.96	99% gamma percentile (KM)	28.23

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.40, α)	5.494	Adjusted Chi Square Value (12.40, β)	5.393
95% Gamma Approximate KM-UCL (use when n>=50)	3.862	95% Gamma Adjusted KM-UCL (use when n<50)	3.934

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.895	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	8.1025E-5	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.16	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.121	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.71	Mean in Log Scale	-3.82
SD in Original Scale	5.86	SD in Log Scale	3.174
95% t UCL (assumes normality of ROS data)	2.905	95% Percentile Bootstrap UCL	2.989
95% BCA Bootstrap UCL	3.466	95% Bootstrap t UCL	3.878
95% H-UCL (Log ROS)	16.16		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.485	KM Geo Mean	0.0306
KM SD (logged)	2.704	95% Critical H Value (KM-Log)	3.304
KM Standard Error of Mean (logged)	0.333	95% H-UCL (KM -Log)	3.559
KM SD (logged)	2.704	95% Critical H Value (KM-Log)	3.304
KM Standard Error of Mean (logged)	0.333		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.71	Mean in Log Scale	-3.592
SD in Original Scale	5.86	SD in Log Scale	2.852
95% t UCL (Assumes normality)	2.905	95% H-Stat UCL	5.525

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 4.838

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SSBaP

General Statistics

Total Number of Observations	34	Number of Distinct Observations	34
		Number of Missing Observations	0
Minimum	0.0119	Mean	3.196
Maximum	33	Median	0.0586
SD	7.468	Std. Error of Mean	1.281
Coefficient of Variation	2.337	Skewness	2.708

Normal GOF Test

Shapiro Wilk Test Statistic	0.506	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.44	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.363	95% Adjusted-CLT UCL (Chen-1995)	5.938
		95% Modified-t UCL (Johnson-1978)	5.462

Gamma GOF Test

A-D Test Statistic	4.853	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.89	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.34	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.166	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.232	k star (bias corrected MLE)	0.231
Theta hat (MLE)	13.78	Theta star (bias corrected MLE)	13.83
nu hat (MLE)	15.77	nu star (bias corrected)	15.71
MLE Mean (bias corrected)	3.196	MLE Sd (bias corrected)	6.649
		Approximate Chi Square Value (0.05)	7.759
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	7.483

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.472	95% Adjusted Gamma UCL (use when n<50)	6.711

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.431	Mean of logged Data	-1.938
Maximum of Logged Data	3.497	SD of logged Data	2.468

Assuming Lognormal Distribution

95% H-UCL	21.94	90% Chebyshev (MVUE) UCL	6.297

95% Chebyshev (MVUE) UCL	8.132	97.5% Chebyshev (MVUE) UCL	10.68
99% Chebyshev (MVUE) UCL	15.68		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	5.303	95% Jackknife UCL	5.363
95% Standard Bootstrap UCL	5.299	95% Bootstrap-t UCL	7.083
95% Hall's Bootstrap UCL	6.017	95% Percentile Bootstrap UCL	5.391
95% BCA Bootstrap UCL	5.888		
90% Chebyshev(Mean, Sd) UCL	7.038	95% Chebyshev(Mean, Sd) UCL	8.778
97.5% Chebyshev(Mean, Sd) UCL	11.19	99% Chebyshev(Mean, Sd) UCL	15.94

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL	11.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TSBaP

General Statistics

Total Number of Observations	67	Number of Distinct Observations	58
Number of Detects	56	Number of Non-Detects	11
Number of Distinct Detects	52	Number of Distinct Non-Detects	6
Minimum Detect	9.2000E-4	Minimum Non-Detect	0.0014
Maximum Detect	33	Maximum Non-Detect	0.0021
Variance Detects	35.82	Percent Non-Detects	16.42%
Mean Detects	1.976	SD Detects	5.985
Median Detects	0.0374	CV Detects	3.028
Skewness Detects	3.665	Kurtosis Detects	14.46
Mean of Logged Detects	-2.84	SD of Logged Detects	2.552

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.393	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.461	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.118	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.652	KM Standard Error of Mean	0.674
KM SD	5.471	95% KM (BCA) UCL	2.93
95% KM (t) UCL	2.777	95% KM (Percentile Bootstrap) UCL	2.846
95% KM (z) UCL	2.761	95% KM Bootstrap t UCL	3.433
90% KM Chebyshev UCL	3.675	95% KM Chebyshev UCL	4.592
97.5% KM Chebyshev UCL	5.864	99% KM Chebyshev UCL	8.363

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	7.399	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.91	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.304	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.132	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.208	k star (bias corrected MLE)	0.209
Theta hat (MLE)	9.513	Theta star (bias corrected MLE)	9.478
nu hat (MLE)	23.27	nu star (bias corrected)	23.35
Mean (detects)	1.976		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.2000E-4	Mean	1.653
Maximum	33	Median	0.0255
SD	5.512	CV	3.334
k hat (MLE)	0.202	k star (bias corrected MLE)	0.203
Theta hat (MLE)	8.176	Theta star (bias corrected MLE)	8.14
nu hat (MLE)	27.1	nu star (bias corrected)	27.22
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (27.22, α)	16.32	Adjusted Chi Square Value (27.22, β)	16.13
95% Gamma Approximate UCL (use when n>=50)	2.757	95% Gamma Adjusted UCL (use when n<50)	2.789

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.652	SD (KM)	5.471
Variance (KM)	29.94	SE of Mean (KM)	0.674
k hat (KM)	0.0912	k star (KM)	0.097
nu hat (KM)	12.21	nu star (KM)	13
theta hat (KM)	18.12	theta star (KM)	17.03
80% gamma percentile (KM)	1.096	90% gamma percentile (KM)	4.34
95% gamma percentile (KM)	9.603	99% gamma percentile (KM)	26.64

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.00, α)	5.893	Adjusted Chi Square Value (13.00, β)	5.788
95% Gamma Approximate KM-UCL (use when n>=50)	3.644	95% Gamma Adjusted KM-UCL (use when n<50)	3.711

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.91	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	3.1141E-4	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.118	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.652	Mean in Log Scale	-3.609
SD in Original Scale	5.513	SD in Log Scale	2.923
95% t UCL (assumes normality of ROS data)	2.775	95% Percentile Bootstrap UCL	2.875
95% BCA Bootstrap UCL	3.29	95% Bootstrap t UCL	3.49
95% H-UCL (Log ROS)	7.169		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.509	KM Geo Mean	0.0299
KM SD (logged)	2.762	95% Critical H Value (KM-Log)	3.379
KM Standard Error of Mean (logged)	0.341	95% H-UCL (KM -Log)	4.28
KM SD (logged)	2.762	95% Critical H Value (KM-Log)	3.379
KM Standard Error of Mean (logged)	0.341		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.652	Mean in Log Scale	-3.531
SD in Original Scale	5.513	SD in Log Scale	2.81
95% t UCL (Assumes normality)	2.775	95% H-Stat UCL	5.001

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	5.864

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

EC21SSBbF

General Statistics

Total Number of Observations	34	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	0.0223	Mean	4.942
Maximum	50	Median	0.101
SD	11.4	Std. Error of Mean	1.956
Coefficient of Variation	2.307	Skewness	2.661

Normal GOF Test

Shapiro Wilk Test Statistic	0.508	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.441	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.251	95% Adjusted-CLT UCL (Chen-1995)	9.112
		95% Modified-t UCL (Johnson-1978)	8.4

Gamma GOF Test

A-D Test Statistic	5.042	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.886	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.337	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.166	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.241	k star (bias corrected MLE)	0.239
Theta hat (MLE)	20.54	Theta star (bias corrected MLE)	20.68
nu hat (MLE)	16.36	nu star (bias corrected)	16.25
MLE Mean (bias corrected)	4.942	MLE Sd (bias corrected)	10.11
		Approximate Chi Square Value (0.05)	8.139
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	7.855

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.866	95% Adjusted Gamma UCL (use when n<50)	10.22

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.784	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.243	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.803	Mean of logged Data	-1.373
Maximum of Logged Data	3.912	SD of logged Data	2.388

Assuming Lognormal Distribution

95% H-UCL	28.29	90% Chebyshev (MVUE) UCL	9.191
95% Chebyshev (MVUE) UCL	11.83	97.5% Chebyshev (MVUE) UCL	15.5
99% Chebyshev (MVUE) UCL	22.71		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	8.158	95% Jackknife UCL	8.251
95% Standard Bootstrap UCL	8.144	95% Bootstrap-t UCL	10.51

95% Hall's Bootstrap UCL	9.466	95% Percentile Bootstrap UCL	8.323
95% BCA Bootstrap UCL	8.828		
90% Chebyshev(Mean, Sd) UCL	10.81	95% Chebyshev(Mean, Sd) UCL	13.47
97.5% Chebyshev(Mean, Sd) UCL	17.15	99% Chebyshev(Mean, Sd) UCL	24.4

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL	17.15

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TSBbF

General Statistics

Total Number of Observations	67	Number of Distinct Observations	58
Number of Detects	57	Number of Non-Detects	10
Number of Distinct Detects	54	Number of Distinct Non-Detects	6
Minimum Detect	0.0015	Minimum Non-Detect	0.0014
Maximum Detect	50	Maximum Non-Detect	0.0021
Variance Detects	82.3	Percent Non-Detects	14.93%
Mean Detects	3.005	SD Detects	9.072
Median Detects	0.0663	CV Detects	3.019
Skewness Detects	3.647	Kurtosis Detects	14.32
Mean of Logged Detects	-2.357	SD of Logged Detects	2.522

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.392	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.462	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.117	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.556	KM Standard Error of Mean	1.031
KM SD	8.363	95% KM (BCA) UCL	4.299
95% KM (t) UCL	4.276	95% KM (Percentile Bootstrap) UCL	4.445
95% KM (z) UCL	4.252	95% KM Bootstrap t UCL	5.541
90% KM Chebyshev UCL	5.649	95% KM Chebyshev UCL	7.049
97.5% KM Chebyshev UCL	8.993	99% KM Chebyshev UCL	12.81

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	7.493	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.908	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.302	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.131	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.211	k star (bias corrected MLE)	0.212
Theta hat (MLE)	14.23	Theta star (bias corrected MLE)	14.2
nu hat (MLE)	24.06	nu star (bias corrected)	24.13
Mean (detects)	3.005		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0015	Mean	2.558
Maximum	50	Median	0.049
SD	8.425	CV	3.294
k hat (MLE)	0.202	k star (bias corrected MLE)	0.203

Theta hat (MLE)	12.64	Theta star (bias corrected MLE)	12.59
nu hat (MLE)	27.11	nu star (bias corrected)	27.22
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (27.22, α)	16.33	Adjusted Chi Square Value (27.22, β)	16.14
95% Gamma Approximate UCL (use when n>=50)	4.265	95% Gamma Adjusted UCL (use when n<50)	4.314

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.556	SD (KM)	8.363
Variance (KM)	69.94	SE of Mean (KM)	1.031
k hat (KM)	0.0934	k star (KM)	0.0992
nu hat (KM)	12.52	nu star (KM)	13.29
theta hat (KM)	27.36	theta star (KM)	25.77
80% gamma percentile (KM)	1.753	90% gamma percentile (KM)	6.781
95% gamma percentile (KM)	14.84	99% gamma percentile (KM)	40.77

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.29, α)	6.091	Adjusted Chi Square Value (13.29, β)	5.984
95% Gamma Approximate KM-UCL (use when n>=50)	5.579	95% Gamma Adjusted KM-UCL (use when n<50)	5.68

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.913	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	3.6259E-4	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.134	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.117	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.556	Mean in Log Scale	-3.164
SD in Original Scale	8.426	SD in Log Scale	3.038
95% t UCL (assumes normality of ROS data)	4.274	95% Percentile Bootstrap UCL	4.217
95% BCA Bootstrap UCL	4.983	95% Bootstrap t UCL	5.598
95% H-UCL (Log ROS)	17.76		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.981	KM Geo Mean	0.0507
KM SD (logged)	2.746	95% Critical H Value (KM-Log)	3.358
KM Standard Error of Mean (logged)	0.338	95% H-UCL (KM -Log)	6.843
KM SD (logged)	2.746	95% Critical H Value (KM-Log)	3.358
KM Standard Error of Mean (logged)	0.338		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.556	Mean in Log Scale	-3.059
SD in Original Scale	8.426	SD in Log Scale	2.873
95% t UCL (Assumes normality)	4.274	95% H-Stat UCL	10.18

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	8.993

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SSDibenz

General Statistics

Total Number of Observations	34	Number of Distinct Observations	33
Number of Detects	33	Number of Non-Detects	1
Number of Distinct Detects	32	Number of Distinct Non-Detects	1
Minimum Detect	0.0015	Minimum Non-Detect	0.002

Maximum Detect	6.6	Maximum Non-Detect	0.002
Variance Detects	1.849	Percent Non-Detects	2.941%
Mean Detects	0.55	SD Detects	1.36
Median Detects	0.01	CV Detects	2.474
Skewness Detects	3.301	Kurtosis Detects	12.32
Mean of Logged Detects	-3.478	SD of Logged Detects	2.344

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.478	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.931	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.426	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.152	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.534	KM Standard Error of Mean	0.23
KM SD	1.323	95% KM (BCA) UCL	0.905
95% KM (t) UCL	0.923	95% KM (Percentile Bootstrap) UCL	0.909
95% KM (z) UCL	0.912	95% KM Bootstrap t UCL	1.305
90% KM Chebyshev UCL	1.225	95% KM Chebyshev UCL	1.538
97.5% KM Chebyshev UCL	1.972	99% KM Chebyshev UCL	2.825

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.639	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.882	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.324	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.168	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.247	k star (bias corrected MLE)	0.245
Theta hat (MLE)	2.225	Theta star (bias corrected MLE)	2.245
nu hat (MLE)	16.31	nu star (bias corrected)	16.16
Mean (detects)	0.55		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0015	Mean	0.534
Maximum	6.6	Median	0.01
SD	1.342	CV	2.515
k hat (MLE)	0.247	k star (bias corrected MLE)	0.245
Theta hat (MLE)	2.163	Theta star (bias corrected MLE)	2.182
nu hat (MLE)	16.78	nu star (bias corrected)	16.64
Adjusted Level of Significance (β)	0.0422		
Approximate Chi Square Value (16.64, α)	8.413	Adjusted Chi Square Value (16.64, β)	8.123
95% Gamma Approximate UCL (use when n>=50)	1.056	95% Gamma Adjusted UCL (use when n<50)	1.093

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.534	SD (KM)	1.323
Variance (KM)	1.749	SE of Mean (KM)	0.23
k hat (KM)	0.163	k star (KM)	0.168
nu hat (KM)	11.07	nu star (KM)	11.42
theta hat (KM)	3.278	theta star (KM)	3.176
80% gamma percentile (KM)	0.633	90% gamma percentile (KM)	1.602
95% gamma percentile (KM)	2.868	99% gamma percentile (KM)	6.461

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.42, α)	4.85	Adjusted Chi Square Value (11.42, β)	4.639
95% Gamma Approximate KM-UCL (use when n>=50)	1.257	95% Gamma Adjusted KM-UCL (use when n<50)	1.314

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.931	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.152	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.534	Mean in Log Scale	-3.615
SD in Original Scale	1.342	SD in Log Scale	2.442
95% t UCL (assumes normality of ROS data)	0.923	95% Percentile Bootstrap UCL	0.941
95% BCA Bootstrap UCL	1.066	95% Bootstrap t UCL	1.304
95% H-UCL (Log ROS)	3.704		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.567	KM Geo Mean	0.0282
KM SD (logged)	2.331	95% Critical H Value (KM-Log)	4.391
KM Standard Error of Mean (logged)	0.406	95% H-UCL (KM -Log)	2.534
KM SD (logged)	2.331	95% Critical H Value (KM-Log)	4.391
KM Standard Error of Mean (logged)	0.406		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.534	Mean in Log Scale	-3.579
SD in Original Scale	1.342	SD in Log Scale	2.382
95% t UCL (Assumes normality)	0.923	95% H-Stat UCL	3.039

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	1.972

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TSDibenz

General Statistics

Total Number of Observations	67	Number of Distinct Observations	50
Number of Detects	46	Number of Non-Detects	21
Number of Distinct Detects	43	Number of Distinct Non-Detects	9
Minimum Detect	7.1000E-4	Minimum Non-Detect	0.0014
Maximum Detect	6.6	Maximum Non-Detect	0.0022
Variance Detects	1.373	Percent Non-Detects	31.34%
Mean Detects	0.4	SD Detects	1.172
Median Detects	0.00955	CV Detects	2.927
Skewness Detects	3.978	Kurtosis Detects	17.99
Mean of Logged Detects	-3.872	SD of Logged Detects	2.24

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.406	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.945	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.448	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.129	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.275	KM Standard Error of Mean	0.121
KM SD	0.978	95% KM (BCA) UCL	0.478
95% KM (t) UCL	0.477	95% KM (Percentile Bootstrap) UCL	0.491
95% KM (z) UCL	0.474	95% KM Bootstrap t UCL	0.681
90% KM Chebyshev UCL	0.638	95% KM Chebyshev UCL	0.802

97.5% KM Chebyshev UCL	1.03	99% KM Chebyshev UCL	1.477

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	6.487	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.891	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.32	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.144	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.242	k star (bias corrected MLE)	0.24
Theta hat (MLE)	1.657	Theta star (bias corrected MLE)	1.666
nu hat (MLE)	22.23	nu star (bias corrected)	22.11
Mean (detects)	0.4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.1000E-4	Mean	0.278
Maximum	6.6	Median	0.01
SD	0.985	CV	3.541
k hat (MLE)	0.251	k star (bias corrected MLE)	0.25
Theta hat (MLE)	1.106	Theta star (bias corrected MLE)	1.111
nu hat (MLE)	33.7	nu star (bias corrected)	33.52
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (33.52, α)	21.28	Adjusted Chi Square Value (33.52, β)	21.07
95% Gamma Approximate UCL (use when n>=50)	0.438	95% Gamma Adjusted UCL (use when n<50)	0.442

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.275	SD (KM)	0.978
Variance (KM)	0.957	SE of Mean (KM)	0.121
k hat (KM)	0.0792	k star (KM)	0.0856
nu hat (KM)	10.61	nu star (KM)	11.47
theta hat (KM)	3.476	theta star (KM)	3.216
80% gamma percentile (KM)	0.148	90% gamma percentile (KM)	0.679
95% gamma percentile (KM)	1.603	99% gamma percentile (KM)	4.719

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.47, α)	4.877	Adjusted Chi Square Value (11.47, β)	4.783
95% Gamma Approximate KM-UCL (use when n>=50)	0.647	95% Gamma Adjusted KM-UCL (use when n<50)	0.66

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.945	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.129	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.275	Mean in Log Scale	-5.231
SD in Original Scale	0.985	SD in Log Scale	2.787
95% t UCL (assumes normality of ROS data)	0.476	95% Percentile Bootstrap UCL	0.492
95% BCA Bootstrap UCL	0.597	95% Bootstrap t UCL	0.682
95% H-UCL (Log ROS)	0.839		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.876	KM Geo Mean	0.00763
KM SD (logged)	2.366	95% Critical H Value (KM-Log)	3.129
KM Standard Error of Mean (logged)	0.294	95% H-UCL (KM -Log)	0.312
KM SD (logged)	2.366	95% Critical H Value (KM-Log)	3.129
KM Standard Error of Mean (logged)	0.294		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.275	Mean in Log Scale	-4.857
SD in Original Scale	0.985	SD in Log Scale	2.364
95% t UCL (Assumes normality)	0.476	95% H-Stat UCL	0.316

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.802

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SS24DNT

General Statistics

Total Number of Observations	33	Number of Distinct Observations	10
Number of Detects	6	Number of Non-Detects	27
Number of Distinct Detects	6	Number of Distinct Non-Detects	4
Minimum Detect	0.026	Minimum Non-Detect	0.058
Maximum Detect	19.8	Maximum Non-Detect	0.2
Variance Detects	79.78	Percent Non-Detects	81.82%
Mean Detects	8.014	SD Detects	8.932
Median Detects	6.945	CV Detects	1.115
Skewness Detects	0.244	Kurtosis Detects	-2.543
Mean of Logged Detects	0.0465	SD of Logged Detects	3.035

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.803	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.479	KM Standard Error of Mean	0.886
KM SD	4.645	95% KM (BCA) UCL	3.271
95% KM (t) UCL	2.979	95% KM (Percentile Bootstrap) UCL	2.96
95% KM (z) UCL	2.936	95% KM Bootstrap t UCL	3.406
90% KM Chebyshev UCL	4.136	95% KM Chebyshev UCL	5.34
97.5% KM Chebyshev UCL	7.011	99% KM Chebyshev UCL	10.29

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.702	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.762	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.315	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.355	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.333	k star (bias corrected MLE)	0.278
Theta hat (MLE)	24.06	Theta star (bias corrected MLE)	28.86
nu hat (MLE)	3.998	nu star (bias corrected)	3.332
Mean (detects)	8.014		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.506
Maximum	19.8	Median	0.01
SD	4.712	CV	3.128
k hat (MLE)	0.189	k star (bias corrected MLE)	0.192
Theta hat (MLE)	7.95	Theta star (bias corrected MLE)	7.827
nu hat (MLE)	12.51	nu star (bias corrected)	12.7
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (12.70, α)	5.693	Adjusted Chi Square Value (12.70, β)	5.452
95% Gamma Approximate UCL (use when n>=50)	3.361	95% Gamma Adjusted UCL (use when n<50)	3.51

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.479	SD (KM)	4.645
Variance (KM)	21.58	SE of Mean (KM)	0.886
k hat (KM)	0.101	k star (KM)	0.112
nu hat (KM)	6.689	nu star (KM)	7.414
theta hat (KM)	14.59	theta star (KM)	13.16
80% gamma percentile (KM)	1.2	90% gamma percentile (KM)	4.108
95% gamma percentile (KM)	8.503	99% gamma percentile (KM)	22.15

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.41, α)	2.401	Adjusted Chi Square Value (7.41, β)	2.256
95% Gamma Approximate KM-UCL (use when n>=50)	4.567	95% Gamma Adjusted KM-UCL (use when n<50)	4.86

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.302	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.488	Mean in Log Scale	-3.935
SD in Original Scale	4.715	SD in Log Scale	2.974
95% t UCL (assumes normality of ROS data)	2.879	95% Percentile Bootstrap UCL	2.93
95% BCA Bootstrap UCL	3.362	95% Bootstrap t UCL	3.549
95% H-UCL (Log ROS)	27.87		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.971	KM Geo Mean	0.0512
KM SD (logged)	1.852	95% Critical H Value (KM-Log)	3.623
KM Standard Error of Mean (logged)	0.354	95% H-UCL (KM -Log)	0.932
KM SD (logged)	1.852	95% Critical H Value (KM-Log)	3.623
KM Standard Error of Mean (logged)	0.354		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.486	Mean in Log Scale	-2.795
SD in Original Scale	4.715	SD in Log Scale	1.837
95% t UCL (Assumes normality)	2.876	95% H-Stat UCL	1.064

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.979

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21SSIndeno

General Statistics

Total Number of Observations	34	Number of Distinct Observations	33
		Number of Missing Observations	0
Minimum	0.0046	Mean	2.346
Maximum	30	Median	0.045
SD	5.908	Std. Error of Mean	1.013
Coefficient of Variation	2.518	Skewness	3.531

Normal GOF Test

Shapiro Wilk Test Statistic	0.464	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.436	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.061	95% Adjusted-CLT UCL (Chen-1995)	4.669
		95% Modified-t UCL (Johnson-1978)	4.163

Gamma GOF Test

A-D Test Statistic	5.053	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.886	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.363	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.166	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.24	k star (bias corrected MLE)	0.238
Theta hat (MLE)	9.79	Theta star (bias corrected MLE)	9.853
nu hat (MLE)	16.3	nu star (bias corrected)	16.19
MLE Mean (bias corrected)	2.346	MLE Sd (bias corrected)	4.808
		Approximate Chi Square Value (0.05)	8.099
Adjusted Level of Significance	0.0422	Adjusted Chi Square Value	7.815

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	4.692	95% Adjusted Gamma UCL (use when n<50)	4.862

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.808	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.933	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.232	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.15	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.382	Mean of logged Data	-2.131
Maximum of Logged Data	3.401	SD of logged Data	2.379

Assuming Lognormal Distribution

95% H-UCL	12.81	90% Chebyshev (MVUE) UCL	4.219
95% Chebyshev (MVUE) UCL	5.43	97.5% Chebyshev (MVUE) UCL	7.111
99% Chebyshev (MVUE) UCL	10.41		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	4.013	95% Jackknife UCL	4.061
95% Standard Bootstrap UCL	4.043	95% Bootstrap-t UCL	5.724
95% Hall's Bootstrap UCL	9.137	95% Percentile Bootstrap UCL	4.016
95% BCA Bootstrap UCL	4.805		
90% Chebyshev(Mean, Sd) UCL	5.386	95% Chebyshev(Mean, Sd) UCL	6.763
97.5% Chebyshev(Mean, Sd) UCL	8.674	99% Chebyshev(Mean, Sd) UCL	12.43

Suggested UCL to Use

97.5% Chebyshev (Mean, Sd) UCL	8.674

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TSIndeno

General Statistics

Total Number of Observations	67	Number of Distinct Observations	53
Number of Detects	53	Number of Non-Detects	14
Number of Distinct Detects	49	Number of Distinct Non-Detects	7
Minimum Detect	0.0014	Minimum Non-Detect	0.0014
Maximum Detect	30	Maximum Non-Detect	0.0021
Variance Detects	23.37	Percent Non-Detects	20.9%
Mean Detects	1.529	SD Detects	4.834
Median Detects	0.037	CV Detects	3.163
Skewness Detects	4.492	Kurtosis Detects	23.59
Mean of Logged Detects	-2.81	SD of Logged Detects	2.363

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.373	**Normal GOF Test on Detected Observations Only**
5% Shapiro Wilk P Value	0	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.468	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.121	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.209	KM Standard Error of Mean	0.531
KM SD	4.304	95% KM (BCA) UCL	2.214
95% KM (t) UCL	2.095	95% KM (Percentile Bootstrap) UCL	2.114
95% KM (z) UCL	2.083	95% KM Bootstrap t UCL	3.098
90% KM Chebyshev UCL	2.802	95% KM Chebyshev UCL	3.523
97.5% KM Chebyshev UCL	4.525	99% KM Chebyshev UCL	6.491

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	7.539	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.901	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.335	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.135	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.224	k star (bias corrected MLE)	0.223
Theta hat (MLE)	6.838	Theta star (bias corrected MLE)	6.84
nu hat (MLE)	23.7	nu star (bias corrected)	23.69
Mean (detects)	1.529		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0014	Mean	1.211
Maximum	30	Median	0.026
SD	4.336	CV	3.58
k hat (MLE)	0.215	k star (bias corrected MLE)	0.216
Theta hat (MLE)	5.623	Theta star (bias corrected MLE)	5.615
nu hat (MLE)	28.86	nu star (bias corrected)	28.9
Adjusted Level of Significance (β)	0.0464		
Approximate Chi Square Value (28.90, α)	17.63	Adjusted Chi Square Value (28.90, β)	17.44
95% Gamma Approximate UCL (use when n>=50)	1.985	95% Gamma Adjusted UCL (use when n<50)	2.007

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.209	SD (KM)	4.304
Variance (KM)	18.53	SE of Mean (KM)	0.531
k hat (KM)	0.079	k star (KM)	0.0854
nu hat (KM)	10.58	nu star (KM)	11.44
theta hat (KM)	15.32	theta star (KM)	14.17
80% gamma percentile (KM)	0.65	90% gamma percentile (KM)	2.981
95% gamma percentile (KM)	7.046	99% gamma percentile (KM)	20.76

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.44, α)	4.861	Adjusted Chi Square Value (11.44, β)	4.766
95% Gamma Approximate KM-UCL (use when n>=50)	2.847	95% Gamma Adjusted KM-UCL (use when n<50)	2.903

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.891	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	5.1990E-5	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.121	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.209	Mean in Log Scale	-3.842
SD in Original Scale	4.337	SD in Log Scale	2.937
95% t UCL (assumes normality of ROS data)	2.093	95% Percentile Bootstrap UCL	2.135
95% BCA Bootstrap UCL	2.435	95% Bootstrap t UCL	2.97
95% H-UCL (Log ROS)	5.986		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.595	KM Geo Mean	0.0275
KM SD (logged)	2.581	95% Critical H Value (KM-Log)	3.169
KM Standard Error of Mean (logged)	0.318	95% H-UCL (KM -Log)	2.102
KM SD (logged)	2.581	95% Critical H Value (KM-Log)	3.169
KM Standard Error of Mean (logged)	0.318		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.209	Mean in Log Scale	-3.699
SD in Original Scale	4.337	SD in Log Scale	2.728
95% t UCL (Assumes normality)	2.093	95% H-Stat UCL	3.126

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	3.523

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC21TS24DNT

General Statistics

Total Number of Observations	65	Number of Distinct Observations	11
Number of Detects	7	Number of Non-Detects	58
Number of Distinct Detects	7	Number of Distinct Non-Detects	4
Minimum Detect	0.026	Minimum Non-Detect	0.058
Maximum Detect	19.8	Maximum Non-Detect	0.2
Variance Detects	73.77	Percent Non-Detects	89.23%
Mean Detects	6.994	SD Detects	8.589
Median Detects	0.87	CV Detects	1.228
Skewness Detects	0.581	Kurtosis Detects	-1.972
Mean of Logged Detects	0.02	SD of Logged Detects	2.771

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.776	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.777	KM Standard Error of Mean	0.454
KM SD	3.387	95% KM (BCA) UCL	1.691
95% KM (t) UCL	1.534	95% KM (Percentile Bootstrap) UCL	1.529
95% KM (z) UCL	1.523	95% KM Bootstrap t UCL	1.798
90% KM Chebyshev UCL	2.138	95% KM Chebyshev UCL	2.755
97.5% KM Chebyshev UCL	3.611	99% KM Chebyshev UCL	5.292

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.57	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.776	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.267	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.349	k star (bias corrected MLE)	0.295
Theta hat (MLE)	20.02	Theta star (bias corrected MLE)	23.71
nu hat (MLE)	4.892	nu star (bias corrected)	4.129
Mean (detects)	6.994		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.792
Maximum	19.8	Median	0.01
SD	3.415	CV	4.311
k hat (MLE)	0.198	k star (bias corrected MLE)	0.199
Theta hat (MLE)	4.011	Theta star (bias corrected MLE)	3.987
nu hat (MLE)	25.68	nu star (bias corrected)	25.82
Adjusted Level of Significance (β)	0.0463		
Approximate Chi Square Value (25.82, α)	15.24	Adjusted Chi Square Value (25.82, β)	15.06
95% Gamma Approximate UCL (use when n>=50)	1.342	95% Gamma Adjusted UCL (use when n<50)	1.358

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.777	SD (KM)	3.387
Variance (KM)	11.47	SE of Mean (KM)	0.454
k hat (KM)	0.0526	k star (KM)	0.0604
nu hat (KM)	6.833	nu star (KM)	7.851
theta hat (KM)	14.77	theta star (KM)	12.86
80% gamma percentile (KM)	0.191	90% gamma percentile (KM)	1.471
95% gamma percentile (KM)	4.359	99% gamma percentile (KM)	15.62

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.85, α)	2.649	Adjusted Chi Square Value (7.85, β)	2.581
95% Gamma Approximate KM-UCL (use when n>=50)	2.302	95% Gamma Adjusted KM-UCL (use when n<50)	2.362

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.254	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.791	Mean in Log Scale	-4.355
SD in Original Scale	3.411	SD in Log Scale	2.742
95% t UCL (assumes normality of ROS data)	1.497	95% Percentile Bootstrap UCL	1.548
95% BCA Bootstrap UCL	1.887	95% Bootstrap t UCL	1.862
95% H-UCL (Log ROS)	1.819		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.25	KM Geo Mean	0.0388
KM SD (logged)	1.417	95% Critical H Value (KM-Log)	2.316
KM Standard Error of Mean (logged)	0.19	95% H-UCL (KM -Log)	0.159
KM SD (logged)	1.417	95% Critical H Value (KM-Log)	2.316
KM Standard Error of Mean (logged)	0.19		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.785	Mean in Log Scale	-3.043
SD in Original Scale	3.412	SD in Log Scale	1.406
95% t UCL (Assumes normality)	1.491	95% H-Stat UCL	0.192

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	2.302

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC29 Lead SS

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	69.2	Mean	217.5
Maximum	559	Median	120.9
SD	229.6	Std. Error of Mean	114.8
Coefficient of Variation	1.056	Skewness	1.9

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.747	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	487.7	95% Adjusted-CLT UCL (Chen-1995)	522.9
		95% Modified-t UCL (Johnson-1978)	505.9

Gamma GOF Test

A-D Test Statistic	0.486	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.662	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.338	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.399	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.567	k star (bias corrected MLE)	0.558
Theta hat (MLE)	138.8	Theta star (bias corrected MLE)	389.4
nu hat (MLE)	12.54	nu star (bias corrected)	4.468
MLE Mean (bias corrected)	217.5	MLE Sd (bias corrected)	291
		Approximate Chi Square Value (0.05)	0.915
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1062	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.283	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.237	Mean of logged Data	5.03
Maximum of Logged Data	6.326	SD of logged Data	0.912

Assuming Lognormal Distribution

95% H-UCL	5815	90% Chebyshev (MVUE) UCL	469.7
95% Chebyshev (MVUE) UCL	589.4	97.5% Chebyshev (MVUE) UCL	755.5
99% Chebyshev (MVUE) UCL	1082		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	406.3	95% Jackknife UCL	487.7
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	561.9	95% Chebyshev(Mean, Sd) UCL	717.9
97.5% Chebyshev(Mean, Sd) UCL	934.5	99% Chebyshev(Mean, Sd) UCL	1360

Suggested UCL to Use

95% Adjusted Gamma UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC29Lead TS

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	4.9	Mean	117.3
Maximum	559	Median	56.5
SD	185	Std. Error of Mean	65.39
Coefficient of Variation	1.577	Skewness	2.462

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.649	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	241.2	95% Adjusted-CLT UCL (Chen-1995)	285.7
		95% Modified-t UCL (Johnson-1978)	250.7

Gamma GOF Test

A-D Test Statistic	0.341	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.307	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.612	k star (bias corrected MLE)	0.466
Theta hat (MLE)	191.8	Theta star (bias corrected MLE)	251.9
nu hat (MLE)	9.785	nu star (bias corrected)	7.449
MLE Mean (bias corrected)	117.3	MLE Sd (bias corrected)	171.9
		Approximate Chi Square Value (0.05)	2.42
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	1.76

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	361	95% Adjusted Gamma UCL (use when n<50)	496.5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.181	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.589	Mean of logged Data	3.757
Maximum of Logged Data	6.326	SD of logged Data	1.605

Assuming Lognormal Distribution

95% H-UCL	3286	90% Chebyshev (MVUE) UCL	319.3
95% Chebyshev (MVUE) UCL	410.3	97.5% Chebyshev (MVUE) UCL	536.8
99% Chebyshev (MVUE) UCL	785.1		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	224.8	95% Jackknife UCL	241.2
95% Standard Bootstrap UCL	218.6	95% Bootstrap-t UCL	518.1
95% Hall's Bootstrap UCL	647.4	95% Percentile Bootstrap UCL	235.5
95% BCA Bootstrap UCL	287.3		
90% Chebyshev(Mean, Sd) UCL	313.5	95% Chebyshev(Mean, Sd) UCL	402.3
97.5% Chebyshev(Mean, Sd) UCL	525.7	99% Chebyshev(Mean, Sd) UCL	767.9

Suggested UCL to Use

95% Adjusted Gamma UCL	496.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.023	Minimum Non-Detect	0.012
Maximum Detect	1.3	Maximum Non-Detect	0.026
Variance Detects	0.195	Percent Non-Detects	20%
Mean Detects	0.208	SD Detects	0.441
Median Detects	0.0555	CV Detects	2.121
Skewness Detects	2.821	Kurtosis Detects	7.967
Mean of Logged Detects	-2.605	SD of Logged Detects	1.217

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.455	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.492	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.169	KM Standard Error of Mean	0.128
KM SD	0.377	95% KM (BCA) UCL	0.424
95% KM (t) UCL	0.403	95% KM (Percentile Bootstrap) UCL	0.42
95% KM (z) UCL	0.379	95% KM Bootstrap t UCL	3.141
90% KM Chebyshev UCL	0.552	95% KM Chebyshev UCL	0.726
97.5% KM Chebyshev UCL	0.966	99% KM Chebyshev UCL	1.439

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.713	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.456	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.307	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.597	k star (bias corrected MLE)	0.457
Theta hat (MLE)	0.349	Theta star (bias corrected MLE)	0.456
nu hat (MLE)	9.555	nu star (bias corrected)	7.305
Mean (detects)	0.208		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.169
Maximum	1.3	Median	0.054
SD	0.398	CV	2.363
k hat (MLE)	0.516	k star (bias corrected MLE)	0.428
Theta hat (MLE)	0.326	Theta star (bias corrected MLE)	0.394
nu hat (MLE)	10.33	nu star (bias corrected)	8.561
Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (8.56, α)	3.064	Adjusted Chi Square Value (8.56, β)	2.521
95% Gamma Approximate UCL (use when n>=50)	0.471	95% Gamma Adjusted UCL (use when n<50)	0.572

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.169	SD (KM)	0.377
Variance (KM)	0.142	SE of Mean (KM)	0.128
k hat (KM)	0.202	k star (KM)	0.208
nu hat (KM)	4.032	nu star (KM)	4.156
theta hat (KM)	0.841	theta star (KM)	0.815
80% gamma percentile (KM)	0.228	90% gamma percentile (KM)	0.512

95% gamma percentile (KM)	0.864	99% gamma percentile (KM)	1.827

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.16, α)	0.784	Adjusted Chi Square Value (4.16, β)	0.568
95% Gamma Approximate KM-UCL (use when n>=50)	0.898	95% Gamma Adjusted KM-UCL (use when n<50)	1.24

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.708	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.168	Mean in Log Scale	-3.057
SD in Original Scale	0.398	SD in Log Scale	1.441
95% t UCL (assumes normality of ROS data)	0.399	95% Percentile Bootstrap UCL	0.418
95% BCA Bootstrap UCL	0.541	95% Bootstrap t UCL	2.77
95% H-UCL (Log ROS)	0.94		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.936	KM Geo Mean	0.0531
KM SD (logged)	1.221	95% Critical H Value (KM-Log)	3.574
KM Standard Error of Mean (logged)	0.415	95% H-UCL (KM -Log)	0.479
KM SD (logged)	1.221	95% Critical H Value (KM-Log)	3.574
KM Standard Error of Mean (logged)	0.415		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.168	Mean in Log Scale	-3.03
SD in Original Scale	0.398	SD in Log Scale	1.409
95% t UCL (Assumes normality)	0.399	95% H-Stat UCL	0.854

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.726

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC29TSAroclor1260

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
Number of Detects	8	Number of Non-Detects	6
Number of Distinct Detects	8	Number of Distinct Non-Detects	5
Minimum Detect	0.023	Minimum Non-Detect	0.012
Maximum Detect	1.3	Maximum Non-Detect	0.037
Variance Detects	0.195	Percent Non-Detects	42.86%
Mean Detects	0.208	SD Detects	0.441
Median Detects	0.0555	CV Detects	2.121
Skewness Detects	2.821	Kurtosis Detects	7.967
Mean of Logged Detects	-2.605	SD of Logged Detects	1.217

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.455	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.492	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.126	KM Standard Error of Mean	0.0932
KM SD	0.326	95% KM (BCA) UCL	0.311
95% KM (t) UCL	0.291	95% KM (Percentile Bootstrap) UCL	0.306
95% KM (z) UCL	0.279	95% KM Bootstrap t UCL	1.849
90% KM Chebyshev UCL	0.406	95% KM Chebyshev UCL	0.532
97.5% KM Chebyshev UCL	0.708	99% KM Chebyshev UCL	1.054

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.713	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.456	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.307	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.597	k star (bias corrected MLE)	0.457
Theta hat (MLE)	0.349	Theta star (bias corrected MLE)	0.456
nu hat (MLE)	9.555	nu star (bias corrected)	7.305
Mean (detects)	0.208		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.123
Maximum	1.3	Median	0.03
SD	0.34	CV	2.756
k hat (MLE)	0.469	k star (bias corrected MLE)	0.416
Theta hat (MLE)	0.263	Theta star (bias corrected MLE)	0.296
nu hat (MLE)	13.13	nu star (bias corrected)	11.65
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (11.65, α)	4.996	Adjusted Chi Square Value (11.65, β)	4.432
95% Gamma Approximate UCL (use when n>=50)	0.287	95% Gamma Adjusted UCL (use when n<50)	0.324

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.126	SD (KM)	0.326
Variance (KM)	0.106	SE of Mean (KM)	0.0932
k hat (KM)	0.149	k star (KM)	0.165
nu hat (KM)	4.178	nu star (KM)	4.616
theta hat (KM)	0.845	theta star (KM)	0.764
80% gamma percentile (KM)	0.147	90% gamma percentile (KM)	0.378
95% gamma percentile (KM)	0.68	99% gamma percentile (KM)	1.542

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.62, α)	0.979	Adjusted Chi Square Value (4.62, β)	0.78
95% Gamma Approximate KM-UCL (use when n>=50)	0.594	95% Gamma Adjusted KM-UCL (use when n<50)	0.746

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.708	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.362	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.122	Mean in Log Scale	-3.624
SD in Original Scale	0.34	SD in Log Scale	1.537
95% t UCL (assumes normality of ROS data)	0.283	95% Percentile Bootstrap UCL	0.302
95% BCA Bootstrap UCL	0.393	95% Bootstrap t UCL	1.563
95% H-UCL (Log ROS)	0.432		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.268	KM Geo Mean	0.0381
KM SD (logged)	1.17	95% Critical H Value (KM-Log)	3.083
KM Standard Error of Mean (logged)	0.35	95% H-UCL (KM -Log)	0.206
KM SD (logged)	1.17	95% Critical H Value (KM-Log)	3.083
KM Standard Error of Mean (logged)	0.35		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.125	Mean in Log Scale	-3.367
SD in Original Scale	0.339	SD in Log Scale	1.298
95% t UCL (Assumes normality)	0.285	95% H-Stat UCL	0.264

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.532

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32SSArsenic

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	16.7	Mean	28.9
Maximum	44.6	Median	24
SD	11.21	Std. Error of Mean	5.011
Coefficient of Variation	0.388	Skewness	0.625

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	39.58	95% Adjusted-CLT UCL (Chen-1995)	38.64
		95% Modified-t UCL (Johnson-1978)	39.82

Gamma GOF Test

A-D Test Statistic	0.286	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.259	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.487	k star (bias corrected MLE)	3.528
Theta hat (MLE)	3.405	Theta star (bias corrected MLE)	8.191
nu hat (MLE)	84.87	nu star (bias corrected)	35.28

MLE Mean (bias corrected)	28.9	MLE Sd (bias corrected)	15.39
		Approximate Chi Square Value (0.05)	22.69
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	18.41

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	44.94	95% Adjusted Gamma UCL (use when n<50)	55.39

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.815	Mean of logged Data	3.304
Maximum of Logged Data	3.798	SD of logged Data	0.388

Assuming Lognormal Distribution

95% H-UCL	48.76	90% Chebyshev (MVUE) UCL	43.84
95% Chebyshev (MVUE) UCL	50.62	97.5% Chebyshev (MVUE) UCL	60.02
99% Chebyshev (MVUE) UCL	78.49		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	37.14	95% Jackknife UCL	39.58
95% Standard Bootstrap UCL	36.29	95% Bootstrap-t UCL	52.96
95% Hall's Bootstrap UCL	137.3	95% Percentile Bootstrap UCL	36.88
95% BCA Bootstrap UCL	37.3		
90% Chebyshev(Mean, Sd) UCL	43.93	95% Chebyshev(Mean, Sd) UCL	50.74
97.5% Chebyshev(Mean, Sd) UCL	60.19	99% Chebyshev(Mean, Sd) UCL	78.76

Suggested UCL to Use

95% Student's-t UCL	39.58

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32TSArsenic

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	2.42	Mean	18.62
Maximum	44.6	Median	16.7
SD	14.87	Std. Error of Mean	4.957
Coefficient of Variation	0.798	Skewness	0.581

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	27.84	95% Adjusted-CLT UCL (Chen-1995)	27.8
		95% Modified-t UCL (Johnson-1978)	28

Gamma GOF Test

A-D Test Statistic	0.369	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.737	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.196	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.285	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.343	k star (bias corrected MLE)	0.969
Theta hat (MLE)	13.87	Theta star (bias corrected MLE)	19.21
nu hat (MLE)	24.17	nu star (bias corrected)	17.45
MLE Mean (bias corrected)	18.62	MLE Sd (bias corrected)	18.92
		Approximate Chi Square Value (0.05)	8.992
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	7.746

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	36.14	95% Adjusted Gamma UCL (use when n<50)	41.95

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.884	Mean of logged Data	2.508
Maximum of Logged Data	3.798	SD of logged Data	1.085

Assuming Lognormal Distribution

95% H-UCL	82.62	90% Chebyshev (MVUE) UCL	43.01
95% Chebyshev (MVUE) UCL	53.33	97.5% Chebyshev (MVUE) UCL	67.66
99% Chebyshev (MVUE) UCL	95.79		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	26.78	95% Jackknife UCL	27.84
95% Standard Bootstrap UCL	26.24	95% Bootstrap-t UCL	29.94
95% Hall's Bootstrap UCL	29.83	95% Percentile Bootstrap UCL	26.92
95% BCA Bootstrap UCL	26.8		
90% Chebyshev(Mean, Sd) UCL	33.49	95% Chebyshev(Mean, Sd) UCL	40.23
97.5% Chebyshev(Mean, Sd) UCL	49.58	99% Chebyshev(Mean, Sd) UCL	67.94

Suggested UCL to Use

95% Student's-t UCL	27.84

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32SSBaA

General Statistics

Total Number of Observations	22	Number of Distinct Observations	21
		Number of Missing Observations	0
Minimum	0.11	Mean	47.82

Maximum	1000	Median	0.83
SD	212.7	Std. Error of Mean	45.36
Coefficient of Variation	4.448	Skewness	4.686

Normal GOF Test

Shapiro Wilk Test Statistic	0.232	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.497	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	125.9	95% Adjusted-CLT UCL (Chen-1995)	170.8
		95% Modified-t UCL (Johnson-1978)	133.4

Gamma GOF Test

A-D Test Statistic	5.036	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.892	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.451	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.206	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.209	k star (bias corrected MLE)	0.211
Theta hat (MLE)	229.1	Theta star (bias corrected MLE)	227.1
nu hat (MLE)	9.184	nu star (bias corrected)	9.265
MLE Mean (bias corrected)	47.82	MLE Sd (bias corrected)	104.2
		Approximate Chi Square Value (0.05)	3.488
Adjusted Level of Significance	0.0386	Adjusted Chi Square Value	3.227

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	127	95% Adjusted Gamma UCL (use when n<50)	137.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.801	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.222	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.184	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.207	Mean of logged Data	0.365
Maximum of Logged Data	6.908	SD of logged Data	1.874

Assuming Lognormal Distribution

95% H-UCL	42.33	90% Chebyshev (MVUE) UCL	17.37
95% Chebyshev (MVUE) UCL	22.1	97.5% Chebyshev (MVUE) UCL	28.65
99% Chebyshev (MVUE) UCL	41.53		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	122.4	95% Jackknife UCL	125.9
95% Standard Bootstrap UCL	123.3	95% Bootstrap-t UCL	8964
95% Hall's Bootstrap UCL	2988	95% Percentile Bootstrap UCL	138.5
95% BCA Bootstrap UCL	184.8		
90% Chebyshev(Mean, Sd) UCL	183.9	95% Chebyshev(Mean, Sd) UCL	245.5
97.5% Chebyshev(Mean, Sd) UCL	331.1	99% Chebyshev(Mean, Sd) UCL	499.1

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	245.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32TSBaA

General Statistics

Total Number of Observations	33	Number of Distinct Observations	32
Number of Detects	31	Number of Non-Detects	2
Number of Distinct Detects	30	Number of Distinct Non-Detects	2
Minimum Detect	0.0028	Minimum Non-Detect	0.0015
Maximum Detect	1000	Maximum Non-Detect	0.0019
Variance Detects	32133	Percent Non-Detects	6.061%
Mean Detects	34.56	SD Detects	179.3
Median Detects	0.62	CV Detects	5.187
Skewness Detects	5.56	Kurtosis Detects	30.94
Mean of Logged Detects	-0.652	SD of Logged Detects	2.717

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.198	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.489	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	32.46	KM Standard Error of Mean	30.28
KM SD	171.1	95% KM (BCA) UCL	92.98
95% KM (t) UCL	83.75	95% KM (Percentile Bootstrap) UCL	92.81
95% KM (z) UCL	82.27	95% KM Bootstrap t UCL	1768
90% KM Chebyshev UCL	123.3	95% KM Chebyshev UCL	164.4
97.5% KM Chebyshev UCL	221.6	99% KM Chebyshev UCL	333.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.611	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.925	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.373	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.176	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.179	k star (bias corrected MLE)	0.183
Theta hat (MLE)	193.5	Theta star (bias corrected MLE)	189.1
nu hat (MLE)	11.07	nu star (bias corrected)	11.33
Mean (detects)	34.56		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0028	Mean	32.46
Maximum	1000	Median	0.59
SD	173.8	CV	5.353
k hat (MLE)	0.172	k star (bias corrected MLE)	0.177
Theta hat (MLE)	188.5	Theta star (bias corrected MLE)	183.6
nu hat (MLE)	11.37	nu star (bias corrected)	11.67
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (11.67, α)	5.01	Adjusted Chi Square Value (11.67, β)	4.786
95% Gamma Approximate UCL (use when n>=50)	75.61	95% Gamma Adjusted UCL (use when n<50)	79.15

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	32.46	SD (KM)	171.1
Variance (KM)	29280	SE of Mean (KM)	30.28

k hat (KM)	0.036	k star (KM)	0.0529
nu hat (KM)	2.375	nu star (KM)	3.493
theta hat (KM)	902	theta star (KM)	613.4
80% gamma percentile (KM)	5.344	90% gamma percentile (KM)	53.2
95% gamma percentile (KM)	176	99% gamma percentile (KM)	690.2

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.49, α)	0.532	Adjusted Chi Square Value (3.49, β)	0.48
95% Gamma Approximate KM-UCL (use when n>=50)	213	95% Gamma Adjusted KM-UCL (use when n<50)	236.2

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.929	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.156	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	32.46	Mean in Log Scale	-1.029
SD in Original Scale	173.8	SD in Log Scale	3.032
95% t UCL (assumes normality of ROS data)	83.7	95% Percentile Bootstrap UCL	92.85
95% BCA Bootstrap UCL	153.2	95% Bootstrap t UCL	1747
95% H-UCL (Log ROS)	676.4		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.006	KM Geo Mean	0.366
KM SD (logged)	2.943	95% Critical H Value (KM-Log)	5.355
KM Standard Error of Mean (logged)	0.521	95% H-UCL (KM -Log)	449.8
KM SD (logged)	2.943	95% Critical H Value (KM-Log)	5.355
KM Standard Error of Mean (logged)	0.521		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	32.46	Mean in Log Scale	-1.041
SD in Original Scale	173.8	SD in Log Scale	3.057
95% t UCL (Assumes normality)	83.7	95% H-Stat UCL	754.8

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL 221.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32SSBaP

General Statistics

Total Number of Observations	22	Number of Distinct Observations	21
		Number of Missing Observations	0
Minimum	0.12	Mean	34.87
Maximum	720	Median	0.82
SD	153.1	Std. Error of Mean	32.64
Coefficient of Variation	4.39	Skewness	4.684

Normal GOF Test

Shapiro Wilk Test Statistic	0.234	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.491	**Lilliefors GOF Test**

5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	91.04	95% Adjusted-CLT UCL (Chen-1995)	123.4
		95% Modified-t UCL (Johnson-1978)	96.47

Gamma GOF Test

A-D Test Statistic	4.87	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.885	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.433	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.205	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.223	k star (bias corrected MLE)	0.223
Theta hat (MLE)	156.1	Theta star (bias corrected MLE)	156.2
nu hat (MLE)	9.828	nu star (bias corrected)	9.821
MLE Mean (bias corrected)	34.87	MLE Sd (bias corrected)	73.81
		Approximate Chi Square Value (0.05)	3.83
Adjusted Level of Significance	0.0386	Adjusted Chi Square Value	3.555

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	89.42	95% Adjusted Gamma UCL (use when n<50)	96.35

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.203	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.184	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.12	Mean of logged Data	0.314
Maximum of Logged Data	6.579	SD of logged Data	1.809

Assuming Lognormal Distribution

95% H-UCL	32.27	90% Chebyshev (MVUE) UCL	14.56
95% Chebyshev (MVUE) UCL	18.46	97.5% Chebyshev (MVUE) UCL	23.87
99% Chebyshev (MVUE) UCL	34.5		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	88.56	95% Jackknife UCL	91.04
95% Standard Bootstrap UCL	88.22	95% Bootstrap-t UCL	4657
95% Hall's Bootstrap UCL	1592	95% Percentile Bootstrap UCL	100
95% BCA Bootstrap UCL	132.9		
90% Chebyshev(Mean, Sd) UCL	132.8	95% Chebyshev(Mean, Sd) UCL	177.1
97.5% Chebyshev(Mean, Sd) UCL	238.7	99% Chebyshev(Mean, Sd) UCL	359.6

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 177.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32TSBaP

General Statistics

Total Number of Observations	33	Number of Distinct Observations	30

Number of Detects	32	Number of Non-Detects	1
Number of Distinct Detects	29	Number of Distinct Non-Detects	1
Minimum Detect	0.0018	Minimum Non-Detect	0.0015
Maximum Detect	720	Maximum Non-Detect	0.0015
Variance Detects	16128	Percent Non-Detects	3.03%
Mean Detects	24.45	SD Detects	127
Median Detects	0.63	CV Detects	5.195
Skewness Detects	5.647	Kurtosis Detects	31.92
Mean of Logged Detects	-0.856	SD of Logged Detects	2.766

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.197	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.93	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.48	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.154	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	23.7	KM Standard Error of Mean	21.78
KM SD	123.2	95% KM (BCA) UCL	66.82
95% KM (t) UCL	60.6	95% KM (Percentile Bootstrap) UCL	67.13
95% KM (z) UCL	59.53	95% KM Bootstrap t UCL	1149
90% KM Chebyshev UCL	89.05	95% KM Chebyshev UCL	118.7
97.5% KM Chebyshev UCL	159.7	99% KM Chebyshev UCL	240.4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.297	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.921	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.345	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.173	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.184	k star (bias corrected MLE)	0.188
Theta hat (MLE)	132.9	Theta star (bias corrected MLE)	130.3
nu hat (MLE)	11.77	nu star (bias corrected)	12
Mean (detects)	24.45		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0018	Mean	23.71
Maximum	720	Median	0.61
SD	125.1	CV	5.276
k hat (MLE)	0.181	k star (bias corrected MLE)	0.185
Theta hat (MLE)	131.1	Theta star (bias corrected MLE)	128.5
nu hat (MLE)	11.93	nu star (bias corrected)	12.18
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (12.18, α)	5.345	Adjusted Chi Square Value (12.18, β)	5.112
95% Gamma Approximate UCL (use when n>=50)	54.01	95% Gamma Adjusted UCL (use when n<50)	56.47

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	23.7	SD (KM)	123.2
Variance (KM)	15168	SE of Mean (KM)	21.78
k hat (KM)	0.037	k star (KM)	0.0539
nu hat (KM)	2.445	nu star (KM)	3.556
theta hat (KM)	639.9	theta star (KM)	440
80% gamma percentile (KM)	4.137	90% gamma percentile (KM)	39.69
95% gamma percentile (KM)	129.2	99% gamma percentile (KM)	500.3

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.56, α)	0.555	Adjusted Chi Square Value (3.56, β)	0.501

95% Gamma Approximate KM-UCL (use when n>=50)	152	95% Gamma Adjusted KM-UCL (use when n<50)	168.4

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.154	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	23.7	Mean in Log Scale	-1.063
SD in Original Scale	125.1	SD in Log Scale	2.97
95% t UCL (assumes normality of ROS data)	60.58	95% Percentile Bootstrap UCL	66.88
95% BCA Bootstrap UCL	89.26	95% Bootstrap t UCL	1162
95% H-UCL (Log ROS)	484.1		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.027	KM Geo Mean	0.358
KM SD (logged)	2.85	95% Critical H Value (KM-Log)	5.204
KM Standard Error of Mean (logged)	0.504	95% H-UCL (KM -Log)	285.9
KM SD (logged)	2.85	95% Critical H Value (KM-Log)	5.204
KM Standard Error of Mean (logged)	0.504		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	23.7	Mean in Log Scale	-1.048
SD in Original Scale	125.1	SD in Log Scale	2.937
95% t UCL (Assumes normality)	60.58	95% H-Stat UCL	420.8

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL 159.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32SSBbF

General Statistics

Total Number of Observations	22	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	0.18	Mean	62.49
Maximum	1300	Median	1.3
SD	276.5	Std. Error of Mean	58.94
Coefficient of Variation	4.424	Skewness	4.686

Normal GOF Test

Shapiro Wilk Test Statistic	0.233	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.5	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	163.9	95% Adjusted-CLT UCL (Chen-1995)	222.4
		95% Modified-t UCL (Johnson-1978)	173.7

Gamma GOF Test

A-D Test Statistic	4.86	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.888	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.426	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.205	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.217	k star (bias corrected MLE)	0.218
Theta hat (MLE)	287.4	Theta star (bias corrected MLE)	286.5
nu hat (MLE)	9.569	nu star (bias corrected)	9.598
MLE Mean (bias corrected)	62.49	MLE Sd (bias corrected)	133.8
		Approximate Chi Square Value (0.05)	3.692
Adjusted Level of Significance	0.0386	Adjusted Chi Square Value	3.422

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	162.5	95% Adjusted Gamma UCL (use when n<50)	175.3

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.911	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.18	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.184	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.715	Mean of logged Data	0.796
Maximum of Logged Data	7.17	SD of logged Data	1.842

Assuming Lognormal Distribution

95% H-UCL	58.29	90% Chebyshev (MVUE) UCL	25.1
95% Chebyshev (MVUE) UCL	31.87	97.5% Chebyshev (MVUE) UCL	41.27
99% Chebyshev (MVUE) UCL	59.74		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	159.4	95% Jackknife UCL	163.9
95% Standard Bootstrap UCL	155	95% Bootstrap-t UCL	9058
95% Hall's Bootstrap UCL	3443	95% Percentile Bootstrap UCL	180
95% BCA Bootstrap UCL	297.7		
90% Chebyshev(Mean, Sd) UCL	239.3	95% Chebyshev(Mean, Sd) UCL	319.4
97.5% Chebyshev(Mean, Sd) UCL	430.6	99% Chebyshev(Mean, Sd) UCL	649

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	319.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32TSBbF

General Statistics

Total Number of Observations	33	Number of Distinct Observations	31
Number of Detects	32	Number of Non-Detects	1
Number of Distinct Detects	30	Number of Distinct Non-Detects	1
Minimum Detect	0.0033	Minimum Non-Detect	0.0015
Maximum Detect	1300	Maximum Non-Detect	0.0015
Variance Detects	52593	Percent Non-Detects	3.03%
Mean Detects	43.79	SD Detects	229.3
Median Detects	0.95	CV Detects	5.237
Skewness Detects	5.649	Kurtosis Detects	31.94

Mean of Logged Detects	-0.379	SD of Logged Detects	2.785

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.196	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.491	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.154	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	42.47	KM Standard Error of Mean	39.33
KM SD	222.4	95% KM (BCA) UCL	121.1
95% KM (t) UCL	109.1	95% KM (Percentile Bootstrap) UCL	120.4
95% KM (z) UCL	107.2	95% KM Bootstrap t UCL	2103
90% KM Chebyshev UCL	160.5	95% KM Chebyshev UCL	213.9
97.5% KM Chebyshev UCL	288.1	99% KM Chebyshev UCL	433.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.363	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.924	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.34	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.174	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.18	k star (bias corrected MLE)	0.184
Theta hat (MLE)	243.4	Theta star (bias corrected MLE)	238.2
nu hat (MLE)	11.51	nu star (bias corrected)	11.77
Mean (detects)	43.79		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0033	Mean	42.47
Maximum	1300	Median	0.9
SD	225.8	CV	5.318
k hat (MLE)	0.176	k star (bias corrected MLE)	0.18
Theta hat (MLE)	240.9	Theta star (bias corrected MLE)	235.3
nu hat (MLE)	11.64	nu star (bias corrected)	11.91
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (11.91, α)	5.169	Adjusted Chi Square Value (11.91, β)	4.941
95% Gamma Approximate UCL (use when n>=50)	97.86	95% Gamma Adjusted UCL (use when n<50)	102.4

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	42.47	SD (KM)	222.4
Variance (KM)	49462	SE of Mean (KM)	39.33
k hat (KM)	0.0365	k star (KM)	0.0533
nu hat (KM)	2.407	nu star (KM)	3.521
theta hat (KM)	1165	theta star (KM)	796
80% gamma percentile (KM)	7.178	90% gamma percentile (KM)	70.27
95% gamma percentile (KM)	230.8	99% gamma percentile (KM)	900

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.52, α)	0.542	Adjusted Chi Square Value (3.52, β)	0.489
95% Gamma Approximate KM-UCL (use when n>=50)	275.8	95% Gamma Adjusted KM-UCL (use when n<50)	305.7

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.93	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.154	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	42.47	Mean in Log Scale	-0.587
SD in Original Scale	225.8	SD in Log Scale	2.991
95% t UCL (assumes normality of ROS data)	109.1	95% Percentile Bootstrap UCL	120.7
95% BCA Bootstrap UCL	198.5	95% Bootstrap t UCL	2132
95% H-UCL (Log ROS)	863.5		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.564	KM Geo Mean	0.569
KM SD (logged)	2.896	95% Critical H Value (KM-Log)	5.279
KM Standard Error of Mean (logged)	0.512	95% H-UCL (KM -Log)	561.7
KM SD (logged)	2.896	95% Critical H Value (KM-Log)	5.279
KM Standard Error of Mean (logged)	0.512		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	42.47	Mean in Log Scale	-0.585
SD in Original Scale	225.8	SD in Log Scale	2.987
95% t UCL (Assumes normality)	109.1	95% H-Stat UCL	845.8

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL 288.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32SSDibenz

General Statistics

Total Number of Observations	22	Number of Distinct Observations	19
		Number of Missing Observations	0
Minimum	0.025	Mean	7.205
Maximum	150	Median	0.17
SD	31.9	Std. Error of Mean	6.801
Coefficient of Variation	4.427	Skewness	4.687

Normal GOF Test

Shapiro Wilk Test Statistic	0.232	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.503	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.184	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	18.91	95% Adjusted-CLT UCL (Chen-1995)	25.65
		95% Modified-t UCL (Johnson-1978)	20.04

Gamma GOF Test

A-D Test Statistic	4.997	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.887	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.407	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.205	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.219	k star (bias corrected MLE)	0.22
Theta hat (MLE)	32.85	Theta star (bias corrected MLE)	32.8
nu hat (MLE)	9.65	nu star (bias corrected)	9.667
MLE Mean (bias corrected)	7.205	MLE Sd (bias corrected)	15.37
		Approximate Chi Square Value (0.05)	3.735
Adjusted Level of Significance	0.0386	Adjusted Chi Square Value	3.463

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	18.65	95% Adjusted Gamma UCL (use when n<50)	20.11

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.911	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.184	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.689	Mean of logged Data	-1.333
Maximum of Logged Data	5.011	SD of logged Data	1.8

Assuming Lognormal Distribution

95% H-UCL	6.037	90% Chebyshev (MVUE) UCL	2.759
95% Chebyshev (MVUE) UCL	3.496	97.5% Chebyshev (MVUE) UCL	4.519
99% Chebyshev (MVUE) UCL	6.528		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	18.39	95% Jackknife UCL	18.91
95% Standard Bootstrap UCL	18.28	95% Bootstrap-t UCL	900.7
95% Hall's Bootstrap UCL	456.6	95% Percentile Bootstrap UCL	20.77
95% BCA Bootstrap UCL	27.77		
90% Chebyshev(Mean, Sd) UCL	27.61	95% Chebyshev(Mean, Sd) UCL	36.85
97.5% Chebyshev(Mean, Sd) UCL	49.68	99% Chebyshev(Mean, Sd) UCL	74.88

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	36.85

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC32TSDibenz

General Statistics

Total Number of Observations	33	Number of Distinct Observations	27
Number of Detects	29	Number of Non-Detects	4
Number of Distinct Detects	26	Number of Distinct Non-Detects	2
Minimum Detect	0.0019	Minimum Non-Detect	0.0015
Maximum Detect	150	Maximum Non-Detect	0.0019
Variance Detects	772.2	Percent Non-Detects	12.12%
Mean Detects	5.58	SD Detects	27.79
Median Detects	0.13	CV Detects	4.98
Skewness Detects	5.378	Kurtosis Detects	28.95
Mean of Logged Detects	-1.935	SD of Logged Detects	2.255

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.206	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.926	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.498	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.161	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.904	KM Standard Error of Mean	4.546
KM SD	25.66	95% KM (BCA) UCL	13.93
95% KM (t) UCL	12.6	95% KM (Percentile Bootstrap) UCL	13.9
95% KM (z) UCL	12.38	95% KM Bootstrap t UCL	230.9
90% KM Chebyshev UCL	18.54	95% KM Chebyshev UCL	24.72
97.5% KM Chebyshev UCL	33.29	99% KM Chebyshev UCL	50.14

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.856	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.902	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.357	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.18	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.201	k star (bias corrected MLE)	0.203
Theta hat (MLE)	27.73	Theta star (bias corrected MLE)	27.44
nu hat (MLE)	11.67	nu star (bias corrected)	11.8
Mean (detects)	5.58		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0019	Mean	4.905
Maximum	150	Median	0.13
SD	26.06	CV	5.313
k hat (MLE)	0.192	k star (bias corrected MLE)	0.195
Theta hat (MLE)	25.5	Theta star (bias corrected MLE)	25.14
nu hat (MLE)	12.7	nu star (bias corrected)	12.87
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (12.87, α)	5.809	Adjusted Chi Square Value (12.87, β)	5.565
95% Gamma Approximate UCL (use when n>=50)	10.87	95% Gamma Adjusted UCL (use when n<50)	11.35

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.904	SD (KM)	25.66
Variance (KM)	658.5	SE of Mean (KM)	4.546
k hat (KM)	0.0365	k star (KM)	0.0534
nu hat (KM)	2.41	nu star (KM)	3.525
theta hat (KM)	134.3	theta star (KM)	91.83
80% gamma percentile (KM)	0.832	90% gamma percentile (KM)	8.124
95% gamma percentile (KM)	26.66	99% gamma percentile (KM)	103.9

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.52, α)	0.543	Adjusted Chi Square Value (3.52, β)	0.49
95% Gamma Approximate KM-UCL (use when n>=50)	31.81	95% Gamma Adjusted KM-UCL (use when n<50)	35.25

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.926	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.13	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.161	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.904	Mean in Log Scale	-2.541
SD in Original Scale	26.06	SD in Log Scale	2.69
95% t UCL (assumes normality of ROS data)	12.59	95% Percentile Bootstrap UCL	13.96
95% BCA Bootstrap UCL	18.62	95% Bootstrap t UCL	231.4
95% H-UCL (Log ROS)	30.74		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.489	KM Geo Mean	0.083
KM SD (logged)	2.556	95% Critical H Value (KM-Log)	4.728
KM Standard Error of Mean (logged)	0.453	95% H-UCL (KM -Log)	18.47
KM SD (logged)	2.556	95% Critical H Value (KM-Log)	4.728
KM Standard Error of Mean (logged)	0.453		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.904	Mean in Log Scale	-2.551
SD in Original Scale	26.06	SD in Log Scale	2.7
95% t UCL (Assumes normality)	12.59	95% H-Stat UCL	31.8

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	33.29

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC36SSArsenic

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.88	Mean	5.511
Maximum	8.1	Median	5.8
SD	2.546	Std. Error of Mean	0.962
Coefficient of Variation	0.462	Skewness	-1.021

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	7.381	95% Adjusted-CLT UCL (Chen-1995)	6.697
		95% Modified-t UCL (Johnson-1978)	7.319

Gamma GOF Test

A-D Test Statistic	0.645	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.712	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.966	k star (bias corrected MLE)	1.79
Theta hat (MLE)	1.858	Theta star (bias corrected MLE)	3.079
nu hat (MLE)	41.52	nu star (bias corrected)	25.06

MLE Mean (bias corrected)	5.511	MLE Sd (bias corrected)	4.119
		Approximate Chi Square Value (0.05)	14.66
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	12.32

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	9.423	95% Adjusted Gamma UCL (use when n<50)	11.21

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.746	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.128	Mean of logged Data	1.529
Maximum of Logged Data	2.092	SD of logged Data	0.777

Assuming Lognormal Distribution

95% H-UCL	16.65	90% Chebyshev (MVUE) UCL	11.19
95% Chebyshev (MVUE) UCL	13.57	97.5% Chebyshev (MVUE) UCL	16.87
99% Chebyshev (MVUE) UCL	23.37		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	7.094	95% Jackknife UCL	7.381
95% Standard Bootstrap UCL	6.984	95% Bootstrap-t UCL	7.176
95% Hall's Bootstrap UCL	6.77	95% Percentile Bootstrap UCL	7
95% BCA Bootstrap UCL	6.657		
90% Chebyshev(Mean, Sd) UCL	8.398	95% Chebyshev(Mean, Sd) UCL	9.706
97.5% Chebyshev(Mean, Sd) UCL	11.52	99% Chebyshev(Mean, Sd) UCL	15.09

Suggested UCL to Use

95% Student's-t UCL	7.381

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

EC36TSArsenic

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	0.66	Mean	4.235
Maximum	8.1	Median	4.2
SD	2.749	Std. Error of Mean	0.735
Coefficient of Variation	0.649	Skewness	-0.00584

Normal GOF Test

Shapiro Wilk Test Statistic	0.901	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL	**95% UCLs (Adjusted for Skewness)**

95% Student's-t UCL	5.536	95% Adjusted-CLT UCL (Chen-1995)	5.442
		95% Modified-t UCL (Johnson-1978)	5.536

Gamma GOF Test

A-D Test Statistic	0.754	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.191	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.232	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.748	k star (bias corrected MLE)	1.421
Theta hat (MLE)	2.423	Theta star (bias corrected MLE)	2.98
nu hat (MLE)	48.95	nu star (bias corrected)	39.79
MLE Mean (bias corrected)	4.235	MLE Sd (bias corrected)	3.553
		Approximate Chi Square Value (0.05)	26.34
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	24.89

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6.398	95% Adjusted Gamma UCL (use when n<50)	6.769

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.416	Mean of logged Data	1.131
Maximum of Logged Data	2.092	SD of logged Data	0.931

Assuming Lognormal Distribution

95% H-UCL	9.551	90% Chebyshev (MVUE) UCL	8.279
95% Chebyshev (MVUE) UCL	9.951	97.5% Chebyshev (MVUE) UCL	12.27
99% Chebyshev (MVUE) UCL	16.83		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	5.443	95% Jackknife UCL	5.536
95% Standard Bootstrap UCL	5.406	95% Bootstrap-t UCL	5.538
95% Hall's Bootstrap UCL	5.458	95% Percentile Bootstrap UCL	5.45
95% BCA Bootstrap UCL	5.449		
90% Chebyshev(Mean, Sd) UCL	6.439	95% Chebyshev(Mean, Sd) UCL	7.437
97.5% Chebyshev(Mean, Sd) UCL	8.823	99% Chebyshev(Mean, Sd) UCL	11.54

Suggested UCL to Use

95% Student's-t UCL	5.536

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

EC36SSChromium

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0

Minimum	3.9	Mean	14.44
Maximum	21.1	Median	16.2
SD	5.471	Std. Error of Mean	2.068
Coefficient of Variation	0.379	Skewness	-1.199

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	18.46	95% Adjusted-CLT UCL (Chen-1995)	16.84
		95% Modified-t UCL (Johnson-1978)	18.3

Gamma GOF Test

A-D Test Statistic	0.679	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.049	k star (bias corrected MLE)	2.981
Theta hat (MLE)	2.86	Theta star (bias corrected MLE)	4.846
nu hat (MLE)	70.69	nu star (bias corrected)	41.73
MLE Mean (bias corrected)	14.44	MLE Sd (bias corrected)	8.366
		Approximate Chi Square Value (0.05)	27.92
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	24.56

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	21.58	95% Adjusted Gamma UCL (use when n<50)	24.54

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.754	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.803	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.304	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.361	Mean of logged Data	2.568
Maximum of Logged Data	3.049	SD of logged Data	0.562

Assuming Lognormal Distribution

95% H-UCL	27.64	90% Chebyshev (MVUE) UCL	24.43
95% Chebyshev (MVUE) UCL	28.75	97.5% Chebyshev (MVUE) UCL	34.74
99% Chebyshev (MVUE) UCL	46.52		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	17.84	95% Jackknife UCL	18.46
95% Standard Bootstrap UCL	17.63	95% Bootstrap-t UCL	17.52
95% Hall's Bootstrap UCL	17.17	95% Percentile Bootstrap UCL	17.4
95% BCA Bootstrap UCL	16.96		
90% Chebyshev(Mean, Sd) UCL	20.65	95% Chebyshev(Mean, Sd) UCL	23.46

97.5% Chebyshev(Mean, Sd) UCL	27.36	99% Chebyshev(Mean, Sd) UCL	35.02

Suggested UCL to Use

95% Student's-t UCL 18.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

EC36TSChromium

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
		Number of Missing Observations	0
Minimum	3.3	Mean	12.51
Maximum	21.1	Median	12.85
SD	5.733	Std. Error of Mean	1.532
Coefficient of Variation	0.458	Skewness	-0.157

Normal GOF Test

Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.168	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.23	95% Adjusted-CLT UCL (Chen-1995)	14.97
		95% Modified-t UCL (Johnson-1978)	15.22

Gamma GOF Test

A-D Test Statistic	0.452	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.23	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.976	k star (bias corrected MLE)	3.172
Theta hat (MLE)	3.148	Theta star (bias corrected MLE)	3.946
nu hat (MLE)	111.3	nu star (bias corrected)	88.8
MLE Mean (bias corrected)	12.51	MLE Sd (bias corrected)	7.027
		Approximate Chi Square Value (0.05)	68.08
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	65.67

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	16.32	95% Adjusted Gamma UCL (use when n<50)	16.92

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.89	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.874	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.226	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.194	Mean of logged Data	2.396
Maximum of Logged Data	3.049	SD of logged Data	0.58

Assuming Lognormal Distribution

95% H-UCL	18.36	90% Chebyshev (MVUE) UCL	18.99
95% Chebyshev (MVUE) UCL	21.78	97.5% Chebyshev (MVUE) UCL	25.67
99% Chebyshev (MVUE) UCL	33.29		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	15.03	95% Jackknife UCL	15.23
95% Standard Bootstrap UCL	14.87	95% Bootstrap-t UCL	15.06
95% Hall's Bootstrap UCL	14.86	95% Percentile Bootstrap UCL	14.82
95% BCA Bootstrap UCL	14.73		
90% Chebyshev(Mean, Sd) UCL	17.11	95% Chebyshev(Mean, Sd) UCL	19.19
97.5% Chebyshev(Mean, Sd) UCL	22.08	99% Chebyshev(Mean, Sd) UCL	27.76

Suggested UCL to Use

95% Student's-t UCL	15.23

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

EC36SSLead

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	3.5	Mean	301
Maximum	1150	Median	150
SD	354.1	Std. Error of Mean	112
Coefficient of Variation	1.176	Skewness	1.803

Normal GOF Test

Shapiro Wilk Test Statistic	0.789	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Normal at 5% Significance Level	

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	506.3	95% Adjusted-CLT UCL (Chen-1995)	553.4
		95% Modified-t UCL (Johnson-1978)	516.9

Gamma GOF Test

A-D Test Statistic	0.199	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.137	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.276	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.759	k star (bias corrected MLE)	0.598
Theta hat (MLE)	396.5	Theta star (bias corrected MLE)	503.3
nu hat (MLE)	15.18	nu star (bias corrected)	11.96
MLE Mean (bias corrected)	301	MLE Sd (bias corrected)	389.2
		Approximate Chi Square Value (0.05)	5.202
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	4.453

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	692.2	95% Adjusted Gamma UCL (use when n<50)	808.7

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.192	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.262	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.253	Mean of logged Data	4.92
Maximum of Logged Data	7.048	SD of logged Data	1.625

Assuming Lognormal Distribution

95% H-UCL	5877	90% Chebyshev (MVUE) UCL	1063
95% Chebyshev (MVUE) UCL	1361	97.5% Chebyshev (MVUE) UCL	1774
99% Chebyshev (MVUE) UCL	2586		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	485.2	95% Jackknife UCL	506.3
95% Standard Bootstrap UCL	476.7	95% Bootstrap-t UCL	747.5
95% Hall's Bootstrap UCL	1326	95% Percentile Bootstrap UCL	494.6
95% BCA Bootstrap UCL	555.9		
90% Chebyshev(Mean, Sd) UCL	636.9	95% Chebyshev(Mean, Sd) UCL	789.1
97.5% Chebyshev(Mean, Sd) UCL	1000	99% Chebyshev(Mean, Sd) UCL	1415

Suggested UCL to Use

95% Student's-t UCL 506.3

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC36TSLead

General Statistics

Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	0.79	Mean	217.2
Maximum	1150	Median	81.2
SD	311	Std. Error of Mean	69.54
Coefficient of Variation	1.432	Skewness	1.937

Normal GOF Test

Shapiro Wilk Test Statistic	0.73	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	337.4	95% Adjusted-CLT UCL (Chen-1995)	363.7
		95% Modified-t UCL (Johnson-1978)	342.4

Gamma GOF Test

A-D Test Statistic	0.299	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.817	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.144	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.207	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.43	k star (bias corrected MLE)	0.399
Theta hat (MLE)	505.3	Theta star (bias corrected MLE)	544.8
nu hat (MLE)	17.19	nu star (bias corrected)	15.95
MLE Mean (bias corrected)	217.2	MLE Sd (bias corrected)	344
		Approximate Chi Square Value (0.05)	7.924
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	7.479

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	437	95% Adjusted Gamma UCL (use when n<50)	463

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.236	Mean of logged Data	3.867
Maximum of Logged Data	7.048	SD of logged Data	2.281

Assuming Lognormal Distribution

95% H-UCL	8007	90% Chebyshev (MVUE) UCL	1299
95% Chebyshev (MVUE) UCL	1684	97.5% Chebyshev (MVUE) UCL	2218
99% Chebyshev (MVUE) UCL	3267		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	331.6	95% Jackknife UCL	337.4
95% Standard Bootstrap UCL	332.7	95% Bootstrap-t UCL	408.4
95% Hall's Bootstrap UCL	408.1	95% Percentile Bootstrap UCL	339
95% BCA Bootstrap UCL	363.1		
90% Chebyshev(Mean, Sd) UCL	425.8	95% Chebyshev(Mean, Sd) UCL	520.3
97.5% Chebyshev(Mean, Sd) UCL	651.5	99% Chebyshev(Mean, Sd) UCL	909.1

Suggested UCL to Use

95% Adjusted Gamma UCL	463

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC36TSDioxin

General Statistics

Total Number of Observations	44	Number of Distinct Observations	44
		Number of Missing Observations	0
Minimum	9.9200E-8	Mean	1.0467E-5
Maximum	2.3062E-4	Median	4.6044E-6
SD	3.4311E-5	Std. Error of Mean	5.1726E-6
Coefficient of Variation	N/A	Skewness	6.427

Normal GOF Test

Shapiro Wilk Test Statistic	0.257	**Shapiro Wilk GOF Test**	

5% Shapiro Wilk Critical Value	0.944	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.399	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.132	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.9162E-5	95% Adjusted-CLT UCL (Chen-1995)	2.4330E-5
		95% Modified-t UCL (Johnson-1978)	1.9997E-5

Gamma GOF Test

A-D Test Statistic	2.298	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.809	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.195	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.141	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.544	k star (bias corrected MLE)	0.522
Theta hat (MLE)	1.9250E-5	Theta star (bias corrected MLE)	2.0059E-5
nu hat (MLE)	47.85	nu star (bias corrected)	45.92
MLE Mean (bias corrected)	1.0467E-5	MLE Sd (bias corrected)	1.4490E-5
		Approximate Chi Square Value (0.05)	31.37
Adjusted Level of Significance	0.0445	Adjusted Chi Square Value	30.96

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1.5320E-5	95% Adjusted Gamma UCL (use when n<50)	1.5522E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.944	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.104	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.132	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-16.13	Mean of logged Data	-12.62
Maximum of Logged Data	-8.375	SD of logged Data	1.441

Assuming Lognormal Distribution

95% H-UCL	1.7659E-5	90% Chebyshev (MVUE) UCL	1.6452E-5
95% Chebyshev (MVUE) UCL	1.9865E-5	97.5% Chebyshev (MVUE) UCL	2.4602E-5
99% Chebyshev (MVUE) UCL	3.3907E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.8975E-5	95% Jackknife UCL	1.9162E-5
95% Standard Bootstrap UCL	1.8542E-5	95% Bootstrap-t UCL	5.9638E-5
95% Hall's Bootstrap UCL	5.3396E-5	95% Percentile Bootstrap UCL	2.0548E-5
95% BCA Bootstrap UCL	2.6292E-5		
90% Chebyshev(Mean, Sd) UCL	2.5984E-5	95% Chebyshev(Mean, Sd) UCL	3.3013E-5
97.5% Chebyshev(Mean, Sd) UCL	4.2769E-5	99% Chebyshev(Mean, Sd) UCL	6.1933E-5

Suggested UCL to Use

95% H-UCL 1.7659E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ProUCL computes and outputs H-statistic based UCLs for historical reasons only.

H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.

It is therefore recommended to avoid the use of H-statistic based 95% UCLs.

Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.

EC57BSSManganese

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	485	Mean	7831
Maximum	59900	Median	1445
SD	17296	Std. Error of Mean	4993
Coefficient of Variation	2.209	Skewness	2.96

Normal GOF Test

Shapiro Wilk Test Statistic	0.478	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.455	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	16798	95% Adjusted-CLT UCL (Chen-1995)	20602
		95% Modified-t UCL (Johnson-1978)	17509

Gamma GOF Test

A-D Test Statistic	1.915	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.787	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.402	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.491	k star (bias corrected MLE)	0.424
Theta hat (MLE)	15959	Theta star (bias corrected MLE)	18488
nu hat (MLE)	11.78	nu star (bias corrected)	10.17
MLE Mean (bias corrected)	7831	MLE Sd (bias corrected)	12032
		Approximate Chi Square Value (0.05)	4.046
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	3.477

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	19678	95% Adjusted Gamma UCL (use when n<50)	22899

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.29	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.243	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	6.184	Mean of logged Data	7.668
Maximum of Logged Data	11	SD of logged Data	1.408

Assuming Lognormal Distribution

95% H-UCL	27731	90% Chebyshev (MVUE) UCL	11704
95% Chebyshev (MVUE) UCL	14733	97.5% Chebyshev (MVUE) UCL	18936
99% Chebyshev (MVUE) UCL	27194		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	16044	95% Jackknife UCL	16798

95% Standard Bootstrap UCL	15708	95% Bootstrap-t UCL	192190
95% Hall's Bootstrap UCL	78311	95% Percentile Bootstrap UCL	16209
95% BCA Bootstrap UCL	20934		
90% Chebyshev(Mean, Sd) UCL	22810	95% Chebyshev(Mean, Sd) UCL	29594
97.5% Chebyshev(Mean, Sd) UCL	39011	99% Chebyshev(Mean, Sd) UCL	57509

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 29594

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BTSManganese

General Statistics

Total Number of Observations	24	Number of Distinct Observations	24
		Number of Missing Observations	0
Minimum	21.9	Mean	4041
Maximum	59900	Median	583.5
SD	12574	Std. Error of Mean	2567
Coefficient of Variation	3.112	Skewness	4.242

Normal GOF Test

Shapiro Wilk Test Statistic	0.34	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.466	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.177	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8440	95% Adjusted-CLT UCL (Chen-1995)	10637
		95% Modified-t UCL (Johnson-1978)	8810

Gamma GOF Test

A-D Test Statistic	2.204	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.844	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.288	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.192	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.334	k star (bias corrected MLE)	0.32
Theta hat (MLE)	12087	Theta star (bias corrected MLE)	12616
nu hat (MLE)	16.05	nu star (bias corrected)	15.37
MLE Mean (bias corrected)	4041	MLE Sd (bias corrected)	7140
		Approximate Chi Square Value (0.05)	7.523
Adjusted Level of Significance	0.0392	Adjusted Chi Square Value	7.138

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8258	95% Adjusted Gamma UCL (use when n<50)	8704

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.916	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.129	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.177	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.086	Mean of logged Data	6.278
Maximum of Logged Data	11	SD of logged Data	1.93

Assuming Lognormal Distribution

95% H-UCL	16940	90% Chebyshev (MVUE) UCL	7143
95% Chebyshev (MVUE) UCL	9090	97.5% Chebyshev (MVUE) UCL	11793
99% Chebyshev (MVUE) UCL	17102		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8262	95% Jackknife UCL	8440
95% Standard Bootstrap UCL	8209	95% Bootstrap-t UCL	65133
95% Hall's Bootstrap UCL	29426	95% Percentile Bootstrap UCL	8979
95% BCA Bootstrap UCL	11458		
90% Chebyshev(Mean, Sd) UCL	11741	95% Chebyshev(Mean, Sd) UCL	15228
97.5% Chebyshev(Mean, Sd) UCL	20069	99% Chebyshev(Mean, Sd) UCL	29578

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 15228

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BSSDioxin

General Statistics

Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	2.0807E-6	Mean	8.1769E-6
Maximum	2.7344E-5	Median	6.4633E-6
SD	6.4635E-6	Std. Error of Mean	1.4453E-6
Coefficient of Variation	N/A	Skewness	1.908

Normal GOF Test

Shapiro Wilk Test Statistic	0.789	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.192	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.0676E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1213E-5
		95% Modified-t UCL (Johnson-1978)	1.0779E-5

Gamma GOF Test

A-D Test Statistic	0.417	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.751	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.146	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.196	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.24	k star (bias corrected MLE)	1.938
Theta hat (MLE)	3.6500E-6	Theta star (bias corrected MLE)	4.2202E-6
nu hat (MLE)	89.61	nu star (bias corrected)	77.5
MLE Mean (bias corrected)	8.1769E-6	MLE Sd (bias corrected)	5.8744E-6
		Approximate Chi Square Value (0.05)	58.22
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	56.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.0885E-5	95% Adjusted Gamma UCL (use when n<50)	1.1137E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.106	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.192	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-13.08	Mean of logged Data	-11.95
Maximum of Logged Data	-10.51	SD of logged Data	0.697

Assuming Lognormal Distribution

95% H-UCL	1.1721E-5	90% Chebyshev (MVUE) UCL	1.2115E-5
95% Chebyshev (MVUE) UCL	1.3941E-5	97.5% Chebyshev (MVUE) UCL	1.6474E-5
99% Chebyshev (MVUE) UCL	2.1452E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.0554E-5	95% Jackknife UCL	1.0676E-5
95% Standard Bootstrap UCL	1.0533E-5	95% Bootstrap-t UCL	1.2132E-5
95% Hall's Bootstrap UCL	2.2588E-5	95% Percentile Bootstrap UCL	1.0631E-5
95% BCA Bootstrap UCL	1.1385E-5		
90% Chebyshev(Mean, Sd) UCL	1.2513E-5	95% Chebyshev(Mean, Sd) UCL	1.4477E-5
97.5% Chebyshev(Mean, Sd) UCL	1.7203E-5	99% Chebyshev(Mean, Sd) UCL	2.2557E-5

Suggested UCL to Use

95% Adjusted Gamma UCL 1.1137E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BTSDioxin

General Statistics

Total Number of Observations	39	Number of Distinct Observations	39
		Number of Missing Observations	0
Minimum	1.5870E-8	Mean	6.9033E-6
Maximum	7.4757E-5	Median	3.1916E-6
SD	1.2527E-5	Std. Error of Mean	2.0060E-6
Coefficient of Variation	N/A	Skewness	4.53

Normal GOF Test

Shapiro Wilk Test Statistic	0.497	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.939	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.14	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.0285E-5	95% Adjusted-CLT UCL (Chen-1995)	1.1758E-5
		95% Modified-t UCL (Johnson-1978)	1.0528E-5

Gamma GOF Test

A-D Test Statistic	0.678	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.803	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.128	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.148	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.601	k star (bias corrected MLE)	0.572
Theta hat (MLE)	1.1491E-5	Theta star (bias corrected MLE)	1.2076E-5
nu hat (MLE)	46.86	nu star (bias corrected)	44.59
MLE Mean (bias corrected)	6.9033E-6	MLE Sd (bias corrected)	9.1304E-6
		Approximate Chi Square Value (0.05)	30.27
Adjusted Level of Significance	0.0437	Adjusted Chi Square Value	29.81

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1.0168E-5	95% Adjusted Gamma UCL (use when n<50)	1.0327E-5

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.939	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.182	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.14	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-17.96	Mean of logged Data	-12.91
Maximum of Logged Data	-9.501	SD of logged Data	1.791

Assuming Lognormal Distribution

95% H-UCL	3.3465E-5	90% Chebyshev (MVUE) UCL	2.4239E-5
95% Chebyshev (MVUE) UCL	3.0171E-5	97.5% Chebyshev (MVUE) UCL	3.8405E-5
99% Chebyshev (MVUE) UCL	5.4580E-5		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.0203E-5	95% Jackknife UCL	1.0285E-5
95% Standard Bootstrap UCL	1.0096E-5	95% Bootstrap-t UCL	1.4736E-5
95% Hall's Bootstrap UCL	2.2934E-5	95% Percentile Bootstrap UCL	1.0526E-5
95% BCA Bootstrap UCL	1.2632E-5		
90% Chebyshev(Mean, Sd) UCL	1.2921E-5	95% Chebyshev(Mean, Sd) UCL	1.5647E-5
97.5% Chebyshev(Mean, Sd) UCL	1.9431E-5	99% Chebyshev(Mean, Sd) UCL	2.6863E-5

Suggested UCL to Use

95% Adjusted Gamma UCL	1.0327E-5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BTSBaA

General Statistics

Total Number of Observations	46	Number of Distinct Observations	44
Number of Detects	45	Number of Non-Detects	1
Number of Distinct Detects	43	Number of Distinct Non-Detects	1
Minimum Detect	0.0043	Minimum Non-Detect	0.019
Maximum Detect	35	Maximum Non-Detect	0.019
Variance Detects	45.26	Percent Non-Detects	2.174%
Mean Detects	2.752	SD Detects	6.728
Median Detects	0.45	CV Detects	2.445
Skewness Detects	3.894	Kurtosis Detects	15.77
Mean of Logged Detects	-0.984	SD of Logged Detects	2.312

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.448	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.945	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.344	**Lilliefors GOF Test**	

5% Lilliefors Critical Value	0.131	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.692	KM Standard Error of Mean	0.983
KM SD	6.592	95% KM (BCA) UCL	4.462
95% KM (t) UCL	4.343	95% KM (Percentile Bootstrap) UCL	4.417
95% KM (z) UCL	4.309	95% KM Bootstrap t UCL	7.079
90% KM Chebyshev UCL	5.641	95% KM Chebyshev UCL	6.977
97.5% KM Chebyshev UCL	8.831	99% KM Chebyshev UCL	12.47

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.285	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.853	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.148	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.142	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.339	k star (bias corrected MLE)	0.331
Theta hat (MLE)	8.126	Theta star (bias corrected MLE)	8.316
nu hat (MLE)	30.48	nu star (bias corrected)	29.78
Mean (detects)	2.752		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0043	Mean	2.692
Maximum	35	Median	0.43
SD	6.665	CV	2.475
k hat (MLE)	0.331	k star (bias corrected MLE)	0.324
Theta hat (MLE)	8.144	Theta star (bias corrected MLE)	8.322
nu hat (MLE)	30.42	nu star (bias corrected)	29.77
Adjusted Level of Significance (β)	0.0448		
Approximate Chi Square Value (29.77, α)	18.31	Adjusted Chi Square Value (29.77, β)	18.02
95% Gamma Approximate UCL (use when n>=50)	4.377	95% Gamma Adjusted UCL (use when n<50)	4.448

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.692	SD (KM)	6.592
Variance (KM)	43.45	SE of Mean (KM)	0.983
k hat (KM)	0.167	k star (KM)	0.17
nu hat (KM)	15.35	nu star (KM)	15.68
theta hat (KM)	16.14	theta star (KM)	15.8
80% gamma percentile (KM)	3.224	90% gamma percentile (KM)	8.092
95% gamma percentile (KM)	14.42	99% gamma percentile (KM)	32.35

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.68, α)	7.736	Adjusted Chi Square Value (15.68, β)	7.555
95% Gamma Approximate KM-UCL (use when n>=50)	5.457	95% Gamma Adjusted KM-UCL (use when n<50)	5.587

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.945	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0735	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.131	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.692	Mean in Log Scale	-1.058
SD in Original Scale	6.665	SD in Log Scale	2.34
95% t UCL (assumes normality of ROS data)	4.343	95% Percentile Bootstrap UCL	4.395
95% BCA Bootstrap UCL	5.005	95% Bootstrap t UCL	7.06

95% H-UCL (Log ROS)	22.14

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.068	KM Geo Mean	0.344
KM SD (logged)	2.332	95% Critical H Value (KM-Log)	4.048
KM Standard Error of Mean (logged)	0.348	95% H-UCL (KM -Log)	21.27
KM SD (logged)	2.332	95% Critical H Value (KM-Log)	4.048
KM Standard Error of Mean (logged)	0.348		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.692	Mean in Log Scale	-1.064
SD in Original Scale	6.665	SD in Log Scale	2.349
95% t UCL (Assumes normality)	4.343	95% H-Stat UCL	22.68

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	8.831

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BSSBaP

General Statistics

Total Number of Observations	17	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.069	Mean	1.915
Maximum	9.57	Median	0.749
SD	2.864	Std. Error of Mean	0.695
Coefficient of Variation	1.495	Skewness	1.989

Normal GOF Test

Shapiro Wilk Test Statistic	0.648	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.363	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.207	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3.128	95% Adjusted-CLT UCL (Chen-1995)	3.416
		95% Modified-t UCL (Johnson-1978)	3.184

Gamma GOF Test

A-D Test Statistic	0.848	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.783	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.239	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.218	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.676	k star (bias corrected MLE)	0.596
Theta hat (MLE)	2.835	Theta star (bias corrected MLE)	3.216
nu hat (MLE)	22.97	nu star (bias corrected)	20.25
MLE Mean (bias corrected)	1.915	MLE Sd (bias corrected)	2.482
		Approximate Chi Square Value (0.05)	11.03
Adjusted Level of Significance	0.0346	Adjusted Chi Square Value	10.33

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.514	95% Adjusted Gamma UCL (use when n<50)	3.756

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.892	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.207	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.674	Mean of logged Data	-0.249
Maximum of Logged Data	2.259	SD of logged Data	1.385

Assuming Lognormal Distribution

95% H-UCL	6.354	90% Chebyshev (MVUE) UCL	3.996
95% Chebyshev (MVUE) UCL	4.969	97.5% Chebyshev (MVUE) UCL	6.321
99% Chebyshev (MVUE) UCL	8.975		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.058	95% Jackknife UCL	3.128
95% Standard Bootstrap UCL	2.997	95% Bootstrap-t UCL	4.238
95% Hall's Bootstrap UCL	3.139	95% Percentile Bootstrap UCL	3.062
95% BCA Bootstrap UCL	3.554		
90% Chebyshev(Mean, Sd) UCL	3.999	95% Chebyshev(Mean, Sd) UCL	4.943
97.5% Chebyshev(Mean, Sd) UCL	6.253	99% Chebyshev(Mean, Sd) UCL	8.826

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	4.943

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BTSBaP

General Statistics

Total Number of Observations	46	Number of Distinct Observations	42
Number of Detects	45	Number of Non-Detects	1
Number of Distinct Detects	41	Number of Distinct Non-Detects	1
Minimum Detect	0.0042	Minimum Non-Detect	0.019
Maximum Detect	27	Maximum Non-Detect	0.019
Variance Detects	27.96	Percent Non-Detects	2.174%
Mean Detects	2.329	SD Detects	5.288
Median Detects	0.47	CV Detects	2.271
Skewness Detects	3.692	Kurtosis Detects	14.26
Mean of Logged Detects	-1.055	SD of Logged Detects	2.302

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.48	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.945	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.131	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.278	KM Standard Error of Mean	0.773
KM SD	5.183	95% KM (BCA) UCL	3.708
95% KM (t) UCL	3.576	95% KM (Percentile Bootstrap) UCL	3.712
95% KM (z) UCL	3.549	95% KM Bootstrap t UCL	5.34
90% KM Chebyshev UCL	4.596	95% KM Chebyshev UCL	5.647

97.5% KM Chebyshev UCL	7.104	99% KM Chebyshev UCL	9.967

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.959	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.849	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.142	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.353	k star (bias corrected MLE)	0.345
Theta hat (MLE)	6.59	Theta star (bias corrected MLE)	6.758
nu hat (MLE)	31.8	nu star (bias corrected)	31.01
Mean (detects)	2.329		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0042	Mean	2.278
Maximum	27	Median	0.43
SD	5.24	CV	2.3
k hat (MLE)	0.345	k star (bias corrected MLE)	0.337
Theta hat (MLE)	6.609	Theta star (bias corrected MLE)	6.766
nu hat (MLE)	31.71	nu star (bias corrected)	30.98
Adjusted Level of Significance (β)	0.0448		
Approximate Chi Square Value (30.98, α)	19.26	Adjusted Chi Square Value (30.98, β)	18.96
95% Gamma Approximate UCL (use when n>=50)	3.664	95% Gamma Adjusted UCL (use when n<50)	3.722

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.278	SD (KM)	5.183
Variance (KM)	26.86	SE of Mean (KM)	0.773
k hat (KM)	0.193	k star (KM)	0.195
nu hat (KM)	17.78	nu star (KM)	17.95
theta hat (KM)	11.79	theta star (KM)	11.68
80% gamma percentile (KM)	2.963	90% gamma percentile (KM)	6.889
95% gamma percentile (KM)	11.81	99% gamma percentile (KM)	25.43

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (17.95, α)	9.356	Adjusted Chi Square Value (17.95, β)	9.154
95% Gamma Approximate KM-UCL (use when n>=50)	4.371	95% Gamma Adjusted KM-UCL (use when n<50)	4.468

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.945	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0835	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.131	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.278	Mean in Log Scale	-1.129
SD in Original Scale	5.24	SD in Log Scale	2.33
95% t UCL (assumes normality of ROS data)	3.576	95% Percentile Bootstrap UCL	3.59
95% BCA Bootstrap UCL	4.201	95% Bootstrap t UCL	5.444
95% H-UCL (Log ROS)	19.91		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.138	KM Geo Mean	0.321
KM SD (logged)	2.32	95% Critical H Value (KM-Log)	4.03
KM Standard Error of Mean (logged)	0.346	95% H-UCL (KM -Log)	19.03
KM SD (logged)	2.32	95% Critical H Value (KM-Log)	4.03
KM Standard Error of Mean (logged)	0.346		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.278	Mean in Log Scale	-1.133
SD in Original Scale	5.24	SD in Log Scale	2.337
95% t UCL (Assumes normality)	3.576	95% H-Stat UCL	20.3

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.468

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BTSBbF

General Statistics

Total Number of Observations	46	Number of Distinct Observations	42
Number of Detects	45	Number of Non-Detects	1
Number of Distinct Detects	41	Number of Distinct Non-Detects	1
Minimum Detect	0.0079	Minimum Non-Detect	0.019
Maximum Detect	38	Maximum Non-Detect	0.019
Variance Detects	55.97	Percent Non-Detects	2.174%
Mean Detects	3.525	SD Detects	7.482
Median Detects	0.78	CV Detects	2.122
Skewness Detects	3.465	Kurtosis Detects	12.82
Mean of Logged Detects	-0.53	SD of Logged Detects	2.209

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.516	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.945	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.131	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.449	KM Standard Error of Mean	1.094
KM SD	7.335	95% KM (BCA) UCL	5.598
95% KM (t) UCL	5.286	95% KM (Percentile Bootstrap) UCL	5.269
95% KM (z) UCL	5.248	95% KM Bootstrap t UCL	7.369
90% KM Chebyshev UCL	6.73	95% KM Chebyshev UCL	8.216
97.5% KM Chebyshev UCL	10.28	99% KM Chebyshev UCL	14.33

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.924	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.844	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.134	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.142	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.372	k star (bias corrected MLE)	0.362
Theta hat (MLE)	9.477	Theta star (bias corrected MLE)	9.738
nu hat (MLE)	33.48	nu star (bias corrected)	32.58
Mean (detects)	3.525		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0079	Mean	3.449
Maximum	38	Median	0.71
SD	7.416	CV	2.15
k hat (MLE)	0.36	k star (bias corrected MLE)	0.351
Theta hat (MLE)	9.568	Theta star (bias corrected MLE)	9.813
nu hat (MLE)	33.16	nu star (bias corrected)	32.34
Adjusted Level of Significance (β)	0.0448		
Approximate Chi Square Value (32.34, α)	20.34	Adjusted Chi Square Value (32.34, β)	20.03
95% Gamma Approximate UCL (use when n>=50)	5.484	95% Gamma Adjusted UCL (use when n<50)	5.568

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	3.449	SD (KM)	7.335
Variance (KM)	53.8	SE of Mean (KM)	1.094
k hat (KM)	0.221	k star (KM)	0.221
nu hat (KM)	20.34	nu star (KM)	20.35
theta hat (KM)	15.6	theta star (KM)	15.59
80% gamma percentile (KM)	4.771	90% gamma percentile (KM)	10.42
95% gamma percentile (KM)	17.3	99% gamma percentile (KM)	35.93

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.35, α)	11.11	Adjusted Chi Square Value (20.35, β)	10.89
95% Gamma Approximate KM-UCL (use when n>=50)	6.318	95% Gamma Adjusted KM-UCL (use when n<50)	6.447

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.945	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.0845	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.131	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.449	Mean in Log Scale	-0.614
SD in Original Scale	7.416	SD in Log Scale	2.258
95% t UCL (assumes normality of ROS data)	5.285	95% Percentile Bootstrap UCL	5.251
95% BCA Bootstrap UCL	6.063	95% Bootstrap t UCL	7.537
95% H-UCL (Log ROS)	26.11		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.616	KM Geo Mean	0.54
KM SD (logged)	2.238	95% Critical H Value (KM-Log)	3.914
KM Standard Error of Mean (logged)	0.334	95% H-UCL (KM -Log)	24.37
KM SD (logged)	2.238	95% Critical H Value (KM-Log)	3.914
KM Standard Error of Mean (logged)	0.334		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.449	Mean in Log Scale	-0.619
SD in Original Scale	7.416	SD in Log Scale	2.268
95% t UCL (Assumes normality)	5.285	95% H-Stat UCL	26.83

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

a Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	6.447

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EC57BTSDibenz

General Statistics

Total Number of Observations	46	Number of Distinct Observations	41
Number of Detects	42	Number of Non-Detects	4
Number of Distinct Detects	39	Number of Distinct Non-Detects	3
Minimum Detect	0.0014	Minimum Non-Detect	0.0018
Maximum Detect	4.7	Maximum Non-Detect	0.019
Variance Detects	0.783	Percent Non-Detects	8.696%
Mean Detects	0.412	SD Detects	0.885
Median Detects	0.109	CV Detects	2.148
Skewness Detects	3.58	Kurtosis Detects	14.24
Mean of Logged Detects	-2.489	SD of Logged Detects	1.993

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.501	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.942	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.324	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.135	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.376	KM Standard Error of Mean	0.126
KM SD	0.843	95% KM (BCA) UCL	0.617
95% KM (t) UCL	0.587	95% KM (Percentile Bootstrap) UCL	0.603
95% KM (z) UCL	0.583	95% KM Bootstrap t UCL	0.801
90% KM Chebyshev UCL	0.754	95% KM Chebyshev UCL	0.925
97.5% KM Chebyshev UCL	1.162	99% KM Chebyshev UCL	1.628

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.168	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.834	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.169	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.146	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.409	k star (bias corrected MLE)	0.396
Theta hat (MLE)	1.006	Theta star (bias corrected MLE)	1.04
nu hat (MLE)	34.38	nu star (bias corrected)	33.26
Mean (detects)	0.412		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0014	Mean	0.377
Maximum	4.7	Median	0.0768
SD	0.852	CV	2.261
k hat (MLE)	0.389	k star (bias corrected MLE)	0.379
Theta hat (MLE)	0.968	Theta star (bias corrected MLE)	0.996
nu hat (MLE)	35.83	nu star (bias corrected)	34.82
Adjusted Level of Significance (β)	0.0448		
Approximate Chi Square Value (34.82, α)	22.32	Adjusted Chi Square Value (34.82, β)	22
95% Gamma Approximate UCL (use when n>=50)	0.588	95% Gamma Adjusted UCL (use when n<50)	0.597

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.376	SD (KM)	0.843
Variance (KM)	0.711	SE of Mean (KM)	0.126

k hat (KM)	0.199	k star (KM)	0.201
nu hat (KM)	18.32	nu star (KM)	18.46
theta hat (KM)	1.889	theta star (KM)	1.875
80% gamma percentile (KM)	0.497	90% gamma percentile (KM)	1.138
95% gamma percentile (KM)	1.937	99% gamma percentile (KM)	4.136

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (18.46, α)	9.721	Adjusted Chi Square Value (18.46, β)	9.515
95% Gamma Approximate KM-UCL (use when n>=50)	0.714	95% Gamma Adjusted KM-UCL (use when n<50)	0.73

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.937	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.942	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0749	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.135	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.376	Mean in Log Scale	-2.827
SD in Original Scale	0.852	SD in Log Scale	2.211
95% t UCL (assumes normality of ROS data)	0.587	95% Percentile Bootstrap UCL	0.585
95% BCA Bootstrap UCL	0.67	95% Bootstrap t UCL	0.776
95% H-UCL (Log ROS)	2.449		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.821	KM Geo Mean	0.0596
KM SD (logged)	2.176	95% Critical H Value (KM-Log)	3.827
KM Standard Error of Mean (logged)	0.325	95% H-UCL (KM -Log)	2.197
KM SD (logged)	2.176	95% Critical H Value (KM-Log)	3.827
KM Standard Error of Mean (logged)	0.325		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.376	Mean in Log Scale	-2.829
SD in Original Scale	0.852	SD in Log Scale	2.225
95% t UCL (Assumes normality)	0.587	95% H-Stat UCL	2.553

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.925

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.



Photograph 01
RTK GPS setup on old building foundation near EC-49.



Photograph 02
Debris removed from Instrument Verification Strip surface sweep.
(see also IVS memorandum in Appendix K)



Photograph 03
EM61-MK2A integrated with RTK GPS in Instrument Verification Strip
(see also IVS memorandum in Appendix K)



Photograph 04
Panorama of propellant grain dump area, facing northeast, EC-21.



Photograph 05
Close up of propellant grains, EC-21. Pen is approximately 5.5 inches long.



Photograph 06
Burn barrel in center of barricade 645, EC-21 (removed prior to fieldwork).



Photograph 07
Interior of barricade 645 with standing water, EC-21.



Photograph 08
EM61-MK2A in "stretcher mode" inside of barricade 645 in EC-21. Note concrete walls.



Photograph 09
Collecting soil sample with hand auger, EC-21.



Photograph 10
Collecting soil samples, propellant grain dump in EC-21.



Photograph 11
37/38mm CS/CN Rockets found during surface sweep, EC-21.



Photograph 12
CS Grenade fragments found during surface sweep, EC-21.



Photograph 13
Direct push technology, east end of barricade 645, EC-21.



Photograph 14
Interior of barricade 646-XK, facing west, EC-22.



Photograph 15
RTS setup in EC-22.



Photograph 16
Panorama of sandy area of EC-25, facing northeast at center.



Photograph 17
Powder burning tower, EC-25.



Photograph 18
Abundant munitions debris on ground surface, EC-25.



Photograph 19
Abundant munitions debris on ground surface, near trench 8, EC-25.



Photograph 20
EM61-MK2A integrated with RTK GPS, northern EC-25.



Photograph 21
After vegetation clearance between fence (left) and shoreline (right) in EC-25.



Photograph 22
IRP Shop Area.



Photograph 23
IRP Shop Area.



Photograph 24
Direct push technology in use at EC-34.



Photograph 25
Foundation of oil shed, EC-35.



Photograph 26
180° Panorama of EC-49, facing west at center.



Photograph 27
Raising the fallen fence, EC-49.



Photograph 28
Part of EC-52 after brush removal, facing northwest.



Photograph 29
Soil sampling in propellant grain dump area, EC-52.



Photograph 30
EM31 integrated with RTK GPS in EC-57C.



Photograph 31
EM31 integrated with RTK GPS in EC-58B.



Photograph 32
Cutting transects into *Phragmites*, EC-58B.



Photograph 33
Direct push technology, western EC-58B.



Photograph 34
Door to the dome-shaped bunker, barricade 644-XI, EC-58C.



Photograph 35
Interior of dome-shaped bunker, barricade 644-XI, EC-58C.



Photograph 36
Interior of barricade 644-XI, facing south from center of EC-58C.



Photograph 37
Robotic Total Station (RTS) in EC-58C.



Photograph 38
Mini-excavator.



Photograph 39
Discarded Military Munitions encountered during soil sampling at EC-57D.



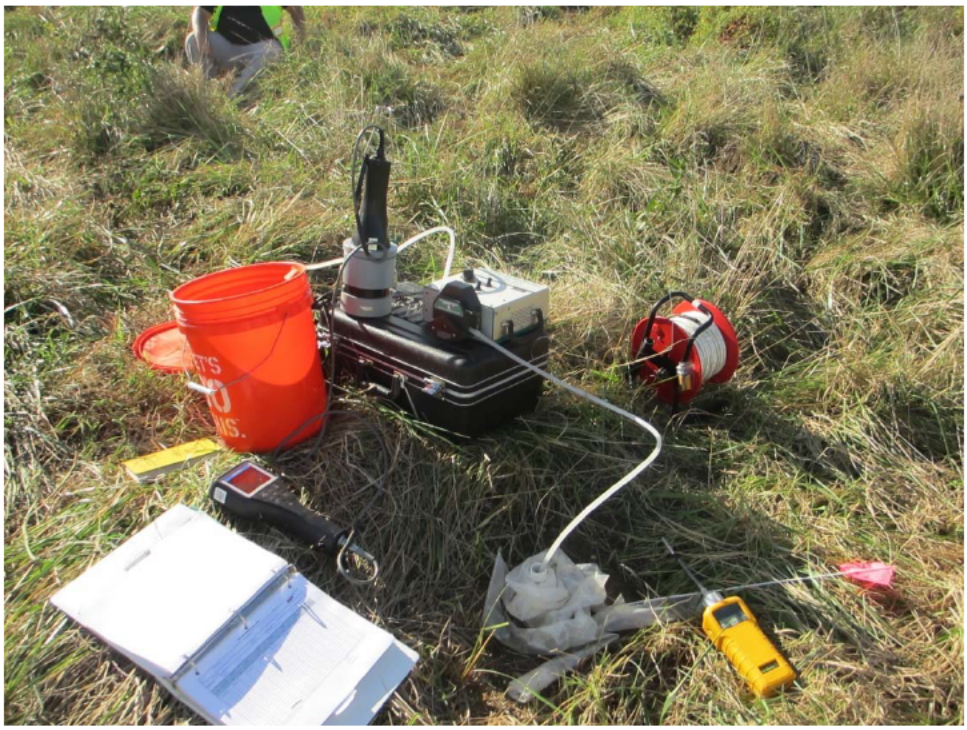
Photograph 40
Hand auguring to collect soil sample at EC-21-10.



Photograph 41
Measuring depth of augur hole prior to collection of subsurface soil sample at EC-57D-09.



Photograph 42
Using pry bar to dig beneath gravel layer at EC-58B-06.



Photograph 43
Measuring groundwater parameters prior to collecting sample at EC-58B.



Photograph 44
Collecting groundwater sample from background well.



Photograph 45
Gravel encountered while soil sampling surrounding the IRP Shop area.

Curtis Bay MRSPP Summary

EC	EHE Rating	CHE Rating	HHE Rating	Overall Rating
EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-22: Barricade 646-XK/Former Explosive Open Burning Area	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-52: Disturbed Areas as the end of the G-Line Road	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-57B: Building 1022 - Brass and Steel Area	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-57C: Building J-408	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-57D: Brass and Steel Stockpile Area	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-58B: Explosive Open Burning/Wire Cage	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard
EC-58C: Explosive Open Burning/Wire Cage	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected Hazard

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit)

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-21 is located on the western portion of the Depot, on the north side of Back Creek Road, and consists of a historical landfill/open dump and Barricade 645 shell burning pit where controlled dumping and burning activities reportedly occurred. According to historical documents, dumping activities were surficial only; no burial or cover was applied to the open dump area. Additionally, no trenching or landfill operations were visible in the historical photographs. Waste materials disposed of in this location included pallets, appliances, dunnage, and scrap. Unwanted materials awaiting disposal or recycling were stored on the surface of the open dump area. Wire cage burning operations at Barricade 645 reportedly consisted of open burning on concrete pads within barricades covered in wire mesh. Little documented information is available pertaining to the cage burning operations; however, train cars containing smokeless powder were moved into the barricades and were reportedly ignited within the barricades in the post-Korean war timeframe for munitions handling and disposal. EC-21 also contains a visible propellant grain dumping area on the ground surface in the southern portion of the EC. A known MC release is associated with the dumping and burning operations and with the propellant grain dump (Section 1.7.1, ERT, 2013). During the RI field investigations, 166 CS grenade bodies and 9 37-38mm CS/CN riot control projectiles were found on the surface. Cartridge cases, bullets and flash tubs were found in one of the trenches within EC-21; all items were classified as MD (Section 18.3.2, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

During the RI field investigations, 166 CS grenade bodies and 9 37-38mm CS/CN riot control projectiles were found on the surface. Cartridge cases, bullets and flash tubs were found in one of the trenches within EC-21; all items were classified as MD (Section 18.3.2, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-21 is located on the western portion of the Depot, on the north side of Back Creek Road, and consists of a historical landfill/open dump and Barricade 645 shell burning pit where controlled dumping and burning activities reportedly occurred (Section 18.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

Historical investigation activities found the presence of MD consisting of small arms projectiles, cartridge cases and cartridge case flash tubes (Section 18.1, ERT, 2016). During the RI investigation, only MD was found at this MRS; no MEC or MPPEH were found (Section 18.3.2, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, as this EC is next to Back Creek there is no fence line along this portion of the Depot and it could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-21.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-21.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-21 and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	(L)
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☒

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
Antimony	80	3.1	25.8
Lead	3230	400	8.08
Manganese	61600	3300	18.7
Benz(a)anthracene	36	62	0.581
Benzo(a)pyrene	33	6.2	5.32
CHF Scale	**CHF Value**	**Sum the Ratios**	**77.3**
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		**M**

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**M**

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 6.0, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio
Soil	Dibenzo(a,h)pyrene	6.6	0.38	17.4
Soil	Indeno(1,2,3-cd)pyrene	30	62	0.484
Soil	2,3,7,8-TCDD	3.9E-04	3.82E-05	9.79E-02
Soil	2,4-Dinitrotoluene		120	0.165
	benzo(b)fluoranthene	50	62	0.806

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)	-	-	-		-		-
Surface Water/Human Endpoint (Table 22)	-	-	-		-		-
Sediment/Human Endpoint (Table 23)	-	-	-		-		-
Surface Water/Ecological Endpoint (Table 24)	-	-	-		-		-
Sediment/Ecological Endpoint (Table 25)	-	-	-		-		-
Surface Soil (Table 26)	-	-	-		-		-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-22: Barricade 646-XK/Former Explosive Open Burning Area

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:
The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-22 is located on the western portion of the Depot, on the north side of Back Creek Road. This EC consists of Barricade 646-XK, a former explosives open burning area where controlled burning occurred, as well as alleged dumping activities. Wire cage burning operations at Barricade 646 were conducted beneath wire enclosures where smokeless powder trains were ignited within built up barricades covered with a wire mesh material. The west end of the barricade appeared to have been used as a dumping area, possibly for dirt and concrete debris (Section 19.2, ERT, 2016). No MEC or MD was found during the RI (Section 19.3.2, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

During the RI field investigations, no anomalies associated with MEC or MD were found at this EC (Section 19.3.2, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. This EC consists of Barricade 646-XK, a former explosives open burning area where controlled burning occurred, as well as alleged dumping activities. Wire cage burning operations at Barricade 646 were conducted beneath wire enclosures where smokeless powder trains were ignited within built up barricades covered with a wire mesh material (Section 19.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the RI, no MEC or MD were found at this EC (Section 19.3.2, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, as this EC is next to Back Creek there is no fence line along this portion of the Depot and it could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-22.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-22.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-22 and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface soil results were reported about the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	(L)
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☒

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
No surface soil results were reported about the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the sampling, there has been no release of MC at this EC; therefore, no MC Hazard exists at this EC (Section 19.4.2, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)	-	-	-		-		-
Surface Water/Human Endpoint (Table 22)	-	-	-		-		-
Sediment/Human Endpoint (Table 23)	-	-	-		-		-
Surface Water/Ecological Endpoint (Table 24)	-	-	-		-		-
Sediment/Ecological Endpoint (Table 25)	-	-	-		-		-
Surface Soil (Table 26)	-	-	-		-		-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-52: Disturbed Areas at the end of G-Line Road

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:
The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-52 is located in the southwestern portion of the Depot. Background information of EC-52 is based on anecdotal reports provided by two former employees of the Depot who described grenade and munitions burial activities at the Depot. The location of the described burial area remains unknown and unconfirmed. Cultural debris, including rolls of metal banding material and pieces of a wire reinforced culvert has been found. A propellant grain dump is located in the western portion of the EC. No MEC or MD was found during the RI (Section 22.3.2, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

During the RI field investigations, no anomalies associated with MEC or MD were found at this EC (Section 22.3.2, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. Background information of EC-52 is based on anecdotal reports provided by two former employees of the Depot who described grenade and munitions burial activities at the Depot. The location of the described burial area remains unknown and unconfirmed. A propellant grain dump is located in the western portion of the EC (Section 22.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the RI, no MEC or MD were found at this EC (Section 22.3.2, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, as this EC is next to Furnace Creek there is no fence line along this portion of the Depot and it could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-52.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-52.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-52 and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☒

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
No surface soil results were reported above the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the sampling, there has been no release of MC at this EC; therefore, no MC Hazard exists at this EC (Section 19.4.2, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)	-	-	-		-		-
Surface Water/Human Endpoint (Table 22)	-	-	-		-		-
Sediment/Human Endpoint (Table 23)	-	-	-		-		-
Surface Water/Ecological Endpoint (Table 24)	-	-	-		-		-
Sediment/Ecological Endpoint (Table 25)	-	-	-		-		-
Surface Soil (Table 26)	-	-	-		-		-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-57B: Building 1022 – Brass and Steel Area

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-57B is located in the southeastern corner of the Depot, along the banks of Furnace Creek, and refers to a warehouse (Building 1022). In 1932 the warehouse was used for renovation of munitions; this involved disassembling 75-mm shrapnel projectiles from the cartridge case, inspecting the propelling charge, re-priming, and reassembling the round. From 1938 to 1942, the warehouse operated as a bag loading plant where propelling charges for 155-mm howitzer and guns were loaded per the specifications for the appropriate charge within the powder container. After the Depot's mission changed in 1942, portions of Building 1022 were used as a small arms packing plant where belting, linking, and clipping of .30 and .50 caliber cartridges occurred. Pre-1950 activities within Building 1022 also included popping furnace operations. A popping furnace was used to heat small arms ammunition to levels that would cause the unexploded primers to fire (Section 23.1, ERT, 2016). No MEC or MD was expected at this EC and therefore was not included in the RI field activities, as the RI included investigation of the area immediately outside of the building, not inside the building.

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

MEC was not part of the field investigation for this EC due to the historical use of the EC (Section 23.1, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	• The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	• The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	• The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	• The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	• The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	• The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	• The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	• The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	• The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	• The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	• Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. In 1932 the warehouse was used for renovation of 75mm shrapnel projectiles. From 1938 to 1942, the warehouse operated as a bag loading plant where propelling charges for 155mm howitzer and guns were loaded per the specifications for the appropriate charge within the powder container. After the Depot's mission changed in 1942, portions of Building 1022 were used as a small arms packing plant where belting, linking, and clipping of .30 and .50 caliber cartridges occurred. Pre-1950 activities within Building 1022 also included popping furnace operations. A popping furnace was used to heat small arms ammunition to levels that would cause the unexploded primers to fire (Section 22.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

MEC and MD was not expected at this EC and therefore was not investigated (no incidental MD was found during the field activities) (Section 23.1, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, as this EC is next to Furnace Creek there is no fence line along this portion of the Depot and it could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-57B.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-57B.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-57B and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

☒ **No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard**

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
Manganese	59900	3300	18.2
Benz(a)anthracene	9.71	62	0.157
Benzo(a)pyrene	9.57	6.2	1.54
Dibenzo(a,h)pyrene	2	0.38	5.26
Indeno(1,2,3-cd)pyrene	5.81	62	0.0937
CHF Scale	**CHF Value**	**Sum the Ratios**	**25.4**
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	**M**

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the Risk Assessment, no MC Hazard exists at this EC (Section 23.4.2, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio
Soil	Benzo(b)fluoranthene	13.6	62	0.219

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)	-	-	-		-		-
Surface Water/Human Endpoint (Table 22)	-	-	-		-		-
Sediment/Human Endpoint (Table 23)	-	-	-		-		-
Surface Water/Ecological Endpoint (Table 24)	-	-	-		-		-
Sediment/Ecological Endpoint (Table 25)	-	-	-		-		-
Surface Soil (Table 26)	-	-	-		-		-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-57C: Building J-408

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:
The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-57C is located in the central portion of the Depot and refers to the location of the 1928 explosion. The fire occurred at Building J-408 in 1928, resulting in the building and its contents being entirely destroyed. The building reportedly stored smokeless powder. No MEC or MD was found during the RI (Section 24.3.2, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

During the RI field investigations, no anomalies associated with MEC or MD were found at this EC (Section 24.3.2, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-57C is located in the central portion of the Depot and refers to the location of the 1928 explosion. The fire occurred at Building J-408 in 1928, resulting in the building and its contents being entirely destroyed. The building reportedly stored smokeless powder (Section 24.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the RI, no MEC or MD were found at this EC (Section 24.3.2, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, the area along Furnace Creek is not fully fenced and could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-57C.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-57C.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-57C and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☒

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
No surface soil results were reported above the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the risk assessment no MC Hazard exists at this EC (Section 24.4.2, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)	-	-	-		-		-
Surface Water/Human Endpoint (Table 22)	-	-	-		-		-
Sediment/Human Endpoint (Table 23)	-	-	-		-		-
Surface Water/Ecological Endpoint (Table 24)	-	-	-		-		-
Sediment/Ecological Endpoint (Table 25)	-	-	-		-		-
Surface Soil (Table 26)	-	-	-		-		-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-57D: Brass and Steel Stockpile Area

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type: The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-57D is presumed to have been used as a stockpile area outside of Building 1022 where munitions were stored, awaiting dismantlement. The EC boundary is comprised of a large vegetated area proximate to Building 1022, where storage of munitions likely occurred (Section 25.1, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

Based on historical information, MEC and MD were not expected at this EC and were not investigated for MEC/MD (Section 25.1, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-57D is presumed to have been used as a stockpile area outside of Building 1022 where munitions were stored, awaiting dismantlement (Section 25.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

As expected, no MEC or MD have been found at this EC (Section 25.1, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, the area along Furnace Creek is not fully fenced and could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-57D.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-57D.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-57D and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

☒ **No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard**

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
No surface soil results were reported above the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Manganese was found at concentrations above the project screening levels; however, it has been determined that these levels are due to the storage of ore stockpiles in the vicinity and are not due to munitions activities. Therefore, there is no MC hazard at this EC (Section 25.5, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)	-	-	-		-		-
Surface Water/Human Endpoint (Table 22)	-	-	-		-		-
Sediment/Human Endpoint (Table 23)	-	-	-		-		-
Surface Water/Ecological Endpoint (Table 24)	-	-	-		-		-
Sediment/Ecological Endpoint (Table 25)	-	-	-		-		-
Surface Soil (Table 26)	-	-	-		-		-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-58B: Explosive Open Burning/Wire Cage

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	☑ Sediment (human receptor)
☑ Surface soil	☑ Surface Water (ecological receptor)
☑Sediment (ecological receptor)	☑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-58B is located along the northeastern boundary between A Line Road and Yard Office Road and contains the high explosive suspect area component of EC-58. There is no documentation in the available historical record regarding the specific operations conducted within EC-58B. A small wire cage was observed in the suspected high explosives area, potentially related to burn cage activities. To date, information regarding the presence of the small wire cage is purely anecdotal as it was not documented via photograph or observed during subsequent site visits. Based on anecdotal information, EC-58B was designated as a burn cage location even though this area was not identified on historical maps as a barricade where cage burning activities typically occurred. Stereoscopic examination of aerial photographs also determined that the area was a possible pit, approximately 5 ft to 10 ft deep (Section 26.1, ERT, 2016). No MEC or MD was found during the RI (Section 26.3.2, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

During the RI field investigations, no MEC or MD were found at this EC (Section 26.3.2, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. Based on anecdotal information, EC-58B was designated as a burn cage location even though this area was not identified on historical maps as a barricade where cage burning activities typically occurred. Stereoscopic examination of aerial photographs also determined that the area was a possible pit, approximately 5 ft to 10 ft deep (Section 26.1, ERT, 2016). No MEC or MD was found during the RI (Section 26.3.2, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the RI, no MEC or MD were found at this EC (Section 26.3.2, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, as this EC is next to Furnace Creek there is no fence line along this portion of the Depot and it could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-58B.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-58B.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-58B and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All surface water concentrations were below the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
All sediment concentrations were below the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All surface water concentrations were below the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☒

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
All sediment concentrations were below the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
No surface soil results were reported above the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the sampling, there has been no release of MC at this EC; therefore, no MC Hazard exists at this EC (Section 26.8, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)	-	-	-	-	-
Surface Water/Human Endpoint (Table 22)	-	-	-	-	-
Sediment/Human Endpoint (Table 23)	-	-	-	-	-
Surface Water/Ecological Endpoint (Table 24)	-	-	-	-	-
Sediment/Ecological Endpoint (Table 25)	-	-	-	-	-
Surface Soil (Table 26)	-	-	-	-	-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

Table A

MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: EC-58C: Explosive Open Burning/Wire Cage

Component: U.S. Army

Installation/Property Name: Former Curtis Bay Ordnance Depot

Location (City, County, State): Anne Arundel County, MD

Site Name/Project Name (Project No.): Investigation (Curtis Bay Ordnance Depot W912DR-09-D-0012)

Date Information Entered/Updated: June 2016 (prepared by ERT)

Point of Contact (Name/Phone): [redacted]

Project Phase (check only one):

❑ PA	❑SI	❑RFI	❑ FS	❑ RD
❑ RA-C	☑ RI	❑ RA-O	❑RC	❑ LTM

Media Evaluated (check all that apply):

☑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-58C is located in the southwestern portion of the Depot. EC-58C is the location of a burn cage area proposed for investigation and is located within Barricade 644-XK. Wire cage burning operations reportedly consisted of open burning on concrete pads within barricades covered in wire mesh. Little documented information is available about the cage burning operations; however, train cars containing smokeless powder were moved into the barricades and were reportedly ignited within the barricades in the post-Korean war timeframe for munitions handling and disposal. The barricades were also used as safety areas where the train cars with smokeless powder could be stored. While there are no historical documents detailing burial activities at this EC, based on burial finds at other barricades at the Depot there is the possibility that burial activities occurred at this EC. The CEHNC Trip Report documents that a revetment with a built in bunker was also used to store acid grade fluorspar based on the remnants of the mineral on the black plastic (1999). During the ERT site visit in 2012, Barricade 644 was the only barricade that contained a bunker; therefore, it is assumed a fluorspar berm also historically existed at this EC. No remnants of black plastic or fluorspar minerals were observed during the 2012 site visit (Section 27.1, ERT, 2016). No MEC or MD was found during the RI (Section 27.3.2, ERT, 2016).

Description of Pathways for Human and Ecological Receptors: Based on the results of the RI Report, there are no complete pathways for human receptors in surface soil, subsurface soil and groundwater and for ecological receptors for surface soil and groundwater for either MEC or MC.

Description of Receptors (Human and Ecological): Current and future receptors include current/future site workers, construction workers and trespassers, future residential groundwater use, and biota to include plants, birds, soil invertebrates, and small mammals.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

During the RI field investigations, no anomalies associated with MEC or MD were found at this EC (Section 27.3.2, ERT, 2016).

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	(4)
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**4**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Former Curtis Bay Depot was utilized from the 1920s to 1958 for the receipt, storage, maintenance and demilitarization of ammunition. EC-58C is the location of a burn cage area proposed for investigation and is located within Barricade 644-XK. While there are no historical documents detailing burial activities at this EC, based on burial finds at other barricades at the Depot there is the possibility that burial activities occurred at this EC (Section 27.1, ERT, 2016).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	(0)
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the RI, no MEC or MD were found at this EC (Section 27.3.2, ERT, 2016).

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	• There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	• There is a barrier preventing access to parts of the MRS, but not the entire MRS.	(8)
Barrier to MRS access is complete but not monitored	• There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	• There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Former Curtis Bay Depot has a fence with a locked gate surrounding that limits access to the EC. However, as this EC is next to Furnace Creek there is no fence line along this portion of the Depot and it could be accessed by trespassers.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	• The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. • The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	(5)
Scheduled for transfer from DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	• The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Former Curtis Bay Depot is managed by the Defense Logistics Agency (DLA) and owned by the General Services Administration (GSA) (Section 1.6, ERT, 2013).

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	• There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	(5)
100–500 persons per square mile	• There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	• There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

According to the 2010 US Census Bureau there are 1,295.9 people per square mile in Anne Arundel County, Maryland (http://www.census.gov/quickfacts/table/POP060210/24003,00).

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	• There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	(5)
16 to 25 inhabited structures	• There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	• There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	• There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	• There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	• There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

The Former Curtis Bay Depot is located within a highly developed portion of Anne Arundel County, Maryland next to Baltimore City and there are numerous inhabited buildings within a 2 mile radius of EC-58C.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	(5)
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	(4)
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	(2)
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

As the Former Curtis Bay Depot is located within a highly developed area, there are residences, industrial areas and warehouses and ball fields within 2 miles of EC-58C.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	• There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	• There are ecological resources present on the MRS.	3
Cultural resources present	• There are cultural resources present on the MRS.	3
No ecological or cultural resources present	• There are no ecological resources or cultural resources present on the MRS.	(0)
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are no RTE species and/or within EC-58C and the EC is not considered critical habitat for RTE species. There are no special breeding grounds within the EC. There are no recognized cultural, traditional, spiritual, religious or historical features within the MRS (Section 6.3, ERT, 2013).

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	4
Source of Hazard	Table 2	4	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	13
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			32

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g. ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	(0)
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

There is no historical or current evidence of CWM existing at this EC.

Tables 12-19
CHE Module

Because there is no historical or current evidence of CWM existing on this EC, Tables 12-19 have been omitted according to Army Policy for Application of the MRSPP, February 2009, 3.d. (2).

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	-	-
Sources of CWM	Table 12	-	
Accessibility Factor Data Elements			
Location of CWM	Table 13	-	-
Ease of Access	Table 14	-	
Status of Property	Table 15	-	
Receptor Factor Data Elements			
Population Density	Table 16	-	-
Population Near Hazard	Table 17	-	
Types of Activities/Structures	Table 18	-	
Ecological and/or Cultural Resources	Table 19	-	
CHE MODULE TOTAL			0

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
All groundwater concentrations were below the project screening criteria (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well down gradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well down gradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well down gradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the Risk Assessment, no MC Hazard exists at this EC (Section 29.0, ERT, 2016).

No Known or Suspected Groundwater MC Hazard ☒

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	L

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☒

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☒

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

☒ **No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard**

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were collected from this EC during the RI (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☒

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
No surface soil results were reported above the project screening levels (ERT, 2016).			

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Based on the results of the sampling, there has been no release of MC at this EC; therefore, no MC Hazard exists at this EC (Section 27.6, ERT, 2016).

No Known or Suspected Surface Soil MC Hazard ☒

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: **Only use this table if there are more than five contaminants in any given medium present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B of the Primer) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: Do not add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)	-	-	-	-	-
Surface Water/Human Endpoint (Table 22)	-	-	-	-	-
Sediment/Human Endpoint (Table 23)	-	-	-	-	-
Surface Water/Ecological Endpoint (Table 24)	-	-	-	-	-
Sediment/Ecological Endpoint (Table 25)	-	-	-	-	-
Surface Soil (Table 26)	-	-	-	-	-

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	-

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected MC Hazard**	

References:

ERT, Inc. 2013. Final MMRP and IRP Remedial Investigation Work Plan for Remedial Investigation/Feasibility Study and Engineering Evaluation/Cost Analysis, Former Curtis Bay Ordnance Depot, Anne Arundel County, Maryland. June.

ERT, Inc. 2016. Draft MMRP and IRP Remedial Investigation/Feasibility Study Report. June.

U.S. Army. 2009. *Memorandum for: Assistant Chief of Staff for Installation Management, 600 Army Pentagon, Room 3E474, Washington, DC 20310-0600. Commander, Installation Management Command, 2511 Jefferson Davis Hwy, Arlington, VA 22202. Director, Military Programs Directorate, U.S. Army Corps of Engineers, U.S. Army Corps of Engineers, 441 G. Street, NW, Washington, DC 20314-1000.* Subject: Army Policy for Application of the Military Munitions Response Site Prioritization Protocol (MRSPP) - Corrected Copy, February.

U.S. Census Bureau. 2010. Quick Facts: Anne Arundel County, MD. http://quickfacts.census.gov Accessed 22 June 2016.

U.S. Department of Defense. 2007. *Memorandum for: Deputy Assistant Secretary of the Army (Environment, Safety, And Occupational Health). Deputy Assistant Secretary of the Navy (Environment). Deputy Assistant Secretary Of The Air Force (Environment, Safety, And Occupational Health).* Subject: Primer for the Munitions Response Site Prioritization Protocol, June.

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MEMORANDUM

TO: [redacted] USACE-CENAB, [redacted], USACE-CENAB, [redacted], USACE-CENAB, [redacted], USACE-CENAB

FROM: [redacted]

DATE: June 28, 2013

SUBJECT: Instrument Verification Strip at Curtis Bay Depot, MD (Revision 2)

ERT, under contract with the U.S. Army Corps of Engineers (USACE), Baltimore District, is performing a Remedial Investigation/Feasibility Study (RI/FS) and Engineering Evaluation/Cost Analysis (EE/CA) at Curtis Bay Depot, Maryland. This memorandum addresses the Instrument Verification Strip (IVS) for the geophysical equipment being used at the Military Munitions Response Program (MMRP) Environmental Concern (EC) Areas.

A 50 ft x 100 ft test area was flagged for data collection on June 20, 2013, to the west of EC-49 at the site. A mag and dig sweep of the area by UXO personnel was conducted first, and 2 pounds of scrap metal were removed from the surface. The EM61-MK2A, integrated with a Topcon HiperGa RTK GPS, was used for data collection over this area in order to check for anomalies. Only one small anomaly was found within the area covered, as shown in Figure 1. This anomaly was not excavated because it could be avoided. The EM61-MK2A data were processed and emailed to the CENAB geophysicist with the recommendation to place the 5 seed items in the center of the area, and CENAB concurred that afternoon.

Industry Standard Objects (ISOs) were utilized as seed items and buried by UXO technicians at the depths/orientations designated by the design shown in Figure 41 of the Final Work Plan, with one exception: CENAB recommended a wider separation of 15 feet (rather than 10 feet) between medium and large ISOs, and this was implemented (Figure 2).

A Maryland licensed surveyor captured the horizontal coordinates and depths of each seed item. Seed orientation and depths are summarized in Table 1. The holes were then backfilled.

The EM61-MK2A data were collected on the IVS on the seed line, background line 6 feet away, and on two additional passes 2.5 feet away on either side of the seed line (Figure 3). All of the seeds were detected, although seed 2 had a very low response of approximately 3.75 mV on gate 3.

As explained in Section 3.5.13.1 and Section 3.5.14.1 of the Final Workplan, gate 3 (rather than the more conventional gate 2) of the EM61 will be used for this project due to its greater compatibility with EM61-MK1 data collected at the site in 1999 by MKM.

Profiles of the two passes (mV vs. distance for gate 3) for background line and seed line are shown in Figure 4.

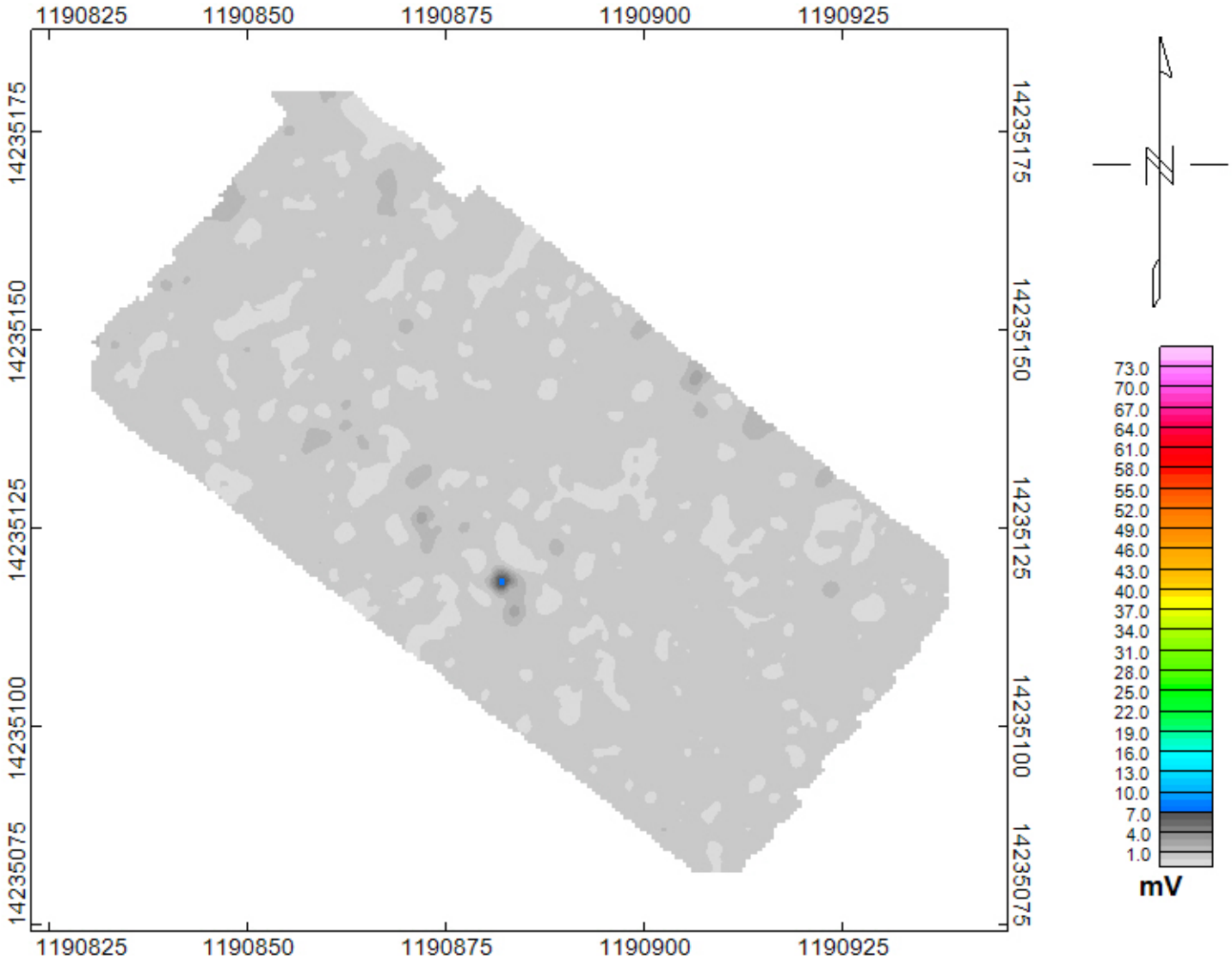
No target threshold is selected for this project, as it is not the intent of the investigation to identify and excavate every target. The objective is to identify possible burial pits, and no threshold is needed for this. However, to quantify the accuracy of the mapping ability of the EM61-MK2, a threshold of 3 mV was used to select targets based on the data collected on the seed line, using UX-Detect in Geosoft Oasis Montaj (v8.0). The picked coordinates of the five seeds are shown in Table 1, along with offsets of the picked anomaly locations and surveyed locations of the centers of the seeds. The offsets fall within the acceptable range of 0.35 to 1.20 feet. The smallest offsets correlate with vertically oriented ISOs. Seed 4 (offset 1.20 ft) was horizontal and along track, and forms a double peak (dipole), as shown in Figure 4. The anomaly pick occurred at one of the two peaks, leading to the greater offset from the center of the ISO.

The EM61 ISO minimum response curves are shown in Figures 5-7, with actual responses plotted. All seed responses plotted above the theoretical minimum response calculated using EM61-MK2 Response v1.2.0.0 (NRL software). (Note: the software does not calculate maximum theoretical response.)

Photos of field activities and the installed seeds prior to backfill are included in Appendix A.

Morning quality control tests for the EM61-MK2A collected 21 June are included in Appendix B, along with a statistical summary. All test results are normal.

Table 1: Seed Items									
Seed	**ISO size**	**UTM Zone 18 N coordinates (ft), surveyed center of seed**		**Orientation**	**Direction**	**Seed depth (top) below ground surface (inches)**	**UTM Zone 18 N coordinates (ft), picked anomaly location**		**Offset (feet)**
		Easting	**Northing**				**Easting**	**Northing**	
1	Small	1190907.260	14235112.236	Vertical	N/A	3.1	1190907.0	14235112.5	0.37
2	Small	1190899.483	14235118.521	Horizontal	Across line	8.58	1190899.0	14235118.0	0.71
3	Medium	1190891.825	14235124.641	Vertical	N/A	17.8	1190891.5	14235124.5	0.35
4	Medium	1190880.119	14235134.059	Horizontal	Along line	16.1	1190879.0	14235134.5	1.20
5	Large	1190868.361	14235143.555	Vertical	N/A	22.78	1190868.0	14235143.5	0.37



Scale 1:250

10 0 10 20

US survey foot

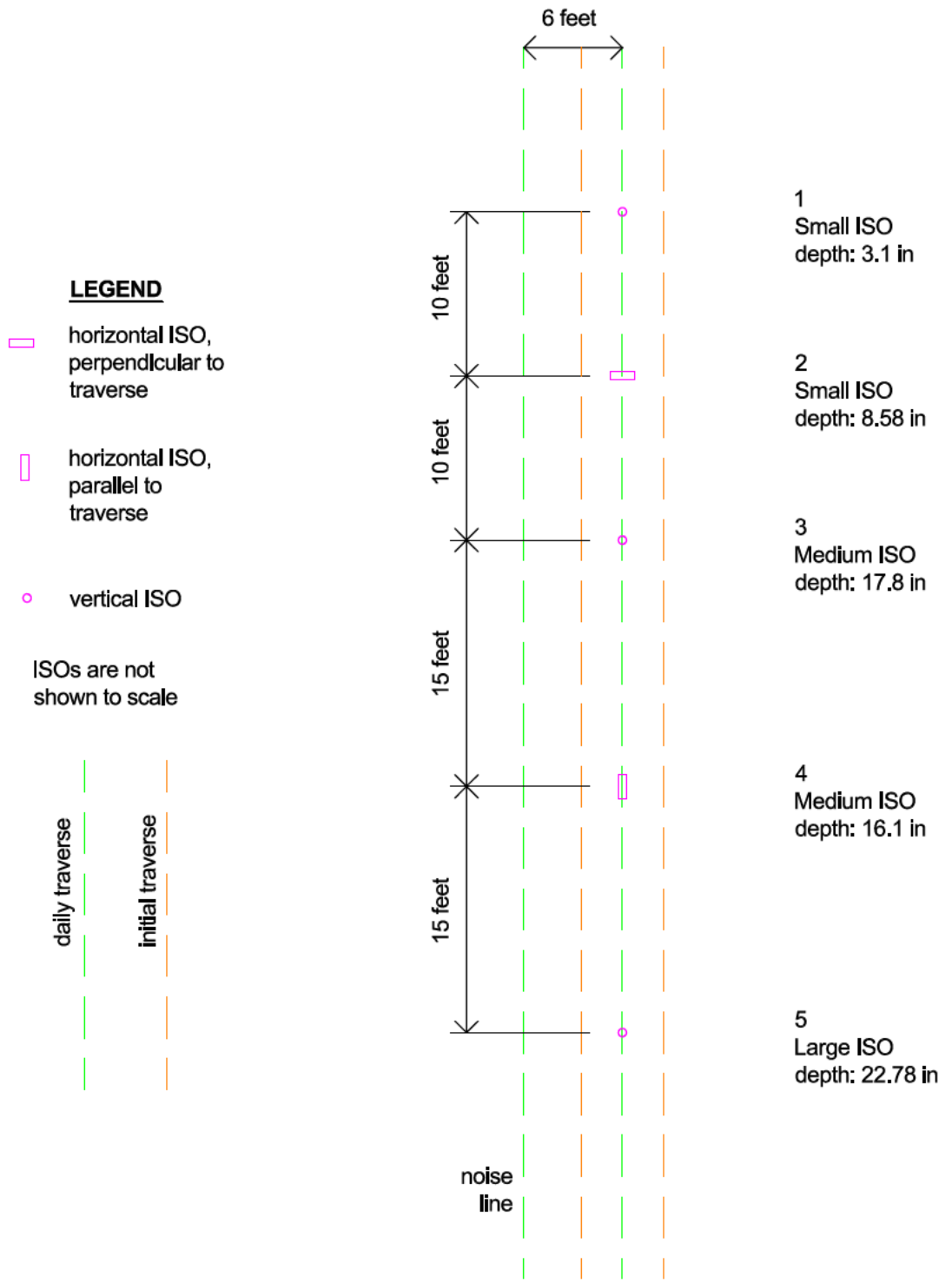
WGS 84 / UTM zone 18N

Figure 1: EM61MK2 Survey

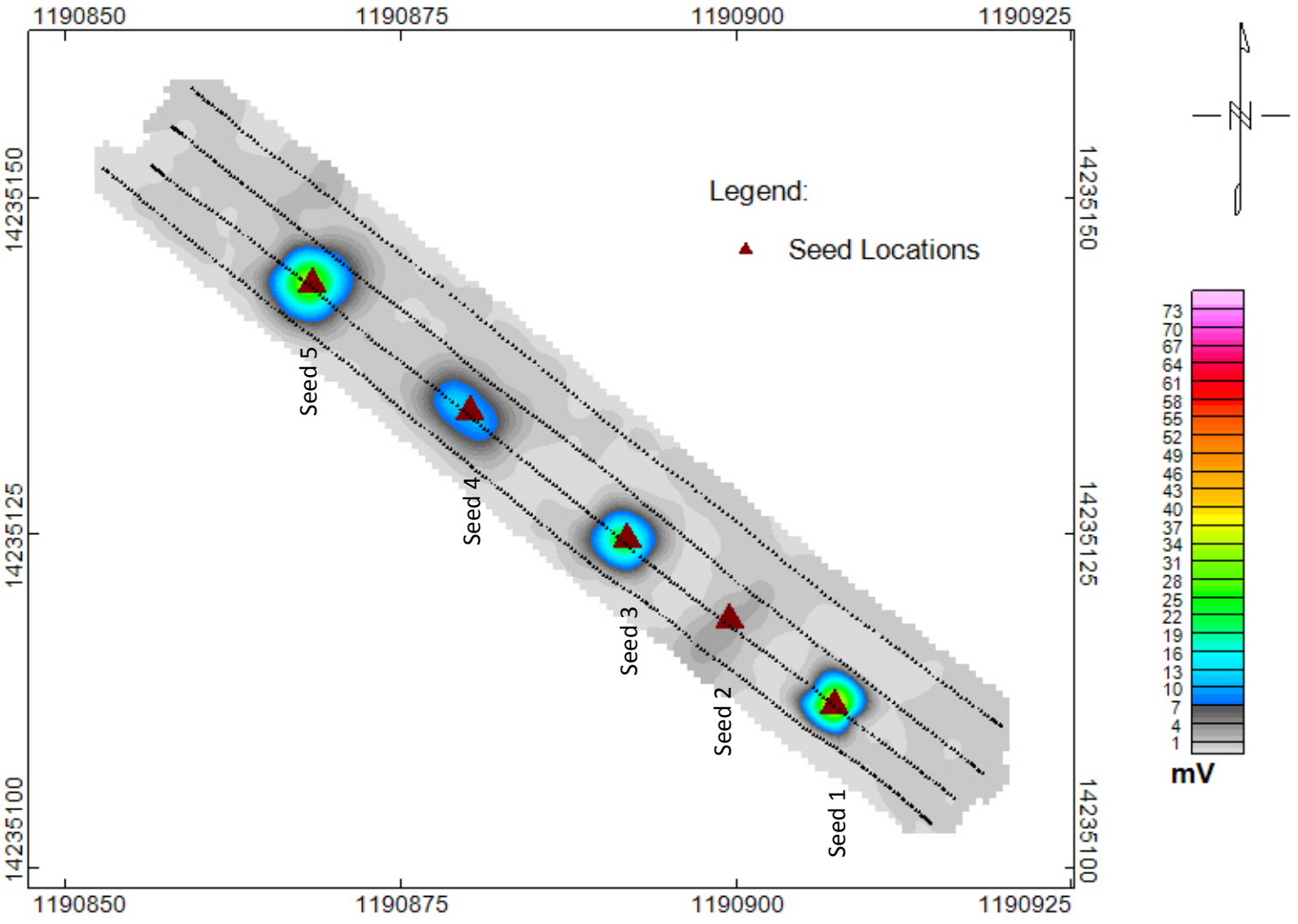
Channel 3

IVS Background
Curtis Bay, MD

ERT Inc.



ERT	Final Instrument Verification Strip Layout Remedial Investigation, Curtis Bay Depot, Maryland	Figure 2 June 2013 SCALE: 1" = 10'



Scale 1:150

5 0 5 10 15

US survey foot

WGS 84 / UTM zone 18N

Figure 3: EM61MK2 Survey

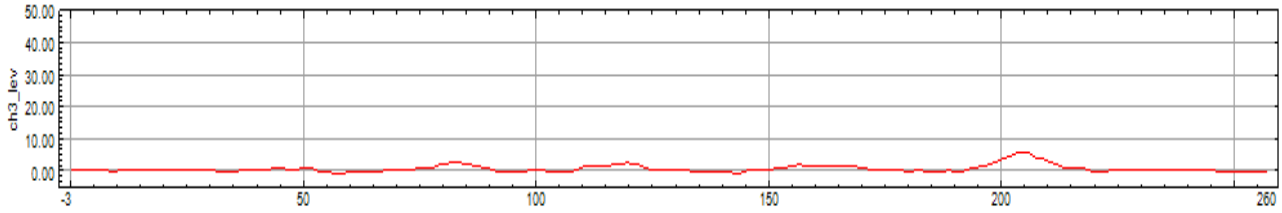
Channel 3

IVS Test
Curtis Bay, MD

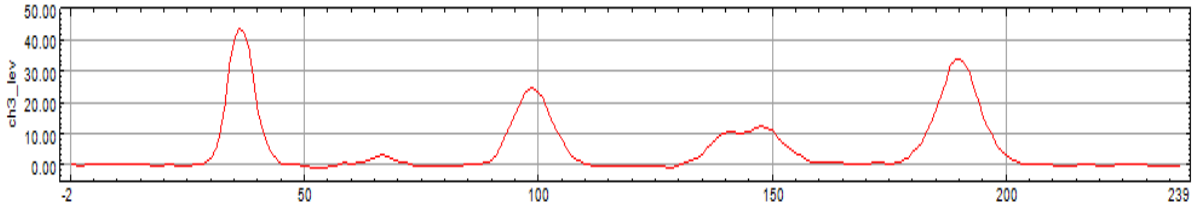
ERT Inc.

Figure 4: EM61-MK2A Response curves (Gate 3) over the noise line (A) and seed line (B).

A: Noise Line



B: Seed Line



Seed 1 Seed 2 Seed 3 Seed 4 Seed 5

Figure 5: Min. EM61-MK2 Response to Small ISO with seed response

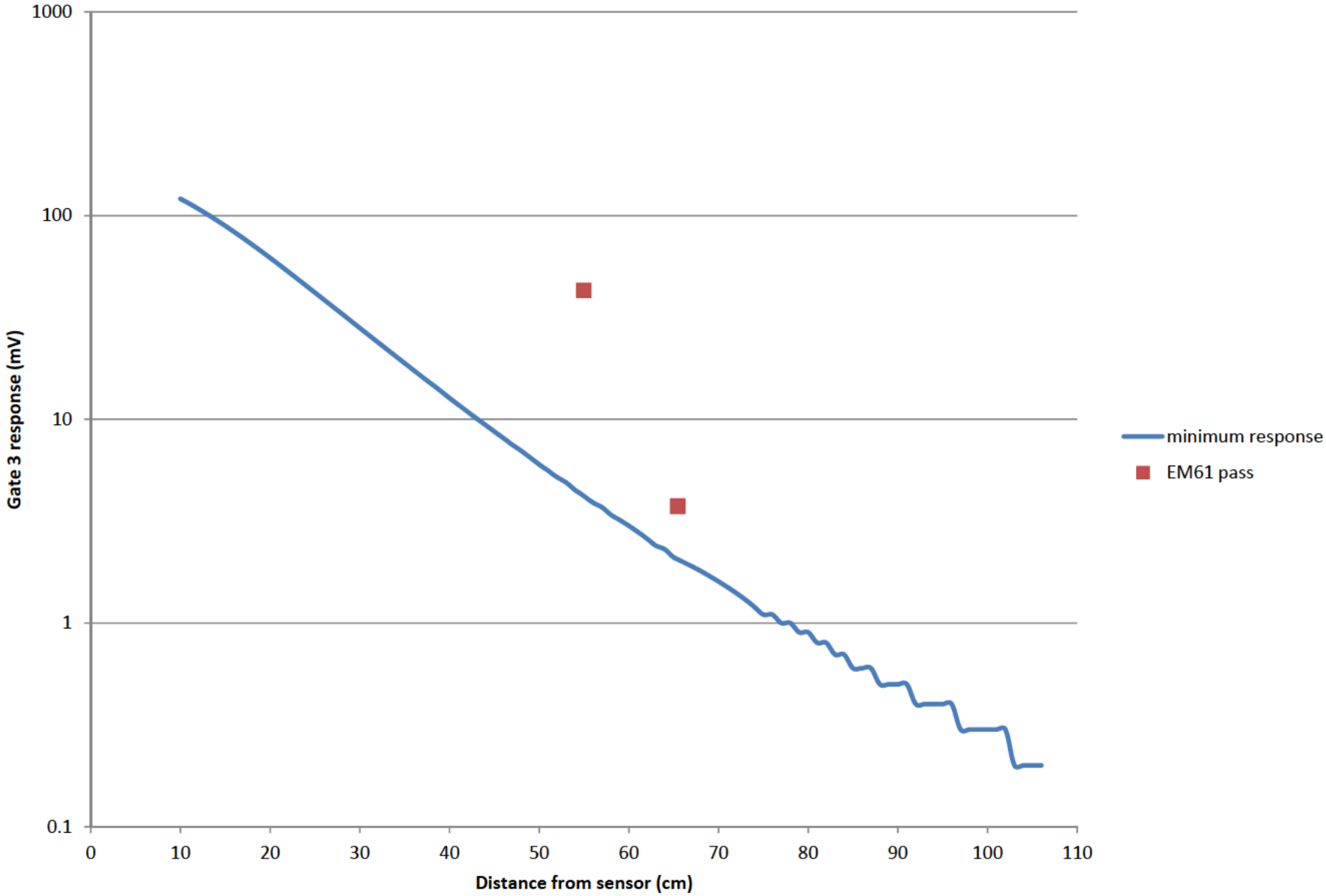


Figure 6: Min. EM61-MK2 Response to Medium ISO with seed response

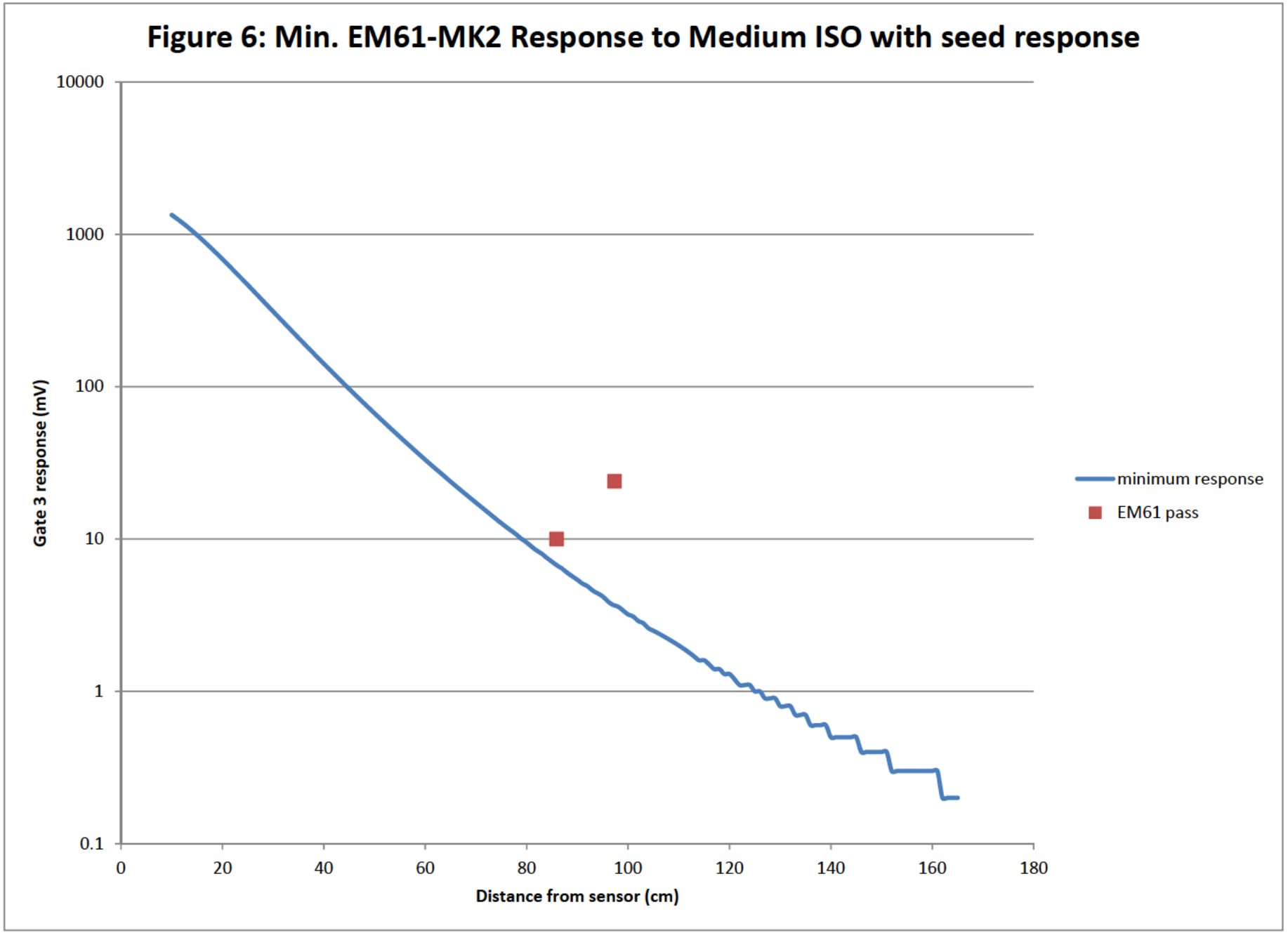
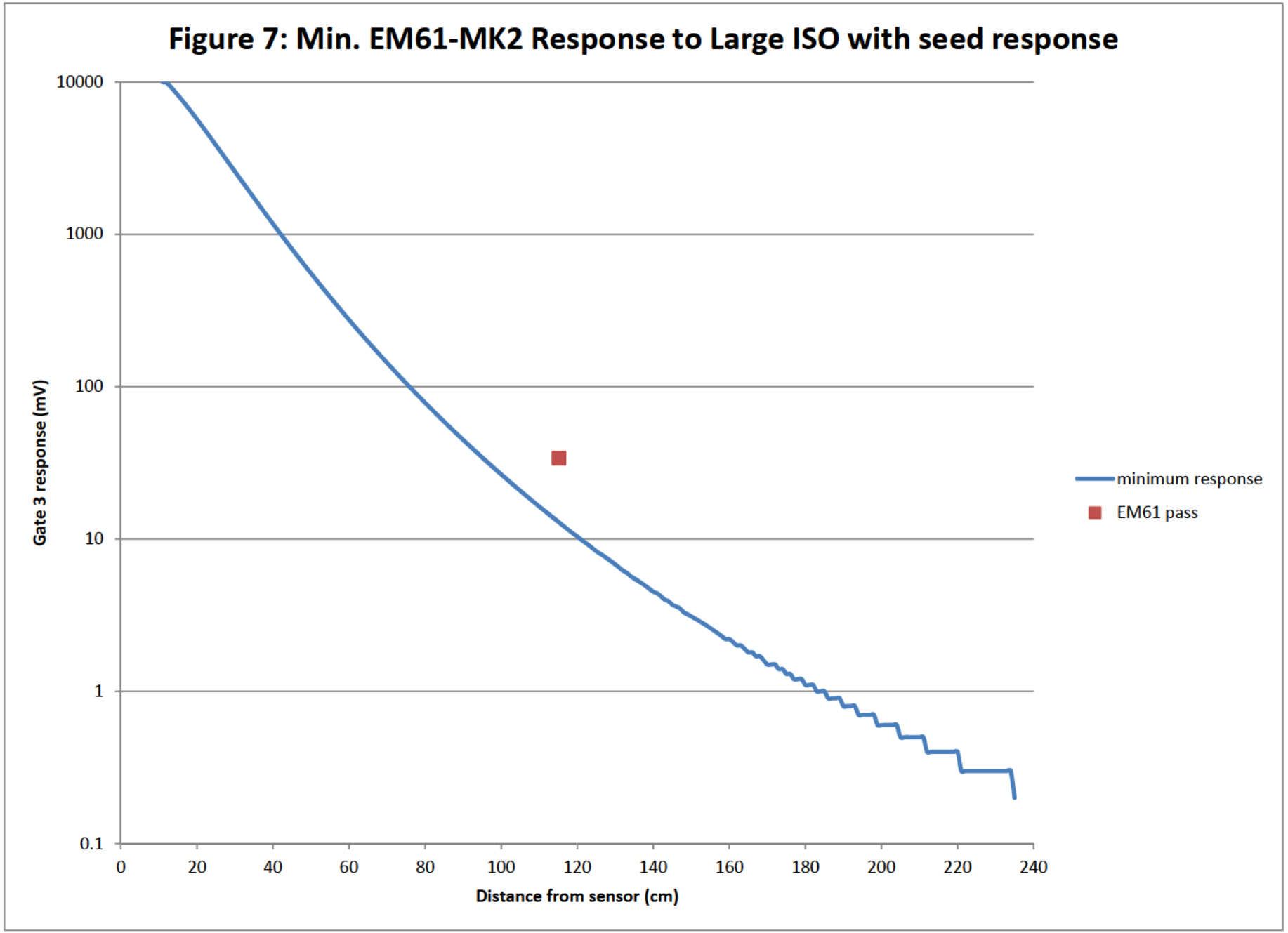


Figure 7: Min. EM61-MK2 Response to Large ISO with seed response



Appendix A: Photo Log.



Collecting background data. 20 June 2013



Excavating seeds 3, 4, and 5. 21 June



Seed 1: Small ISO, vertical



Seed 2: Small ISO, horizontal



Seed 3: Medium ISO, vertical



Seed 4: Medium ISO, horizontal

	
Seed 5: Large ISO, vertical	Surveyor measuring position and elevation of seeds. 21 June
	
Completed IVS: Seed line on left, noise line on right 21 June	

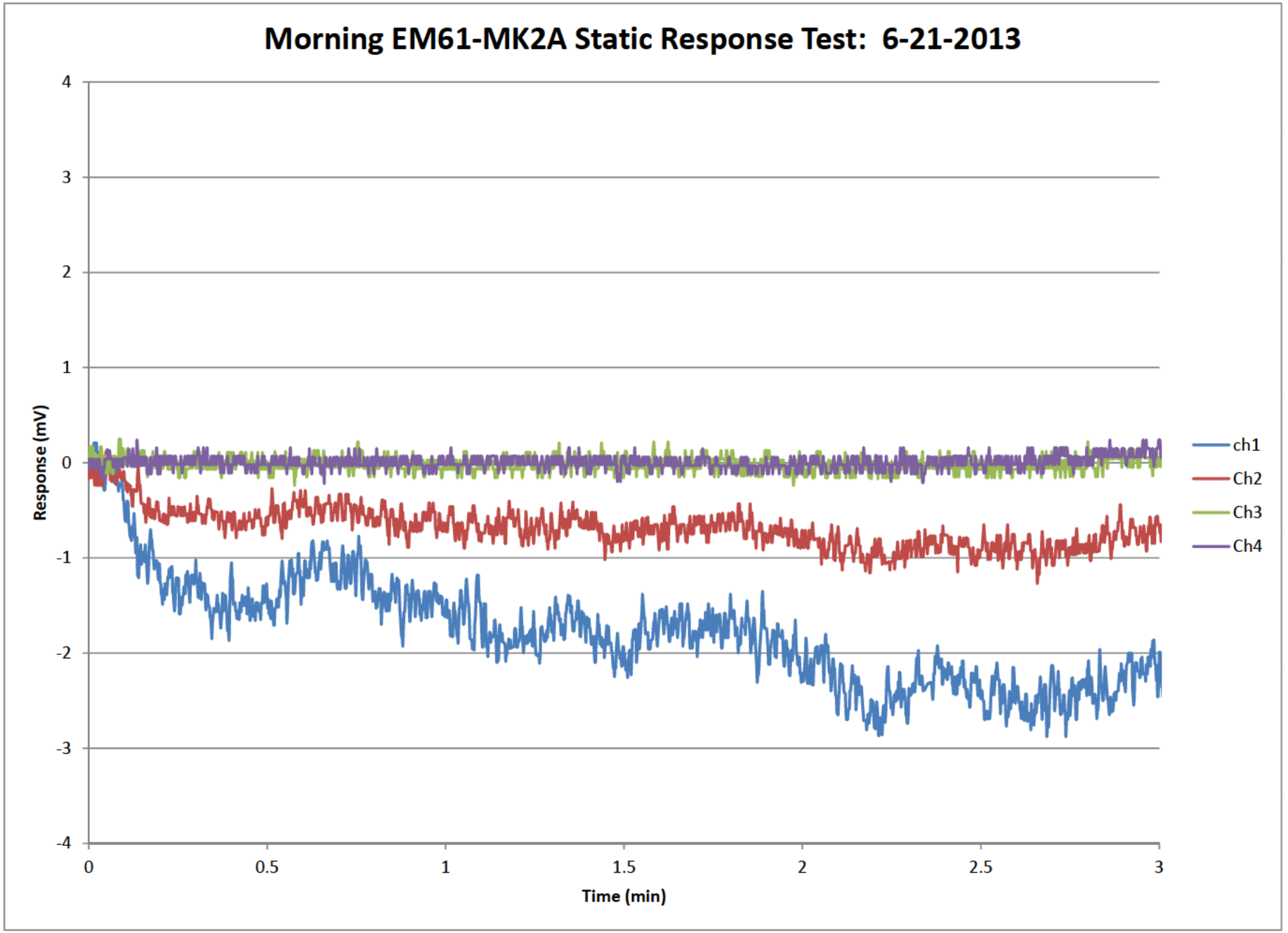
Appendix B

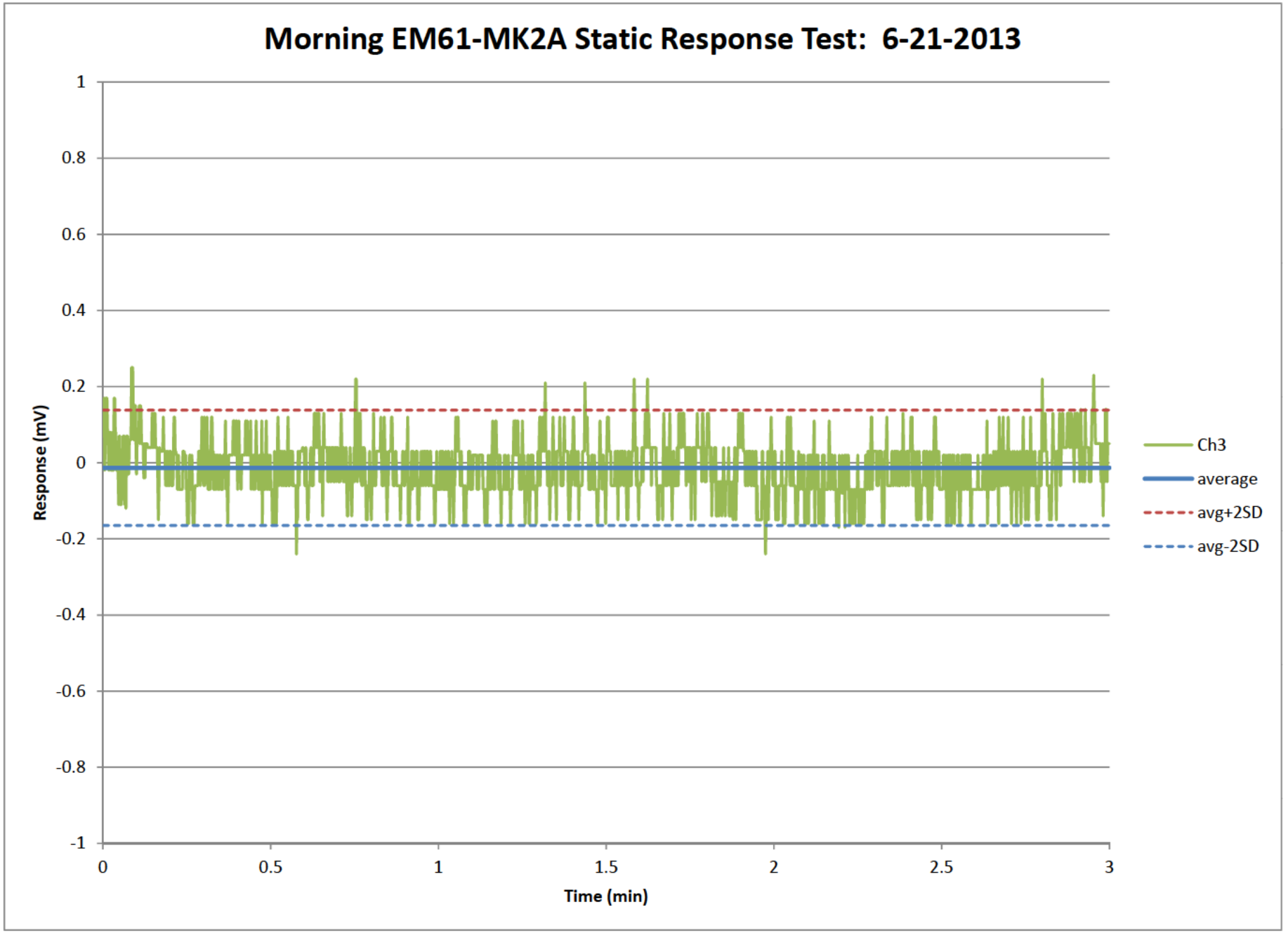
Morning EM61-MK2A Quality Control Tests, 21 June 2013

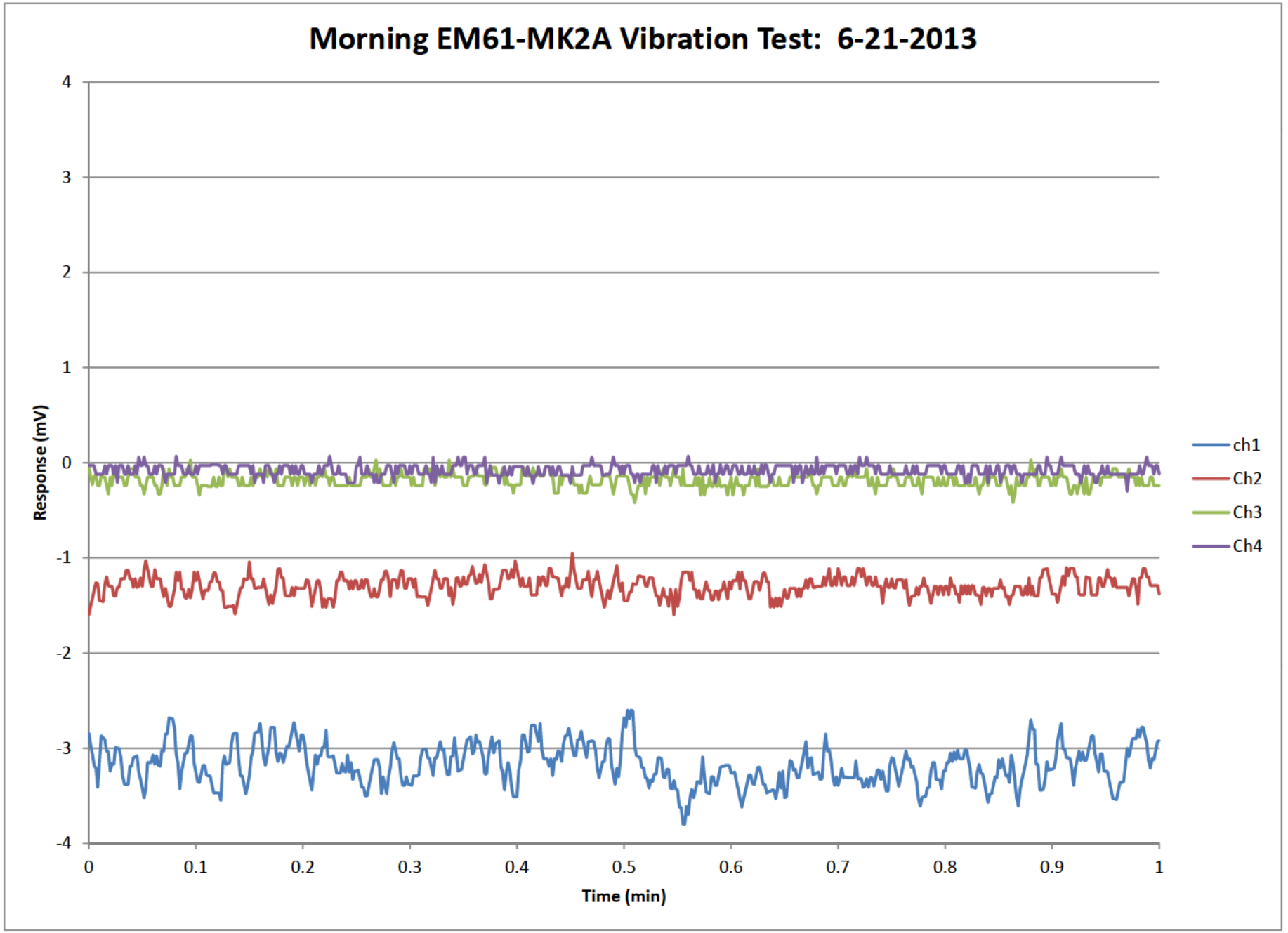
QC Test Statistical Summary					
	mV	Ch 1	Ch 2	Ch 3	Ch 4
static	maximum	0.21	0.12	0.25	0.24
	minimum	-2.88	-1.27	-0.24	-0.22
	average	-1.77	-0.69	-0.01	0.00
	standard deviation	0.58	0.21	0.08	0.07
	avg. + 2xSD	-0.61	-0.27	0.14	0.14
	avg. - 2xSD	-2.93	-1.10	-0.16	-0.13
	% outside tolerance (Ch 3 only)			2.1%	
vibration	maximum	-2.60	-0.95	0.03	0.07
	minimum	-3.80	-1.60	-0.42	-0.30
	average	-3.18	-1.30	-0.18	-0.08
	standard deviation	0.21	0.10	0.07	0.06
	avg. + 2xSD	-2.76	-1.09	-0.04	0.04
	avg. - 2xSD	-3.59	-1.51	-0.33	-0.20
	% outside tolerance (Ch 3 only)			6.0%	
spike	maximum	495.78	318.06	174.92	83.47
	minimum	487.91	314.35	173.16	82.56
	average	490.68	315.42	173.57	82.86
	standard deviation	1.00	0.50	0.23	0.12
	avg. + 2xSD	492.68	316.41	174.04	83.10
	avg. - 2xSD	488.69	314.42	173.10	82.62
	% outside tolerance (Ch 3 only)			4.6%	

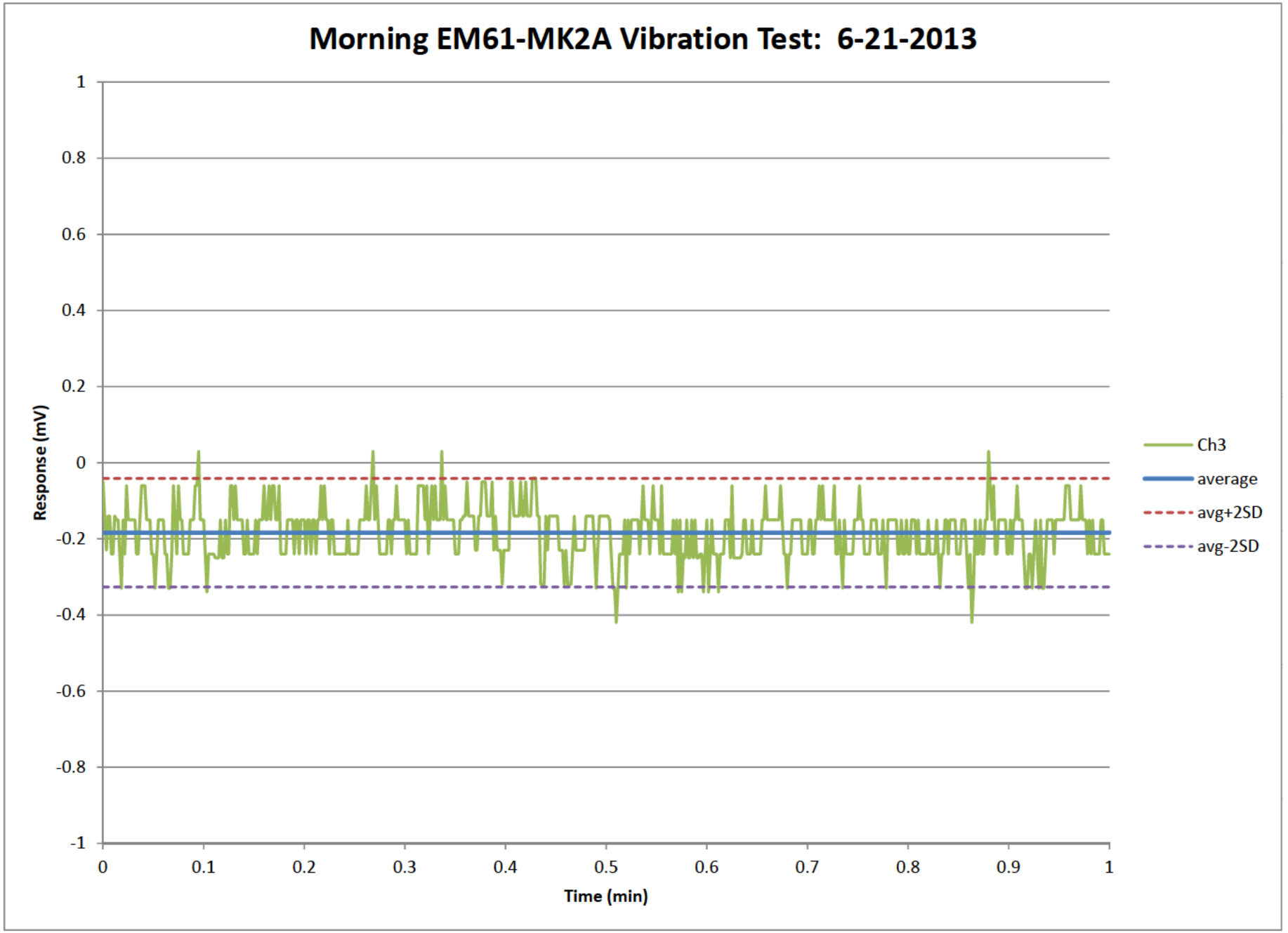
All tests show acceptable variation of less than 10% of data points between Average value plus 2 x standard deviation and Average value minus 2 x standard deviation.

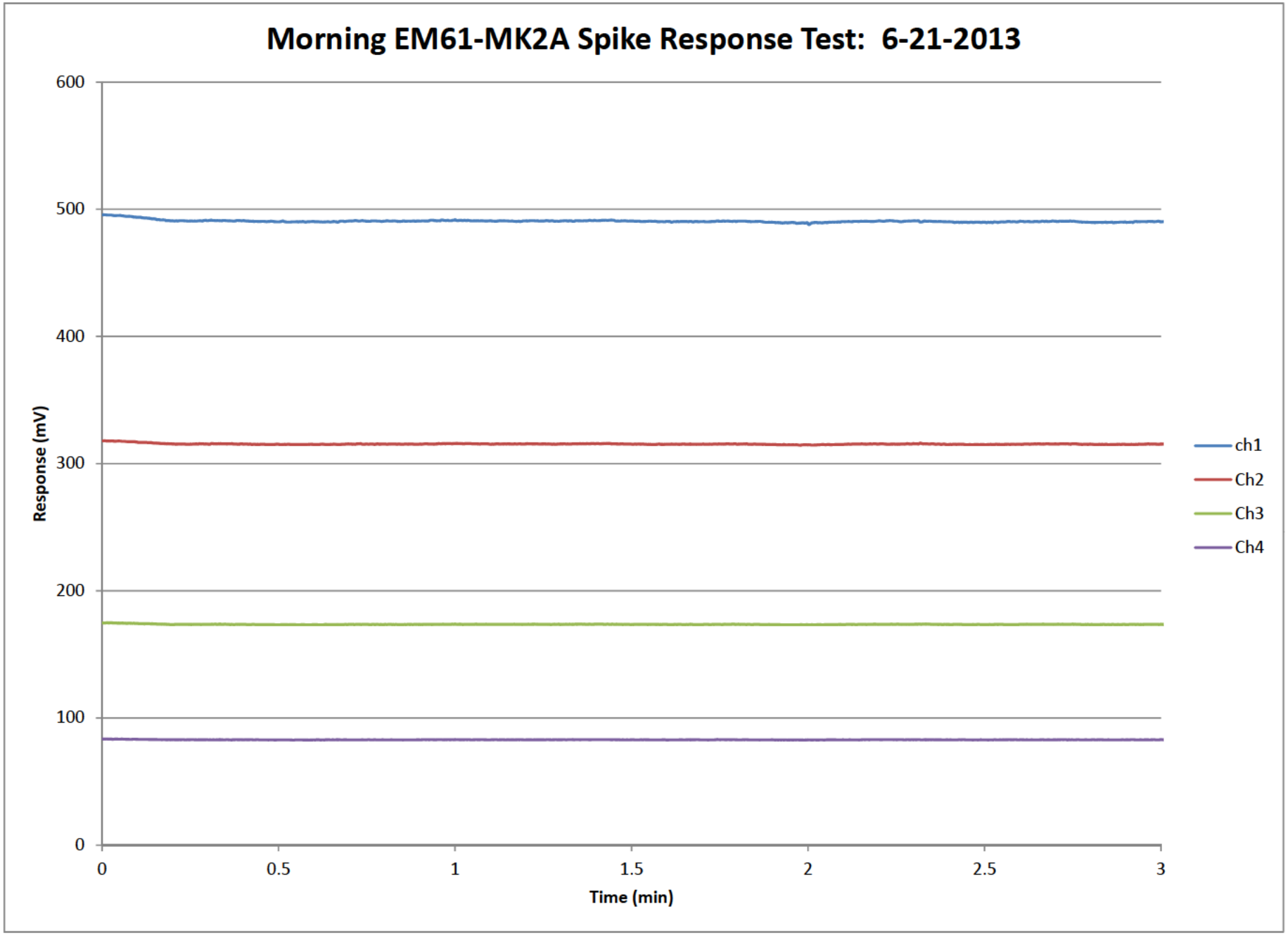
Note: No evening Quality Control Tests were conducted 21 June due to the EM61 data collector (Allegro CX) battery dying.

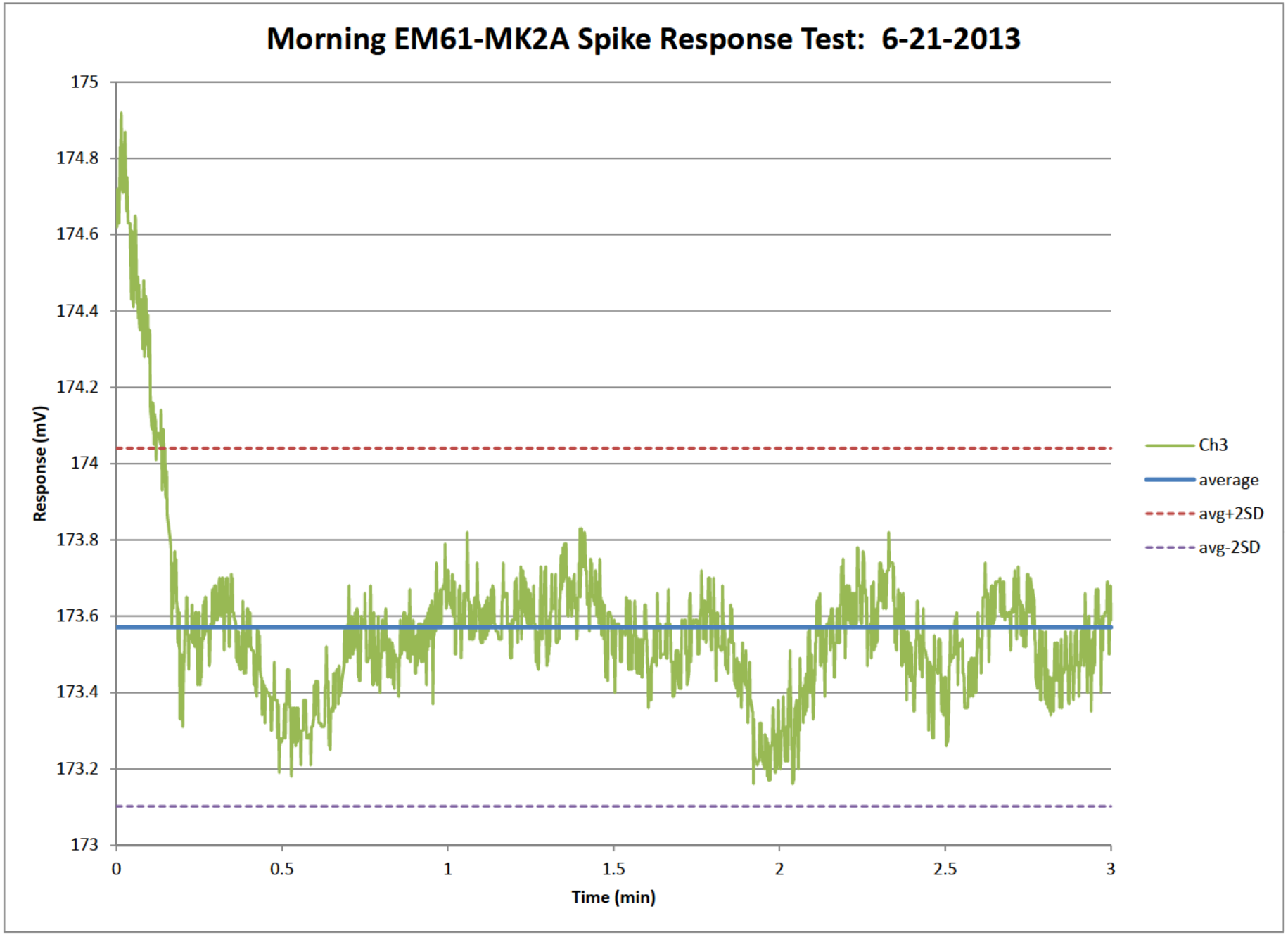

Morning EM61-MK2A Static Response Test: 6-21-2013
Response (mV)
4
3
2
1
0
-1
-2
-3
-4
0
0.5
1
1.5
2
2.5
3
Time (min)
ch1
Ch2
Ch3
Ch4


Morning EM61-MK2A Static Response Test: 6-21-2013
Response (mV)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
Time (min)
Ch3
average
avg+2SD
avg-2SD


Morning EM61-MK2A Vibration Test: 6-21-2013
Response (mV)
4
3
2
1
0
-1
-2
-3
-4
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Time (min)
ch1
Ch2
Ch3
Ch4


Morning EM61-MK2A Vibration Test: 6-21-2013
Response (mV)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Time (min)
Ch3
average
avg+2SD
avg-2SD


Morning EM61-MK2A Spike Response Test: 6-21-2013
600
500
400
300
200
100
0
Response (mV)
0
0.5
1
1.5
2
2.5
3
Time (min)
ch1
Ch2
Ch3
Ch4


Morning EM61-MK2A Spike Response Test: 6-21-2013
175
174.8
174.6
174.4
174.2
174
173.8
173.6
173.4
173.2
173
Response (mV)
0
0.5
1
1.5
2
2.5
3
Time (min)
Ch3
average
avg+2SD
avg-2SD

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MEMORANDUM

TO: [redacted] USACE-CENAB

CC: [redacted] USACE-CENAB

FROM: [redacted] ERT

DATE: July 10, 2013

SUBJECT: Proposed transects in EC-58B for the Former Curtis Bay Ordnance Depot (Depot), Remedial Investigation and Feasibility Study (RI/FS) and Engineering Evaluation/Cost Analysis (EE/CA), Anne Arundel County, MD

During brush clearing activities in EC-58B at the Depot, the UXO staff encountered an area within EC-58B that contains 6-18 inches of standing water, mud, and dense vegetation (*Phragmites*) as well as a ponded area with approximately 18 inches of water (see attached figure).

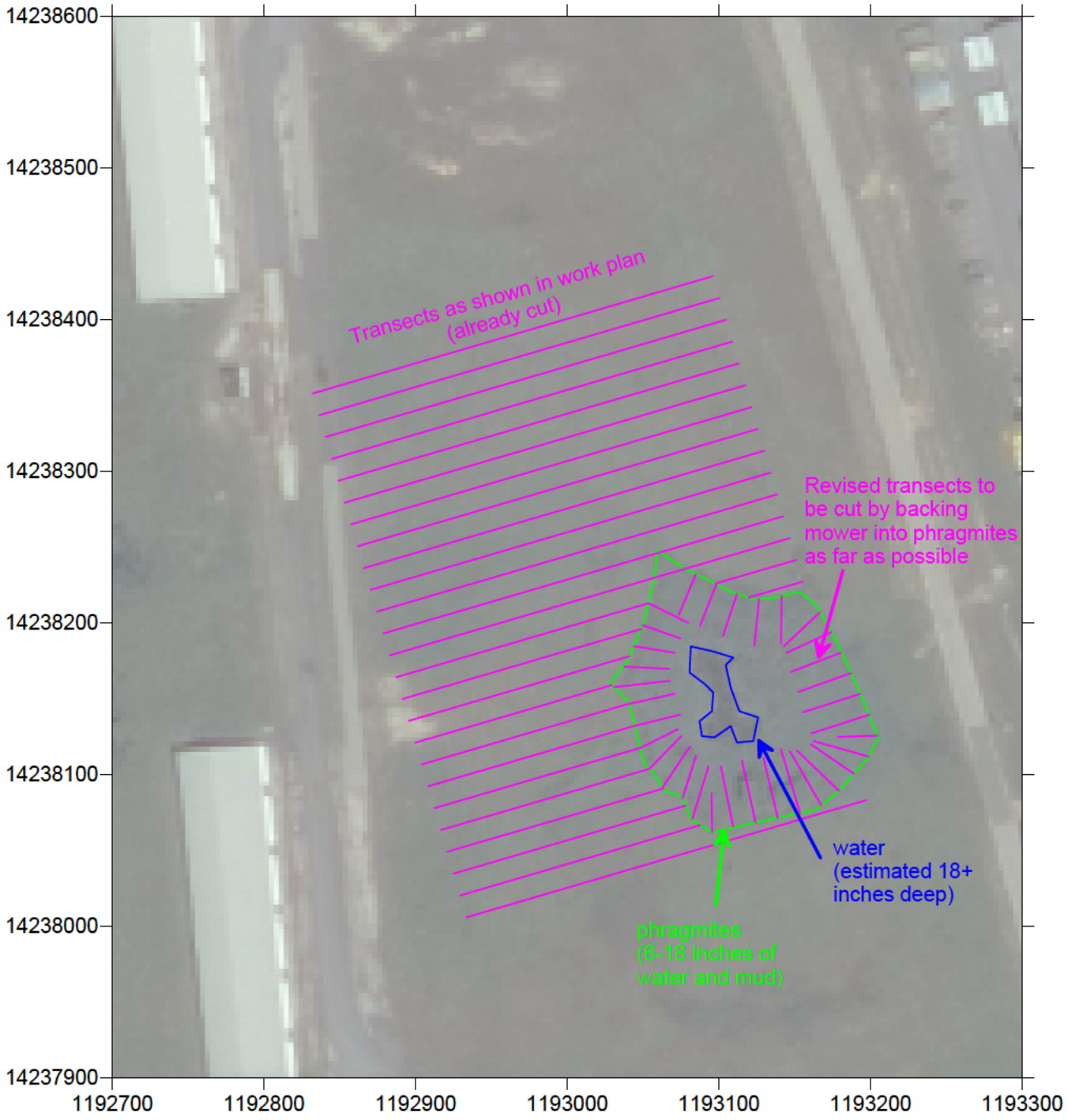
Transects outside of the area containing standing water in EC-58B have been brush and surface cleared, as shown in the attached figure. Per the Final Work Plan, the EM31 is to be used for coverage of approximately 100 percent of EC-58B along 15 foot on-center transect spacing in order to map changes in ground conductivity resulting from burning, contamination, or historical activities associated with the historical pit. Due the existing field conditions and the inability to conduct surface and brush clearing along the originally proposed transects, ERT is proposing to brush and surface clear the area containing standing water (anything within the green boundary on the attached figure) in a radial pattern in order to collect as much data with the EM31 in this area as possible. The attached figure presents ERT's proposed revised approach for clearing the remaining transects in this area of EC-58B.

Please contact me if you have any questions or concerns.

[redacted]

[redacted] PMP
ERT Project Manager

EC-58B
Proposed Revised Transects



UTM Zone 18 coordinates, U.S. Survey Feet

[redacted]
Laurel, MD 20707
[redacted]
www.ERTCorp.com

MEMORANDUM

TO: [redacted] CENAB; [redacted], DLA; [redacted], GSA; [redacted], MDE

FROM: [redacted] (ERT)

DATE: July 29, 2013

SUBJECT: **Final** Former Curtis Bay Depot, EC-25 and EC-49 Proposed Trench and Sampling Locations

1. As part of the ongoing field investigations for the Former Curtis Bay Ordnance Depot (Depot) Engineering Evaluation and Cost Analysis (EE/CA) and Remedial Investigation/Feasibility Study (RI/FS), ERT performed digital geophysical mapping (DGM) of EC-25 and EC-49 from June 21, 2013 through July 16, 2013. DGM data collection in EC-25 will provide information to determine the scope of the area to be removed during the Non-Time Critical Removal Action (NTRCA). The purpose of DGM data collection in EC-49 is to investigate potential burial/burning sites as part of the RI.

2. In a memo dated 15 July 2012 and included in Appendix H of the Work Plan, ERT concluded that DGM data previously collected by MKM Engineers (MKM) are usable for the purposes of this project; therefore, ERT did not collect additional data in these areas, per Section 3.5.13.1 of the Work Plan. Figures 1 and 2 (which were included in the Work Plan as Figures 27 and 29, respectively) present the areas of data collection conducted by MKM and the ERT planned DGM areas.

3. Zapata performed DGM validation and trenching activities based on the MKM DGM data, removing almost 100 lbs of munitions debris (MD), including small arms projectiles, cartridge cases, and cartridge case flash tubes, some of which appeared to have been burned, from EC-49. Approximately 18 lbs of MD was removed from the EC-25 Zapata trenches. Cultural debris was also encountered during Zapata's trenching investigations in EC-25 and EC-49 as described in Section 1.7.1 of the Work Plan.

4. The EM61-MK2 was used to collect data in EC-25, with 100 percent coverage with line spacing of 2.5 feet (ft) in accessible areas not previously mapped. As shown in Figure 1, MKM collected EM61 data over approximately 64 percent of EC-25 (approximately 4.9 of 7.6 acres), as well as the area immediately to the northwest of the EC boundary of approximately 1.4 acres. ERT collected data over the remaining portion of the EC, which is largely the wooded area between the perimeter fence and the shoreline of Furnace Creek. In addition, ERT collected transect data to the north and northwest of the EC boundary, or the limit of the MKM data, in order to determine if contamination extends

beyond the EC boundary. These transect lines were placed 50 feet apart and were up to 150 feet long.

5. The EM61-MK2 was used to collect data in EC-49, with 100 percent coverage with line spacing of 2.5 ft in accessible areas not previously mapped. As shown in Figure 2, MKM collected EM61 data over approximately 63 percent of EC-49 (approximately 4.6 of 7.3 acres), as well as a large area to the west of the EC boundary. ERT collected data over the remaining portion of the EC, which includes the wooded areas between the perimeter fence and the shoreline of Furnace Creek as well as a narrow area on both sides of Patrol Bridge Road. Due to similarities between EC-49 and EC-25, ERT collected data in the area between the two ECs (an area of approximately 0.44 acres) so as not to leave a data gap between them. In addition, ERT collected transect data to the north of the EC boundary, or the limit of the MKM data, in order to determine if contamination extends beyond the EC boundary. These transect lines were placed 50 feet apart and were up to 150 feet long.

6. For both ECs, the shorelines as staked by the surveyor and additional GPS shots taken during field work were used to map the actual edge of the water. The original MRS shoreline boundaries were determined through aerial photos and based on field reconnaissance, and included some intertidal and wetland areas. Figures 3, 4, and 5 show the MRS boundary (in red) and the actual shoreline (in green); DGM data could only be collected within the actual land areas of the ECs.

7. A conference call between the stakeholders was held on July 23, 2013 to discuss the Updated Draft Memo dated July 23, 2013. Changes to a few of the trenches were made after the conference call and were submitted to the stakeholders for review on July 25, 2013.

8. Figure 3 provides the results of EM61 mapping in both EC-25 and EC-49. The color scale for the geophysical data was selected to match the color scale of the MKM data (which is a georeferenced color image of a contour map and thus cannot be altered). It should be noted that the color scale used in Figure 3 and Figure 6 is the same while data presented in Figures 4 uses a different color scale in order to contrast the high responses in EC-25. Additionally, as there is a "higher" response area on the eastern edge of EC-49 that appears to connect to the EC-25 site, that data has been taken off of Figure 6 and only included in Figure 4. This way, the variation in responses can be more easily determined for all of the "high response areas" where there response is greater than 100 mV versus the lower response areas where the response is less than 100 mV.

9. Figure 4 presents the data collected by both MKM and ERT in EC-25, trenches previously investigated by Zapata, and proposed ERT trench locations. Data collection efforts were limited by tidal shoreline, fences, large trees, and railroad tracks. In order to further investigate a linear response along the eastern boundary of the MKM data, ERT

collected ground penetrating radar (GPR) profiles along this area and determined that this corresponds to underground utilities (probable large pipe or duct bank); therefore, ERT is not proposing trenches in this area. The GPR profiles are available upon request.

10. Excavation in EC-25 will support the development of the EE/CA and determination of the scope of the removal action. While Table 3-6 of the Work Plan states that up to 8 trenches in potential burial areas in EC-25 may be excavated, based on the results of both the MKM and ERT DGM data collection in EC-25, ERT proposes the mechanical excavation of 27 trenches within EC-25, each with dimensions of 2 feet wide by 20 feet long. While this is a much higher number then originally discussed during Work Plan development and review, it is felt that this will give us a sound understanding of the area associated with a probably removal action. The July 23, 2013 memo proposed 28 trenches, however one of these trenches was relocated to EC-49 after stakeholder discussions.

11. Based on a review of the geophysical data, it does not appear that the burial areas associated with EC-25 extend west past the railroad tracks. This is supported by the responses of consistently approximately 300 mV or more on the east side of the tracks, while the west side is mainly below approximately 100 mV. In order to determine this definitely, ERT will be excavating 6 trenches along the western side of the railroad tracks. Two of these trenches (26, 28) are associated with areas of high response anomalies (> 750 mV) and four (9, 13, 15, and 22) are in lower response areas (< 150 mV).

12. In EC-25, in order to cover more of the EC response areas and ensure that the boundary of the munitions related items can be determined, ERT is proposing to trench at 21 locations. Eighteen of these trenches are within areas with a high response (>300 mV) and 3 trenches (6, 10, 19) are in areas of low response (<200 mV). Proposed trenches associated with EC-25 are presented in Figure 4 and described in more detail below.

13. Figure 5 shows the metallic contamination extent based on responses over approximately 50 mV from the ERT and MKM data. All proposed ERT trenches and existing Zapata trenches shown in Figure 4 are shown again for clarity.

14. The four corners of each trench will be marked using GPS and excavation will occur within the delineated area per the Work Plan, Accident Prevention Plan and Site Safety and Health Plan requirements. Trench orientations may be altered slightly by field conditions.

15. While the initial approach presented in the Work Plan noted that the EE/CA soil samples would only be analyzed for RCRA Characterization for disposal options, in order to determine if there is any MC contamination that should be addressed as a result of the findings in the EE/CA, the following revised sampling approach is being proposed:

a. Collect a surface soil sample (0-0.5 ft below ground surface [bgs]) from each trench location (total of 27 surface soil samples). The location of the surface sample will be taken based on field observations, such as stained soil, evidence of energetic material (breached munitions items) or in areas of significant MD, where at least 50 percent of the munition could be identified by UXO Technicians, such that an assumption of MC in the vicinity could be tested by taking a sample.
b. A total of 9 subsurface samples will be collected from the trenches. The subsurface sample will be collected along the interval of 1 ft bgs to the bottom of the trench along the side wall of the trench. The determination of which of the 28 trenches to collect the 9 subsurface samples and the location of the side wall samples will be made using best professional judgment by the field team who will look for material potentially presenting an explosive hazard/munitions and explosives of concern (MPPEH/MEC) or munitions debris (MD) within the trench, soil staining, etc. The subsurface samples will be collected from the trenches that appear, through best professional judgment and amount of munitions items, to be the most probably location for MC contamination.
c. Trenches dug during each work day will be left open until the end of the day at which point the determination of which trench(es) to collect a subsurface sample from will be made. Once the subsurface sample(s) are collected, all trenches will be backfilled. If for some unforeseen reason the trenches are left open overnight, they will be covered and secured per the Site Safety and Health Plan requirements.
d. Should there be any additional field observations during trenching activities that cause interest, additional biased samples will be collected in order to ensure characterization of all areas/soil types, etc. of the EC. The depth for these unknown biased soil samples will be just below the depth of the associated munition, or in the case of samples collected where there is visible evidence of energetic material in the top few inches of soil.
e. Collect 1 groundwater sample using direct push technology at a co-located surface soil location (9a).
f. The samples collected as described above in 9a-9e will be analyzed for select metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, TNT, perchlorate, dioxins/furans, PCBs, PAHs, as detailed in Table 3-7 of the Work Plan. These analytes are based on the historical usage of the EC, as described in Section 1.7.1.3 of the Work Plan.
g. In order to determine removal options, including disposal, for the EE/CA, ERT will collect 4 samples from the trenches and analyze for RCRA Characterization (40 CFR Part 260) including: total characteristic leaching procedure (TCLP) (metals, VOCs, SVOCs, herbicides, pesticides), reactive cyanide, reactive sulfide, ignitability, and corrosivity. There will be 2 surface samples and 2 subsurface samples collected from the trenches; the trenches selected for this sampling will

be determined in the field by the ERT Soil Scientist based on observations of soil characteristics, density of munition related items, etc.

16. As the EE/CA site will be characterized by the NTCRA contractor, ERT will utilize the confirmatory samples collected by that contractor for the EC-25 RI. ERT will not collect any RI level samples at this EC.

17. Figure 6 presents the data collected by both MKM and ERT in EC-49, trenches investigated by Zapata, proposed ERT trench locations, and random sampling locations. Data collection efforts were limited by tidal shoreline, fences, large trees, and railroad tracks.

18. Unlike EC-25, most of the geophysical response in EC-49 is below 10mV, indicating little or no metal in the subsurface. Anomalies that are present are generally in the range of 10-100mV, and the anomaly pattern is indicative of isolated or scattered metal content rather than a "saturated" response throughout the area.

19. Per Table 3-8 of the Work Plan, up to 3 trenches in potential burial areas in EC-49 may be excavated. Based on the results of both the MKM and ERT DGM data collection in EC-49, ERT proposes the excavation of 8 trenches within EC-49. The July 23, 2013 memo proposed 7 trenches, however one of the proposed trenches from EC-25 was relocated to EC-49. All excavation within EC-49 is to determine nature and extent of MEC in support of the RI. Proposed trenches associated with the lower response area of EC-49 are presented in Figure 6 and described in more detail below.

20. Trenches 49A through 49H are placed in areas of high response, and are 2 feet wide and 20 feet long. Trenches 49E, 49F, and 49G are located in high response areas near Zapata trench 7A, where 50 lbs of munitions debris were excavated from a small trench.

21. Sixteen biased soil samples from the side walls of the trenches associated with EC-49; one surface sample (0-0.5 ft bgs) and one subsurface sample (1 ft bgs to the bottom of the trench) will be collected from each trench. The determination of the location of the side wall samples will be made using best professional judgment by the field team who will look for soil staining, etc. If there are no field indicators available, the two samples from each trench will be collected from the side wall closest to the nearest water body, as it is assumed groundwater will flow in that direction.

22. Per Table 3-9 of the Work Plan, up to 3 biased soil samples will be collected at locations based on field observations, such as evidence of energetic material or in areas of significant MD. No such areas were identified during surface sweeps of ERT DGM areas in EC-49. Any such areas that are identified during trenching activities will be sampled, per procedures described in the Work Plan.

23. Thirteen discrete, co-located surface (0-0.5 ft) and subsurface soil samples at random locations were generated using VSP throughout the entirety of EC-49, as described in UFP-QAPP Worksheet #17. Sample location 9 lies within an inaccessible, tidal area of EC-49, as shown on Figure 6. This sample location will be relocated approximately 30-40 ft north in order to collect surface and subsurface samples in an accessible area within EC-49 near the initial sample location; the GPS coordinates of the relocated sample will be determined in the field and recorded. The depth of the subsurface samples will be based on field observations; in instances where no observable field conditions (MEC/MPPEH or MD, burned soil, staining, odor, etc.) are available, the subsurface sample will be collected from the 1-2 ft interval. Random sampling locations are presented in Figure 6.

24. The samples collected per #20-22 above in EC-49 will be analyzed for metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, TNT, perchlorate, dioxins/furans, and PAHs based on the historical use of the EC as outlined in Table 3-9 and Section 1.7.1.4 of the Work Plan.

25. The maximum depth of investigation in trenching activity by Zapata was 4 ft; anomalies were detected below 4 ft bgs, but were not excavated. It is unknown if the anomalies left in place were MEC-related, or cultural debris. During trench excavations performed by Zapata, excavations down to 4 ft bgs often encountered groundwater. Based on professional judgment, inferred from historical information and prior investigations, MEC-related burial activities are not expected to exceed 6 ft bgs.

26. The site is moderately vegetated with trees and brush that may limit where the trenches can be installed. Placement and orientation of the trenches will be made in the field in accessible areas, ensuring the anomalous response is bisected by the trench. GPS data on the outline of the trench will be collected and included in the appropriate reports.

27. The surface size of the trench may be increased if the trenches are extended below 5 feet in order to conduct stepping that is needed for safety concerns. A Trenching Competent Person will oversee all trenching work starting at a depth of 5 feet bgs. All trenching work will be conducted using a mini-excavator.

Figure 1. EC-25 MKM and ERT DGM Coverage

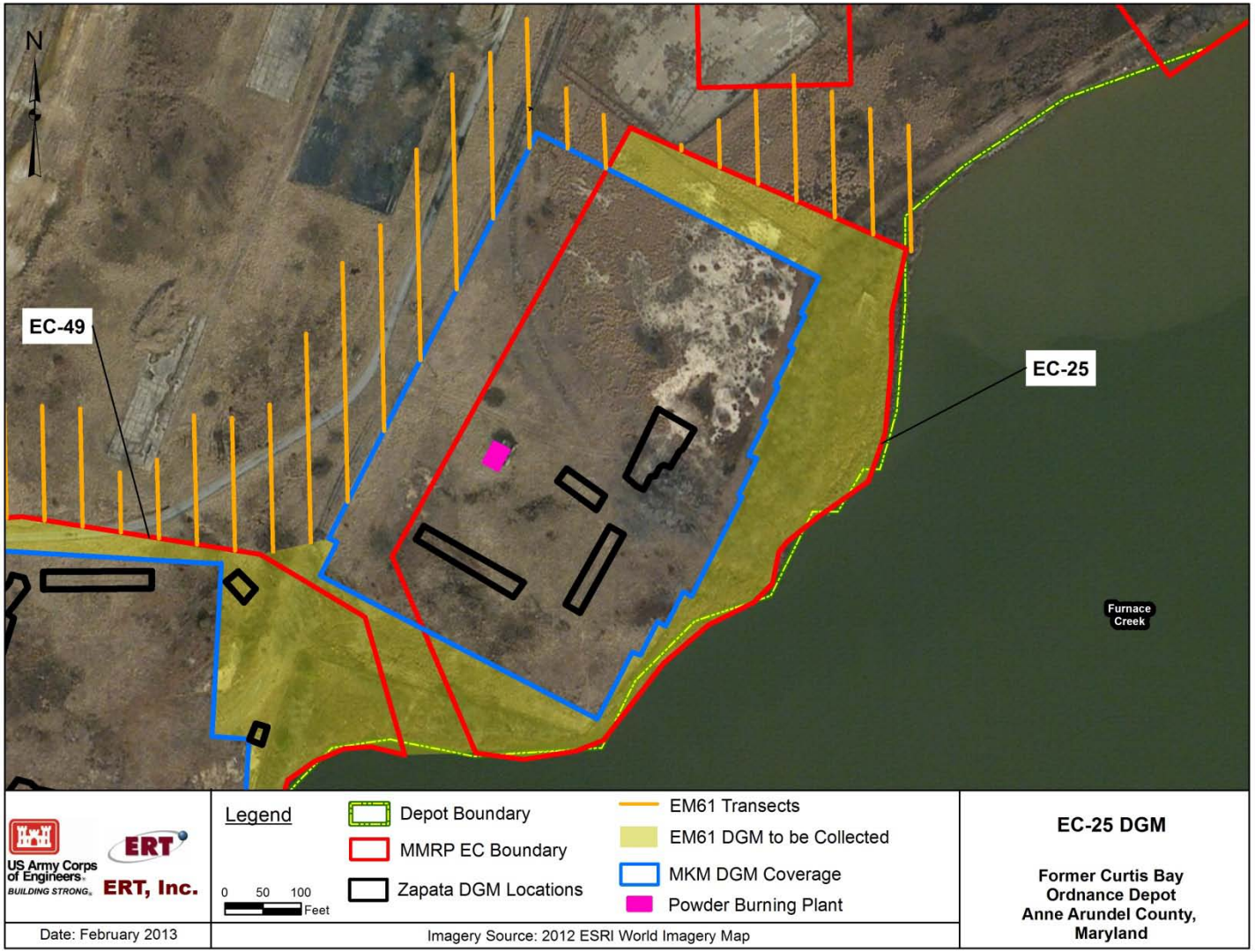
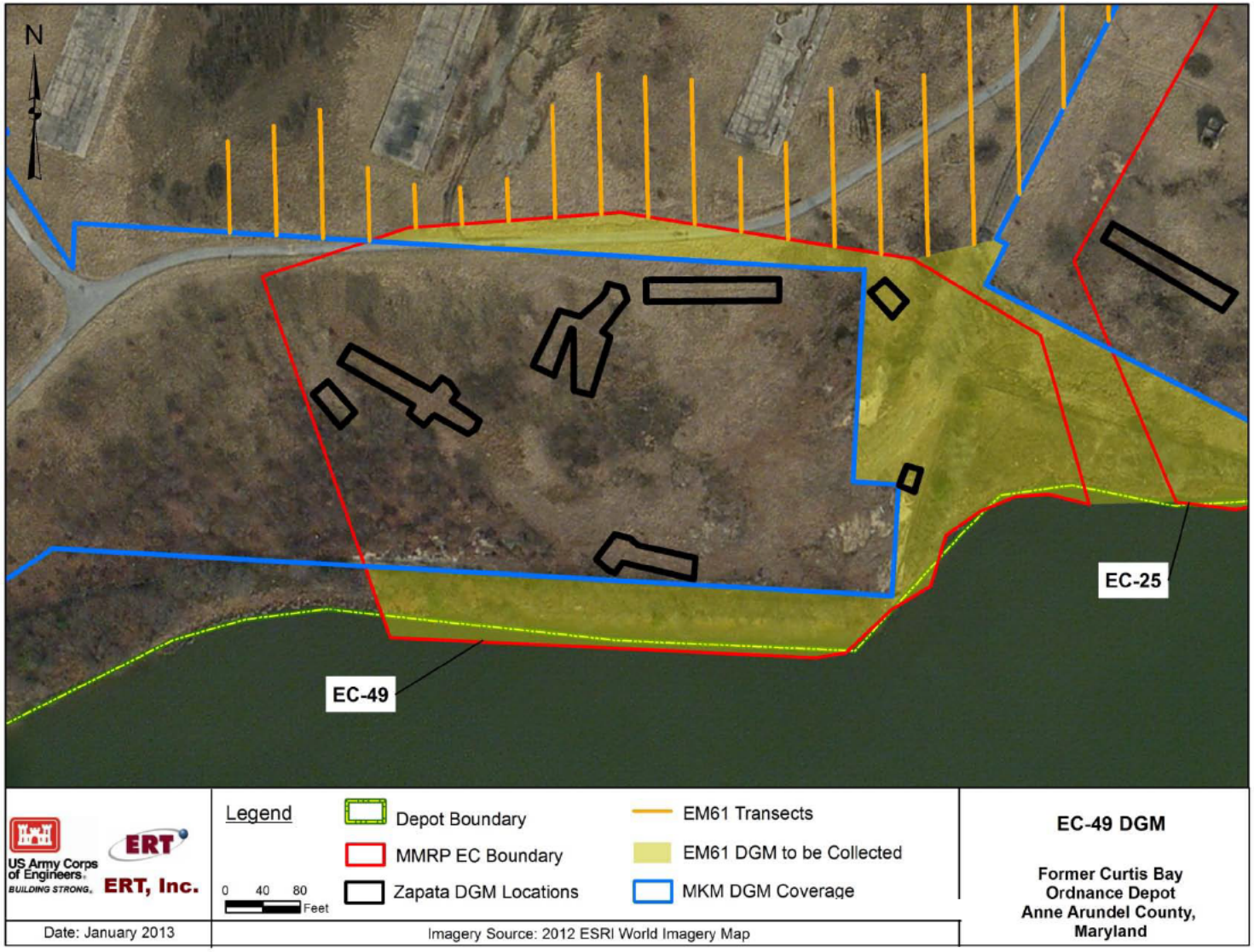


Figure 2: EC-49 MKM and ERT DGM Coverage



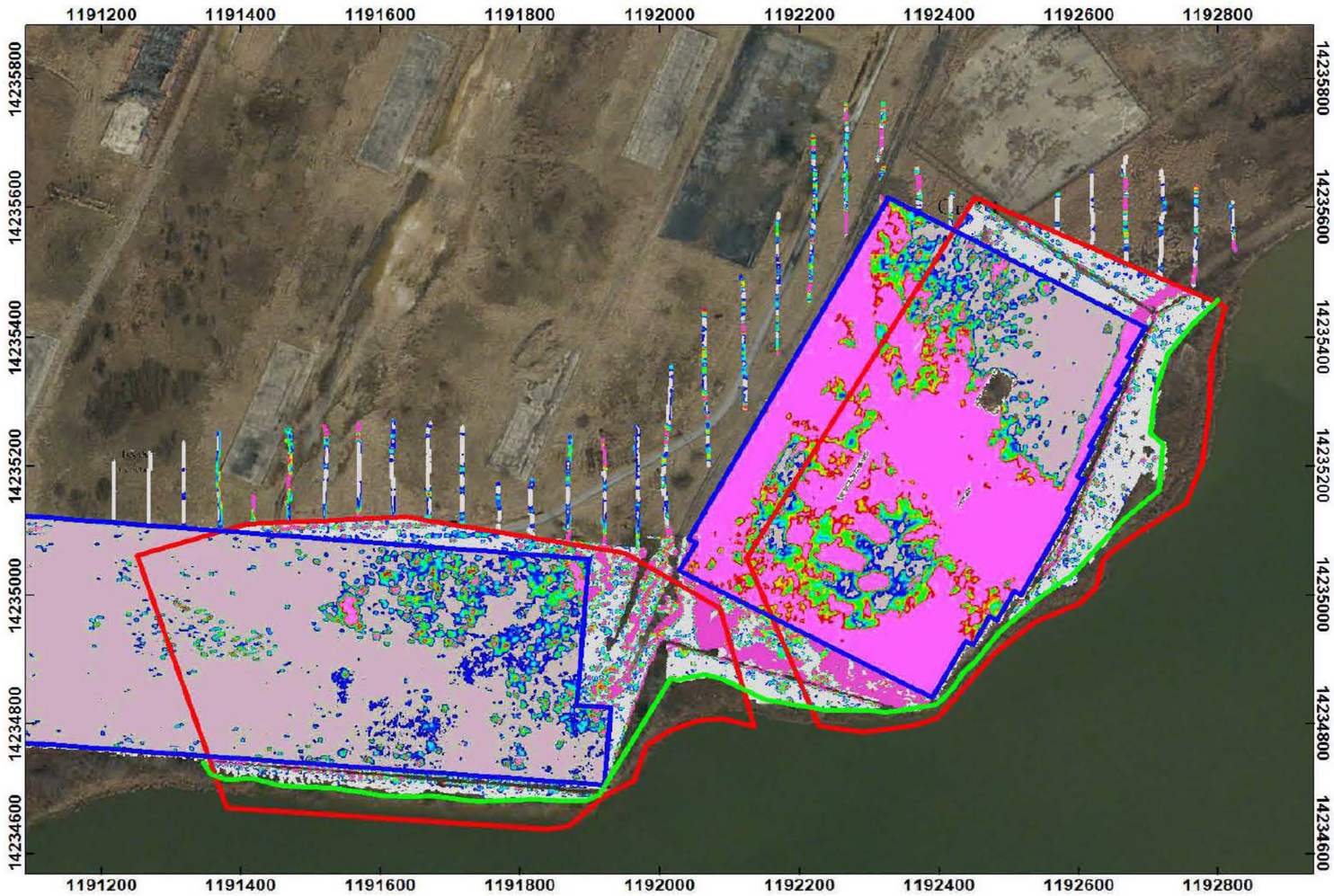


Figure 3
EM61MK2 Survey
Channel 3

EC-25 and EC-49 Area
Curtis Bay, MD

Legends:
- EC boundary
- Shoreline
- MKM Survey Boundary

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:2200
100 0 100 200
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. Date: July 2013

Created By: [redacted] Verified By: [redacted] Approved By: [redacted]

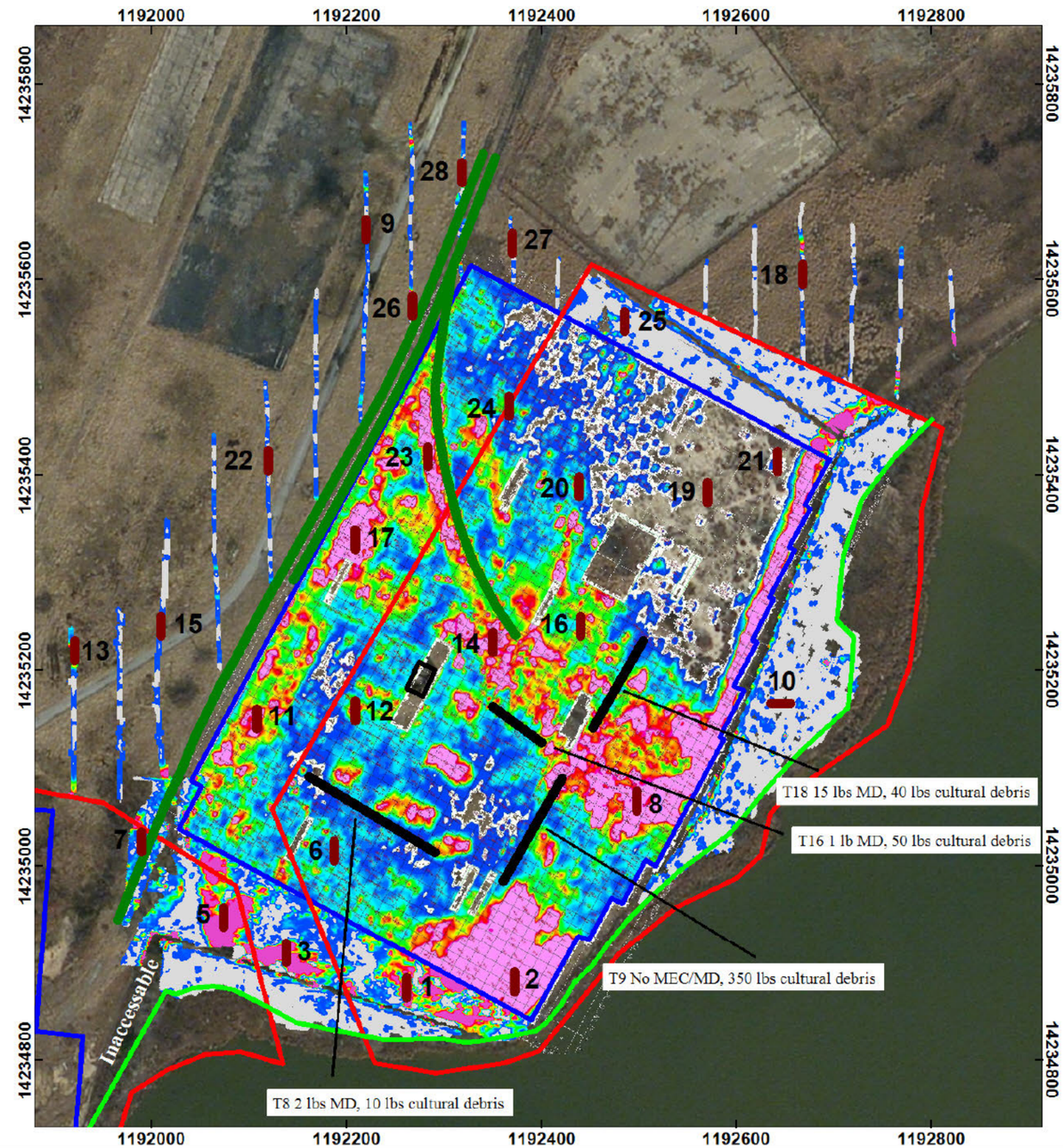


Figure 4
EM61MK2 Survey
Channel 3

EC-25 Area
Curtis Bay, MD

Legends:
- EC boundary
- ERT Proposed Trenches
- MKM Survey Boundary
- Powder Burning Tower
- RR Spurs
- Shoreline
- 2009 Zapata Trenches

mV
0 80 180 260 330 400 470 540 610 680 780 920

Scale 1:1500
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: [redacted] | Verified By: [redacted] | Approved By: [redacted]

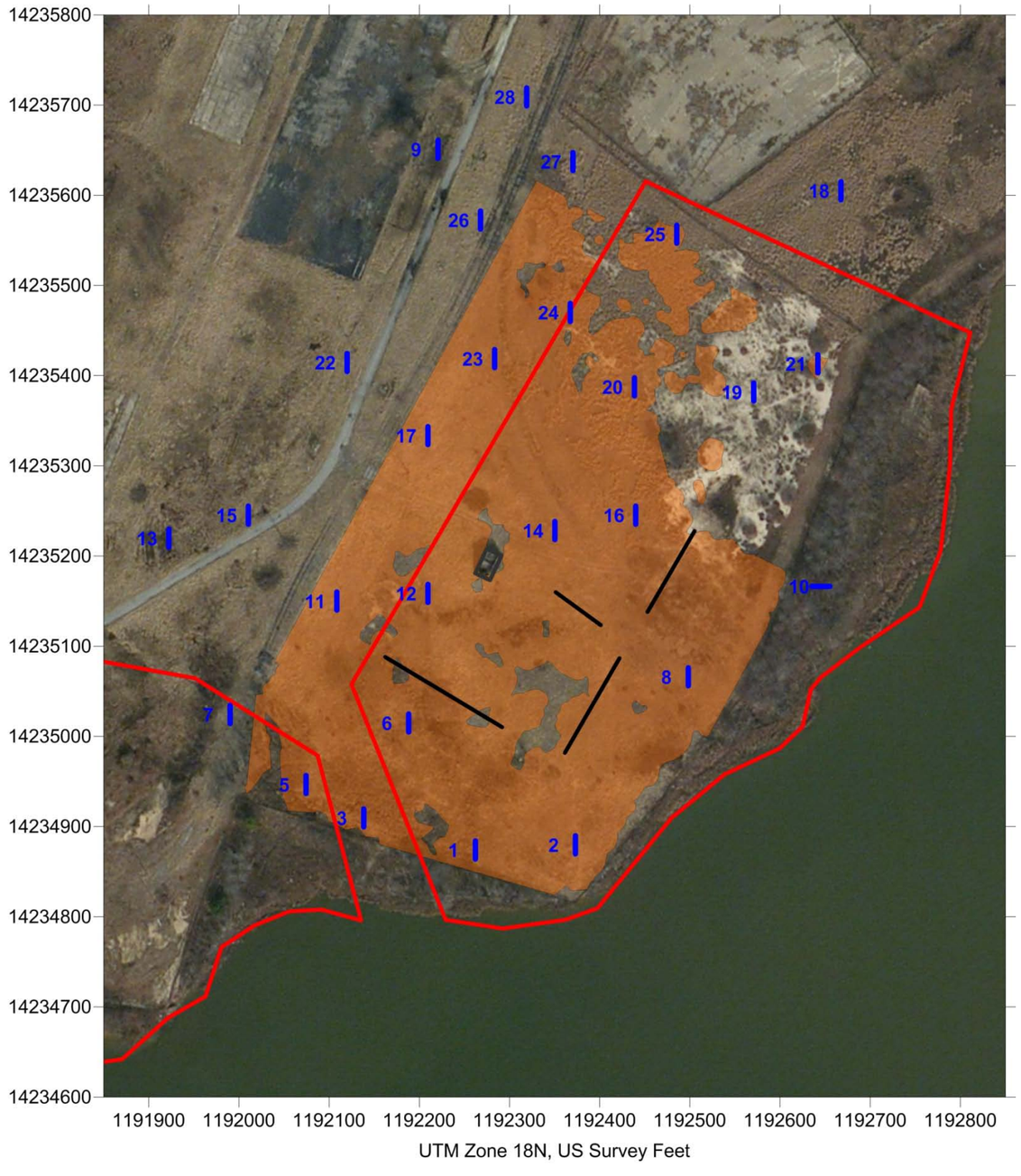


Figure 5: EC-25 Metallic Contamination Extent and proposed trenches (blue)

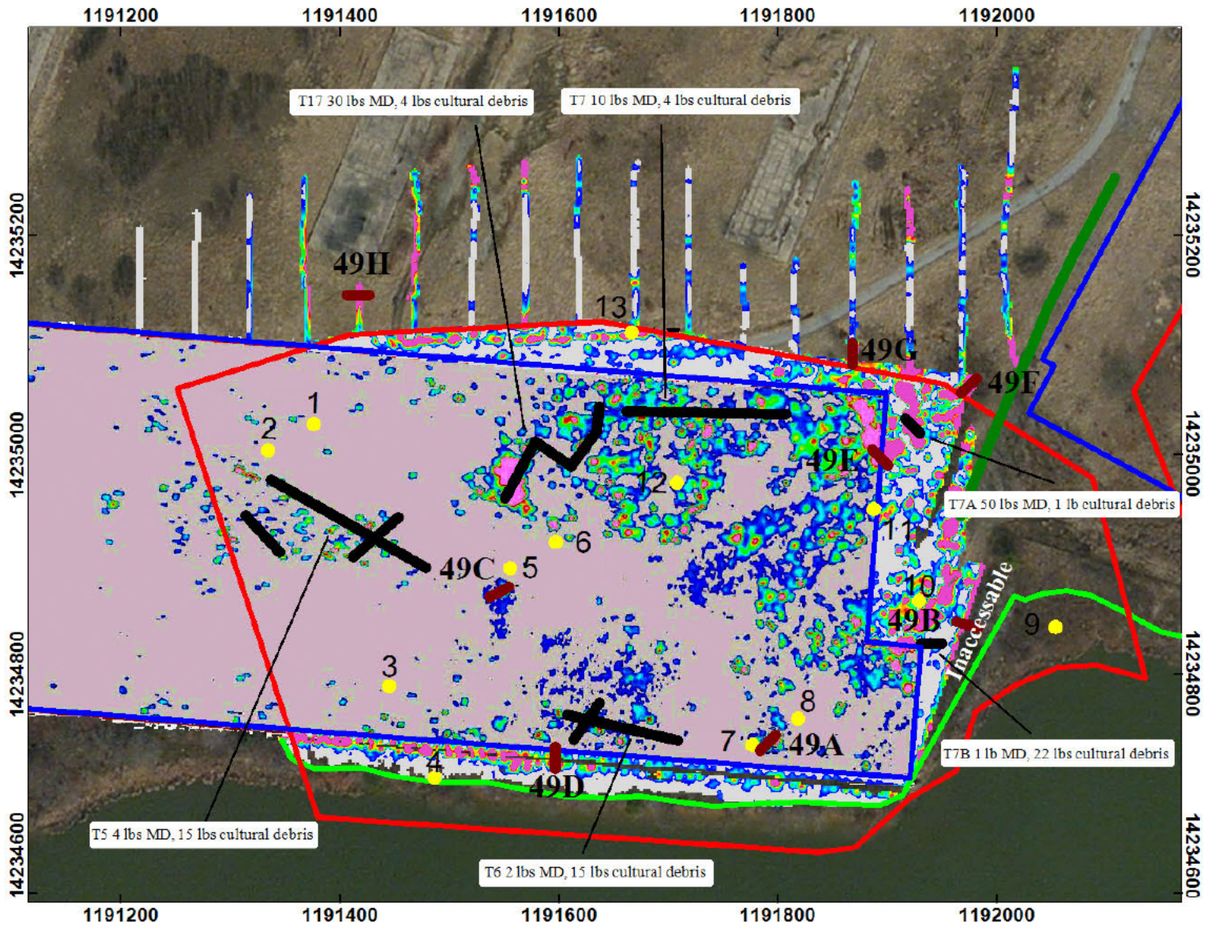


Figure 6
EM61MK2 Survey
Channel 3

EC-49 Area
Curtis Bay, MD

Legends:
- EC boundary
- ERT Proposed Trenches
- MKM Survey Boundary
- RR Spurs
- Shoreline
- Random Sample Locations
- 2009 Zapata Trenches

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:1500
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. Date: July 2013

Created By: [redacted] Verified By: [redacted] Approved By: [redacted]

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Laurel, MD 20707
[redacted]
www.ERTCorp.com

MEMORANDUM

TO: [redacted] CENAB; [redacted] DLA; [redacted], MDE

FROM: [redacted] (ERT)

DATE: August 19, 2013

SUBJECT: **Final** Former Curtis Bay Depot, EC-21, EC-22, EC-52, EC-57C, EC-58B, EC-58C, EC-57D Proposed Trench and Sampling Locations

1. As part of the ongoing field investigations for the Former Curtis Bay Ordnance Depot (Depot) Remedial Investigation/Feasibility Study (RI/FS), ERT performed digital geophysical mapping (DGM) of EC-21, EC-22, EC-52, EC-57C, EC-58B, and EC-58C from July 11 through July 31, 2013. DGM data collection with the EM61 in EC-21, EC-22, EC-52, and EC-58C will provide information to determine if there are potential burial areas containing MEC. DGM data collection with the EM31 in EC-57C and EC-58B will provide information to guide placement of environmental sampling locations for MC characterization.

2. In a memo dated 15 July 2012 and included in Appendix H of the Work Plan, ERT concluded that DGM data previously collected by MKM Engineers (MKM) are usable for the purposes of this project; therefore, ERT did not collect additional data in these areas, per Section 3.5.13.1 of the Work Plan. Figures 1, 2, and 3 (which were included in the Work Plan as Figures 24, 26, and 31, respectively) present the areas of data collection conducted by MKM in and the ERT planned DGM areas ECs 21, 22, and 52. No MKM data were collected in the other ECs in this memo, and therefore the coverage in the remaining ECs (57C, 58B, and 58C) was 100 percent coverage.

3. Zapata performed DGM validation and trenching activities based on the MKM DGM data in EC-21, removing approximately 44 lbs of munitions debris (MD), including small arms projectiles, cartridge cases, and flash tubes. Over 3,800 lbs of cultural debris were found as well, mostly from trench 2 in EC-21 (Figure 4). In EC-52, no MD was removed from the Zapata trenches. Zapata did not conduct trenching in EC-22 or EC-58C.

4. The four corners of each trench will be marked using GPS and excavation will occur within the delineated area per the Work Plan, Accident Prevention Plan and Site Safety and Health Plan requirements. Trench orientations may be altered slightly by field conditions.

5. The maximum depth of investigation in trenching activity by Zapata was 4 ft; anomalies were detected below 4 ft bgs, but were not excavated. It is unknown if the anomalies left in place were MEC-related, or cultural debris. During trench excavations performed by Zapata, excavations down to 4 ft bgs often encountered groundwater. Based on professional judgment, inferred from historical information and prior investigations, MEC-related burial activities are not expected to exceed 6 ft bgs.

6. The site is moderately vegetated with trees and brush that may limit where the trenches and/or sampling locations can be installed. Placement and orientation of the trenches will be made in the field in accessible areas, ensuring the anomalous response is bisected by the trench. GPS data on the outline of the trench will be collected and included in the appropriate reports.

7. The surface size of the trench may be increased if the trenches are extended below 5 feet in order to conduct stepping that is needed for safety concerns. A Trenching Competent Person will oversee all trenching work starting at a depth of 5 feet bgs. All trenching work will be conducted using a mini-excavator.

EC-21: Landfill/"Open Dump" and Barricade 645 (Shell Burning Pit) (RI level EC)

8. The EM61-MK2 was used to collect data in EC-21, with 100 percent coverage with line spacing of 2.5 feet (ft) in accessible areas not previously mapped. As shown in Figure 1, MKM collected EM61 data over approximately 66 percent of EC-21 (approximately 6.9 of 10.4 acres), as well as areas outside but adjacent to the EC boundary. ERT collected data over the remaining portion of the EC, including in the interior of barricade 645, over MKM data gaps to the north, over the propellant grain dump area, and in the woods to the east and southeast.

9. Figure 4 provides the results of EM61 mapping in EC-21 by both MKM and ERT, the locations of trenches excavated by Zapata, and proposed ERT trench and biased sampling locations. Data collection efforts were limited by steep slopes of the barricade, fences, large trees, and railroad tracks. According to the Work Plan, up to 3 trenches may be excavated in this EC, with a surface and subsurface sample from each trench, as well as up to 3 biased soil samples (co-located with 1 surface and 1 subsurface collected from each location); these locations are all based on the DGM results. Proposed trenches (21A, 21B, 21C) are placed to investigate geophysical anomalies. 21A is inside the barricade, which is known to be an area where ordnance burning took place, and it crosses an anomaly over 100mV. 21B crosses an anomaly near the opening of the barricade. 21C is placed at the MKM survey boundary in a large, intense anomaly. Two biased soil samples are proposed at smaller geophysical anomalies – one in the barricade and one near Zapata trench T11. A point-in-time groundwater sample will be collected via direct push technology (DPT) from the sample location in the barricade, as shown in Figure 4.

10. Additionally, ERT will conduct test pitting along the northern boundary of the large anomaly associated with the MKM data in order to determine the extent of buried munitions debris in this area.

11. Figure 4 also shows the location of the previously approved random sampling locations (13 co-located surface and subsurface samples) and the grid samples (15 co-located surface and subsurface samples) collected over the propellant grain area.

12. As detailed in Table 3-2 of the Final Work Plan, the trench, biased, and random soil samples will be analyzed for: PAHs, dioxins/furans, metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, TNT, and PCBs. In addition to these analytes, the groundwater sample will also be analyzed for the MDE Solid Waste Table I and II analytes per MDE request at TPP #2.

13. The propellant grain dump area soil samples will be analyzed for: 2,4 DNT, 2,6 DNT, nitroglycerin, and nitroguanidine

EC-22: Barricade 646-XK/Former Explosives Open Burning Area (SI level EC)

14. The EM61-MK2 was used to collect data in EC-22, with 100 percent coverage with line spacing of 2.5 feet (ft) in accessible areas not previously mapped. As shown in Figure 2, MKM collected EM61 data over approximately 32 percent of EC-21 (approximately 0.9 of 2.8 acres), as well as areas outside but adjacent to the EC boundary to the south and east. ERT collected data over the remaining portion of the EC, including in the interior of barricade 646-XK, over MKM data gaps to the east, and accessible areas on the west side of the barricade.

15. Figure 5 provides the results of EM61 mapping in EC-22 by both MKM and ERT and proposed ERT biased sampling locations. Data collection efforts were limited by steep slopes of the barricade and large trees. According to the Work Plan, up to 2 trenches may be excavated in this EC, with a surface and subsurface sample from each trench, as well as up to 5 biased soil samples (co-located with 1 surface and 1 subsurface collected from each location); these locations are all based on the DGM results. Due to the lack of anomaly clusters or large, broad anomalies indicative of possible burial pits, no trenches are proposed for this EC. Five (5) biased co-located surface and subsurface soil samples are proposed at some of the more intense isolated geophysical anomalies. A point-in-time groundwater sample will be collected via DPT from the sample location to the southeast of the opening of the barricade, as shown in Figure 5. Note that the large anomaly present in the MKM data on the southwest side of the barricade was excavated and remediated in 2007 by Solutient Technologies as part of an investigation conducted by the Department of Energy.

16. As detailed in Table 3-4 of the Final Work Plan, the biased soil and groundwater samples will be analyzed for: PAHs, dioxins/furans, metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4 DNT, 2,6-DNT, TNT, and PCBs.

EC-52: Disturbed Areas at End of G-Line Road (SI and RI level EC)

There are two different investigations being conducted in this EC. The propellant grain dump area is being investigated at the RI level. The rest of the EC is being investigated at the SI level.

17. The EM61-MK2 was used to collect data in EC-52, with 100 percent coverage with line spacing of 2.5 feet (ft) in accessible areas not previously mapped. As shown in Figure 3, MKM collected EM61 data over approximately 93 percent of EC-21 (approximately 4.7 of 5.0 acres), as well as areas outside but adjacent to the EC boundary to the north, south, and east. ERT collected data over the remaining portion of the EC, including only two narrow strips of data along the western fence line and along the perimeter road.

18. Figure 6 provides the results of EM61 mapping in EC-52 by both MKM and ERT, the locations of trenches excavated by Zapata, and proposed ERT trench and biased sampling locations. Data collection efforts were limited by steep slopes next to the road and by fences. According to the Work Plan, up to 2 trenches may be excavated in this EC, with a surface and subsurface sample from each trench, as well as up to 2 biased soil samples (co-located with 1 surface and 1 subsurface collected from each location); these locations are all based on the DGM results. Due

to the fact that all significant anomalies were investigated by Zapata, ERT is proposing only one confirmatory trench at the largest anomaly cluster near the center of the EC. Two biased soil samples are proposed at two anomaly locations in the southern part of the EC. A point-in-time groundwater sample will be collected via DPT from the southernmost sample location and from a grid sample location, as shown in Figure 6.

19. Figure 6 also shows the location of the previously approved grid samples (15 co-located surface and subsurface samples) collected over the propellant grain area.

20. As detailed in Table 3-11 of the Final Work Plan, the trench and biased soil samples will be analyzed for: metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4-DNT, 2,6-DNT, and TNT. In addition to these analytes, the groundwater sample will also be analyzed for the MDE Solid Waste Table I and II analytes per MDE request at TPP #2.

21. The grid samples locations placed over the propellant grain dump area (13 co-located surface and subsurface soil samples) will be analyzed for: 2,4 DNT, 2,6 DNT, nitroglycerin, and nitroguanidine. In addition to these analytes, the groundwater sample collected from a grid sample location will also be analyzed for the MDE Solid Waste Table I and II analytes per MDE request at TPP #2.

EC-58C: Explosive Open Burning/Wire Cage (SI Level EC)

22. The EM61-MK2 was used to collect data in EC-58C, with 100 percent coverage with line spacing of 2.5 feet (ft) in accessible areas. No MKM data were collected within several hundred feet of the EC boundary. ERT collected data over accessible portions of the EC in the interior of Barricade 644-XK, which includes a northern and southern area separated by a steep earthen mound in the center of the barricade.

23. Figure 7 provides the results of EM61 mapping in EC-58C by ERT and proposed ERT trench and biased sampling locations. Data collection efforts were limited by steep slopes of the barricade and by large trees. According to the Work Plan, up to 2 trenches may be excavated in this EC, with a surface and subsurface sample from each trench, as well as up to 2 biased soil samples (co-located with 1 surface and 1 subsurface collected from each location); these locations are all based on the DGM results. ERT proposes three trenches (58C-A, 58C-B, 58C-C) to investigate larger, burial-like anomalies. 58C-A will cross an intense anomaly in the southern basin half of the EC. 58C-B will cross another intense anomaly. However, it is likely that this anomaly is caused by railroad tracks or a structure related to the dome-shaped magazine embedded in the barricade, rather than buried ordnance (this is supported by the linear anomalies to the north which are co-linear with an existing railroad bed outside the EC). 58C-C crosses a cluster of less-intense anomalies offset from the trend of railroad tracks. Trench 58C-C will remain in the proposed location if the response adjacent to the trench is confirmed to be due to the presence of railroad tracks. If railroad tracks are not confirmed, the trench will be rotated 90 degrees. A single biased soil sample and point-in-time groundwater sample will be collected via DPT over an anomaly in the southern EC, as shown in Figure 7.

24. As detailed in Table 3-20 of the Final Work Plan, the trench and biased soil and groundwater samples will be analyzed for: metals (Al, Cu, Mn, Pb, Sb, Zn), 2,4,-DNT, 2,6-DNT, TNT, dioxins/furans, PCBs, and PAHs

EC-57C: Bldg. J-408 (SI Level EC)

25. The EM31 was used to collect data in EC-57C, the site of a former magazine fire, with 100 percent coverage with line spacing of 15 feet (ft) in accessible areas. The goal of this DGM was to map changes in ground conductivity resulting from burning or contamination.

26. Figures 8 and 9 provide the results of EM31 mapping in EC-57C and proposed ERT random sampling locations. The results of the geophysics (both conductivity and inphase channels) only indicate anomalies correlating strongly with the concrete pad or possible ore debris adjacent to the pad. Therefore, ERT proposes collection of 4 random soil samples (locations generated with VSP according to the Work Plan), as shown on the figures. A single random soil sample and point-in-time groundwater sample will be collected via DPT at the southwestern sample location, as shown in Figures 8 and 9.

27. As detailed in Table 3-15 of the Final Work Plan, these random samples will be analyzed for: nitroglycerin, nitroguanidine, 2,4-DNT, 2,6-DNT, TNT, dioxins/furans, and PAHs.

EC-58B: Explosive Open Burning/Wire Cage (SI Level EC)

28. The EM31 was used to collect data in EC-58B, the "HE suspect area", with 100 percent coverage with line spacing of 15 feet (ft) in accessible areas. The goal of the DGM for this EC was to map changes in ground conductivity resulting from burning, contamination, or historical activities associated with the historical pit.

29. In a memo to USACE dated July 10, 2013, a change to the EM31 transect design was proposed, in order to collect data more efficiently around a stand of *Phragmites* with a permanent pond in the center; this approach was approved by USACE. The memo is available upon request.

30. Figures 10 and 11 provide the results of EM31 mapping in EC-58B and proposed ERT biased sampling locations. Both the ground conductivity map (Figure 10) and the inphase (metal detector) map (Figure 11) show significant anomalies. According to the Work Plan, up to 5 biased soil samples (co-located with 1 surface and 1 subsurface collected from each location) based on DGM results may be collected. Based on the results, ERT will place one trench along the northern portion of the EC, which is located at a coincident conductivity/inphase anomaly, as shown in Figures 10 and 11. Four biased soil sampling locations are placed in areas correlating with strong inphase or conductivity anomalies. If, during excavation of the trench in this EC, no metallic debris is found and it is determined that the geophysical responses were due to changes in soil characteristics, then four VSP determined random sampling locations (Figure 12) will be sampled, rather than the locations shown on Figures 10 and 11. The trench location will also be utilized as a soil sampling location.

31. As detailed in Table 3-18 of the Final Work Plan, the biased samples will be analyzed for: 2,4-DNT, 2,6-DNT, TNT, dioxins/furans, and PAHs.

EC-57D: Brass and Steel Stockpile Area (SI Level EC)

32. No DGM was collected in EC-57D. According to the Work Plan, co-located biased surface and subsurface soil samples will be collected based on field observations such as soil staining, grading of the area, low spots, etc. If the area is completely flat and no notable field findings are observed, ERT will utilize the VSP module "Non-statistical Sampling Approach > Predetermined Number of Samples" to place the co-located biased soil samples.

33. Field observations of non-vegetated areas, low spots, and munitions debris were observed within this EC; therefore, the sampling locations will be determined by field observations, which will be noted in the field notes and RI Report. VSP will not be utilized for this EC.

Figure 1. EC-21 MKM and ERT DGM Coverage

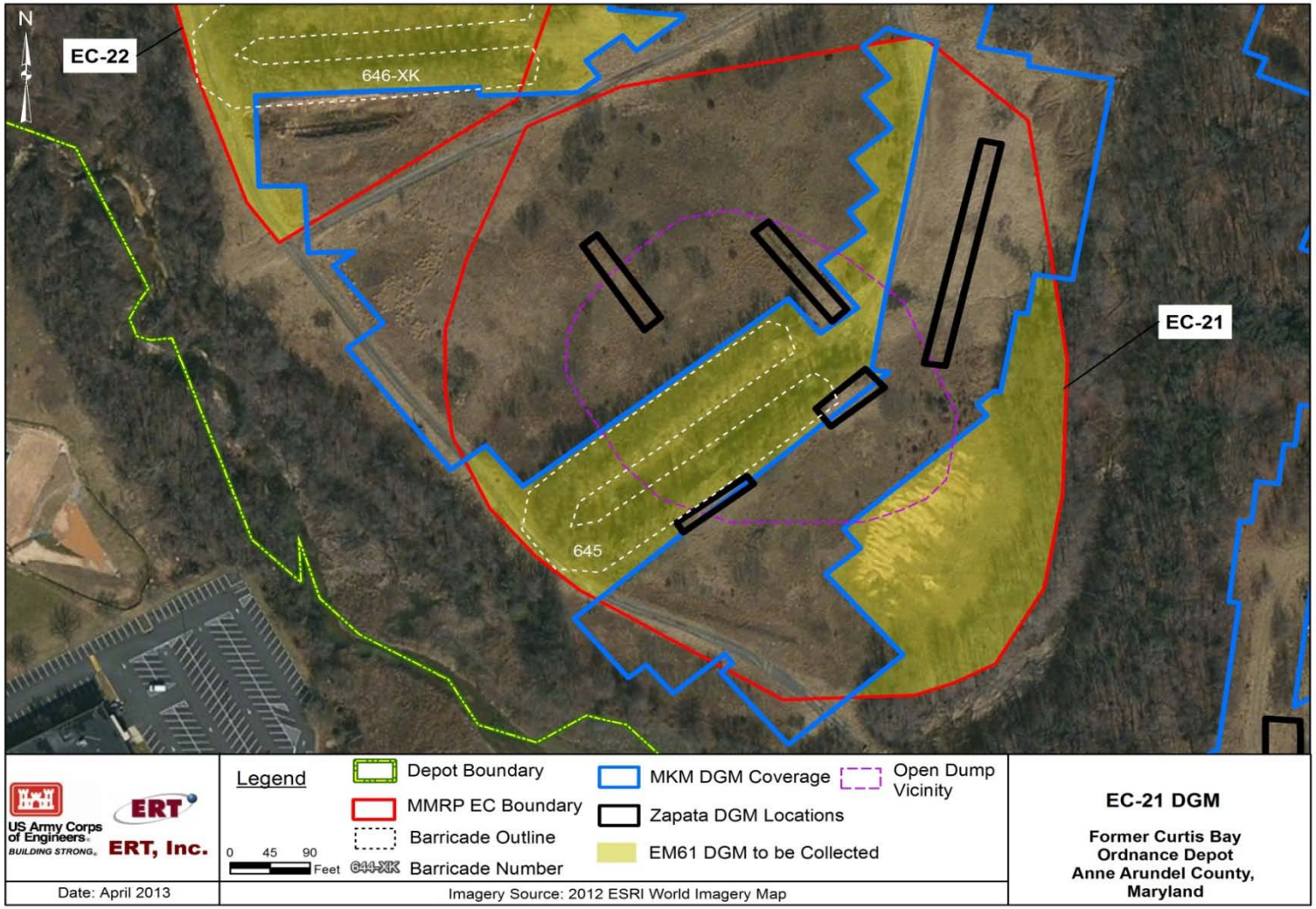


Figure 2: EC-22 MKM and ERT DGM Coverage

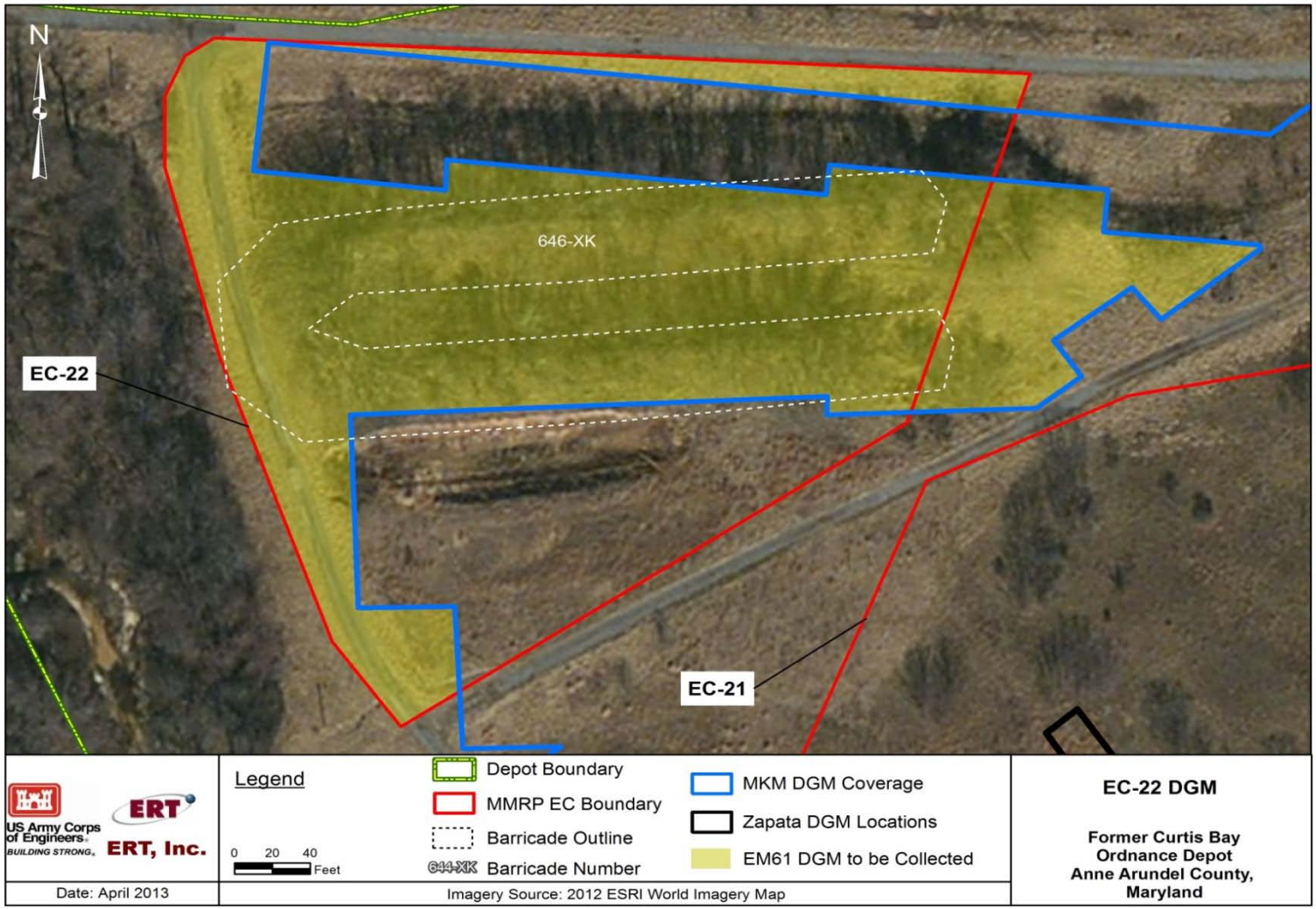
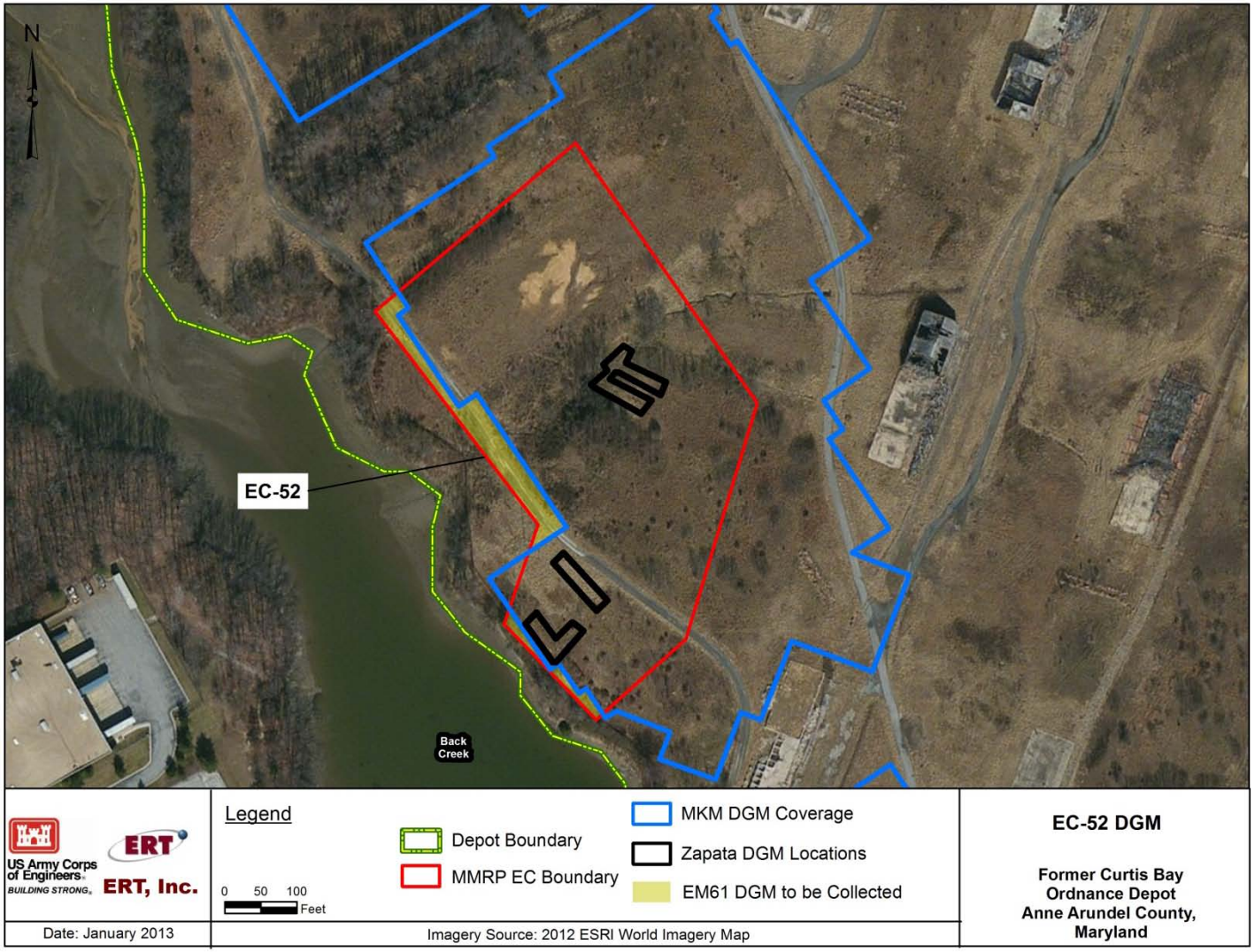


Figure 3: EC-52 MKM and ERT DGM Coverage



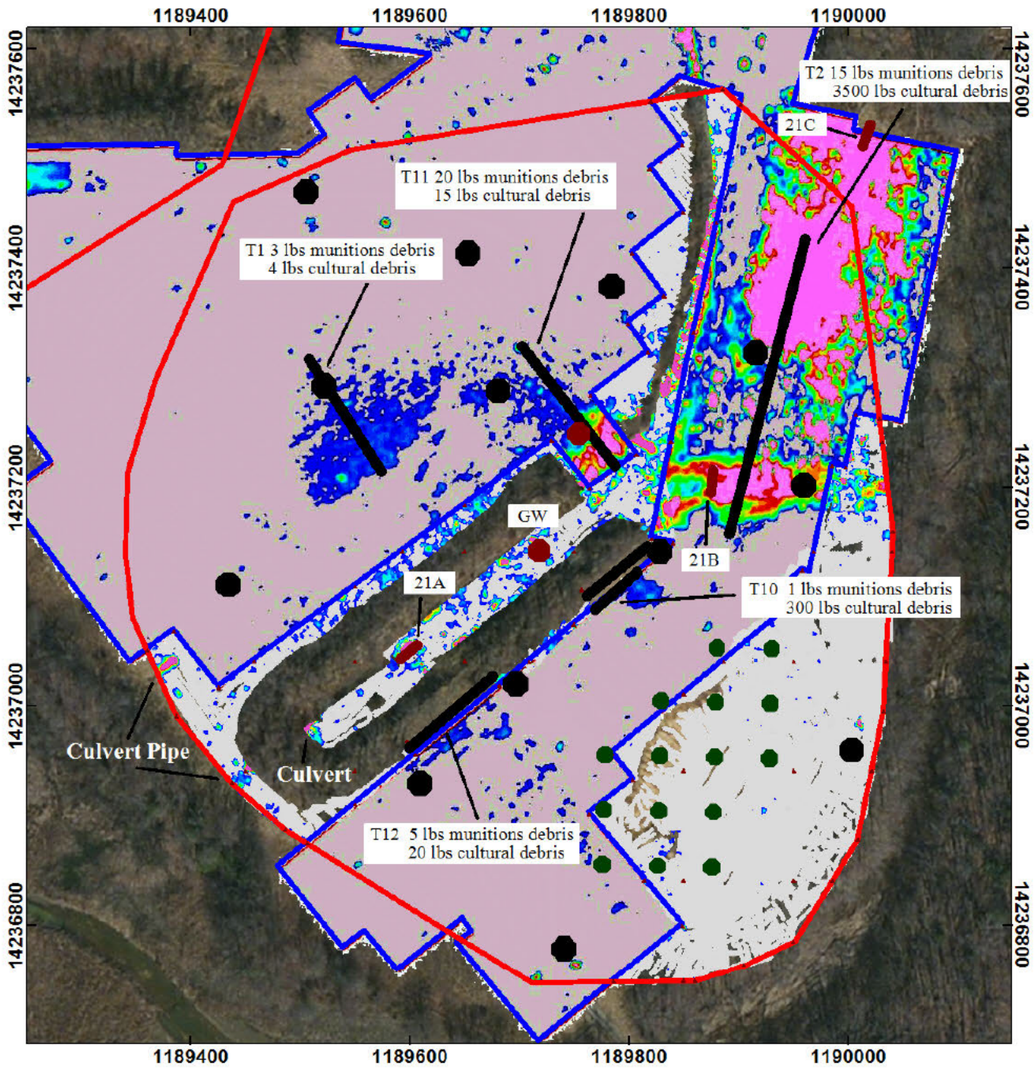


Figure 4
EM61MK2 Survey
Channel 3

EC-21 Area
Curtis Bay, MD

Legends:
- EC Boundary
- ERT Proposed Trenches
- MKM Survey Boundary
- Biased Soil Sample Locations
- Biased Grid Soil Sample Locations
- GW Groundwater Sample
- Random Soil Sample Locations
- 2009 Zapata Trenches

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:1500
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. Date: July 2013

Created By: [redacted] Verified By: [redacted] Approved By: [redacted]

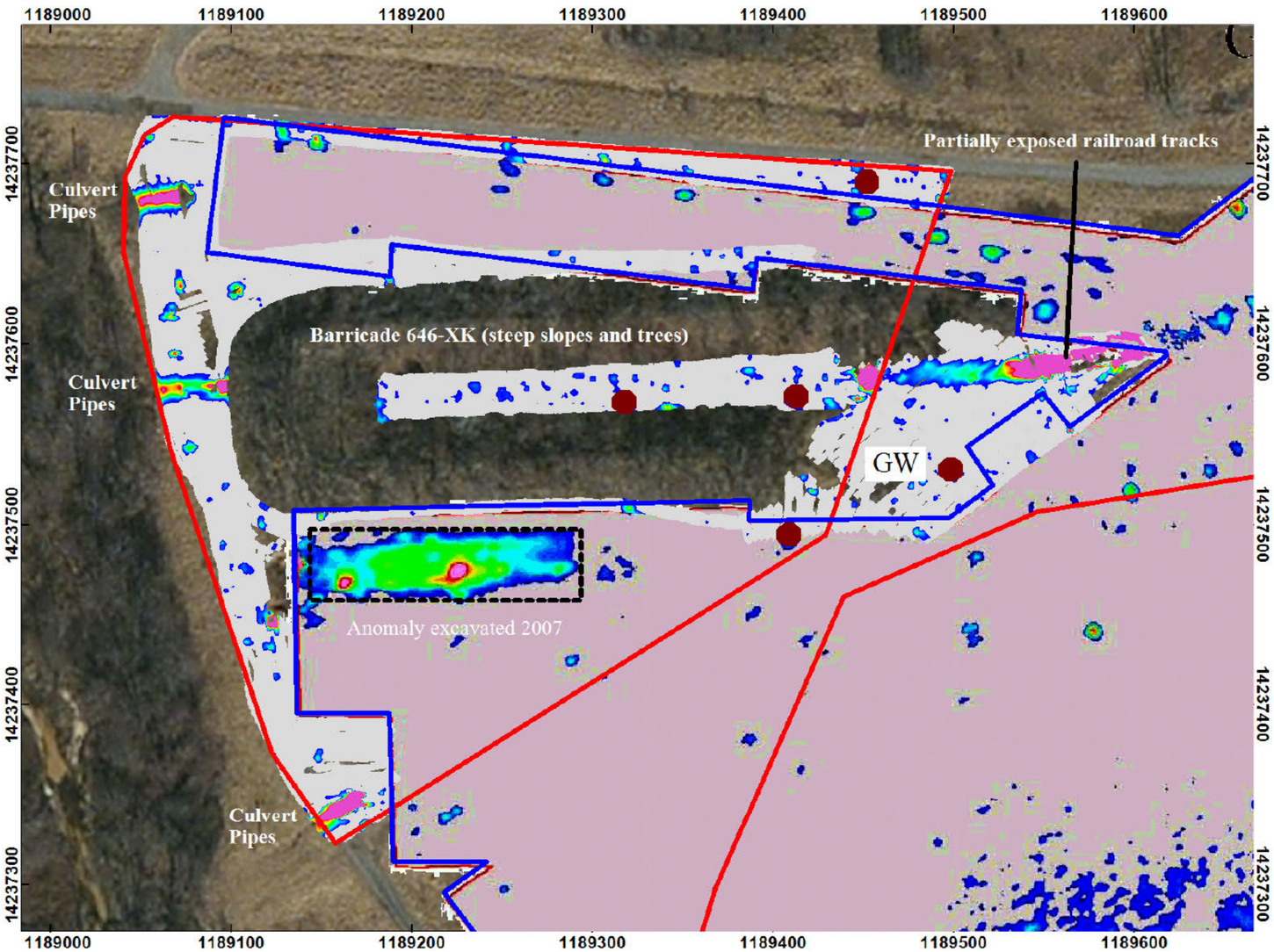


Figure 5
EM61MK2 Survey
Channel 3

EC-22 Area
Curtis Bay, MD

Legends:
- EC Boundary
- MKM Survey Boundary
- Biased Soil Sample Locations

GW Groundwater Sample

mV

0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:800

50 0 50

US survey foot

WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. Date: July 2013

Created By: [redacted] Verified By: [redacted] Approved By: [redacted]

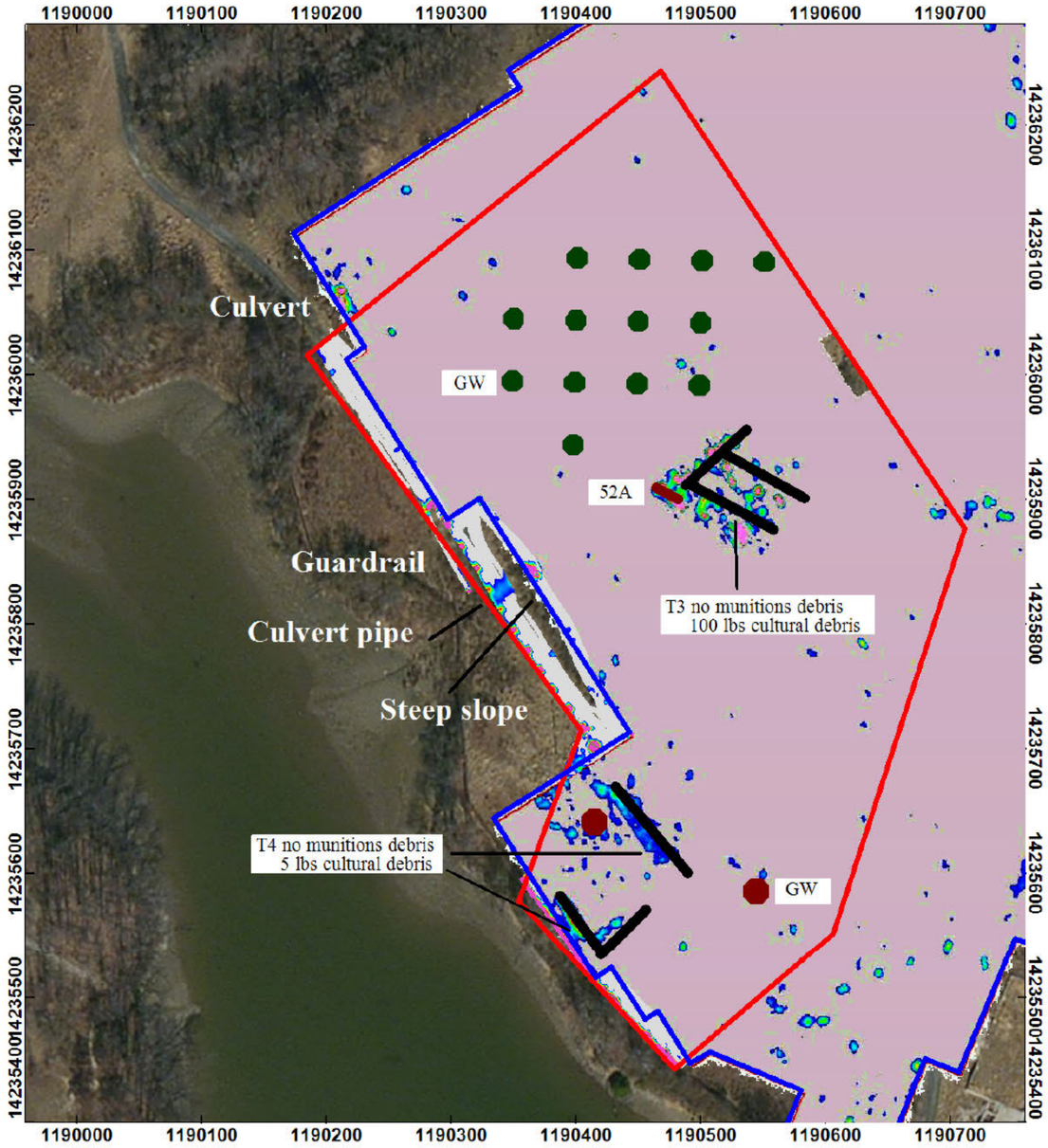


Figure 6
EM61MK2 Survey
Channel 3

EC-52 Area
Curtis Bay, MD

Legends:
- EC Boundary
- ERT Proposed Trenches
- MKM Survey Boundary
- Biased Soil Sample Locations
- Biased Grid Soil Sample Locations
- GW Groundwater Sample
- 2009 Zapata Trenches

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

Scale 1:1250
50 0 50 100 150
US survey foot
WGS 84 / UTM zone 18N

Client: U.S. Army Corps of Engineers

Project: Curtis Bay, MD

Contractor: ERT, Inc. | Date: July 2013

Created By: | Verified By: | Approved By:

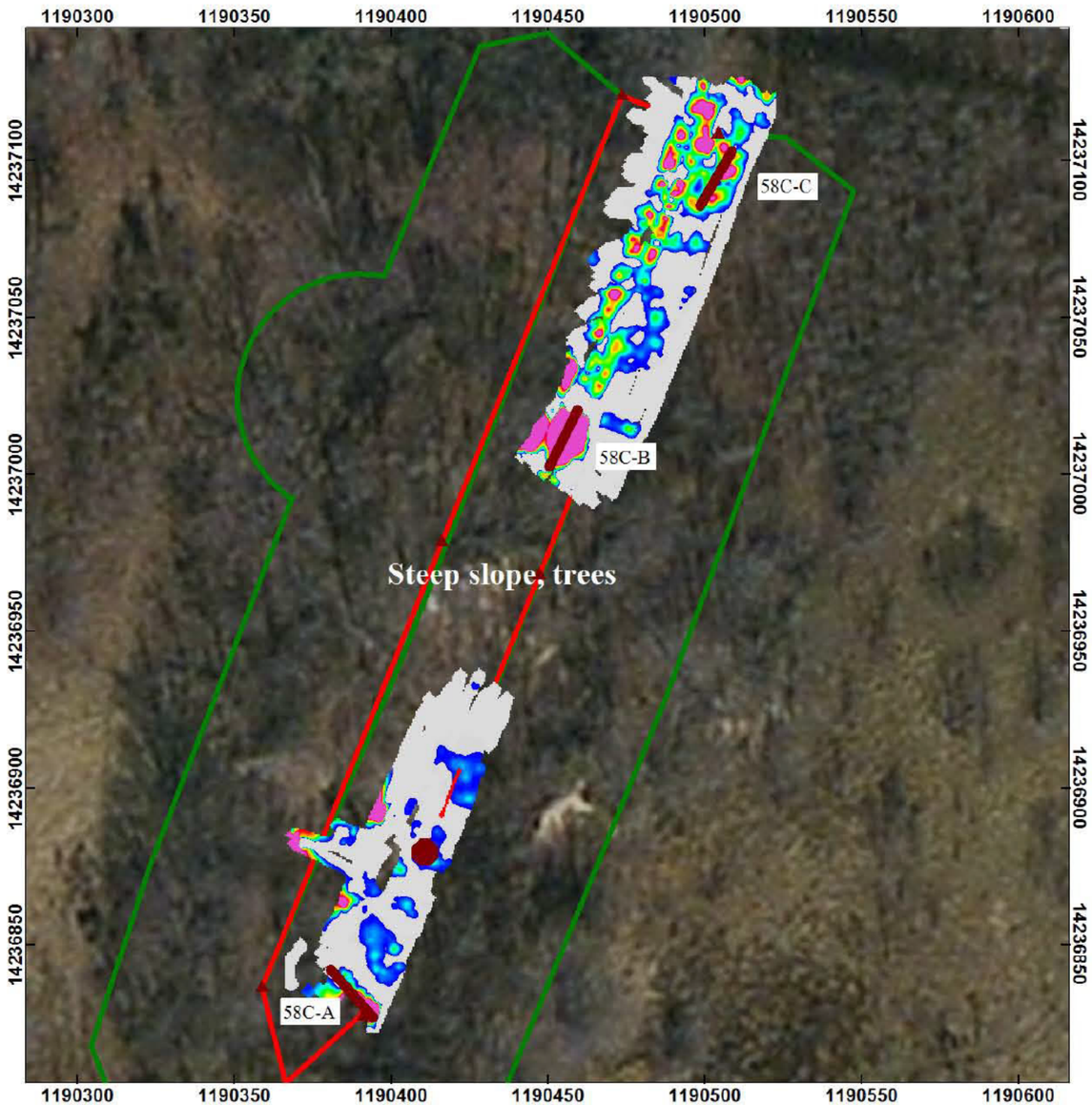


Figure 7
EM61MK2 Survey
Channel 3

EC-58C Area
Curtis Bay, MD

Legends:
- EC boundary
- Barricade 644-XI
- ERT Proposed Trenches
- Biased Soil Sample Locations

mV
0 6 10 15 20 30 38 44 49 58 68 74 79 84 89 94

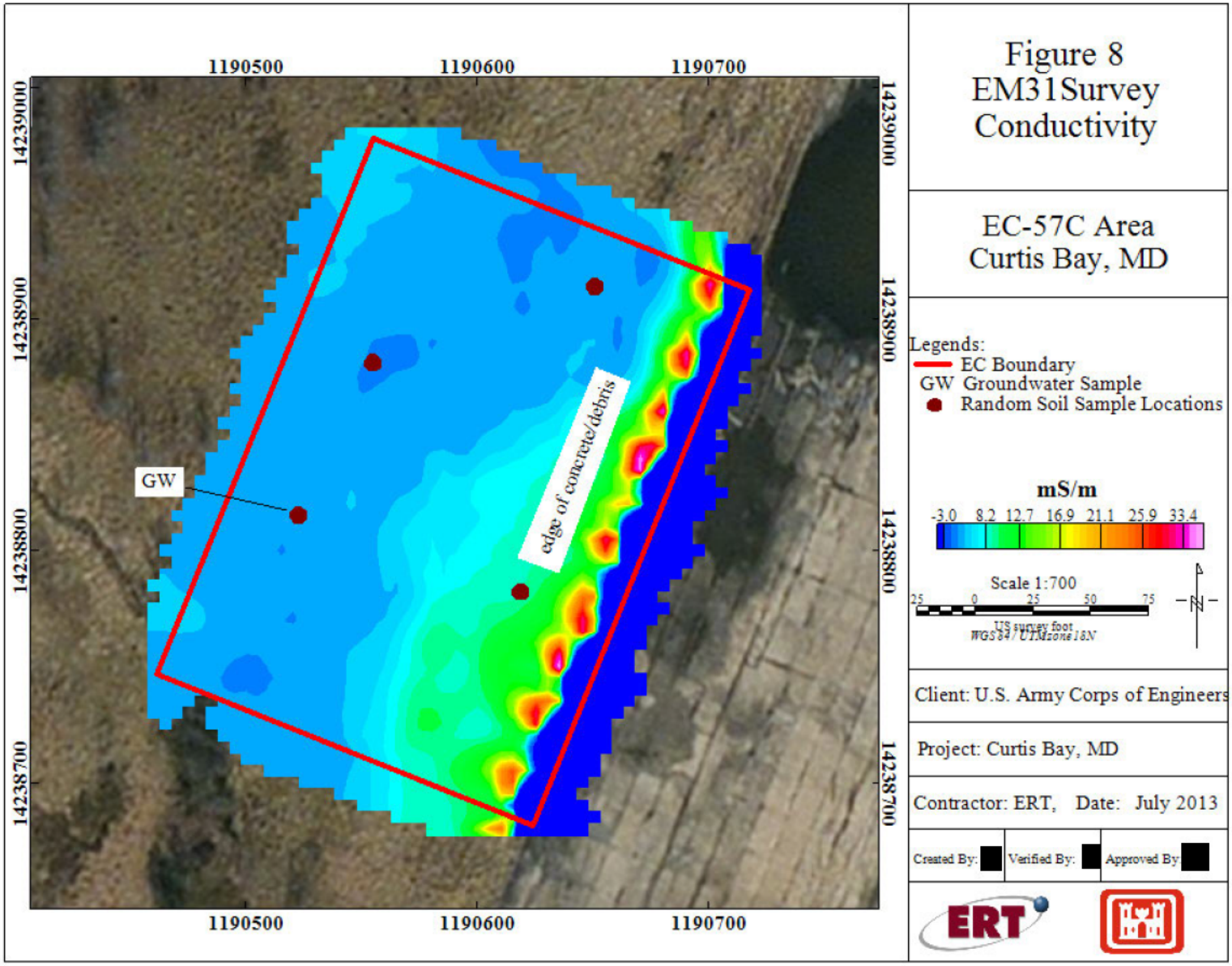
Scale 1:500
25 0 25 50
US survey foot
WGS 84 / UTM zone 18N

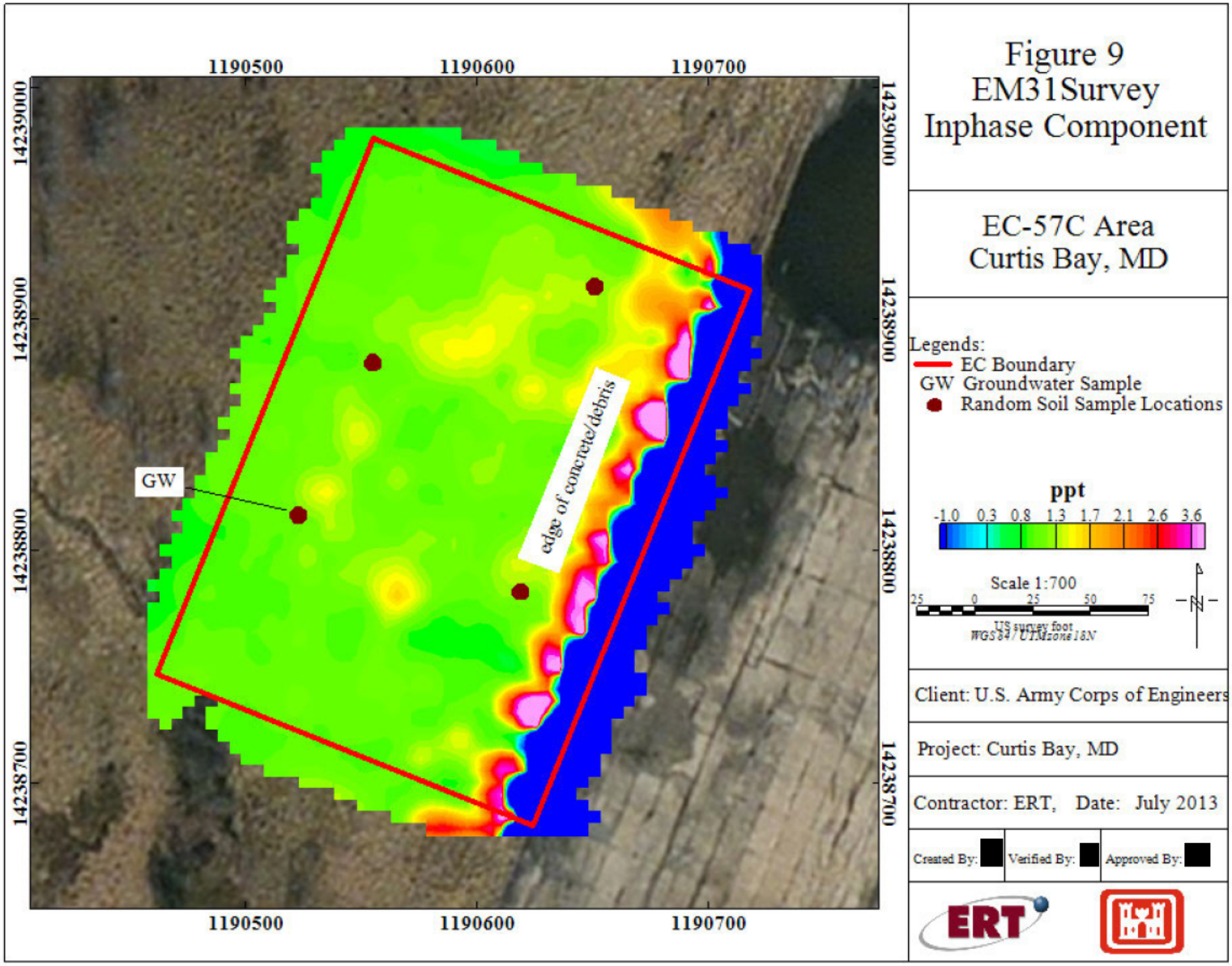
Client: U.S. Army Corps of Engineers

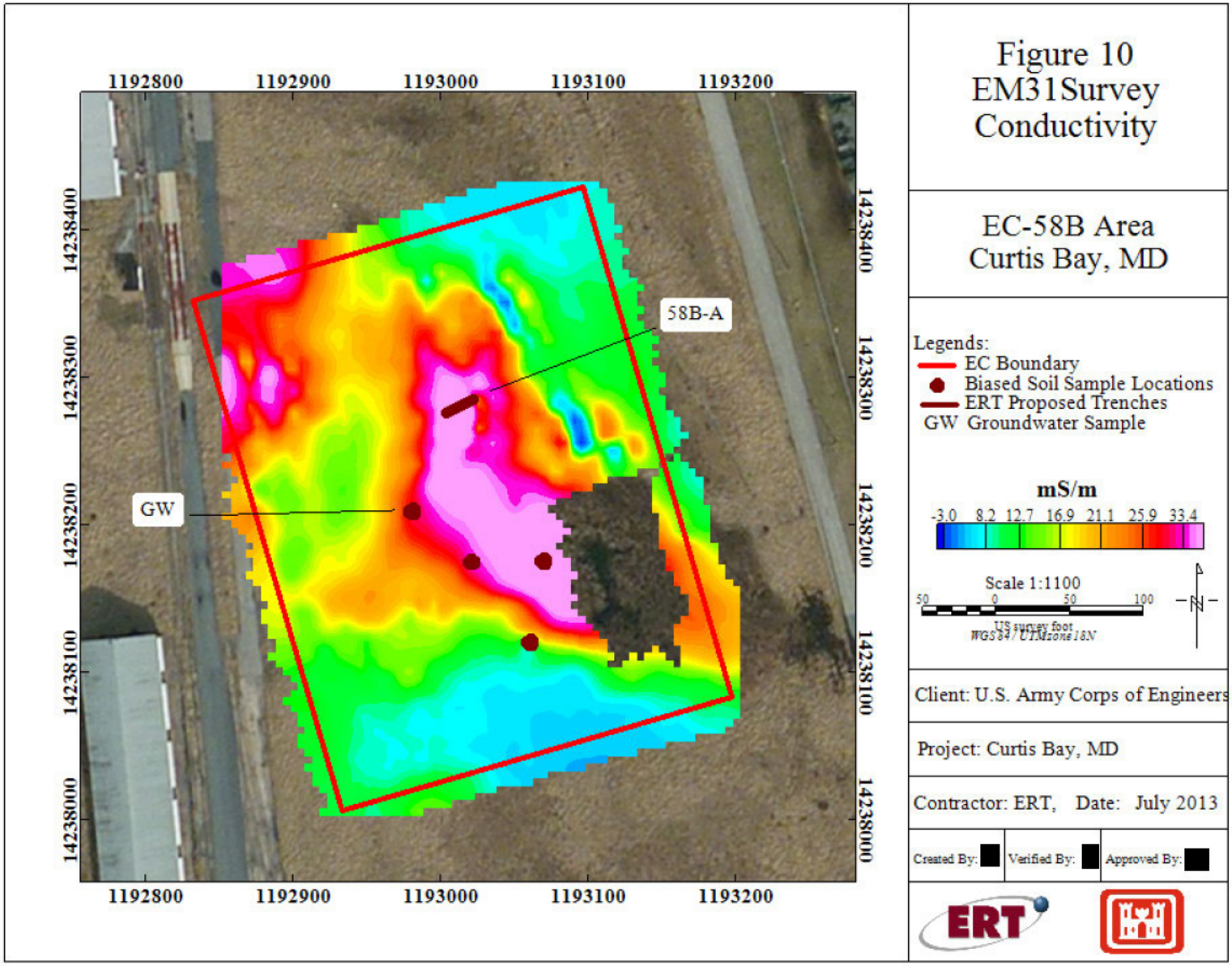
Project: Curtis Bay, MD

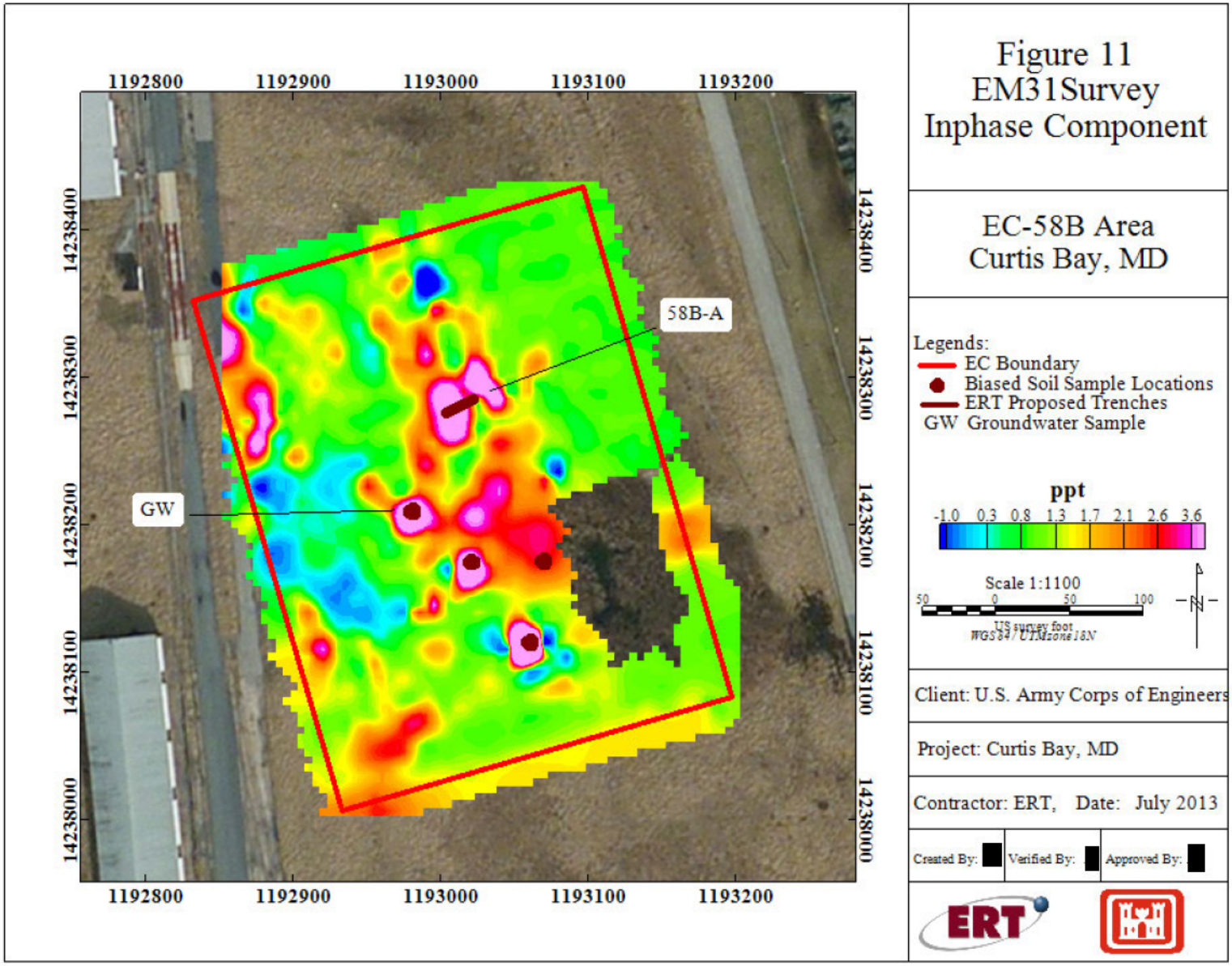
Contractor: ERT, Inc. Date: July 2013

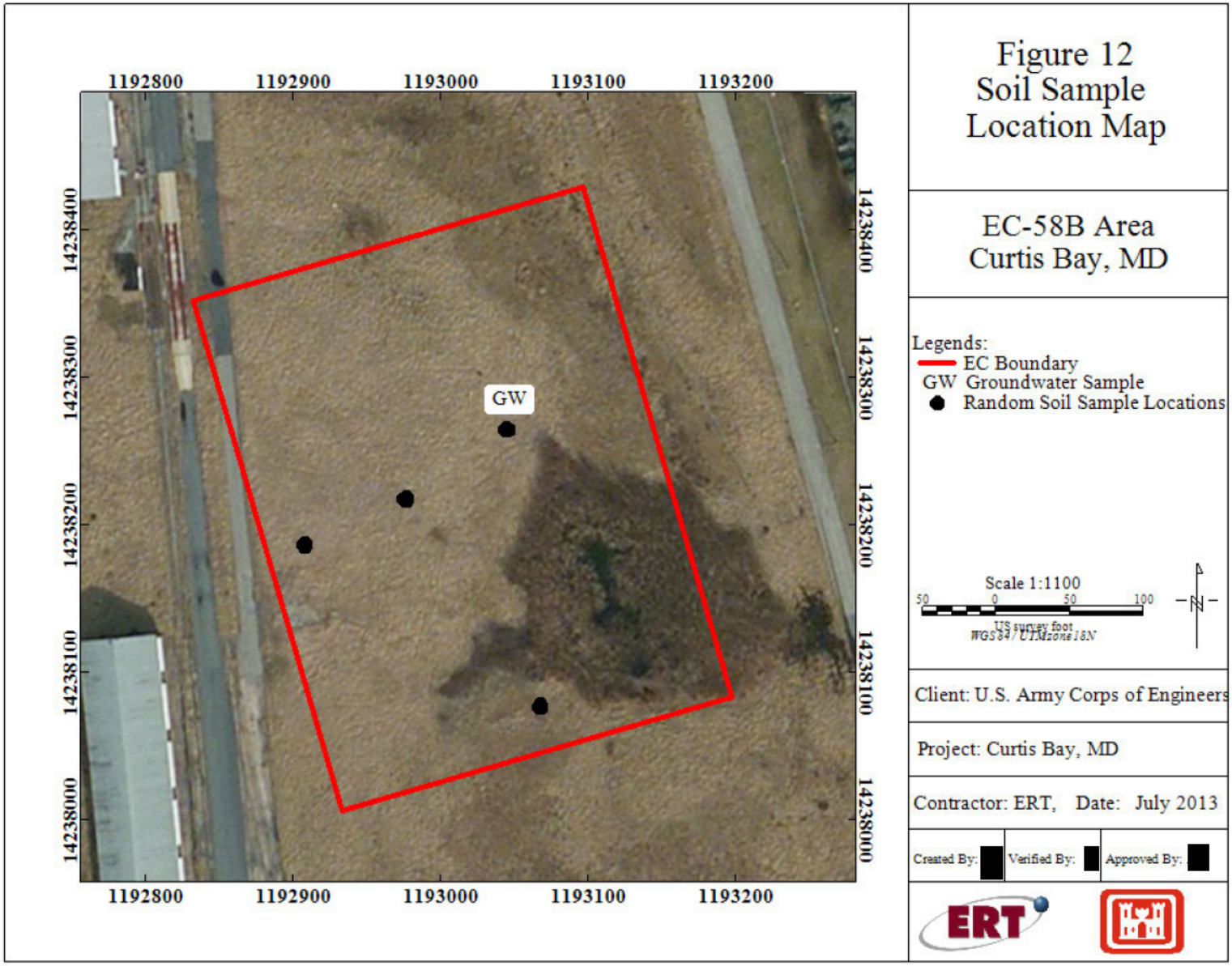
Created By [redacted] Verified By: [redacted] Approved By: [redacted]


1190500
1190600
1190700
14239000
14238900
14238800
14238700
GW
edge of concrete/debris
Figure 8
EM31Survey
Conductivity
EC-57C Area
Curtis Bay, MD
Legends:
EC Boundary
GW Groundwater Sample
Random Soil Sample Locations
mS/m
-3.0 8.2 12.7 16.9 21.1 25.9 33.4
Scale 1:700
25 0 25 50 75
US survey foot
WGS84 / UTM zone 18N
N
Client: U.S. Army Corps of Engineers
Project: Curtis Bay, MD
Contractor: ERT, Date: July 2013
Created By:
Verified By:
Approved By


1190500
1190600
1190700
14239000
14238900
14238800
14238700
GW
edge of concrete/debris
Figure 9
EM31Survey
Inphase Component
EC-57C Area
Curtis Bay, MD
Legends:
EC Boundary
GW Groundwater Sample
Random Soil Sample Locations
ppt
-1.0 0.3 0.8 1.3 1.7 2.1 2.6 3.6
Scale 1:700
25 0 25 50 75
US survey foot
WGS84 / UTMzone18N
N
Client: U.S. Army Corps of Engineers
Project: Curtis Bay, MD
Contractor: ERT, Date: July 2013
Created By:
Verified By:
Approved By:


1192800
1192900
1193000
1193100
1193200
14238400
14238300
14238200
14238100
14238000
58B-A
GW
Figure 10
EM31Survey
Conductivity
EC-58B Area
Curtis Bay, MD
Legends:
EC Boundary
Biased Soil Sample Locations
ERT Proposed Trenches
GW Groundwater Sample
mS/m
-3.0 8.2 12.7 16.9 21.1 25.9 33.4
Scale 1:1100
50 0 50 100
US survey foot
WGS84 / UTM zone 18N
N
Client: U.S. Army Corps of Engineers
Project: Curtis Bay, MD
Contractor: ERT, Date: July 2013
Created By:
Verified By:
Approved By:
ERT


1192800
1192900
1193000
1193100
1193200
14238400
14238300
14238200
14238100
14238000
58B-A
GW
Figure 11
EM31Survey
Inphase Component
EC-58B Area
Curtis Bay, MD
Legends:
EC Boundary
Biased Soil Sample Locations
ERT Proposed Trenches
GW Groundwater Sample
ppt
-1.0 0.3 0.8 1.3 1.7 2.1 2.6 3.6
Scale 1:1100
50 0 50 100
US survey foot
WGS84 / UTM zone 18N
N
Client: U.S. Army Corps of Engineers
Project: Curtis Bay, MD
Contractor: ERT, Date: July 2013
Created By:
Verified By:
Approved By:
ERT


1192800
1192900
1193000
1193100
1193200
14238400
14238300
14238200
14238100
14238000
GW
Figure 12
Soil Sample
Location Map
EC-58B Area
Curtis Bay, MD
Legends:
EC Boundary
GW Groundwater Sample
Random Soil Sample Locations
Scale 1:1100
50 0 50 100
US survey foot
WGS84 / UTM zone 18N
N
Client: U.S. Army Corps of Engineers
Project: Curtis Bay, MD
Contractor: ERT, Date: July 2013
Created By:
Verified By:
Approved By:
ERT

[redacted]
Laurel, MD 20707
[redacted]
www.ERTCorp.com

MEMORANDUM

TO: [redacted], CENAB

FROM: [redacted] (ERT)

DATE: January 5, 2015

SUBJECT: **Additional Sampling at Curtis Bay Based on the Preliminary Findings from the Curtis Bay Addendum Sampling**

1. As part of the Former Curtis Bay Ordnance Depot (Depot) Remedial Investigation/Feasibility Study (RI/FS) project, ERT conducted Addendum sampling from September 21 through October 9, 2015.
2. Preliminary sampling results (non-validated results) have been received and were provided to the CENAB project team in the "Preliminary Findings from the Curtis Bay Addendum Sampling" memo dated December 3, 2015.
3. ERT and the CENAB project team met on December 15, 2015 to discuss the preliminary results and develop a plan for additional sampling at ECs that are not fully delineated.
4. Any ECs that are not discussed in this memo have either 1) been determined to have no release prior to the Addendum sampling or 2) have been fully delineated and will move to the risk assessment phase.
5. EC-21 was presented in the December 3rd memo and the team agreed that the EC was fully delineated; therefore, it is not being presented in this memo.
6. The IRP Shop Arsenic Area was presented in the December 3rd meeting. Based on follow-on discussions, this sampling will not be included in the January 2016 sampling event.
7. All surface soil samples were collected from the 0-6 inches below ground surface (bgs).
8. In order to reduce further mobilizations for additional sampling, contingent samples will be collected at specific locations. The contingent samples associated with horizontal delineation are shown the figures with the asterisk (*) symbol. The contingent samples will be collected during the January field event, submitted to the laboratory for processing and storage, and analyzed if the adjacent primary samples are reported as exceeding project screening levels.

EC-32: Bldg. S832-P.E. Lumber Storage

9. ERT collected an additional 8 surface and subsurface (3-4 ft bgs) samples (co-located) and analyzed for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene.
10. Based on the preliminary results, the delineation of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene at this EC is incomplete.
11. ERT proposes to collect an additional 10 surface (EC-32-11 through EC-32-20) soil samples to achieve delineation (Figure 1).

12. ERT proposes to collect 3 subsurface (EC-32-11, EC-32-12, and EC-32-20) (3-4 ft bgs) soil samples. Additional contingent subsurface samples will be collected from 4-6 ft bgs interval at these 3 locations.
13. Additionally, sample locations EC-32-05 and EC-32-06 will have subsurface samples collected from 4-6 ft bgs to determine vertical extent. Additional contingent samples at these two locations will be collected from the 6-8 ft bgs interval.
14. Note that a sample at EC-32-20 will only be collected if an accessible area of soil is found between the sidewalk and the building. If the area is primarily concrete/asphalt a sample will not be collected.
15. All samples will be analyzed for: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene.
16. Note on Figure 1 that the new sampling locations are shown by a "+" on the map. Contingency soil samples to assist with horizontal delineation will be collected, as noted by the asterisks on Figure 1.

EC-36: Bldg. 515- Incinerator Plant

17. ERT collected an additional 8 surface and subsurface (3-4 ft bgs) soil samples (co-located) and analyzed for lead and select dioxins/furans (total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzofuran, and total tetrachlorodibenzo-p-dioxin).
18. Based on the preliminary results, the delineation of lead has been completed. The delineation of the select dioxins/furans is still incomplete.
19. ERT proposes to collect an additional 6 surface and subsurface (2-4 ft bgs) samples (EC-36-16 through EC-36-21) to achieve delineation associated with screening level exceedances at EC-36-09 and EC-36-13 (Figure 2).
20. The 6 additional sampling locations will also have contingent samples collected from 4-6 ft bgs.
21. Additionally, ERT will collect subsurface samples from 4-6 ft bgs at EC-36-09 and EC-36-13. Contingent samples will be collected from 6-8 ft bgs.
22. All samples will be analyzed for dioxins/furans.
23. Note that contingency samples stepped out from the new sampling locations will also be collected in case there are detections in the 3rd phase samples.

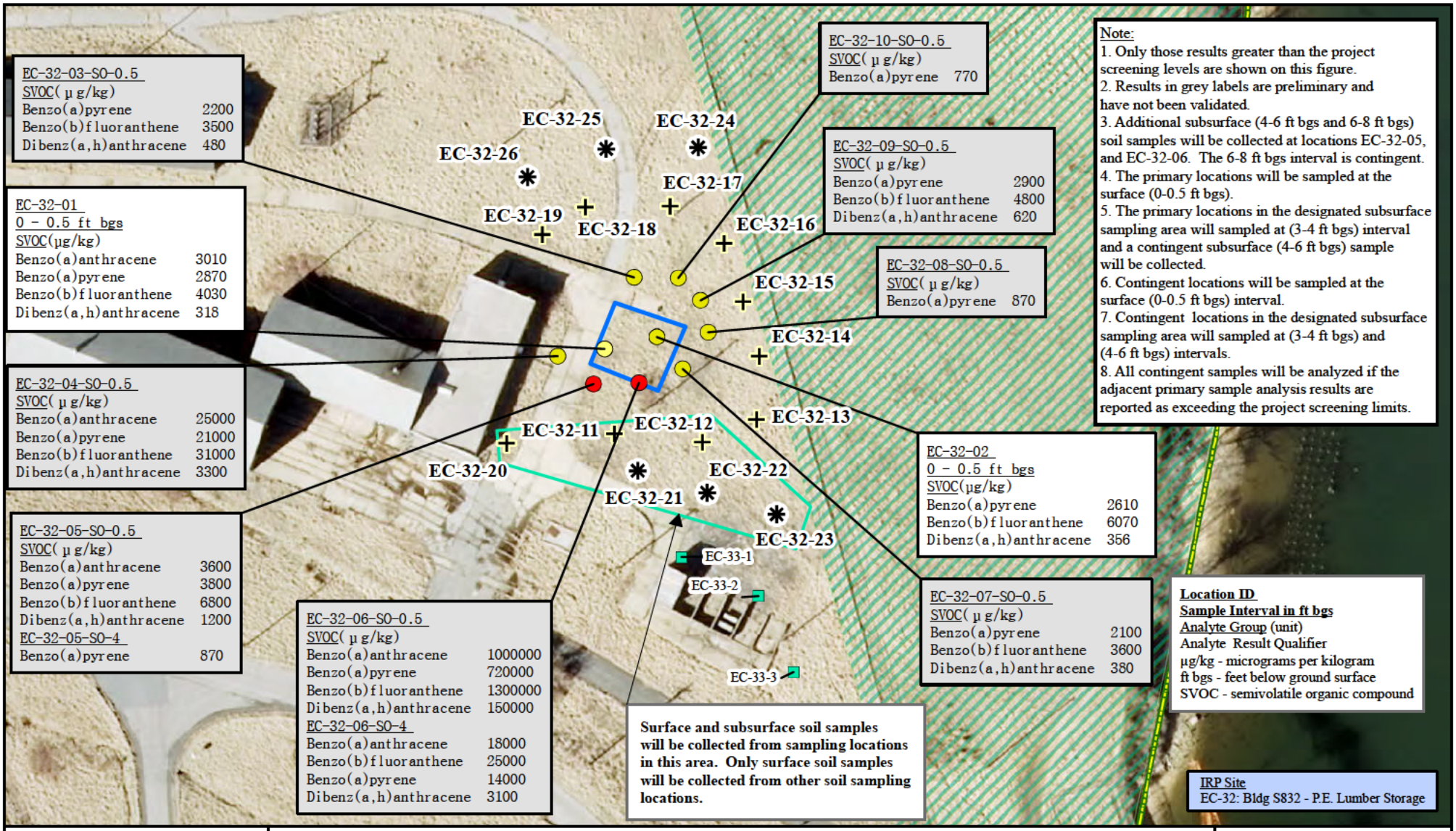
EC-57B: Bldg. 1022 Brass and Steel Area

24. ERT collected an additional 7 surface and subsurface (1-2 feet bgs) samples (co-located) and analyzed for manganese, select dioxins/furans (total hexachlorodibenzofuran, total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzo-p-dioxin), and select PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene).
25. Note that due to the asphalt and concrete around the outside of this building, the sampling locations represent the only locations that could be accessed for soil sampling.
26. Based on the preliminary results, the delineation of select dioxins/furans and select PAHs at this EC is incomplete.

27. ERT proposes to collect an additional 4 surface and subsurface (1-2 ft bgs) samples (EC-57B-13 through EC-57B-16) to achieve delineation on the western side of the EC (Figure 3). Of concern for this additional sampling area is that the area may have gravel/asphalt or concrete under a small amount of soil. This will be determined when sampling is conducted.
28. Contingent subsurface samples from 4-6 ft bgs will be collected from these 4 sampling locations.
29. Additionally, ERT will collect additional subsurface samples from 2-4 ft bgs and at EC-57B-06 and EC-57B-07. Contingent samples at 4-6 ft bgs will also be collected from these locations.
30. All samples will be analyzed for dioxins/furans and select PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene
31. Note that contingency samples stepped out from the new sampling locations will also be collected in case there are detections in the 3rd sampling phase samples.
32. ERT will investigate the area along the southeastern MRS boundary (south of sampling locations EC-57B-11 and EC-57B-12 and the walkway) to determine if a soil sample can be collected from this area. Currently the area is believed to be part of the rip-rap that protects the site. If a location exists for a soil sample, ERT will collect one at the surface and subsurface (1-2 ft bgs interval). If not, ERT will document field conditions and provide this information in the RI Report.
33. Based on the amount of asphalt, concrete, gravel that is located outside of the Building, it may be that the results are more likely associated with the site infrastructure (concrete/asphalt parking lots, roads, etc.) than with activities that occurred within the building.

EC-57D: Brass and Steel Stockpile Area

34. ERT collected an additional 6 surface and subsurface (1-2 ft bgs) samples (co-located) and analyzed for manganese.
35. Note that due to a concrete/gravel/asphalt layer at approximately 1 ft bgs, subsurface samples at EC-57D-09 and EC-57D-10 could not be collected. The EC-57D-11 subsurface sample was offset in order to collect what was hoped to be the northern boundary subsurface sample.
36. Based on the preliminary results, the delineation of manganese at this EC is incomplete.
37. ERT proposes to collect an additional 4 surface and subsurface (1-2 ft bgs) samples (EC-57D-13 through EC-57D-15) to achieve delineation (Figure 4).
38. Contingent samples will be collected from 2-4 ft bgs at these 4 sampling locations.
39. Additionally, sample location EC-57D-11a will have subsurface samples collected from 2-4 ft bgs to determine vertical extent. A contingent subsurface sample will be collected from the 4-6 ft bgs interval.
40. All samples will be analyzed for manganese
41. Note that contingency samples stepped out from the new sampling locations will also be collected in case there are detections in the 3rd sampling phase samples.



Legend

- Proposed Sampling Location PAH Compounds
- Proposed Contingent Sampling Location PAH Compounds
- Sampling Locations
- Sample Location with Results Greater Than Surface Soil PSL
- Sample Location with Results Greater Than Surface and Subsurface Soil PSL
- Sample Location Analyzed for PAH with No Reported Results Greater Than PSLs (Surface and Subsurface)
- EC-32
- Former Curtis Bay Ordnance Depot Boundary
- U.S. Army Reserve Facility

N, W, E, S

0 75 150 Feet

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Revision Date: December 2015

Imagery Source: U.S. Gelogical Survey, 2011

Figure 1
EC-32
Soil Sampling Results Greater Than PSLs

Former Curtis Bay Ordnance Depot Anne Arundel County, Maryland

Document Path [redacted] mxd

Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
ft bgs - feet below ground surface
pg/g - picograms per gram
J - estimated result

Note:
1. Only those results greater than the project screening levels are shown on this figure.
2. Results in grey labels are preliminary and have not been validated.
3. Two additional subsurface (4-6 ft bgs and 6-8 ft bgs) samples will be collected at locations EC-36-09, and EC-36-13. The 6-8 ft bgs samples are contingent.
4. The primary locations will be sampled at the surface (0-0.5 ft bgs) and subsurface (2-4 ft bgs) intervals and a contingent subsurface (4-6 ft bgs) sample will be collected.
5. Contingent soil samples will be collected at the surface (0-0.5 ft bgs), and two subsurface (2-4 ft bgs and 4-6 ft bgs) intervals.
6. All contingent samples will be analyzed if the adjacent primary sample analysis results are reported as exceeding the project screening limits.



EC-36-03
0 - 0.5 ft bgs
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 94.2 J

EC-36-13-SO-0.5
Dioxin/Furan(pg/g)
Total Pentachlorodibenzofuran 103
EC-36-13-SO-4
Total Pentachlorodibenzofuran 131

EC-36-02
0 - 0.5 ft bgs
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 152 J

IRP Site
EC-36: Bldg 515 - Incinerator Plant

EC-36-09-SO-0.5
Dioxin/Furan(pg/g)

Total Pentachlorodibenzofuran	167
Total Pentachlorodibenzo-p-dioxin	31.4

EC-36-09-SO-4

1,2,3,7,8-PeCDD	26.4
2,3,4,6,7,8-HxCDF	300
2,3,4,7,8-PeCDF	305
Total Pentachlorodibenzofuran	2830
Total Pentachlorodibenzo-p-dioxin	265
Total Tetrachlorodibenzo-p-dioxin	193
Total Tetrachlorodibenzofuran	2660

EC-36-04
0 - 0.5 ft bgs
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 119 J

EC-36-06
0 - 0.5 ft bgs
Dioxins/Furans(pg/g)

Total Pentachlorodibenzofuran	317 J
Total Pentachlorodibenzo-p-dioxin	32.9 J
Total Tetrachlorodibenzofuran	576 J
Total Tetrachlorodibenzo-p-dioxin	35.8

Metal(mg/kg)

Lead	1150

EC-36-22, EC-36-08, EC36-1, EC-36-14, EC36-7, EC-36-15, EC-36-29, EC-36-16, EC-36-2-GW, EC-36-28, EC-36-23, EC-36-1-GW, EC-36-21, EC36-5, EC-36-17, EC-36-20, EC-36-12, EC-36-27, EC-36-24, EC-36-18, EC-36-26, EC-36-19, EC-36-25, EC-36-10, EC-36-11

Legend

+ Proposed Surface and Subsurface Soil Sampling Location Dioxin/Furan Compounds

* Proposed Contingent Surface and Subsurface Soil Sampling Location Dioxin/Furan Compounds

SI Sample Locations

Surface/Subsurface Soil Sample - No Exceedance

Soil Sample with Surface Exceedance for Lead and Dioxin/Furan Compounds

Soil Sample with Surface Exceedance for Dioxin/Furan Compounds

Soil Sample with Surface/Subsurface Exceedance for Dioxin/Furan Compounds

Groundwater Sample Location With No Reported Results Greater Than PSLs

IRP Site Boundary

0 25 50 Feet

N W E S

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Figure 2
IRP EC 36
Soil Sampling Results

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Revision Date: December 2015

Imagery Source: U.S. Gelogical Survey, 2011

Document Path: [redacted]\EC36.mxd

Note:
1. Only those results greater than the project screening levels are shown on this figure.
2. Results in grey labels are preliminary and have not been validated.
3. Additional subsurface (2-4 ft bgs and 4-6 ft bgs) soil samples will be collected at locations EC-57B-06 and EC-57B-07. The 4-6 ft bgs sample is contingent.
4. The primary locations will be sampled at the surface (0-0.5 ft bgs) and subsurface (1-2 ft bgs) intervals and a contingent subsurface (2-4 ft bgs) sample will be collected.
5. Contingent soil samples will be collected at the surface (0-0.5 ft bgs), and two subsurface (1-2 ft bgs and 2-4 ft bgs) intervals.
6. Contingent samples will be analyzed if the adjacent primary sample analysis results are reported as exceeding the project screening limits.



EC-35

EC-57B-02
0 - 0.5 ft bgs
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 108 J
1 - 2 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 1390

EC-57B-05
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 2190
Benzo(b)fluoranthene 5110
Dibenz(a,h)anthracene 382
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 216 J
Total Pentachlorodibenzo-p-dioxin 122 J
Total Tetrachlorodibenzo-p-dioxin 67.3
Metal(mg/kg)
Manganese 59900

EC-57B-04
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 9710
Benzo(a)pyrene 7800
Benzo(b)fluoranthene 13400
Dibenz(a,h)anthracene 2000
Indeno(1,2,3-cd)pyrene 5810
Dioxins/Furans(pg/g)
Total Hexachlorodibenzofuran 225
Total Pentachlorodibenzofuran 172
Metal(mg/kg)
Manganese 20400
1 - 2 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 2950
Benzo(a)pyrene 2910
Benzo(b)fluoranthene 4160
Dibenz(a,h)anthracene 330

EC-57B-01
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 4920
Benzo(a)pyrene 5490
Benzo(b)fluoranthene 8800
Dibenz(a,h)anthracene 629
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 96

EC-57B

EC-57B-03
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 7940
Benzo(a)pyrene 9570
Benzo(b)fluoranthene 13600
Dibenz(a,h)anthracene 1380
Indeno(1,2,3-cd)pyrene 4080
1 - 2 ft bgs
Benzo(a)pyrene 1630 K

EC-57B-20
EC-57B-13
EC-57B-19
EC-57B-14
EC-57B-18
EC-57B-16
EC-57B-15
EC-57B-17
EC-57B-08

EC-34-02
EC-34-04
EC-34-03
EC-34-1-GW
EC-34-01
EC-34

EC-57B-12-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 1000

EC-57B-11-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 1200

EC-57B-10-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 1100

EC-57B-06-SO-2
PAH(µg/Kg)
Benzo(a)anthracene 35000
Benzo(a)pyrene 27000
Benzo(b)fluoranthene 38000
Dibenz(a,h)anthracene 4700
Indeno(1,2,3-cd)pyrene 22000
Dioxin/Furan(pg/g)
Total Hexachlorodibenzofuran 1060
Total Hexachlorodibenzo-p-dioxin 434
Total Pentachlorodibenzofuran 85.7
Total Pentachlorodibenzo-p-dioxin 38.9

EC-57B-07-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 300
EC-57B-07-SO-2
Benzo(a)pyrene 520

EC-57B-09-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 470
Dioxin/Furan(pg/g)
Total Pentachlorodibenzofuran 122

IRP Sites
EC-34: Building 1025-Boiler House-Warehouse Area
MMRP Sites
EC-57B: Bldg. 1022 - Brass and Steel Area

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Revision Date: December 2015

Legend
+ Proposed Surface and Subsurface Soil Sampling Location PAH and Dioxin/Furan Compounds
✱ Proposed Contingent Surface and Subsurface Soil Sampling Location PAH and Dioxin/Furan Compounds
Groundwater Sampling Location
SI Sample Locations
Surface/Subsurface Soil Sample - No Exceedance
Soil Sample with Surface Exceedance
Soil Sample with Subsurface Exceedance
Soil Sample with Surface/Subsurface Exceedance
Asphalt/Concrete
MMRP EC Boundary
IRP EC Boundary
Curtis Bay Depot Boundary

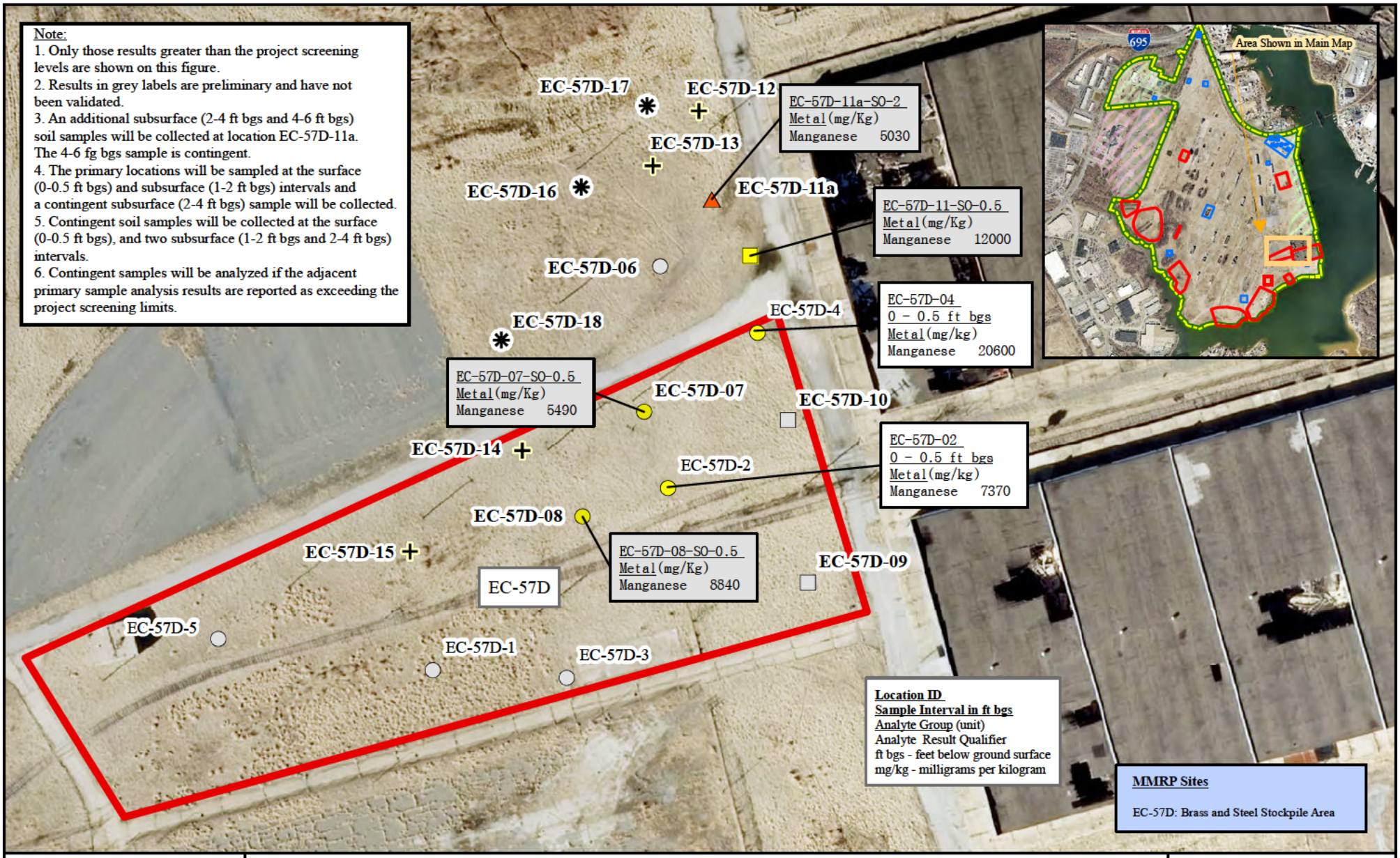
Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
µg/kg - micrograms per kilogram
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
pg/g - picograms per gram
J - estimated result
K - estimated result, may be biased high
SVOC - semivolatile organic compound

N W E S
0 75 150 Feet

Imagery Source: U.S. Gelogical Survey, 2011

Document Path [redacted]\EC-57B.mxd

Figure 3
IRP EC 34 and MMRP EC 57B
Soil Sampling Results
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland



US Army Corps of Engineers
BUILDING STRONG
ERT

Legend

Proposed Surface and Subsurface Soil Sampling Location Manganese

Proposed Contingent Surface and Subsurface Soil Sampling Location Manganese

Sampling Locations

Suface Soil Sampling Location No Results Greater Than PSL

Suface Soil Sampling Location Results Greater Than PSL

Suface and Subsurface Soil Sampling Location No Results Greater Than PSL

Suface and Subsuface Soil Sampling Location Surface Soil Results Greater Than PSL

Subuface Soil Sampling Location Results Greater Than PSL

MMRP Site Boundary

N W E S

0 50 100 Feet

Revision Date: January 2015

Imagery Source: U.S. Gelogical Survey, 2011

Figure 4
MMRP EC 57D
Proposed Additional Sampling

Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland

Document Path: [redacted]\EC57D.mxd

[redacted]
Laurel, MD 20707
[redacted]
www.ERTCorp.com

MEMORANDUM

TO: [redacted], CENAB

FROM: [redacted] (ERT)

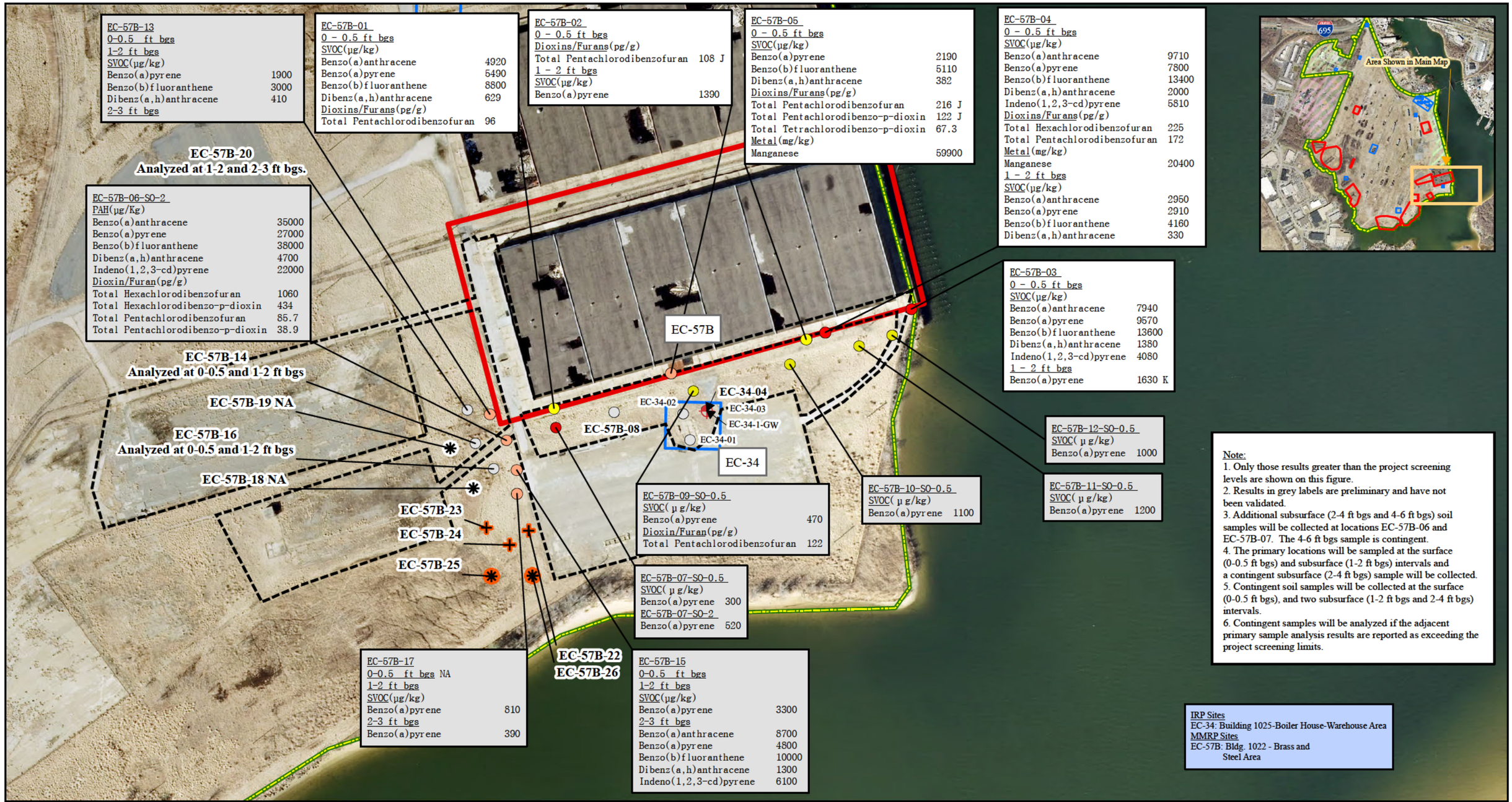
DATE: February 9, 2016

SUBJECT: **Additional Sampling at EC-57B, Curtis Bay Based on the Preliminary Findings from the Curtis Bay Addendum Sampling**

EC-57B: Bldg. 1022 Brass and Steel Area

1. In January 2016, ERT collected an additional 8 samples analyzed for manganese, select dioxins/furans (total hexachlorodibenzofuran, total pentachlorodibenzofuran, total pentachlorodibenzo-p-dioxin, total tetrachlorodibenzo-p-dioxin), and select PAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene).
2. ERT collected 4 preliminary samples (EC-13-16) and 4 contingent samples (EC-17-20). Samples were collected from 0-0.5 ft bgs, 1-2 ft bgs, and 2-3 ft bgs. Groundwater was encountered at approximately 3 ft bgs at all locations. Therefore, the sampling interval of 2-4 could not be collected as planned.
3. Note that due to the asphalt and concrete around the outside of this building, the sampling locations represent the only locations that could be accessed for soil sampling.
4. Preliminary sampling results are shown on attached figure.
5. Delineation of PAH impacts is complete in the subsurface in the southern portion of EC-57B.
6. The results for the subsurface sample collected from EC-57B-13 at the 1-2 ft bgs interval were greater than PSLs. The results for the subsurface samples (1-2 ft bgs and 2-3 ft bgs) collected from EC-57B-15 and EC-57B-17 were greater than PSLs.
7. Samples collected from contingent locations EC-57B-18 and EC-57B-19 were not analyzed because the results from the primary samples collected at EC-57B-14 and EC-57B-16 were less than PSLs.
8. Results for contingent sample EC-57B-20 were less than PSLs at the surface (0-0.5 ft bgs) and subsurface (1-2 ft bgs and 2-3 ft bgs) intervals.
9. Due to the reported results for samples collected from EC-57B-15 and EC-57B-17, ERT proposes collecting an additional 10 subsurface samples from five locations EC-57B-22 through EC-57B-26 (shown on the figure as "+" and "*". Samples will be collected from the subsurface intervals of 1-2 ft bgs and 2-4 ft bgs (or the 1-foot interval above the groundwater table as conditions permit). Analysis of samples collected from EC-57B-25 and EC-57B-26 will be contingent on the results from samples collected at EC-57B-23, EC-57B-24, and EC-57B-25. Samples will be submitted for laboratory analysis of select PAHs.

10. Based on the amount of asphalt, concrete, gravel that is located outside of the Building, it may be that the results are more likely associated with the site infrastructure (concrete/asphalt parking lots, roads, etc.) than with activities that occurred within the building.
11. Dioxin/furan compound results have not been reported for the predominance of the EC-57B samples. To date, EC-57B-13, EC-57B-14, and EC-57B-15 at the surface interval (0-0.5 ft bgs) have been received from the laboratory. All reported results to date are less than PSLs.


EC-57B-13
0-0.5 ft bgs
1-2 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 1900
Benzo(b)fluoranthene 3000
Dibenz(a,h)anthracene 410
2-3 ft bgs
EC-57B-01
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 4920
Benzo(a)pyrene 5490
Benzo(b)fluoranthene 8800
Dibenz(a,h)anthracene 629
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 96
EC-57B-02
0 - 0.5 ft bgs
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 108 J
1 - 2 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 1390
EC-57B-05
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 2190
Benzo(b)fluoranthene 5110
Dibenz(a,h)anthracene 382
Dioxins/Furans(pg/g)
Total Pentachlorodibenzofuran 216 J
Total Pentachlorodibenzo-p-dioxin 122 J
Total Tetrachlorodibenzo-p-dioxin 67.3
Metal(mg/kg)
Manganese 59900
EC-57B-04
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 9710
Benzo(a)pyrene 7800
Benzo(b)fluoranthene 13400
Dibenz(a,h)anthracene 2000
Indeno(1,2,3-cd)pyrene 5810
Dioxins/Furans(pg/g)
Total Hexachlorodibenzofuran 225
Total Pentachlorodibenzofuran 172
Metal(mg/kg)
Manganese 20400
1 - 2 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 2950
Benzo(a)pyrene 2910
Benzo(b)fluoranthene 4160
Dibenz(a,h)anthracene 330
Area Shown in Main Map
EC-57B-20
Analyzed at 1-2 and 2-3 ft bgs.
EC-57B-06-SO-2
PAH(µg/Kg)
Benzo(a)anthracene 35000
Benzo(a)pyrene 27000
Benzo(b)fluoranthene 38000
Dibenz(a,h)anthracene 4700
Indeno(1,2,3-cd)pyrene 22000
Dioxin/Furan(pg/g)
Total Hexachlorodibenzofuran 1060
Total Hexachlorodibenzo-p-dioxin 434
Total Pentachlorodibenzofuran 85.7
Total Pentachlorodibenzo-p-dioxin 38.9
EC-57B
EC-57B-14
Analyzed at 0-0.5 and 1-2 ft bgs
EC-57B-19 NA
EC-57B-16
Analyzed at 0-0.5 and 1-2 ft bgs
EC-57B-18 NA
EC-57B-23
EC-57B-24
EC-57B-25
EC-57B-08
EC-34-04
EC-34-02
EC-34-03
EC-34-1-GW
EC-34-01
EC-34
EC-57B-03
0 - 0.5 ft bgs
SVOC(µg/kg)
Benzo(a)anthracene 7940
Benzo(a)pyrene 9570
Benzo(b)fluoranthene 13600
Dibenz(a,h)anthracene 1380
Indeno(1,2,3-cd)pyrene 4080
1 - 2 ft bgs
Benzo(a)pyrene 1630 K
EC-57B-12-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 1000
EC-57B-11-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 1200
EC-57B-10-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 1100
EC-57B-09-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 470
Dioxin/Furan(pg/g)
Total Pentachlorodibenzofuran 122
EC-57B-07-SO-0.5
SVOC(µg/kg)
Benzo(a)pyrene 300
EC-57B-07-SO-2
Benzo(a)pyrene 520
EC-57B-17
0-0.5 ft bgs NA
1-2 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 810
2-3 ft bgs
Benzo(a)pyrene 390
EC-57B-22
EC-57B-26
EC-57B-15
0-0.5 ft bgs
1-2 ft bgs
SVOC(µg/kg)
Benzo(a)pyrene 3300
2-3 ft bgs
Benzo(a)anthracene 8700
Benzo(a)pyrene 4800
Benzo(b)fluoranthene 10000
Dibenz(a,h)anthracene 1300
Indeno(1,2,3-cd)pyrene 6100
Note:
1. Only those results greater than the project screening levels are shown on this figure.
2. Results in grey labels are preliminary and have not been validated.
3. Additional subsurface (2-4 ft bgs and 4-6 ft bgs) soil samples will be collected at locations EC-57B-06 and EC-57B-07. The 4-6 ft bgs sample is contingent.
4. The primary locations will be sampled at the surface (0-0.5 ft bgs) and subsurface (1-2 ft bgs) intervals and a contingent subsurface (2-4 ft bgs) sample will be collected.
5. Contingent soil samples will be collected at the surface (0-0.5 ft bgs), and two subsurface (1-2 ft bgs and 2-4 ft bgs) intervals.
6. Contingent samples will be analyzed if the adjacent primary sample analysis results are reported as exceeding the project screening limits.
IRP Sites
EC-34: Building 1025-Boiler House-Warehouse Area
MMRP Sites
EC-57B: Bldg. 1022 - Brass and Steel Area
US Army Corps of Engineers
BUILDING STRONG
ERT
Revision Date: December 2015
Legend
Proposed Surface and Subsurface Soil Sampling Location PAH and Dioxin/Furan Compounds
Proposed Contingent Surface and Subsurface Soil Sampling Location PAH and Dioxin/Furan Compounds
Collected Contingent Surface and Subsurface Soil Sampling Location No Analysis (NA)
SI Sample Locations
Surface/Subsurface Soil Sample - No Exceedance
Soil Sample with Surface Exceedance
Soil Sample with Subsurface Exceedance
Soil Sample with Surface/Subsurface Exceedance
Groundwater Sampling Location
Asphalt/Concrete
MMRP EC Boundary
IRP EC Boundary
Curtis Bay Depot Boundary
Imagery Source: U.S. Gelogical Survey, 2011
Location ID
Sample Interval in ft bgs
Analyte Group (unit)
Analyte Result Qualifier
µg/kg - micrograms per kilogram
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
pg/g - picograms per gram
J - estimated result
K - estimated result, may be biased high
SVOC - semivolatile organic compound
N
W
E
S
0
75
150
Feet
Figure 3
IRP EC 34 and MMRP EC 57B
Soil Sampling Results
Former Curtis Bay Ordnance Depot
Anne Arundel County, Maryland
Document Path [redacted].mxd

FORMER CURTIS BAY ORDNANCE DEPOT

TECHNICAL PROJECT PLANNING MEETING #1

Military Munitions Response Program and Installation Restoration Program
Remedial Investigation/Feasibility Study
and Engineering Evaluation/Cost Analysis

August 21, 2012

Final Meeting Summary

Attendees:

NAME	ORGANIZATION	EMAIL
[redacted]	USACE	[redacted]
[redacted]	USACE	[redacted]
[redacted]	USACE	[redacted]
[redacted]	USACE	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted]	MDE	[redacted]
[redacted]	EPA	[redacted]
[redacted]	DLA	[redacted]
[redacted]	DLA	[redacted]
[redacted]	GSA	[redacted]
[redacted] by phone)	GSA	[redacted]

Action Items:

- USACE will provide a schedule of deliverables to [redacted] in order for [redacted] to coordinate [redacted] with MDE and EPA.
- USACE will draft a Right-of-Entry and send it to DLA for their ROE process; DLA will coordinate the ROE with GSA.
- ERT will research information on a transformer storage yard located near the Main Gate.
- [redacted] requested that the property manager, [redacted] be notified regarding the schedule and type of field activities.
- ERT will review the results of an environmental investigation conducted at Badger Army Ammunition Plant, which suggested that PCBs may volatize from paint at excessive temperatures.
- [redacted] will discuss the proposed risk assessment approach with the risk assessment team at the EPA to ensure that the proposed approach is appropriate.

- [redacted] should be carbon copied (cc'd) on any correspondence sent to DLA.

Meeting Minutes:

[redacted] began the Former Curtis Bay Ordnance Depot (Depot) Technical Project Planning (TPP) #1 meeting by thanking everyone for attending and asking each attendee to introduce themselves. Following introductions, [redacted] explained the objectives of the TPP process. The TPP process involves a series of three meetings intended to provide discussion on project plans and goals. [redacted] discussed the agenda for the TPP #1 meeting, explaining that the scope of work for the project fell under both the Military Munitions Response Program (MMRP) and the Installation Restoration Program (IRP). He noted that the objective for this meeting is not to get into specific details about the technical approach, but provide a general overview of the project.

[redacted] continued the presentation by emphasizing the number of stakeholders involved with the project. The property is owned by the General Services Administration (GSA); the Defense Logistics Agency (DLA), who is under the Department of Defense (DoD), is acting as executor for the GSA. As such, the DoD is very interested in the progress of the project. [redacted] will report regular status updates to the DoD. [redacted] commented that the ultimate objective for the project is to make sure that the Depot is safe for future use.

[redacted] explained that not every site at the Depot has had a preliminary Site Investigation (SI) component completed. For that reason, the presentation would group the sites under investigation, defined as environmental concerns (ECs), into three categories: 1) SI-level ECs with an unknown release status; 2) Remedial Investigation (RI)-level ECs with a known release; and 3) the Engineering Evaluation/Cost Analysis (EE/CA) EC, which is part of a Non-Time Critical Removal Action (NTCRA). The objective of the SI-level sites is to collect enough data to determine whether a release has occurred; if a release is documented at a specific EC, additional investigation at a RI-level will be conducted. The objective of the RI-level sites is to investigate to determine the nature and extent of contamination. Finally, the objective of the EE/CA is to determine the scope of the removal action.

[redacted] then reviewed important terminology associated with the project. Hazardous, toxic and radioactive waste (HTRW) issues are associated with the IRP sites; however, there are no radioactive wastes associated with this project, therefore this project will be concerned with HTW. [redacted] expressed that significant time would be spent analyzing historical activities to develop appropriate Conceptual Site Models (CSMs) that would guide the field work. In relation to the MMRP sites, there is a potential for Munitions and Explosives of Concern (MEC). Unexploded ordnance, discarded military munitions (DMM), and munitions constituents (MC) are the categories of MEC. The primary MEC concern at the Depot is anticipated to be DMM that may pose an unacceptable safety hazard. [redacted] provided the definitions for material potentially presenting an explosive hazard, munitions debris (MD), and open burn/open detonation.

He recapped the two programs: the MMRP and the IRP. The MMRP handles sites that have suspected MEC hazards or MC contamination. The IRP handles sites that have suspected HTW contamination. [redacted] then illustrated where along the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) the Depot project fell, observing that there are SI, RI, and removal action

components of the Performance Work Statement. The Depot project primarily falls within the RI phase of the CERCLA process; the EE/CA site will include a NTCRA; the NTCRA is not part of the ERT scope and is not yet funded by DoD. [redacted] presented a physical representation of a typical RI decision model and summarized that this model will be used to develop data collection methods with the goal of ensuring that the chosen methods are valid and appropriate. Further, the RI decision model will define outputs and major actions after the collection of the data is complete.

[redacted] then introduced [redacted] the ERT Project Manager, who mentioned that the meeting was being recorded. [redacted] reiterated [redacted] point that the Depot project will follow the TPP process to ensure that the each stakeholder is in agreement throughout the project. The TPP process will include four, rather than the typical three, meetings. Following the TPP #1 meeting, the second TPP meeting will occur after the stakeholders have had a chance to review the Draft Final version of the Work Plan. The third TPP meeting will occur after field work for the EE/CA site is complete and after the stakeholders have had a chance to review the Draft Final EE/CA Report. The final TPP meeting will take place once the stakeholders have reviewed and commented on the Draft Final versions of the individual MMRP and IRP RI/FS Reports.

[redacted] continued with the presentation and introduced the process that will be used to complete the Data Quality Objectives (DQOs). The Depot project consists of 22 separate ECs; the Work Plan will contain a separate DQO for each EC. The Work Plan will address the problem to be solved, identify the decision, the process for getting answers, the type of data that will be collected, how the data will be collected, and the analysis proposed. The aim is for the Work Plan to fully explain the reasoning behind the proposed field activities. [redacted] emphasized that ERT is working towards completing the EE/CA Report by September 2013 and completing the two RI/FS Reports by [redacted]. The initial focus of the project will be directed towards the completion of the EE/CA Report.

[redacted] asked whether the deliverables would include Draft, Draft Final, and Final versions. [redacted] replied that the Draft version would go to the Army for review first, and then the Draft Final version would go to each stakeholder for review. [redacted] added that the Draft version is reviewed exclusively by the Army to ensure that ERT and the Army are in complete agreement. [redacted] requested a list of deliverables and the anticipated schedule for deliverables so that he can work with DLA to get [redacted] in place. [redacted] will provide [redacted] with a schedule and list of deliverables that MDE will be requested to review. [redacted] asked about review times and [redacted] noted his maximum review time would be 90 days.

[redacted] continued the presentation and discussed a brief history of the Depot and key prior investigations completed at the Depot, notably a Geophysical Survey (completed by MKM Engineers), a Geophysical Validation Report (completed by Zapata, Inc.), and a Environmental Survey and Analysis Report (completed by EA Engineering, Science, and Technology). The data collected through the Geophysical Survey and the Geophysical Validation project have been reviewed and assessed by ERT and will be used for this project, ensuring that similar equipment and methods are used to fill in existing data gaps. [redacted] then presented the list of munitions that have been encountered at the Depot. The MKM Report notes MEC items were removed, but no additional information on those items is available. Only MD was found during the Zapata project.

[redacted] went on to introduce the preliminary CSM, which is based on the Depot being defined as an industrial area. ERT assumes that the Depot will remain zoned industrial and requested verification of the Depot's future use from the meeting attendees. [redacted] confirmed that the property would remain zoned industrial. [redacted] also confirmed that the property would remain zoned industrial and did not anticipate future plans to change its classification. [redacted] stated he was under the assumption that Anne Arundel County would like to use the property for recreational purposes and a strip mall. [redacted] explained that the County had not acquired the property yet and would need to take further action to change the zoning standard for the Depot. The property appraisal is consistent with existing land use of industrial and that if any clean up is needed it should be done to the industrial standards. [redacted] commented that any Decision Document would require land use controls to ensure the industrial land use scenario. The attendees were in agreement that the current and future land use classification of the Depot would remain industrial.

[redacted] has been in communication with the Maryland Department of Transportation (MDOT), who has expressed interested in acquiring the property, and stated that GSA continues to keep MDOT advised on the disposal status. [redacted] commented that GSA has placed the property on hold until environmental studies and remedial actions are complete. GSA will reiterate to MDOT that the Depot is zoned industrial and will be cleaned to industrial standards, if needed.

[redacted] provided a general summary of the field work plans. The field work includes brush cutting, digital geophysical mapping (DGM) on MMRP ECs, intrusive investigations of clusters of anomalies, and environmental media sampling (surface soil, subsurface soil, groundwater, surface water, and sediment). Surface soil samples will be collected from 0 to 6 inches below the surface; the subsurface soil samples will be collected from 7 inches to 6 feet below the surface. Depths will be defined in the Work Plan; the bottom depth of 6 feet is based on previous investigations and historical evidence that no ordnance items were encountered more than 6 feet deep. [redacted] explained that ERT will be using background soil metals data from a previous investigation conducted by Parsons in 2006. ERT will collect background soil samples at the same locations used in 2006 specifically to analyze for PAH levels. One groundwater monitoring well installed in 2006 will also be used as a background well. The groundwater monitoring will be conducted by point-in-time sampling. [redacted] asked [redacted] to ensure that the property manager of the Depot was kept aware of any field activities.

[redacted] emphasized that a RI required monitoring wells that could produce reproducible data. [redacted] explained that if the ECs have a confirmed release to groundwater, they would be investigated by the full RI process. [redacted] presented the overall Depot map and described the separation of MMRP and IRP sites. [redacted] further explained that not all the sites had undergone SI level investigations.

ERT worked with the USACE to group the EC sites as SI-level ECs (IRP and MMRP), RI-level ECs (MMRP only), and the EE/CA site. The SI-level group of ECs will be investigated to determine the presence or absence of a release. The RI-level group of ECs will be investigated to determine the nature and extent of MEC or MC contamination. The EE/CA site will be investigated to determine the scope of the removal action to allow for the completion of the RI. [redacted] asked if it would be effective for MDE and EPA to build a list of sampling parameters for each EC. [redacted] wanted to expand the

sampling parameters presented at some of the ECs. For example, in relation to the Tire Retreading Shop, he noted that in talking to other MDE staff a recommendation on possibly adding select metals to the sampling parameters should be considered for this EC. This is due to the possibility that tires may have ground down and some of the tires may have contained steel belts. [redacted] responded that ERT and the USACE initially thought it would be most beneficial to wait until the stakeholders had received all available data for the sampling parameters presented before providing comments on the list of analytes. He added that ERT will provide necessary information in the Work Plan to justify the specific sampling parameters for each EC and would address specific comments and concerns at the second TPP meeting. [redacted] explained that each indicator compound is being carefully determined through in-depth historical research. [redacted] explained that available historical information, including Technical Manuals, was being carefully analyzed to determine an accurate and appropriate list of sampling parameters.

In an effort to get as much information as possible prior to Work Plan submittal, the attendees agreed to discuss each EC and associated indicator compounds during the meeting, suggesting follow-up conference calls, if needed, to firm up the specific sampling parameter list for each EC. [redacted] presented the first group – the IRP SI-level group – to the meeting attendees and discussed the available history and proposed sampling parameters. During the discussion of the IRP SI-level ECs, [redacted] informed the meeting attendees that he remembered seeing a staging area for transformers near the dog training facility and asked whether it was being investigated during the RI project. ERT did not have this area on their current list of ECs, but will visit the site to look for any indication of a transformer storage yard near the dog training facility. If a storage area is located, ERT will determine the age of the transformers to see if any investigation of this area is necessary.

[redacted] raised concerns with EC-34 (Boiler House) and EC-35 (Oil House). He mentioned that CERCLA Section 101.14 outlines a petroleum exclusion. If a release is demonstrated from either EC-34 or EC-35, [redacted] will have to forward the information to MDE's Oil Control Program for review, which could potentially affect the MDE review schedule. The attendees noted [redacted] concerns. [redacted] requested clarification for EC-28 – specifically what lumber activities had occurred. ERT responded that the building activities included the storage of treated lumber. ERT will make it clear in the Work Plan that only storage activities occurred within the EC-28 building, not the actual treatment of lumber.

After completing the discussion on the IRP SI-level ECs, [redacted] continued with the SI-level MMRP ECs. [redacted] explained that MMRP EC investigations would entail a geophysical investigation and MC sampling. [redacted] stressed that the intrusive activities proposed at the MMRP ECs would not include investigating individual anomalies, rather areas would be flagged for intrusive investigations based on clusters of geophysical responses. [redacted] discussed the history of each MMRP SI-level EC and the technical approach planned at each EC, beginning with EC-58A. [redacted] asked why ERT would not be investigating individual anomalies. [redacted] explained that the historical information indicated either burial or burning areas that typically span larger areas than individual anomalies. As such, the investigations are geared towards large burials areas rather than individual anomalies which are common on firing/impact ranges. [redacted] finished the discussion on the MMRP SI-level ECs: EC-57, EC-52, and EC-22 and then called a short break in the meeting.

After returning from the short break, attendees asked [redacted] about the process for obtaining a Right-of-Entry (ROE) from GSA for the planned activities. [redacted] and [redacted] decided that GSA would be able to issue a ROE for DLA and DLA's contractors. USACE will draft a ROE and send it to DLA and allow DLA and GSA to produce a formal ROE.

[redacted] requested a point-of-contact for the planned field activities and informed the attendees that [redacted] was the property manager for the Depot. [redacted] noted he was the point of contact for USACE and that he has [redacted] contact information and has already been in contact with him.

[redacted] noted that the number of MC samples cannot be predetermined for the MMRP ECs in the Work Plan. Upon receiving results from the geophysics data, ERT will put together a brief memo discussing the geophysical data results and would propose a plan for both the trench locations and the biased MC sampling locations. A conference call between the stakeholders, once the memo is submitted, will finalize the proposed field work. [redacted] and [redacted] noted that this process has been used effectively on recent projects and both the MDE and EPA representatives have recently participated in memo reviews of trench locations on another ERT/USACE project.

[redacted] then introduced the MMRP RI-level ECs; the investigation at each involves DGM and MC investigations to determine the nature and extent of contamination as these locations have known releases. [redacted] began the discussion with EC-25. During the discussion, [redacted] noted that he had reviewed investigations of the Badger Army Ammo Burning Plant in Wisconsin, which burned any material that may have come into contact with explosives. The results of a soil investigation of the contaminated area suggested that polychlorinated biphenyls (PCBs) in paint may volatize from excessive heat. [redacted] suggested reviewing the investigation as its results may warrant adding PCBs to the sampling parameters for EC-25. ERT agreed and will follow up on this issue. During the discussion of EC-52, it was noted that sampling parameters on the slide incorrectly listed select explosives rather than select propellants.

[redacted] discussed the last grouping for the ECs: the EE/CA at EC-25. The first objective for this EC is to determine the scope of the area that needs to be addressed with a NTCRA. After receiving the results from the EE/CA that detail the lateral and horizontal extent of the burial area(s), a NTCRA will be conducted. [redacted] stated that while [redacted] for the NTCRA, USACE-Baltimore has the ability and desire to conduct the NTCRA and will be working with DLA to coordinate this. After completion of the removal action, ERT will perform the necessary steps to complete the RI. Completing the EE/CA objectives will entail an accelerated 18-month schedule, in order to have the NTCRA completed and confirmatory sampling conducted and submitted with the MMRP RI/FS report.

[redacted] discussed the proposed approach for the IRP and the MMRP risk assessments. Data will be screened against applicable standards. Chemicals reported above the standard screening levels will be included in a baseline human health and/or screening-level ecological risk assessment. ERT proposes to group geographical areas for the risk assessment as receptors across the Depot will be the same. The groundwater will be evaluated as a whole for the Depot with both the MMRP and IRP RI/FS Reports having the same groundwater risk assessment component as the groundwater is assumed to be mixed

across the Depot. [redacted] commented that the EPA risk-assessors will need to review the proposed approach for the risk assessment. [redacted] will share the tentative plans with the risk assessment team at the EPA to ensure that the approach is acceptable. If not, a conference call with the appropriate personnel can be held to discuss this issue in detail.

The attendees discussed the proposed schedule for the entire Depot project. [redacted] asked whether the project would include a remedial design. [redacted] replied no, a remedial design will not be part of the RI/FS reports. During the schedule discussion, [redacted] and [redacted] agreed that MDOT involvement at this level would not be appropriate. [redacted] requested to be copied on everything that is sent to [redacted]

At 4:00 pm, [redacted] concluded the meeting and thanked everyone for their attendance and participation.

FORMER CURTIS BAY ORDNANCE DEPOT

TECHNICAL PROJECT PLANNING MEETING #2

Military Munitions Response Program and Installation Restoration Program
Remedial Investigation/Feasibility Study
and Engineering Evaluation/Cost Analysis

April 24, 2013

Meeting Summary

Attendees:

NAME	ORGANIZATION	EMAIL
[redacted]	USACE	[redacted]
[redacted]	USACE	[redacted]
[redacted]	USACE	[redacted]
[redacted]	USACE	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted]	ERT	[redacted]
[redacted] (by phone)	ERT	[redacted]
[redacted]	MDE	[redacted]
[redacted]	DLA	[redacted]
[redacted]	DLA	[redacted]
[redacted]	GSA	[redacted]
[redacted] (by phone)	GSA	[redacted]

Action Items:

- U.S. Environmental Protection Agency, Region 3 will be copied on project deliverables for recordkeeping.
- [redacted] will coordinate with [redacted] as well as the Defense Logistics Agency (DLA)'s real estate division, to obtain a Right-of-Entry (ROE) for the Former Curtis Bay Depot property to allow field activities to commence.
- ERT, Inc. (ERT) will provide [redacted] geographic information system files for environmental concern (EC) 39 – Medical Supplies Burial Area.
- U.S. Army Corps of Engineers will coordinate with the Army Reserve facilities and obtain an ROE for the property to conduct background sampling.
- ERT will provide a list of logistical questions to [redacted] who will coordinate with [redacted] and communicate decisions to ERT.
- ERT will provide DLA with specific information of where the field team anticipates [redacted] to access EC-25 and EC-49.

- [redacted] will communicate any changes to the period of performance for the engineering evaluation/cost analysis for EC-25.

Meeting Minutes:

[redacted] U.S. Army Corps of Engineers (USACE) Project Manager (PM), began the Former Curtis Bay Ordnance Depot (Depot) Technical Project Planning (TPP) #2 meeting by thanking the participants for attending and asking each attendee to introduce themselves. Following introductions, [redacted] explained that the purpose of the meeting was to achieve stakeholder agreement on the Draft Final Work Plan, more specifically to receive regulator consensus in order to finalize the Work Plan and begin field mobilization efforts.

[redacted] then introduced [redacted] the ERT, Inc. (ERT) PM. [redacted] began the slide presentation by reviewing the agenda for meeting. [redacted] emphasized that the meeting would be an open discussion to foster communication and consensus between the stakeholders.

[redacted] began by reviewing the status of the action items, listed below, from the TPP #1 meeting held on 21 August 2012.

- USACE will provide a schedule of deliverables to [redacted] in order for [redacted] to coordinate [redacted] with MDE and EPA. *Action Completed. Funding agreements between the Maryland Department of the Environment (MDE) and the Defense Logistics Agency (DLA) are complete.* [redacted] *summarized that the U.S. Environmental Protection Agency (USEPA) will not be providing regulatory services on the project. However, the USEPA has offered technical support to MDE, as needed. The USEPA will not be reviewing project deliverables unless certain sections are specifically requested for review by MDE. The USEPA will be carbon copied (cc'd) on the project deliverables for recordkeeping.*

- USACE will draft a Right-of-Entry (ROE) and send it to DLA for their ROE process; DLA will coordinate the ROE with the General Services Administration (GSA). *Action Pending.* [redacted] *DLA, received an email from* [redacted] *GSA, regarding a request for a ROE.* [redacted] *relayed that the ROE had yet to undergo an internal review; after review, the ROE would be directed to the DLA real estate division.* [redacted] *USACE, conveyed that the USACE real estate division had advised that USACE should not be involved in the ROE procurement process. The ROE should be procured through DLA and GSA.* [redacted] *stated that a formal written request may be required and that she would coordinate with* [redacted] *following a discussion with the DLA real estate division.* [redacted] *emphasized that she would approach the DLA real estate division promptly, but could not comment on timeliness of their response.*

- ERT will research information on a transformer storage yard located near the Main Gate. *Action Completed.* [redacted] *expressed that ERT had researched information regarding a transformer storage yard located near the Main Gate and concluded that there was no record of a transformer storage yard on the Depot property.*

- [redacted] requested that the Depot property manager, [redacted] be notified regarding the schedule and type of field activities. *Action Ongoing.* [redacted] *expressed that ERT, through* [redacted] *had been in communication with* [redacted] *regarding schedule and field*

activities. [redacted] *will continue to be informed of on-going activities and will be provided an updated schedule of field activities.*

- ERT will review the results of an environmental investigation conducted at Badger Army Ammunition Plant, which suggested that polychlorinated biphenyls (PCBs) may volatize from paint at excessive temperatures. *Action Completed.* [redacted] *expressed that ERT had reviewed the results of the environmental investigation at the Badger Army Ammunition Plant and, based on that review, ERT had added PCBs to any environmental concern (EC) with reported former burning activities.*
- [redacted] will discuss the proposed risk assessment approach with the risk assessment team at the USEPA to ensure that the proposed approach is appropriate. *Action Completed. The USEPA had provided an overview of the slides following the TPP #1 meeting. ERT and USACE have not received any information regarding the proposed approach for the Depot risk assessment and based on the discussion on the first action item bullet, do not expect any additional input from USEPA.*
- [redacted] should be cc'd on any correspondence sent to DLA. *Action on-going. All correspondence to DLA is directed to* [redacted] *as she is now in charge of this project.*

During the discussion of the TPP #1 action items, [redacted] MDE, requested to review the Draft Final Work Plan document page by page. [redacted] suggested instead reviewing the prepared slide presentation and then reviewing the document in more specificity.

[redacted] continued with the slide presentation, providing a brief overview of Depot history and a description of the remedial investigation (RI) objectives. She explained that two sets of studies would be occurring concurrently and that the overall project included an RI/Feasibility Study and associated engineering evaluation/cost analysis (EE/CA) effort. [redacted] then provided a broad overview of the RI technical approach, explaining that if a release is confirmed at a Site Investigation (SI) level site, then an RI would be conducted for those specific sites.

[redacted] presented the different groupings for the ECs at the depot: SI level ECs (Installation Restoration Program [IRP] and Military Munitions Response Program [MMRP]), RI level ECs (MMRP only), and the EE/CA site (EC-25). The SI level group of ECs will be investigated to determine the presence or absence of a release. The RI level group of ECs will be investigated to determine the nature and extent of MEC or MC contamination. The EE/CA site will be investigated to determine the scope of the removal action to allow for the completion of the RI. [redacted] asked why two of the ECs, EC-53 and EC-39, were highlighted in green on the list presented in the slide. [redacted] responded that the two ECs had been discussed at the TPP #1 meeting and were concluded to require no further action (NFA). The determination had been presented in a technical memorandum, issued as an appendix to the Draft Final Work Plan, and agreed upon during the TPP #1 meeting.

[redacted] relayed that MDE believes enough investigation has been completed at EC-39: Medical Supplies Burial Area. As such, [redacted] explained, EC-39, in accordance with Comprehensive Environmental Recovery, Compensation, and Liability Act (CERCLA) requirements, may proceed to NFA status. However, according to Maryland state law, EC-39 is classified as a landfill. Further, while EC-39 may proceed to NFA status through CERCLA, [redacted] will report that a landfill was investigated under CERCLA to the MDE Solid Waste division, who may require additional investigation

or remediation. [redacted] explained that the MDE Solid Waste division would input the site into its landfill database. When reporting EC-39 to the MDE Solid Waste Division, [redacted] will summarize that the site was investigated in accordance with CERCLA and that no risk is associated with the site. [redacted] asked if either GSA or DLA involvement would be needed after the report to the MDE Solid Waste division was submitted. [redacted] answered that no further information from GSA or DLA would be needed, unless the MDE Solid Waste division had any questions/concerns at which time they would reach out to the property owner. To aid in [redacted] report, ERT will provide GIS files to MDE.

Following the discussion on EC-39, [redacted] continued the presentation by introducing individualized technical approaches for the ECs. She explained that activities at EC-22, the first EC to be discussed, may historically have included dumping activities, although it was not a known munitions dumping area. Further, [redacted] explained that the EM61 would be used to locate potential burial areas, rather than to investigate individual targets or munitions that are typically associated with firing points or impact areas, which are not present at the Depot.

At this point in the presentation, [redacted] USACE, asked [redacted] if he would prefer to review his comments within the Draft Final Work Plan. [redacted] replied that he would rather save his comments until the review of the document, following the prepared presentation. Upon further discussion, the attendees decided that it would be more beneficial and efficient to review [redacted] comments on the Draft Final Work Plan, presenting a corresponding slide when applicable.

[redacted] led the discussion of MDE comments on the Draft Final Work Plan.

General Comments

Comment #1: [redacted] noted that several of the sites include a pared down list of analytes for metals. Since the laboratory will be analyzing for all metals and reporting only the targeted metals requested, the [redacted] would be minimal. Therefore, it was suggested to report all metals analyzed.

Response: [redacted] responded that the discussion at TPP #1 had focused on this topic and had concluded that the analyte list would be targeting analytes associated with the specific historical activities. The stakeholders at TPP #1 had been in agreement with the approach to produce a targeted list of metals based on historical activities per EC. [redacted] emphasized that many of the ECs were currently classified as SI level ECs. As such, the focus of the analytes would be targeted to a specific activity.

After a group discussion, [redacted] reiterated that the same topic had been presented at TPP #1 and the stakeholders had been in agreement to continue with the technical approach of targeting indicator analytes of historical activities. [redacted] stated that because it had been resolved at TPP #1 then he was in agreement to move forward with the proposed technical approach.

Comment #2: [redacted] noted that several sites included paint storage as a former activity yet the analytical suite varied per paint storage EC.

Response: [redacted] responded that ERT would back check the former activities associated with each EC to confirm that the appropriate individualized analytical suite was presented. [redacted] added that prior background research conducted by ERT on paint storage activities was documented in the technical memorandum presented as an appendix to the Draft Final Work Plan. [redacted]

noted that some ECs may have additional metals/solvents in the analyte list based on historical activities in addition to paint storage.

Specific Comments

Comment #1, multiple pages: Several instances in the Draft Final Work Plan discuss "smokeless powder trains." [redacted] suggested including a definition of "smokeless powder train" to assist the reader of the document to better understand the activities at the Depot, as different definitions could be attributed to the phrase "smokeless powder train."

Response: [redacted] explained the definition of "smokeless powder train" by stating that the historical activity included loading a train car with smokeless powder, moving the train car to a barricade, and burning the contents of the train car. [redacted] had assumed a different definition of a "smokeless powder train" and requested that ERT clarify the definition and terminology within the Draft Final Work Plan (i.e., stating "train car" versus "train"). [redacted] clarified that he assumed that the burning of the train cars was done in an attempt to remove any explosive residue from the train cars and to limit any explosion. [redacted] responded that this was the assumption for past historical activity. Based on the historical timeframe, [redacted] suggested that train cars could have been made of wood, with a metal undercarriage. [redacted] replied that the historical record did not provide information on the type of train car used or the material of the train car. ERT will clarify language in the text regarding these historical activities.

Comment #2, Page 10, Line 15: The text states that no known releases are associated with EC-22. [redacted] asked if that meant any current releases, as a historical removal action had occurred for a radiological release.

Response: [redacted] explained that there had been no known releases of hazardous and toxic waste (HTW) had occurred. The term HTW had been used in the text instead of hazardous, radiological, and toxic waste because the radiological portion of the Depot had been addressed separately. [redacted] requested that the information be clarified in the text; ERT will update the Work Plan language to note no known HTW releases have occurred.

Comment #3, Page 12, Line 30: [redacted] asked what type of munitions had been "renovated" at EC-57B. Further, he asked what type of renovation had been conducted.

Response: [redacted] replied that ERT would review historical documents for further details but emphasized that the historical record was not complete. [redacted] reiterated that the historical record would be reviewed and the text would be updated if more specific details were encountered. ERT will also reach out to the Corps of Engineers, Baltimore District (CENAB) Munitions Safety Office group for an explanation of the terminology.

Comment#4 Page 12: The text specifies that EC-57B was also used as a bag loading plant. [redacted] asked what the contents of the bags were and listed possibilities of the bags contents. [redacted] also asked what had been conducted at the "small arms packing plant."

Response: Mr. [redacted] stressed that EC-57B had been used for different purposes throughout the course of the Depot's activities. [redacted] added that the understanding was that intact munitions were belted, clipped, and packed for shipping. [redacted] suggested that the text of the Draft Final Work Plan was vague and could be interpreted differently. [redacted] emphasized the

primary missions of the Depot, which were receipt, package, and demilitarization of ammunition. She expressed that ERT would research the specific terminology used in the historical documents and provide a clearer explanation in the text of the Work Plan.

Comment #5, Page 12, Line 35: [redacted] asked if the remaining lead, copper, steel, and other materials were reclaimed. [redacted] speculated on potential disposal or reuse scenarios of the remaining materials.

Response: [redacted] responded that the possibility exists that the historical documents do not provide enough conclusive details of the former activities conducted at the Depot. [redacted] replied that if former activities were not well documented or known, then the analytical parameters per EC may have to be increased to account for the uncertainty in regards to former activities. [redacted] emphasized that the activities occurred within the confines of a building. [redacted] stated that, in the past, if the historical record was sparse, text has been used to communicate that the information presented is based on military knowledge and experience. The historical record will be reviewed and the Final Work Plan will include any updated historical information and information gathered from the CENAB Munitions Safety Office to provide a robust historical context. The updated Work Plan text will provide a clearer description of the known and unknown historical information.

[redacted] asked whether historical photographs had been examined for burial activities that could be related to excess lead from the former small arms packing plant. [redacted] replied that an extensive historical photographic review had been conducted and the boundaries of several ECs had been updated based on that review. [redacted] expressed that lead would historically be used in berms. [redacted] replied that, based on the historical review, no new berm construction had been undertaken since the 1940s or 1950s.

Comment #6, Page 13, Lines 5 and 6: For EC-57C, [redacted] questioned whether the text meant to state "inch" rather than "9.2mm howitzer."

Response: The text will be updated to read "howitzer powder" or "smokeless powder" rather than "9.2mm howitzer." [redacted] further explained that the building stored smokeless powder that was used for howitzer munitions.

Comment #7, Page 13, Line 14: The text reads that "no known releases" have occurred at EC-57D; however, EC-57D is the known location of a historical fire. [redacted] asked for the reasoning behind the statements to be clarified.

Response: [redacted] stated that available information indicates the potential for a release to have occurred. [redacted] added that no investigation had been conducted at EC-57D to confirm a release. The text will be clarified to read "no confirmed release" has occurred at EC-57D.

Comment #8, Section 1.7.2.1, EC-3: The text states that "minimal information is available" about EC-3. [redacted] suggested that the phrase was misleading and requested that the phrase be deleted from the text.

Response: [redacted] responded that the description for EC-3 would be updated, along with any similar instances in the text that read "minimal information is available."

Comment #9 EC-53: [redacted] was in agreement with the proposed plan to not investigate EC-53, as was decided at the TPP#1 meeting.

Comment #10, Graphic 2-1 Organization Chart: For clarification, [redacted] noted that MDE was not listed in the organization chart.

Response: [redacted] replied that the organization chart reflected the management structure through which ERT interfaces with USACE and its subcontractors.

Comment #11, Page 31, Line 21: [redacted] noted that USEPA Region 3 was no longer involved in the project and acknowledged that the change had occurred after the Draft Final Work Plan had been submitted for review.

Response: References to USEPA involvement with the project will be updated, as appropriate, throughout the text in order to reflect this change.

Comment #12, Page 38, EC-21: [redacted] asked why the excavation was being limited to three trenches as he felt that trenches should extend to the extent of where the landfills are found.

Response: [redacted] responded that for planning purposes, a number of trenches for excavation had to be provided for the Work Plan. [redacted] explained that the number had been reached by reviewing the geological features of the site and that the number reflected the anticipated trenches. However, [redacted] noted, the number of trenches would be subject to change based on the investigation findings. For clarification, ERT will update the text of the Work Plan, for at least the RI level sites, to indicate that the number of trenches will be subject to discussion based on preliminary results and data.

Comment #13, Page 39, EC-21 Environmental Sampling: [redacted] asked for ERT, at a minimum, to analyze for analytes on the Maryland Solid Waste Tables 1 and 2. The standard list represents the analytes that the MDE Solid Waste division requires for landfills, in addition to any site-specific monitoring requirements.

Response: [redacted] explained that the EC was considered an "open dump" rather than a landfill, emphasizing that any storage at the EC was surficial. [redacted] responded that if the EC is characterized as NFA, then it will be reported to the MDE Solid Waste division. [redacted] asked if [redacted] was requesting for the parameters from Tables 1 and 2 to be used during the investigation, or if [redacted] was providing them as a reference. [redacted] added that the project was being conducted under CERCLA and, as such, wanted to clarify whether the request for the additional sampling parameters was a request based on MDE Solid Waste guidelines. If the request was for the MDE Solid Waste division, the MMRP and IRP programs address CERCLA-related issues, not solid waste issues. [redacted] responded that MDE was involved with several projects through the U.S. Navy, Air Force, and U.S. Army in accordance with CERCLA and that they were investigating the monitoring parameters provided in the tables.

[redacted] stated that the potential existed for buried items within the EC. [redacted] countered that the nomenclature for the site may have been an error. [redacted] added that, historically, the term "landfill" was applied to any area where debris was disposed of or stored. [redacted] added that no trenching or landfilling operations were visible in the historical photographs.

It was decided that the text would be clarified to reflect that although ERT reviewed the Zapata report and MD was found in the subsurface in one or more of the trenches, no indication of landfill activities exists for the EC, and will expand upon the fact that the area was used as a surficial storage area for unwanted items that were awaiting disposal or recycling. Further, the text will include information deduced from the historical photographs.

[redacted] requested that redline changes be sent to his review prior to issuing the Final Work Plan. [redacted] expressed that it would not be a problem to add the full list of requested parameters from Tables 1 and 2 to the analytes for the groundwater sample collected at EC-21. Further, he emphasized that USACE would like the sites characterized fully. Following this discussion, the attendees adjourned for lunch.

Following the break for lunch, the meeting resumed. [redacted] then continued his review by confirming that only screening groundwater samples would be collected, initially. He expressed that a risk assessment could not be conducted through groundwater screening samples only; it would be necessary to collect groundwater samples from permanent wells. The attendees confirmed that the information was understood. [redacted] then continued providing specific comments on the Draft Final Work Plan.

Comment #14, Use of MDE Cleanup Standards: [redacted] emphasized that MDE guidance regarding cleanup standards at voluntary cleanup program sites was not intended for sites associated with CERCLA and requested that the document be updated to remove these standards. MDE guidance dictates which programs the cleanup standards may be used for and they do not apply to projects being conducted in accordance with CERCLA.

Response: It was agreed that references to MDE cleanup standards would be removed in all instances from the Work Plan and from the Quality Assurance Project Plan (QAPP).

Comment #15, multiple pages: [redacted] requested that the trade name "Geoprobe" be removed in all instances, unless a "Geoprobe" would definitely be used during the investigation.

Response: All references to "Geoprobe" in the Work Plan and in the QAPP will be replaced with the phrase "direct push technology."

Comment #16, EC-52: [redacted] suggested that EC-52 be classified as a landfill.

Response: [redacted] and [redacted] countered that the past robust geophysical data do not indicate the presence of burial areas. [redacted] added that the term "landfill" may be a misnomer; the term "pits" would be more appropriate. [redacted] replied that the investigation proposed in the Work Plan was sound; however, he would have to report the site to MDE Solid Waste division in the event that the site is later classified as NFA under CERCLA. It was further decided that groundwater samples at EC-52 would be screened for the parameters provided in Tables 1 and 2 from MDE Solid Waste.

Comment #17, Page 59, EC-58B: [redacted] noted that the description of EC-58B states that the area may potentially have been a pit ranging between 5 to 10 feet deep. He continued that he was under the assumption that the pit had been filled in and requested information on the material used to fill the pit.

Response: [redacted] responded that ERT did not believe the pit had been filled based on the topography of the area; the depression in now a wetland area that has overgrown with species such as

Phragmites. Through the historical photograph investigation, [redacted] had singled out the EC because it demonstrated the only occurrence of a possible pit in the area. [redacted] asked whether there was any additional information on the EC. [redacted] responded that based on available information, the pit exists, although its purpose remains unknown. DGM investigation is planned in this area as well as sediment and surface water samples.

Comment #18, Paint Storage: [redacted] elaborated on a comment he presented earlier in the discussion, stating that the activity 'paint storage' was listed for multiple ECs. However, the analytical suite per EC varied.

Response: [redacted] responded that variability among the analytical parameters was most likely due to the individual use of the different ECs. ERT will review the Work Plan to ensure that the analytical suites for each EC with similar historical activities, particular those that include paint storage activities, are complimentary and include the same paint related solvents.

Comment #19, Page 67, EC-30: [redacted] noted that no other metals besides lead were included for laboratory analysis and requested further explanation.

Response: [redacted] responded that ERT had researched extensively the potential historical activities that may have occurred at EC-30. Based on the research, it was concluded that extensive restoration had not been conducted within the Locomotive House. The lead is based on the historical usage for lead-acid battery storage. [redacted] then asked if the same analytes that were listed to investigate other paint storage sites would be included in the analytical parameters list for EC-30. [redacted] explained that the painting activities that had occurred within the Locomotive House were very minor as only lower echelon maintenance occurred here; therefore, paint related solvents were not included in the analytical suite for EC-30. The echelon of maintenance was such that large-scale painting of the locomotives, etc. would have been outsourced to another location that performed a higher echelon of maintenance. [redacted] requested that the text be updated to explain that the painting activities at EC-30 were only minor.

Comment #20, EC-30: [redacted] noted that there are 2 pits filled with water at this EC, but there is no proposed sampling for the water or possible sediment at the bottom of these pits.

[redacted] noted that EA Science and Technology had collected samples from the pits within EC-30 and only organic matter was found. The surface water sample results did not indicate petroleum contamination. However, [redacted] expressed interest in solvents and heavy metals data for the pits inside of EC-30, and that he is not interested in petroleum as it is exempt from CERCLA.

Response: After a group discussion, everyone agreed that the text would be updated to note that the pits are not filled with water, but that there is a minor amount of water collected here and that the roof of EC-30 was intact. Additionally, investigations on the inside of buildings are not covered by CERCLA.

Comment #21, Section 3.7.6: [redacted] requested to be informed if any item is blown in place or vented during field activities. He explained that his approval was not necessary but requested an explanation of what had happened so that he could document the event in the project file. He clarified that it would not be necessary to provide him with daily reports.

Response: [redacted] responded that MDE would be kept informed in the event of a significant MEC activity in the field; [redacted] will be the main contact for MDE.

Comment #22, Page 99, Investigative Derived Waste: [redacted] provided a hardcopy of a comment that discusses the distinction between investigative derived waste (IDW) and investigative derived media (IDM). Based on the comment provided by [redacted] he requested that the title of the section be renamed to "Investigative Derived Media." If the waste were classified as IDW, it would imply that waste would have to be disposed in accordance with applicable regulations. Alternatively, if the waste were classified as IDM, the media could be stored on site in drums and could be reintroduced to the environment upon laboratory confirmation. Disposable sampling equipment, such as nitrile gloves and scoops, will be considered waste and can be disposed of at a local landfill.

Response: The Work Plan will be edited to rename the specific section "Investigative Derived Media" rather than "Investigative Derived Waste." The terms will be used throughout the document according to the guidance provided by MDE. [redacted] requested to be included in the correspondence of information regarding potential waste manifests and similar documentation. [redacted] noted that the Corps usually signs off on waste manifests on behalf of their clients.

Every hardcopy page provided by [redacted] will be scanned, uploaded, and sent to the meeting attendees.

Comment #23, Figure Edits: [redacted] requested that figures that include known sampling locations be provided on 11 X 17 inch paper. Further, he requested that the barricade number be included on applicable geophysical figures.

Response: Figures depicting sampling locations with sampling numbers will be provided on 11 X 17 inch paper and the barricade number will be included on applicable geophysical figures.

Comment #24, Sample Identification Numbers: [redacted] asked what the sample identification numbers provided on select figures represented.

Response: Following a lengthy discussion among the meeting attendees, it was decided that sample identification numbers would be provided for each known sample location in advance of field activities and would be depicted on applicable figures; for consistency, this will be the same number that is associated with the sample number. Therefore, the text in the QAPP would be updated to reflect the modifications to the sampling nomenclature.

Following this discussion, Ms. [redacted] ERT risk assessor, joined the conference call to discuss the risk assessment portion of the Work Plan.

Comment #25, Page 104, Line 19: [redacted] was not in agreement with the proposed groundwater risk assessment approach in the work plan: "For groundwater, a single baseline risk assessment will be conducted for site-wide groundwater (all data combined), because groundwater is not influenced by only one type of EC." [redacted] noted that at TPP#1 he had deferred to the USEPA representative, but that now the USEPA was no longer involved with the project. Through consultation with other members of MDE, it was concluded that the proposed approach is not consistent with MDE standards and procedures. [redacted] requested that the Corps follow the USEPA Risk Assessment Guidance for Superfund (RAGS).

Response: [redacted] responded that source apportionment may be an issue going forward. As such, [redacted] expressed that it may be useful to conduct a site-specific and site-wide groundwater risk assessment. [redacted] asked if [redacted] would allow certain geographically close sites to be grouped. [redacted] responded that only the "shop area" could realistically be grouped together, as the rest of ECs were too geographically distant. The USACE risk assessor had concluded that a risk assessment at each individual site would be difficult, based on the premise that issues were present all around the Depot.

Upon further discussion, [redacted] concluded that an overall risk assessment for groundwater would be unacceptable. He requested that a risk assessment per EC be completed if a release has been identified. Further, he commented that a holistic approach could be taken if the ECs were geographically close and similar in the nature of former activities. [redacted] asked, in determining if a release had occurred, if analyzing groundwater samples from one well per small EC would be enough to determine if a release had occurred. [redacted] added that the groundwater samples would be biased towards the potentially more contaminated areas. [redacted] responded that in choosing sample locations, USACE would have to consider potential pathways and evidence. He commented that enough information would be available to change the status of the SI level sites to NFA. [redacted] stated that he was under the impression that enough information will be available to move most SI level ECs to the NFA level. The attendees agreed that one groundwater sampling location would be enough to assess if there had been a release to groundwater. If a release is determined, then additional wells would be installed for an RI level groundwater investigation.

The conversation moved towards discussing which screening criteria would be used to assess if a release had occurred. The Draft Final Work Plan indicates that detections above maximum containment levels (MCLs) would constitute a release to groundwater; detections above Regional Screening Levels (RSLs) in soil samples would also constitute a release.

[redacted] asked if it was premature to conduct a risk assessment for SI level ECs, as some SI level ECs may be classified as NFA in the future. The attendees clarified that a groundwater risk assessment could not be conducted at either the SI level ECs or the RI level ECs until after screening data had been collected. The soil human health and ecological risk assessment can go forward at the RI level sites. The Work Plan would be updated to reflect that a site-specific groundwater risk assessment would be completed, if a release is identified.

The discussion then moved towards how a release would be defined during SI level contaminant screening. [redacted] stated that for the SI level ECs, for organics other than PAHs, a release would be defined as detections above the RSL or MCL. For SI level ECs screening for inorganics and PAHs, even if a detection is above an RSL or an MCL, this would not be considered a release if the detection is below the background screening level (as defined in the Work Plan "site data and site-specific background data will be compared using the 95 percent upper prediction limits of each data set, as calculated using USEPA's ProUCL"). The results of this screening for SI level ECs will be the decision point regarding whether additional RI level sampling will be required for that EC. The text will be clarified to address these definitions.

Comment #26, Page 106, Line 8: [redacted] noted that the text states that the Conceptual Site Model figures are depicted on pages 45 and 46, but the figures are depicted instead on pages 47 and 48.

Response: ERT will correct the typo and ensure that the text refers to the correct page.

Comment #27, Page 107: [redacted] requested that future resident adult and child be added to the list of potential human receptors.

Response: [redacted] responded that, at TPP #1, it had been decided that the Depot's future use would remain industrial. [redacted] noted that the text of the Draft Final Work Plan states that the future use of the Depot remains "uncertain" but it is expected to remain classified as industrial use. Alternatively, Table 3-38 states that groundwater will be screened for residential use. [redacted] responded that residential use for groundwater had been included to account for the possibility that the groundwater could have flowed off-site. [redacted] added that until land use controls (LUCs) are implemented, a well could be installed on-site, creating a complete pathway.

[redacted] requested that the text of the Work Plan be clarified to state that residential use will only be screened for groundwater, not for soil, because the Depot will be deeded as industrial use only. [redacted] confirmed that the attendees understood that the site could only be classified as NFA if no risks were identified. To demonstrate that no risks at the Depot exist, a risk assessment, using residential use screening level, would have to be completed for all media at the site. Further, not screening for residential use equates to there being a possibility of residential risk to users. If residential use is not being screened, then LUCs must be in place, at minimum, in the form of deed restrictions.

[redacted] and [redacted] confirmed that the Depot's future use would remain classified as industrial use only. [redacted] wanted to make sure that the attendees were aware that, consequently, the proposed plan would not involve future NFA status.

[redacted] stated that [redacted] interpretation of CERCLA as trigger for action and developing remediation goals is not shared by USACE. Further, she expressed that USACE considered residential use as part of a risk management decision. 'No residential risk' is not considered the only way to classify a site as NFA, from a risk management perspective. The definition that the USACE follows for a site to be considered NFA is that there is 'no unacceptable risk for the future use of the property.' This stance will be clarified in the Work Plan and discussed extensively in the RI.

Comment #28, Page 107, Line 15: [redacted] requested that the text be changed to indicate that groundwater will be considered as a pathway.

Response: [redacted] agreed that the text will be changed to indicate that groundwater will be investigated.

Comment #29, Page 108: [redacted] noted that the fourth bullet that describes groundwater does not list any specific human receptors. He requested that the bullet be updated to add residential adult and child receptors. He noted that construction workers are often included as potential receptors to groundwater exposure.

Response: [redacted] was in agreement with [redacted]

Comment #30, Page 108, Line 25: [redacted] noted that the sentence that begins with "Table 3-8 and continues to the completion of the paragraph should be moved to the 'human' section, and not appear in the 'ecological' section.

Response: [redacted] and [redacted] were in agreement. The text will be revised.

Comment #31, Table 3-8, under "current and future surface water and sediment": [redacted] requested that a trespasser receptor be added to this scenario, as spelled out in the text of the document. He also requested that construction worker be added as a potential receptor to the groundwater portion of Table 3-8, as previously discussed.

Response: Text will be updated as requested.

Comment #32, Page 110, Line 3: [redacted] requested that the text discrepancy between the SI and RI screening levels be clarified in the text.

Response: [redacted] responded that the same screening levels will be used throughout the project and the text would be updated to clarify that.

Specific Comment #32 indicated the completion of [redacted] review. Following the review, [redacted] motioned to return to the prepared slide presentation. [redacted] began by discussing background sampling. She wanted to clarify that the background sampling plan had been changed since the discussion at TPP #1 and noted that the background sampling can only be conducted if an ROE is in place for the Army Reserve property. USACE will coordinate with the Army Reserve facilities and obtain an ROE to conduct the background sampling.

The background sampling will be conducted following all other sampling activities. Background samples for metals had been previously collected by Parsons; samples were collected from both subsurface and surface soil. It was noted that the depth of the background subsurface samples collected was approximately 3 to 4 feet deep. The trenches that will be investigated as part of this RI may exceed those depths. If the trenches exceed the depths of the background samples, and separate soil horizons are noted in the trenches, then background subsurface soil samples will be collected from a depth equivalent to the depth of the trenches. In that event, the Parsons' metal background subsurface data will not be used.

[redacted] also noted that the Parsons' data included 10 samples, but only 9 would be collected as part of this investigation because a building was built over one of the Parsons sample locations. [redacted] asked if 9 samples would be statistically large enough to represent an appropriate sample set. [redacted] responded that ProUCL software dictates a sample set to consist of 5 to 10 samples so 9 would be sufficient for this analysis.

[redacted] then summarized the unnamed tributary sampling approach. Analytes would consist of any possible contaminants that could drain to that tributary from the surrounding ECs.

The attendees then discussed the schedule, which will be updated based on the conclusions from TPP #2. ERT will complete a redline draft of the document which would be submitted to [redacted] for review after USACE/DLA/GSA review. [redacted] asked [redacted] approximately how long it would take him to complete his review. [redacted] responded that it would take him approximately 3 to 4 days to complete, if in the office. He only anticipates simple redline strike outs, as more complex topics had been covered during the day's meeting. He requested that the redline document be submitted electronically. Following [redacted] review of the redline Draft Final revisions, he will send an official letter of consensus with the receipt of the Final (non-redline) Work Plan.

[redacted] then explained that trenching technical memorandums would be prepared for the trenches following the receipt of the digital geophysical mapping (DGM) results. The technical memorandums

will synthesize the results and outline the plan going forward for collaboration between stakeholders. Additionally, [redacted] noted that the schedule requires the EE/CA for EC-25 to be completed first. Within the first four weeks of field activities, a trenching technical memorandum will be developed for EC-25 and EC-49 together as DGM activities at these ECs will be occurring sequentially. The following month, a technical memorandum will be provided for the rest of the ECs that require trenching, per the Work Plan.

As the schedule develops and field activities continue, a Work Plan addendum will be submitted to document the overall preliminary results of the field activities and outline the path forward. [redacted] anticipates that field activities will begin in June.

[redacted] mentioned that the TPP #3 meeting would still be set for August because of the accelerated deadline for the EE/CA. [redacted] will communicate any changes to the period of performance for the EE/CA.

[redacted] will provide a list of logistical questions to [redacted] will coordinate with [redacted] and communicate decisions or concerns with ERT. ERT will provide DLA with information of where the team anticipates cutting an opening in the fences in order to access EC-25 and EC-49.

[redacted] thanked the participants for attending and adjourned the meeting at 3:30pm.

Habitat Assessment Report
for the Former Curtis Bay Ordnance Depot
Curtis Bay, Anne Arundel County, Maryland

Contract No. [redacted]

Delivery Order [redacted]

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January 2018
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Introduction

A qualitative habitat assessment of the Former Curtis Bay Ordnance Depot was conducted on 16 November 2017 by a trained, qualified biologist to determine the ecological character of the site. The assessment evaluates the presence/absence of the following biological groups and special-interest resources associated with the site: vegetation, wildlife, aquatic life, endangered and threatened species, and wetlands. The assessment was conducted within the Former Curtis Bay Ordnance Depot site at the eight Environmental Concern (EC) areas and the Unnamed Tributary for which a Screening Level Ecological Risk Assessment (SLERA) was conducted in 2016 as part of the Draft Final Remedial Investigation (RI) for Former Curtis Bay Ordnance Depot (Figure 1).

A biologist surveyed the site and documented each of the eight EC areas for size, percent impervious cover (e.g. asphalt, concrete pads, etc.), vegetation present, evidence of invertebrate or wildlife use, mammals and birds observed, and recorded photographs documenting these observations. The Unnamed Tributary was also surveyed and evidence of use by aquatic organisms as well as the aquatic habitat quality was documented. The purpose of this assessment was to record habitat aspects for each of the eight ECs and the Unnamed Tributary to be included in a revised SLERA.

In addition, soil pH was recorded at each of the eight EC areas as well as the Unnamed Tributary. Because aluminum is a contaminant of concern at the site, risks are defined based on the soil pH. If soil pH is recorded as greater than 5.5, the risks are considered minimal (USEPA 2003).

This memo discusses the results of soil pH test results as well as data recorded during the habitat assessment conducted in November 2017.

Site Habitat Characterization and Soil Testing

Site-specific data were recorded regarding the types of habitats and wildlife species found at the site. Data were recorded during a one-day site visit conducted on 16 November 2017. The eight EC areas identified in the Draft Final RI for which SLERAs were performed were surveyed and include: EC-16, EC-21, EC-29, EC-32, EC-36, EC-57B, EC-57C, EC-58B as well as the Unnamed Tributary. A pedestrian survey was conducted at the nine areas listed above and a comprehensive list of all species observed was compiled (Attachment A). Observations included sightings, vocalizations, tracks, burrows, nests, and scat. Observations and assessments were concentrated on undeveloped upland areas, waterways, and wetlands within the study area. Additionally, three individual measurements for soil pH and corresponding GPS locations were recorded at each of the eight EC areas as well as the Unnamed Tributary.

Physical Site Description

The Former Curtis Bay Ordnance Depot is located in Anne Arundel County, southeast of the City of Baltimore in Maryland. The depot is composed of approximately 450 acres and is

bordered on the south by Furnace Creek, on the southwest by Back Creek, on the northwest and north by land under the ownership of Anne Arundel County and an Army Reserve Facility. The northeast side of the site is an industrial area and the east and southeast sides border Curtis Creek. The site can be accessed via Ordnance Road through the main gate on the north boundary. The depot is located in the Patapsco River Area/Curtis Bay/Curtis Creek subwatershed of the Chesapeake Bay estuarine system (Parsons 2006).

The site has been filled, drained, graded and otherwise altered to the point that there are few natural areas remaining. Currently the site features consist of warehouses in various stages of disrepair, concrete pads where warehouses once stood, a network of paved and gravel roads, numerous revetments and large piles of spoil, railroad tracks and vacated railroad beds, a small area once used by the Baltimore Police Department for training dogs, and an inactive dock area used by the U.S. Army Reserve. Clean up of materials, including radioactive material, has been on-going in various areas on site (Parsons 2006).

A large central drainage ditch and numerous shallow ditches convey surface water to discharge into adjacent open water bodies, with little surface water retained on site. A small, perennial unnamed stream bisects the central portion of the site and drains to Back Creek, Furnace Creek, then ultimately flows to Curtis Creek (Figure 2). This stream is surrounded by a narrow and mature forested riparian area. The majority of the ditches draining the site are small, intermittent and support wetland species like cattail and giant reed. The majority of land outside the project boundary includes developed, urban lands and open water (Parsons 2006).

Land Use and Vegetative Cover

The majority of the areas at the site have been altered to varying degrees by management practices, whether from mission-related maintenance activities within the last 90 years, or from historical farming practices (Parsons 2006). A network of paved and gravel roads traverses the installation. Many of the roads are in disrepair or have become overgrown due to the lack of traffic and regular maintenance. Four types of land use/vegetative cover were observed within the nine areas included in this habitat assessment: successional old field habitat (including upland meadow); riparian forest habitat; wetlands and waters of the U.S.; and abandoned structures. There is one natural area present within the survey boundary of the site. A narrow and forested riparian area exists along the existing unnamed perennial stream in the central portion of the site. Trees are present along this stream that are over 50 years old and provide good quality habitat in an otherwise urban/industrial area.

The paragraphs below summarize the general habitat types observed at the site followed by detailed results of each EC area surveyed during the November 2017 habitat assessment. A photographic record is also included at the end of this report.

Successional Old Field Habitat

The majority of the undeveloped lands within the habitat assessment area is characterized as successional old field areas that include upland meadow habitat. This habitat type occurs in areas in which the vegetation and/or soil have been altered by clear-cutting, grading, draining,

mowing, or other activities commonly associated with land management practices, such as succession which occurs on abandoned farmland. This environment is first colonized by a group of species called pioneer species. The vegetative cover in these areas is limited to herbaceous species common to recently or routinely disturbed areas and includes numerous nuisance exotic and opportunistic species known as weeds. Pioneer species are usually characterized by having long-lived seeds capable of remaining dormant in the soil for many years, long-range dispersal ability, and the ability to utilize resources rapidly, allowing them to grow and reproduce quickly (Rutgers 2017). It has been proposed that the Former Curtis Bay Ordnance Depot may have been planted with a commercial mixture of grass and forb species commonly used on fallow agricultural lands to enrich the soil, provide forage for wildlife, and prevent erosion (Parsons 2006). All upland areas within the EC areas surveyed that do not support a shrub or tree stratum exceeding 50 percent cover are grouped into this classification, including fallow meadows with scattered, young tree species. This vegetation classification provides excellent habitat for the white-tailed deer which were often observed foraging in the old field areas as well as red fox. Other species that may also utilize this habitat include eastern cottontail rabbit, ground hog, and many types of songbirds.

Forested Riparian Habitat

There is one historic natural area present within the boundaries. A narrow and forested riparian area exists along the existing unnamed perennial stream in the central portion of the site. Deciduous and mature canopy trees are present along this stream that provide good quality habitat compared to the adjacent urban/industrial area.

Wetland Communities and Waters of the U.S. Habitat

The wetlands within the survey area have historically been altered by previous land management practices. Based upon review of aerial photographs, the natural creeks have been straightened and channelized, and former wetland areas have been drained and filled in the project area. The remnant wetlands that currently exist at the site included in the November 2017 survey convey and/or retain stormwater during rain events and have little habitat value due to their lack of native vegetation, their intermittent water regime, and their small size. The northeastern portion of the project drains to the east to discharge into Curtis Creek. A small, perennial unnamed stream bisects the central portion of the site and drains to Back Creek, Furnace Creek, then ultimately flows to Curtis Creek. In the eastern portion of the site, just west of the culvert under Yard Office Road, a shallow wetland has formed in a depression. This wetland is man-made and too small to provide significant wildlife habitat for species other than small mammals.

Abandoned Structures

The features included in this category include previously developed and now abandoned roadways, buildings, industrial areas, and, railroad tracks, that provide very little ecological value. The Former Curtis Bay Ordnance Depot has a network of paved and gravel roads, although many are no longer used, are failing, and/or are overgrown. The roads do not offer forage opportunities for most species, but do provide basking areas for ectothermic species during cooler weather, and therefore offer prey opportunities for certain predators. Deer and

other mammals likely use the roads as game trails (Parsons 2006); during the November 2017 habitat assessment, an Eastern cottontail rabbit was observed dead on Furnace Creek Road. The abandoned buildings within the Curtis Bay Army Depot may provide nesting habitat for barn swallows, roosting sites for bats, and shelter for small mammals (Parsons 2006). No wildlife species were observed in abandoned buildings during the November 2017 habitat assessment. No other habitat utilization of the abandoned buildings was observed. Abandoned railroad tracks within the habitat assessment area were largely overgrown and provided little habitat.

Description of Habitat Types by Area

EC-16 A, B, C, and D includes four small but distinct areas at the site with transformers on poles in successional old field upland areas; these areas are estimated at 5 percent impervious surface since only the actual utility pole is impervious within the areas. Within the successional old field habitats, dominant plant species include orchard grass (*Dactylis glomerata*), yellow foxtail grass (*Setaria pumila*), broomsedge bluestem (*Andropogon virginicus*) and common milkweed (*Asclepias syriaca*). Numerous scattered Bradford pear trees (*Pyrus calleryana*) were observed and provide minimal and low quality avian cover and habitat. Common buckeye butterflies (*Junonia coenia*) was observed within EC-16B and an abandoned osprey nest (*Pandion haliaetus*) was present on a pole near EC-16C. No unique habitat, water features or other wildlife was observed within these four areas. Overall, the habitat quality of the four areas of EC-16 is considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-16.



EC-16C: Abandoned osprey nest near EC-16C



EC-21: Typical open meadow in successional old field habitat.

EC-21 is located in the southwest corner of the site near the Unnamed Tributary and along Back Creek Road. This EC area includes a large expanse of upland meadow and successional old field habitat. This area is estimated at 5 percent impervious surface since some abandoned roads and gravel parking areas still existing within EC-21. There are some narrow areas of immature trees located on the magazine berms. Within the successional old field habitats, dominant plant species include orchard grass, yellow foxtail grass, broomsedge bluestem, switchgrass, black cherry, and common milkweed. Some scattered Bradford pear trees were observed and provide minimal and low quality avian cover and habitat. Other tree species observed include pin oak (*Quercus palustris*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), willow oak (*Quercus phellos*), tree-of-heaven (*Ailanthus altissima*) and persimmon (*Diospyros virginiana*). A small pocket of wetland area and standing water was observed approximately 2 inches deep that appears to originate from surface water runoff and a channel in EC-21. An aquatic diving beetle was observed within the standing water/wetland area. Dominant wetland vegetation includes rush species (*Juncus* species and *Rhynchospora* species), woolgrass (*Scirpus cyperinus*), and black willow (*Salix nigra*). A red fox was observed utilizing the habitat at EC-21 and evidence of white-tailed deer (tracks) was recorded.

EC-29 includes the Building 822 E.E. Machine Shop in the northeastern corner of the site. This area is estimated at 90 percent impervious surface since the area includes an abandoned building and the old associated roads/parking areas. The habitat of EC-29 is characterized as developed and successional old field upland areas dominated by orchard grass, yellow foxtail grass, broomsedge bluestem, butter and eggs (*Linaria vulgaris*), white snakeroot (*Eupatorium rugosum*), and common milkweed. Similar to EC-16 above, numerous scattered Bradford pear trees were observed and provide minimal and low quality avian cover and habitat. White-tailed deer (*Odocoileus virginianus*) were observed utilizing the habitat and an abandoned osprey nest was present on a pole near EC-29. Overall, the habitat quality of EC-29 is considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-29.



EC-29: includes the abandoned Building 822 E.E. Machine Shop and associated roads/parking areas.

EC-32 includes the former Building S832 P.E. Lumber Storage in the northeastern corner of the site. This area is 0 percent impervious surface since the area includes only successional old field upland habitat. An area consisting of dense, young Bradford pear trees exists within EC-32 that supports an understory dominated by Japanese honeysuckle (*Lonicera japonica*), switchgrass species, butter-and-eggs, and white

snakeroot. With the exception of one small, abandoned bird nest, the habitat quality of EC-32 is considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-32.



EC-32: An abandoned bird nest was observed in a Bradford pear tree.

EC-36 includes the Building 1515 Incinerator Plant in the north-central portion of the site. This area is 50 percent impervious surface since the area includes the developed then abandoned (but still standing) incinerator plant and surrounding successional old field upland habitat. The successional old field upland areas are dominated by orchard grass, yellow foxtail grass, broomsedge bluestem, butter and eggs, white snakeroot, and nodding thistle (*Carduus nutans*). There are several young black cherry (*Prunus serotina*) trees growing up around the old incinerator; Carolina mantis (a native species) egg cases were observed on the black cherry trees. Additionally, an Eastern cottontail rabbit (*Sylvilagus floridanus*) was observed dead in the road by EC-36, eight white-tailed deer were recorded and a red tail hawk (*Buteo jamaicensis*) was observed in the vicinity of the EC-36.



EC-36: Carolina mantis (native) egg cases were observed on the black cherry trees

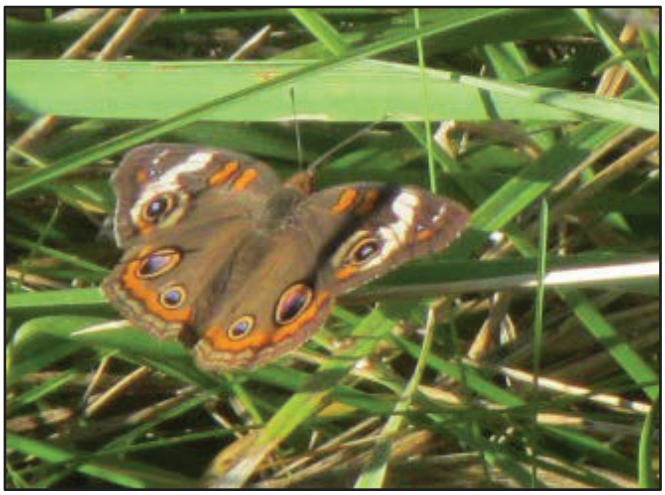


EC-36: includes the abandoned incinerator plant and surrounding successional old field upland habitat.

EC-57B is located near Thomas Point at the northeastern portion of the site and along the shoreline of Curtis Creek. The site includes abandoned Building 1022 and the Brass and Steel Area as well as an old Railroad/Road Bed. As a result, EC-57B is estimated at 80 percent impervious surface; the entire area surrounding the building includes old sidewalks and rail beds and the shoreline along Curtis Creek is completely hardened/developed with no natural areas. Overall, the area that is not developed is characterized as successional old field upland habitat. Some young sycamores, eastern cottonwoods, persimmon, and tree-of-heaven are growing out of the building foundations and provide minimal food and cover habitat; poison ivy (*Toxicodendron radicans*) growing along the fenceline by the Curtis Creek shoreline provides food for wildlife. The pervious areas along the old railroad bed includes an upland meadow area dominated by orchard grass, yellow foxtail grass, broomsedge bluestem, spreading dogbane (*Apocynum androsaemifolium*), common milkweed, and switchgrass species (including *Panicum virgatum*). Additionally, a large area of Allegheny blackberry provides good forage and cover habitat to small mammals and birds. Sparrow species, mockingbirds, and dark-eyed juncos were observed using the shrub and tree species at EC-57B. Common buckeye butterflies as well as white-tailed deer scat and tracks were also observed.


EC-57B: Butter-and-eggs (*Linaria vulgaris*) at EC-57B.

EC-57C is located in the central-western portion of the site where former Building J-408 was once located. Evidence of old stone and foundation is present in the area, but the area is successional old field habitat. Open areas of moss were observed, likely the result of small seeps/groundwater at the site. EC-57C is open meadow dominated by orchard grass, yellow foxtail grass, broomsedge bluestem and common milkweed with some pockets shrubs dominated by Allgeheny blackberry and few trees such as sweetgum and Bradford pear. No wildlife were observed at EC-57C.


EC-58B: Common buckeye at EC-58B

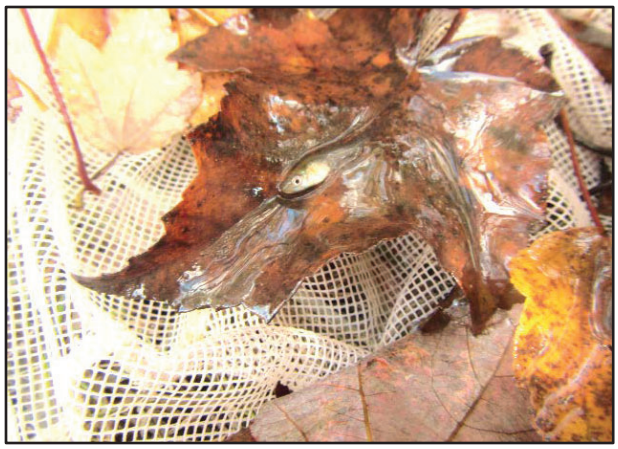
EC-58B is 0 percent impervious surface and located in the northeast portion of the site between A-Line Road and Office Road. EC-58B is dominated by an upland meadow habitat with successional old field upland areas. Within the meadow and successional old field habitats, dominant plant species include orchard grass, yellow foxtail grass, broomsedge bluestem and common milkweed. Lady bird beetles were observed in the meadow and milkweed bugs were observed utilizing the common milkweed

pods in the open meadow areas; monarch butterfly larval habitat is present due to milkweed. Numerous scattered Bradford pear trees were observed and provide minimal and low quality avian cover habitat. A small wetland dominated completely by common reed grass (*Phragmites australis*) is present within EC-58B. Small channels and standing water were observed within the wetland area, which is the low point of the survey area and receives stormwater runoff from adjacent impervious surface, including A-Line Road and Office Road. A great blue heron was observed within the wetland area during the survey but no other wildlife species utilizing the open water/wetlands areas was observed. Overall, the habitat quality of EC-58B would be considered poor due to low habitat complexity and low diversity of vegetation species. Very little wildlife food/forage and cover is present within EC-58B.



Unnamed Tributary and surrounding riparian forest

Unnamed Tributary**:** A small, perennial unnamed stream bisects the central portion of the site and drains to Back Creek, then flows into Furnace Creek, and ultimately confluences with Curtis Creek. A narrow and forested riparian area exists along the left bank of this unnamed stream in the central portion of the site from Back Creek Road south to the Back Creek shoreline. This area is 0 percent impervious and supports wetlands, waters of the U.S., as well as forested habitat. The right bank of the stream is dominated by a large monotypic stand of common reed grass. There is a clearly defined channel south of Back Creek Road; the stream flows south into a wetland complex without a defined channel, then flows into a defined channel again before the confluence with Back Creek. A brief visual in-stream survey of the habitat included observations of undercut banks, snags, root wads, and woody debris. The adjacent riparian forest provides shading to the stream. No well-developed riffles or cobble were observed and as previously stated, the channel flows into a wetland complex. However, in-stream habitat includes numerous leaf packs as well as woody debris in the form of overhanging roots for aquatic habitat as well as some deeper pools. Mosquitofish (*Gambusia affinis*) were observed and recorded in the stream and an American bullfrog (*Lithobates catesbeianus*) was recovered within the leafpack. Groundwater and seep areas that support small wetlands are present adjacent to the stream.



Mosquitofish collected within Unnamed Tributary

Trees are present along this stream that provide good quality habitat in an otherwise urban/industrial area. The narrow riparian forest is likely at least 50 years in age based

upon the diameter at breast height (12 to 24 inches) and tree height (approximately 50 feet tall) estimated in the field as well as a survey of old aerial photographs of the site (Figures 3 through 5). The canopy is dominated by red maple; tulip poplar (*Liriodendron tulipifera*), sweetgum, black willow, red oak (*Quercus rubra*), willow oak (*Quercus phellos*), and chestnut oak (*Quercus montana*); the understory is dominated by rosebay rhododendron (*Rhododendron maximum*), American holly (*Ilex opaca*), and greenbriar (*Smilax rotundifolia*). Mammals observed included typical urban species such as the Eastern gray squirrel and eight white-tailed deer. Avian species observed included an American woodcock (*Scolopax minor*), hairy woodpecker (*Leuconotopicus villosus*), and a great blue heron along the Unnamed Tributary.



Juvenile American bullfrog collected within Unnamed Tributary

Woodcock are attracted to moist, young forests and require a young, dense woodland to provide ample cover and food resources (Tefft 2014). They tend to use edges rather than the interior of big, even-age thickets. In Maryland, the woodcock is a migratory bird that passes through the area to their wintering grounds in Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Texas (Ruffed Grouse Society 2017). During both spring and fall migrations, the woodcock requires sufficient food resources and layover sites. The bird's bill, which appears too long for its body, is used to probe rich soils for earthworms; earthworms provide about 60 percent of the bird's diet. A lush, thick area of shrub or tree growth that is exposed to full sunlight is a highly desired habitat to the woodcock because a variety of food supplies and shelter would likely be available. Numerous earthworms and a large ground beetle (*Carabidae*) were observed during the November 2017 habitat assessment. It is likely that the mature forest and relatively open understory of this area provide the woodcock and other avian species suitable food and cover.

Results of Soil pH Readings

In November 2016, soil pH was recorded at each of the eight EC areas as well as the Unnamed Tributary. Because aluminum is a contaminant of concern at the site, risks are defined based on the soil pH. If soil pH is recorded as greater than 5.5, the risks are considered minimal (USEPA 2003). Three measurements for soil pH and corresponding GPS locations were recorded in situ at nine locations during the Habitat Assessment using a gardener's pH meter. The pH readings ranged from 5.8 to 8.0, thus all were within range of a minimal risk for aluminum (Table 1).



EC-16C: Measuring soil pH

Table 1. Soil pH Reading Results by Location at the Curtis Bay Depot in November 2017

Location	pH Reading		Location	pH Reading		Location	pH Reading
EC-16A-1	6.5		EC-21-3	7.8		EC-57B-2	7.5
EC-16A-2	7.2		EC-29-1	7.0		EC-57B-3	8.0
EC-16A-3	7.5		EC-29-2	7.5		EC-57C-1	7.0
EC-16C-1	7.5		EC-29-3	7.5		EC-57C-2	7.1
EC-16C-2	7.5		EC-32-1	6.0		EC-57C-3	7.0
EC-16C-3	7.8		EC-32-2	6.0		EC-58B-1	6.3
EC-16D-1	7.2		EC-32-3	7.8		EC-58B-2	7.2
EC-16D-2	7.6		EC-36-1	7.2		EC-58B-3	7.5
EC-16D-3	7.0		EC-36-1	7.5		TRIB-1	7.0
EC-21-1	6.8		EC-36-1	7.0		TRIB-2	5.8
EC-21-2	7.6		EC-57B-1	7.8		TRIB-3	7.0

Note: a fence surrounding EC-16B made the area inaccessible for soil pH testing.

Overall Wildlife Resources

The wildlife resources at the Former Curtis Bay Ordnance Depot are present due to the fallow nature of the site and are not currently managed by the landowner. Commonly occurring mammals at the site include urban-dwelling mammals that take advantage of the lack of management. This includes mammals that were observed during November 2017 such as Eastern cottontail rabbit, Eastern gray squirrel, white-tailed deer, and red fox. Waterfowl are attracted to the open water areas around the depot, but the wetlands on site would not provide appropriate habitat due to their lack of native vegetation and intermittent water availability. The wildlife species observed at the site consists of terrestrial species accustomed to an urban environment and aquatic species accustomed to survival in highly disturbed waterbodies. It is important to note that the wildlife evidence and direct observations made during a one-day site visit in November 2017 does not capture the full seasonal use of the site, including the potential use of the site by migratory avian species.

Listed Species and Significant Habitats

No rare, endangered, or threatened species or rare habitats were observed at the Former Curtis Bay Ordnance Depot site. However, it should be noted that this survey effort was conducted at a reconnaissance level and did not include an individual survey for any one particular species of concern that may require a more detailed survey method. There have previously been no records of any state or federally protected species or rare habitats at the site (Parsons 2006).

There was a historical record in 1998 of a least tern colony nesting on the roof of the Central Atlantic Toyota building within one quarter mile of the site (Parsons 2006). The least tern is a state-threatened avian species within the state of Maryland. Although the least tern was not observed at the site during the November 2017 habitat assessment, it is unknown if there is currently suitable nesting or foraging habitat for this species on the Former Curtis Bay Ordnance Depot site. There were two abandoned osprey nests observed on power poles at the site as

described previously. The osprey is protected by The Migratory Bird Treaty Act of 1918. No ospreys were observed at the site during the November 2017 habitat assessment, and it is unknown whether these nests were active in 2017.

Conclusion

A qualitative habitat assessment of the Former Curtis Bay Ordnance Depot was conducted in November 2017 to determine the ecological character of the site. The assessment evaluated the presence/absence of the biological groups and resources associated at the Former Curtis Bay Ordnance Depot site at the eight EC areas and the Unnamed Tributary for which a SLERA was conducted in 2016. A simple habitat ranking was completed to compare the eight EC areas and the Unnamed Tributary; comparisons of habitat quality were relative to each of the nine areas assessed in November 2017.

An overall and relative ranking of habitat quality for each of the EC areas and the Unnamed Tributary was completed based upon the following parameters (Table 2):

- Percentage of Impervious Surface
- Presence of Successional Old Field Upland Habitat
- Presence of Open Water (standing water, not a flowing stream)
- Presence of Stream Habitat (flowing water considered either perennial, intermittant, or ephemeral)
- Presence of Wetland Habitat
- Presence of Forested Habitat and Mature Trees
- Diversity of Vegetation Species Present (Low/Medium/High)
- Avian Presence Observed and/or Habitat Available (including old nests observed in trees or on utility poles)
- Mammal Presence Observed and/or Habitat Available
- Pollinator or Invertebrate Presence Observed and/or Available Habitat
- Quality of Wildlife Forage Sources (Low/Medium/High)
- Presence of Listed Species (Yes/No/Unknown)

After the parameters above were completed, a relative habitat quality ranking was generated that described each EC and the Unnamed Tributary as either minimal, medium, or high (Table 2).

Table 2. Relative Comparison of Resource Types Present and Overall Habitat Quality Ranking

	Environmental Concern (EC) Area								
Type of Resource	**EC-16 ABCD**	**EC-21**	**EC-29**	**EC-32**	**EC-36**	**EC-57B**	**EC-57C**	**EC-58B**	**TRIB**
Fifty-Percent (50%) or More Impervious Surface? (Yes/No)	No	No	Yes	No	Yes	Yes	No	No	No
Successional Old Field Upland Habitat	X	X	X	X	X	X	X	X	
Open Water Present		X						X	X
Stream Habitat Present									X
Wetland Habitat Present		X						X	X
Forested Habitat and Mature Trees Present		X			X				X
Diversity of Vegetation? (Low/Med/High)	Low	Med	Low	Low	Low	Low	Low	Low	High
Avian Presence Observed/Available (including Utility Poles for nesting)	X	X	X	X	X	X		X	X
Mammal Presence Observed/Available		X	X		X	X			X
Pollinator or Invertebrate Presence Observed/Available	X	X			X	X		X	X
Wildlife Forage Sources? (Poor/Med/High)	Poor	Med	Poor	Poor	Poor	Med	Poor	Poor	High
Listed Species Present? (Yes/No/Unk*)	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk	Unk
Pervious Size of EC (Large/Small)	Small	Large	Small	Small	Small	Small	Small	Small	Large
Overall Relative Habitat Quality Ranking (Min/Med/ High)	Min	Med	Min	Min	Min	Min	Min	Min	High

**Unk = unknown due to habitat assessment being conducted on one day in the winter season of 2017..*

All EC sites with the exception of EC-21 were ranked as providing minimal habitat quality. EC-21 was ranked as providing medium habitat quality due to the larger size of this EC, the presence of numerous habitat types, and the observation of many types of wildlife, including birds, mammals, and invertebrate species. The Unnamed Tributary was ranked as providing high quality habitat in comparison to the other EC areas assessed. The forested riparian area that surrounds the Unnamed Tributary includes mature trees, a developed understory, food sources, shading for the stream, and adequate cover for wildlife species. Additionally, in-stream aquatic habitat is also present and includes undercut banks, overhanging roots, leafpack, snags, root wads, and woody debris. Mosquitofish and an American bullfrog were observed and recorded in the stream. Groundwater and seep areas that support small wetlands are present adjacent to the stream. An American woodcock was observed in the understory of the mature forest along the stream and a hairy woodpecker was observed foraging on a standing dead tree in the riparian habitat.

In general, the overall habitat value of the Former Curtis Bay Ordnance Depot site is considered low quality due to the altered habitat, lack of native vegetation, and the on-going adjacent human activity. However, important and good quality terrestrial and aquatic habitat also exists at the site, as supported by the wildlife observations and habitat recorded during the one-day survey conducted in November 2017. The site offers habitat for common species of flora and fauna that have adapted to urban and disturbed habitats. Successional Old Field Habitat was dominant at

the majority of the EC areas. This habitat is essential to the survival of many wildlife species and is the main habitat type present at the Former Curtis Bay Ordnance Depot. Successional Old Field Habitat attracts a wide variety of early-successional dependent birds and mammals as evidenced in this report, including many ground and shrub nesting songbirds, American woodcock, and Eastern cottontails. The loss of this habitat through conversion to other land uses, residential development or through succession, results in the decline and disappearance of wildlife that are dependent upon early-successional habitats (Tefft 2014). The presence of Successional Old Field Habitat in an otherwise urban and industrial area near the City of Baltimore is unique and provides habitat value to numerous wildlife species.

It is important to note that the wildlife evidence and direct observations made during the one-day site visit in November 2017 does not capture the full seasonal use of the site, including the potential use of the site by migratory avian species. Similarly, a full wetland delineation or botanical survey was not conducted during November 2017. Numerous wetlands and seeps were observed but not mapped along the Unnamed Tributary during the habitat assessment. The results of the soil pH readings ranged from 5.8 to 8.0, thus all were within range of a minimal risk for aluminum (USEPA 2003).

Although the site can be generally characterized as highly altered and disturbed, terrestrial and aquatic habitats are present. The location of the site offers a potential opportunity for habitat improvement and restoration, including the removal of invasive plant species such as common reed within wetland areas, restoration of regionally significant habitat for migratory avian use of the site, and a high potential for meadow restoration and Monarch Butterfly habitat.

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Attachment A. Flora and Fauna Species Observed at the Curtis Bay Army Deport Site During the November 2017 Habitat Assessment

SCIENTIFIC NAME	COMMON NAME	EC-16 ABCD	EC-21	EC-29	EC-32	EC-36	EC-57B	EC-57C	EC-58B	TRIB
CANOPY TREES										
Ailanthus altissima	Tree-Of-Heaven		x				x			
Acer rubrum	Red Maple		x							x
Liquidambar styraciflua	Sweetgum		x					x		x
Liriodendron tulipifera	Tulip Poplar									x
Platanus occidentalis	American Sycamore						x			
Populus deltoides	Eastern Cottonwood						x			
Pyrus calleryana	Bradford Pear	x		x	x	x		x	x	
Quercus montana	And Chestnut Oak									x
Quercus palustris	Pin Oak		x							
Quercus phellos	Willow Oak		x							x
Quercus rubra	Red Oak									x
Salix nigra	Black Willow		x						x	x
Ulmus pumila	Siberian Elm				x		x			
UNDERSTORY and OTHER WOODY SPECIES										
Campsis radicans	Trumpet Creeper	x								
Celastrus orbiculatus	Asian Bittersweet						x			
Diospyros virginiana	Common Persimmon		x				x		x	
Ilex opaca	American Holly	x								x
Juniperus virginiana	Eastern Red Cedar	x							x	
Lonicera japonica	Japanese Honeysuckle	x			x					
Prunus serotina	Black Cherry		x			x	x			
Rhododendron maximum	Rosebay Rhododendron									x
Rosa sp.	Rose Species	x								
Rubus allegheniensis	Allegheny Blackberry			x		x	x	x		
Smilax rotundifolia	Common Greenbriar		x							x
Toxicodendron radicans	Poison Ivy						x			

Attachment A. CONTINUED

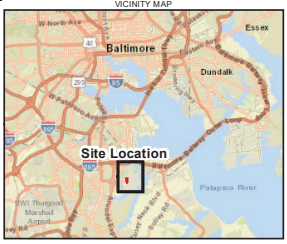
SCIENTIFIC NAME	COMMON NAME	EC-16 ABCD	EC-21	EC-29	EC-32	EC-36	EC-57B	EC-57C	EC-58B	TRIB
HERBACEOUS PLANTS										
Andropogon virginicus	Broomsedge Bluestem	x	x	x			x	x	x	
Apocynum androsaemifolium	Spreading Dogbane						x		x	
Asclepias syriaca	Common Milkweed	x		x			x	x	x	
Carex sp.	Sedge Species							x	x	
Cinna arundinacea	Sweet Woodreed									x
Dactylis glomerata	Orchard Grass	x	x	x		x	x		x	
Dianthus aremeria	Deptford Pink	x						x		
Digitaria sp.	Crabgrass Species	x								
Eupatorium rugosum	White Snakeroot	x	x	x	x	x	x	x	x	
Juncus effusus	Soft Rush		x							x
Juncus sp.	Rush Species		x							
Lespedeza sp.	Bush Clover Species								x	
Linaria vulgaris	Butter And Eggs			x	x	x		x		
Panicum clandestinum	Deertongue Grass								x	
Panicum sp.	Panic Grass Species	x	x		x			x	x	
Panicum virgatum	Switchgrass	x	x		x			x	x	
Phragmites australis	Common Reed Grass			x					x	x
Rhynchospora sp.	Beak Rush Species		x							
Rumex crispus	Curly Dock								x	
Scirpus cyperinus	Woolgrass		x							x
Setaria pumila	Yellow Foxtail Grass	x		x		x	x	x	x	
Verbascum thapsus	Common Mullein						x			
Carduus nutans	Nodding Thistle			x		x	x		x	
Anaphalis margaritacea	Pearly Everlasting						x			

Attachment A. CONTINUED

SCIENTIFIC NAME	COMMON NAME	EC-16 ABCD	EC-21	EC-29	EC-32	EC-36	EC-57B	EC-57C	EC-58B	TRIB
WILDLIFE SPECIES										
Ardea herodias	Great Blue Heron								x	x
Buteo jamaicensis	Red Tail Hawk					x				
Carabidae	Ground Beetle Species									x
Coccinellidae	Lady Bird Beetle Species		x						x	
Coragyps atratus	Black Vulture								x	
Corvus brachyrhynchos	American Crow		x							
Dytiscidae	Small Waterbug		x							
Gambusia affinis	Mosquitofish									
Junco hyemalis	Dark-Eyed Junco						x			
Junonia coenia	Common Buckeye	x					x		x	
Leuconotopicus villosus	Hairy Woodpecker									x
Lithobates catesbeianus	American Bullfrog									
Mimus polyglottos	Mockingbird						x			
Odocoileus virginianus	White-Tailed Deer	x	x	x		x	x		x	x
Oncopeltus fasciatus	Large Milkweed Bug						x		x	
Pandion haliaetus	Osprey (Old Nest Only)	x		x						
Passeridae	Sparrow Species		x				x			
Pyrrharctia isabella	Isabella Tiger Moth Caterpillar (Woolly Bear)								x	
Sciurus carolinensis	Eastern Gray Squirrel									x
Scolopax minor	American Woodcock									x
Stagmomantis carolina	Carolina Mantis (Egg Case)					x				
Sylvilagus floridanus	Eastern Cottontail Rabbit					x				
Vulpes vulpes	Red Fox		x							



VICINITY MAP



Legend

- Environmental Concern (EC) Area- Habitat Assessment in support of Screening Level Ecological Risk Assessment (SLERA)
- EC Area- No SLERA
- Approximate Current Tax Parcel Boundary Reflected in MDAT
- Approximate Boundary Army Reserve Areas (Not Controlled by GSA)
- Tributary area to be included in Habitat Assessment

0 500 1,000
Feet

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Figure 1
Location of Habitat Assessment Environmental Concern (EC) Area
Curtis Bay Ordnance Depot
Baltimore, Md

Map Date: 11/13/2017
Source: ESRI, 2011

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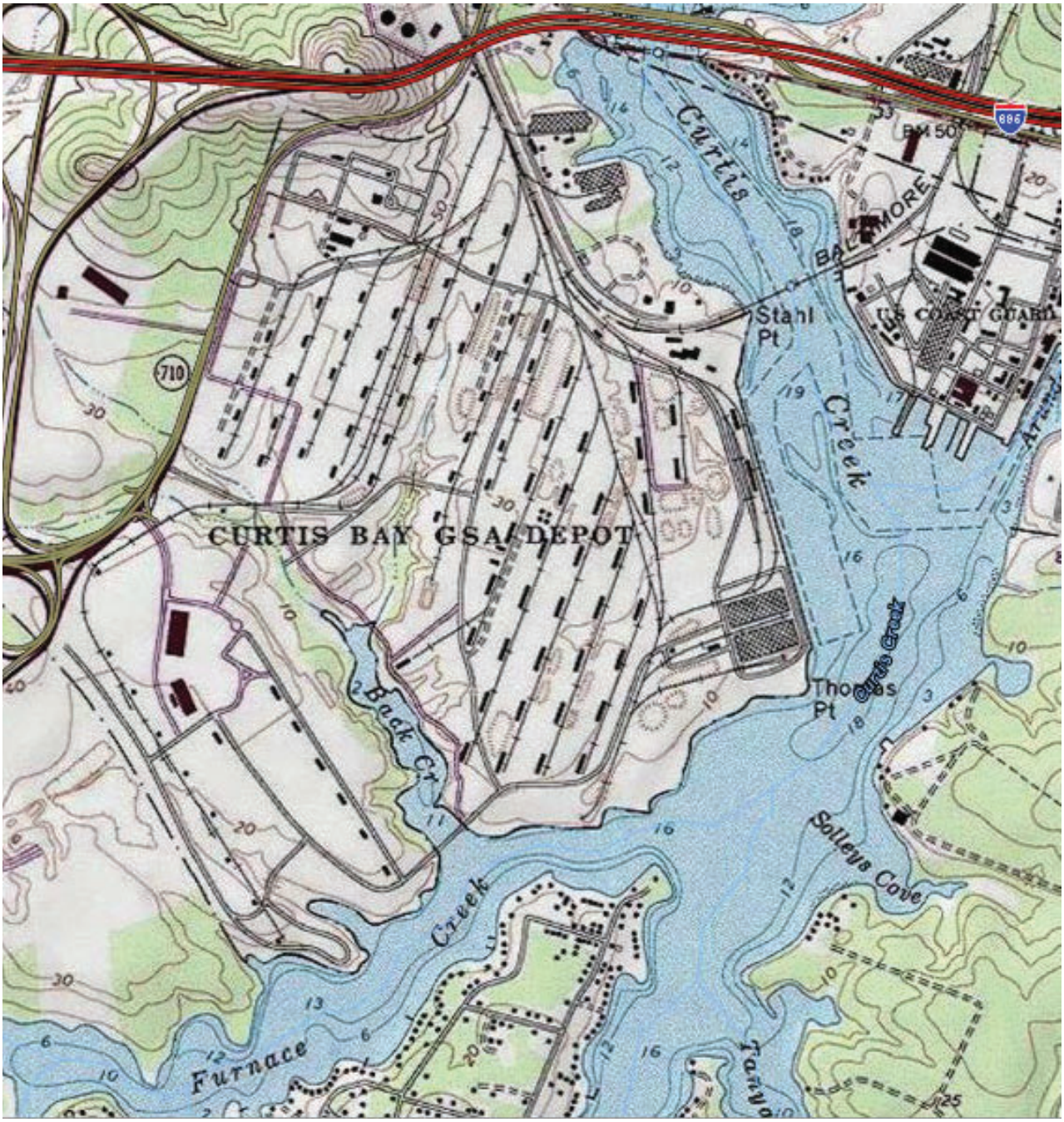


Figure 2. USGS Topographic Map of Curtis Bay Depot Site

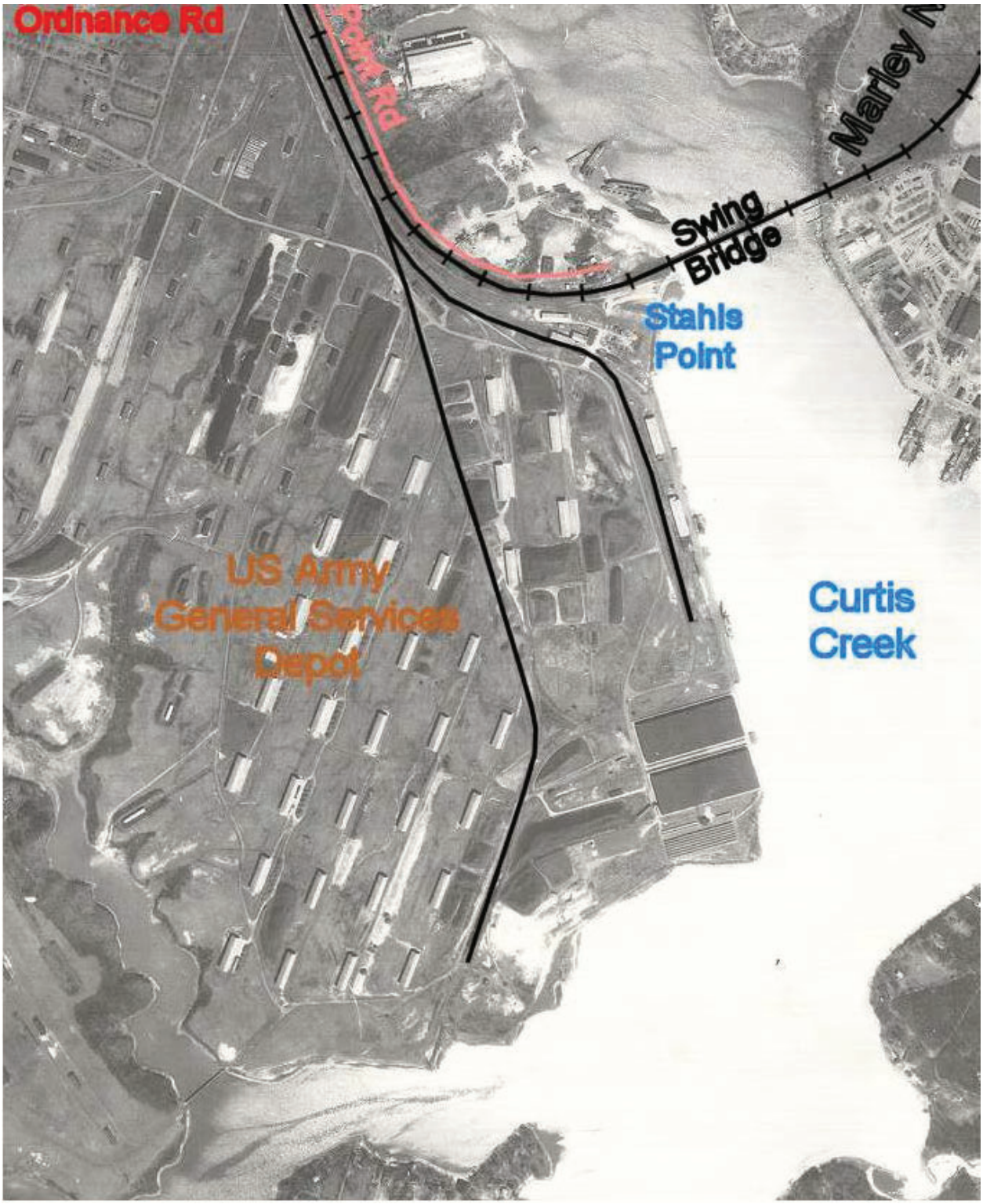


Figure 3. 1964 Aerial Photograph of Curtis Bay Depot Site

(Note Forested Riparian Area at Back Creek)



Figure 4. 1972 Aerial Photograph of Curtis Bay Depot Site

(Note Forested Riparian Area at Back Creek)



Figure 5. 2017 Aerial Photograph of Curtis Bay Depot Site

(Note Forested Riparian Area at Back Creek)

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 1: Successional Old Field habitat at EC16-A



Photograph 2: Successional Old Field habitat at EC-16B; site inaccessible due to fence



Photograph 3: Abandoned osprey nest near EC-16C (left); Successional Old Field habitat at EC-16C (right)



Photograph 4: Successional Old Field habitat at EC-16D at triple transformers on pole

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 5: Small wetland pocket at EC-21



Photograph 6: Small wetland pocket with standing water at EC-21



Photograph 7: Impervious old road beds and gravel areas at EC-21



Photograph 8: Successional Old Field Habitat at EC-21

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 9: EC-29: includes the abandoned Building 822 E.E. Machine Shop and associated roads/parking areas



Photograph 11: EC-32 includes area consisting of dense, young Bradford pear trees



Photograph 10: EC-29: is estimated at 90 percent impervious surface and includes an abandoned



Photograph 12: A small, abandoned bird nest was observed in a Bradford pear tree at EC-32

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



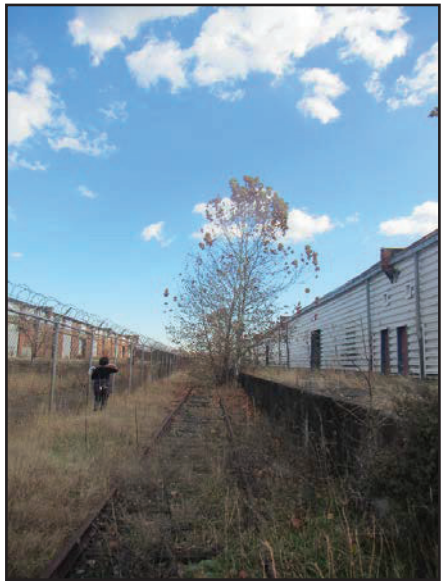
Photograph 13: EC-36 includes the abandoned incinerator plant and surrounding successional old field upland habitat.



Photograph 15: Abandoned structures dominated EC-57B, which was surrounded by Successional Old Field Habitat



Photograph 14: EC-36: Carolina mantis egg cases were observed on the black cherry trees



Photograph 16: Abandoned structures and old railroad tracks dominated EC-57B.

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 17: Large area of Allegheny blackberry that provides cover and food source at EC-57B.



Photograph 18: Abandoned road beds in western portion of EC-57B.



Photograph 19: Dark-eyed junco in sycamore tree at EC-57B.



Photograph 20: Successional Old Field Habitat at EC-57C

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 21: Moss observed at EC-57B due to potential groundwater/seeps in area



Photograph 22: Meadow habitat with common milkweed in foreground; common reed in background at EC-58B



Photograph 23: Large Milkweed bug on common milkweed seed pod in the meadow habitat of EC-58B



Photograph 24: Great blue heron utilizing wetland habitat at EC-58B

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



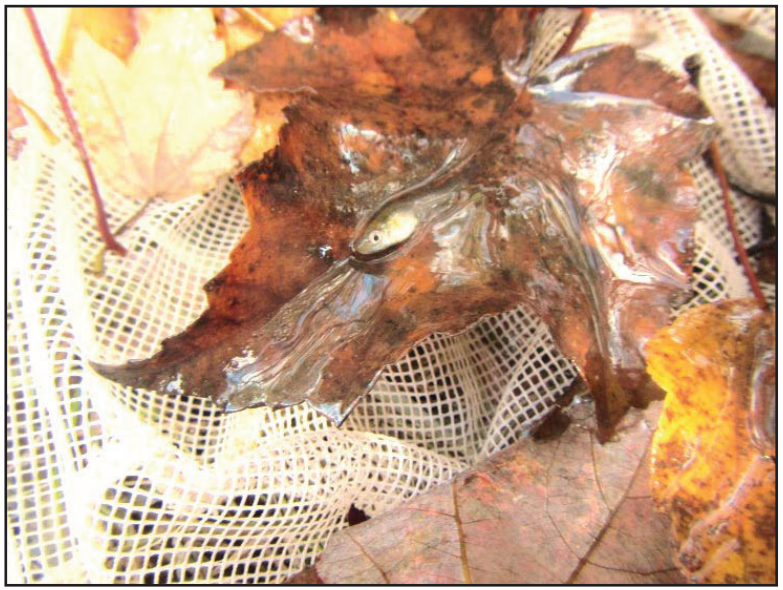
Photograph 25: Bradford pear is the dominant tree species in the Successional Old Field habitats at EC-58B



Photograph 27: Along Tributary the left bank is forested and the right bank is dominated by common reed



Photograph 26: Tulip poplars and red maple trees in forested riparian area along Tributary



Photograph 28: Mosquitofish caught in Tributary

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 29: Well-defined stream channel at Tributary



Photograph 30: Juvenile American bullfrog recovered in leafpack in Tributary



Photograph 31: Ground beetle captured in forested area at Tributary



Photograph 32: In-stream habitat at Tributary of leafpack and overhanging tree roots in channel.

Habitat Assessment Photographs
Former Curtis Bay Ordnance Depot
Photos Taken November 16, 2017



Photograph 33: Scat from small mammal with persimmon seeds observed in forested area at Tributary



Photograph 34: Wetland seep within forested area and adjacent to Tributary



Photograph 35: Confluence of unnamed perennial stream (Tributary) with Back Creek



Photograph 36: Garden pH meter used in situ to collect soils data

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