Appendix W

Subsection One: In-Situ Aerobic Biodegradation

Basis of Design Report

ARCADIS

In-Situ Aerobic Biodegradation Basis of Design Report for the Former Defense Supply Center Philadelphia Facility Philadelphia, PA

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Table of Contents

1. Executive Summary **1**

2. Introduction **3**

3. Site Overview **4**

3.1 Need for Additional Remediation Technique 5

4. Bioventing and Biosparging Overview **5**

5. Conceptual Site Model (CSM) **6**

5.1 Geology and Hydrogeology 6

5.1.1 Regional Geology 6

5.1.2 Site Geology 7

5.1.3 Shallow and Deep Aquifer Communication 7

5.2 LNAPL Characteristics 8

6. Bioventing and Biodegradation Testing **9**

6.1 Soil Vapor Extraction and Respirometry Testing 9

6.1.1 Bioventing Optimization Testing Procedures 9

6.1.2 Bioventing Optimization Testing Conclusions 10

6.2 Geochemical Analyses 10

6.3 VOC COC Detections 11

7. Selection of Potential Bioventing Locations **12**

7.1 Site Suitability 13

7.1.1 Site Geology- Presence of Sandy Strata 13

7.1.2 Biodegradable Contaminants of Concern 14

7.1.3 Current Anaerobic Microbial Conditions 15

7.2 Accessibility and Available Utilities 15

8. Location Recommendations **16**

8.1 Area 1, near RW-A (Strongest Recommendation) 16

8.2 Area 2, near RW-2 (Moderate Recommendation) 16

8.3 Area 3, near MW-65 (Recommendation, with caution) 17

9. Basis for Well Design 17

9.1 Depth 17

9.2 Well and Pipe Network Requirements and Options 18

9.2.1 Passive vs. Active Systems 18

9.2.1.1 Well Radii of Influence 18

9.2.1.2 Bioventing and Biosparging 19

9.2.2 Integrated Remediation Approach 19

10. Available Equipment 19

11. Conclusions and Recommendations 20

11.1 Locations and Design 20

11.2 Pilot Study 21

11.3 Community Concerns 21

11.4 Future Work and Detailed Design Report 22

Figures

FIGURE 1: SITE MAP INFERRED APPARENT PRODUCT THICKNESS (feet) IN MONITORING AND RECOVERY WELLS AUGUST 28, 29, & 30, 2013

FIGURE 2: LNAPL COMPOSITION BASED ON BOILING POINT CHARACTERISTICS

FIGURE 3: BIOVENTING OPTIMIZATION TESTING RESULTS: RESPIROMETRY & OXYGEN UTILIZATION

FIGURE 4: EXISTING REMEDIATION INFRASTRUCTURE & UTILITIES

FIGURE 5: RECOMMENDED BIOVENTING SYSTEM LOCATIONS

FIGURE 6: EXAMPLE PILOT STUDY SETUP

Appendices

APPENDIX A: Site Location

APPENDIX B: Respirometry Testing Results

APPENDIX C: Geochemical and VOC Data

APPENDIX D: Cross Sections

1. Executive Summary

This Basis of Design (BOD) report has been prepared as part of the Pennsylvania Department of Environmental Protection (PADEP) Act 2 Implementation and System Study and Optimization project under Contract [redacted] with the U.S. Army Corps of Engineers (USACE), Philadelphia District. The work is in response to a request for the addition of a bioventing remediation system to supplement the existing remediation facilities at the former Defense Supply Center Philadelphia (DSCP) in Philadelphia, PA. The report includes a site overview, bioventing strategy, description and results of bioventing testing, site suitability, and criteria and recommendations for well locations, depths, and functionality (active or passive, venting, forced air injection, or sparging). Three locations are suggested for bioventing systems, near the following wells, and in order of highest recommendation: near RW-A, near RW-2, near MW-65.

The former DSCP property was closed under the 1993 Base Realignment and Closure (BRAC) program, and is now redeveloped for commercial and industrial use. This area and surrounding affected areas are referred to as the Site. The Site's petroleum hydrocarbon impacts and related human health exposure pathways are associated with light non-aqueous phase liquid (LNAPL) that is present above and below the groundwater table. LNAPL is also present as adsorbed residue in the smear zone. Remediation began in 1996 using skimmer pumps installed to remove LNAPL from the shallow aquifer beneath the site. A full-scale Vapor Enhanced Skimming (VES) system has been in operation since its installation in 2005.

While the existing VES system remains productive, additional techniques may improve recovery and shorten the overall remedial lifecycle at the Site. Bioventing and biosparging, remedial techniques that are effective for removal of otherwise immobile and inaccessible residual LNAPL in saturated and unsaturated soils, are suggested for use at the Site.

Bioventing techniques are characterized by use of air venting or injection to induce airflow in the subsurface, in order to enhance natural microbial biodegradation of organic constituents in the unsaturated soil zone. Biosparging techniques operate similarly, but at greater depths and air flow rates in order to physically strip mass and promote bioremediation in the saturated zone. Locations within the Site are shown to be suitable for a bioventing or biosparging approach through the following criteria:

- The presence of sandy strata that allow for air movement in the subsurface

- The presence of biodegradable targets, especially lighter (lower molecular weight), and more quickly remediated petroleum constituents like those found in gasoline
- Evidence of currently anaerobic redox environments with low degradation rates that could be improved toward more aerobic conditions with higher degradation rates
- For bioventing, field respirometry testing that indicates that oxygen utilization rates are favorable for enhancing biodegradation rates
- The presence of existing utilities, remediation infrastructures, and building footprints
- Available equipment

Potential bioremediation system locations were screened based on the criteria above. The three recommended locations are, in order of highest suitability, near RW-A on the Philadelphia Housing Authority (PHA) property, near RW-2 on the former DSCP property, and near MW-65 on the former DSCP property. Preliminary design components including well depth and airflow rates have been considered. To verify that the recommended preliminary design and location are suitable for a bioremediation system, a pilot study is recommended, to be conducted near the area being considered.

This BOD report provides the framework for future design reports, which will include system design details. As additional data from current field work and analytical work become available, understanding of the site may evolve; the final design documents will draw from the most complete knowledge base available at the time of design.

2. Introduction

On behalf of the U.S. Army Corps of Engineers (USACE) Philadelphia District, ARCADIS U.S., Inc. (ARCADIS) and PARS Environmental, Inc. (PARS) have developed this Basis of Design (BOD) report, as part of the PADEP ACT 2 Implementation and System Study and Optimization conducted at the Defense Supply Center at Philadelphia, Pennsylvania (DSCP). Project work has been conducted under Contract W912BU-12-D-0007.

The former DSCP sits atop a large quantity of petroleum hydrocarbon light non-aqueous phase liquid (LNAPL). The LNAPL resides in the shallow (i.e., water table) aquifer, and encompasses an area of approximately 100-acres in South Philadelphia. The DSCP Site, hereafter referred to as the "Site," includes the former DSCP property and the adjacent former Passyunk Homes property. The subsurface LNAPL impact area has been investigated by Sun Oil, DSCP, and Defense Energy Support Center (DESC).

A full-scale skimming system was installed to remove the LNAPL from the shallow aquifer, and has been in operation for approximately 14 years. The skimming system was augmented with the installation of a Vacuum Enhanced Skimming (VES) system in 2005. While a considerable volume of LNAPL has been recovered to date (approximately one million gallons), a similar volume of recoverable LNAPL reportedly remains. The presence of this LNAPL, and the presence of related potential human health exposure pathways, drives the need for continued Site remediation. However, the LNAPL recovery rate by way of direct skimming has declined as easily recoverable LNAPL has largely been removed. Recent optimization efforts have significantly increased the amount of LNAPL recovered as vapor by the VES system. These efforts have also indicated that an in-situ biodegradation approach based on the aerobic metabolism of hydrocarbons could increase the rate of LNAPL removal. Specifically, this approach could address Site LNAPL that is currently inaccessible to the Site's VES system due to the construction of the existing recovery wells and the presence of residual LNAPL below the water table.

This BOD report follows completion of reconnaissance and optimization testing conducted under Task 1 of the aforementioned contract. The original task called for an exclusively bioventing-based BOD. However, updates to the Conceptual Site Model (CSM), including an improved understanding of the distribution of Constituents of Concern (COC), geochemistry, and Site stratigraphy, led PARS and ARCADIS to also consider biosparging as a viable component of the aerobic in-situ remediation

approach. A combined bioventing and biosparging approach was further supported following receipt of remediation equipment from the former Valmont superfund site that, upon inspection, appeared suitable for such an approach.

This report aims to outline the recommended bioventing/biosparging system setup and location, based on characteristics of the current CSM and the nature of the site's LNAPL.

3. Site Overview

The former DSCP facility was closed under the 1993 Base Realignment and Closure (BRAC) program. In 2001, the United States Army (ARMY) transferred the air and surface rights to the Philadelphia Authority for Industrial Development (PAID). All subsurface rights (deeper than 10 feet) still belong to the Army. Shortly after the air rights were transferred, PAID began selling portions of the former DSCP property for re-development; however, redevelopment within the former DSCP property has been limited to commercial/industrial use as required by the Quitclaim Deeds (Appendix A) for the various former DSCP property parcels.

The Site location is shown in Appendix A, Figure 1. A shopping center, known as the Quartermaster Plaza, was constructed in 2004 to house 18 retail stores and 4 restaurants. Across Interstate-76 (I-76) south of the former DSCP property, the Philadelphia Housing Authority's (PHA) new building has been constructed along with a redevelopment of the former Passyunk Homes property, which was purchased by Penrose Park Developers. Also across the I-76, west of the former DSCP and former Passyunk Homes, is a large petrochemical refinery complex, the former Sunoco Point Breeze Refinery, currently owned by Philadelphia Energy Solutions (PES). Since the Site contaminant is a petroleum hydrocarbon product, the Pennsylvania Department of Environmental Protection (PADEP) is designated the lead regulator. Therefore, this site will be closed out under Pennsylvania's Department of Environmental Protection (PADEP) Act 2 Land Recycling Program (PA Act 2).

The Site's petroleum hydrocarbon impacts and related potential human health exposure pathways are associated with LNAPL impacts present above and below the local groundwater table and at depths ranging generally from 15-30 feet (ft) below ground surface (bgs). Remediation began in 1996 using skimmer pumps installed to remove LNAPL from the shallow aquifer beneath the site. A full-scale VES system has been in operation since its installation in 2005.

3.1 Need for Additional Remediation Technique

ARCADIS and its predecessors have previously focused on vacuum-enhanced skimming techniques for remediation. As of the Third Quarter of 2013, a total of 1,018,265 gallons of LNAPL were recovered from the site. Though the skimming technique continues to be productive, the current CSM and recent optimization testing indicate that consideration of additional techniques may improve recovery and shorten the overall remedial lifecycle at the property. The current skimming method is effective only over a narrow vertical range, through removal of LNAPL directly above the water table. The soil's vadose zone (the smear zone above the water table) or dissolved impacts in the saturated zone (the impacted groundwater and smear zone/aquifer matrix below the water table), are not reached by the current remediation method. To target LNAPL that is present over this greater range of depth, other available technology is required. Bioventing and biosparging are other techniques that are well suited to remediate residual LNAPL above and below the water table, and may be useful for LNAPL recovery if implemented in conjunction with the existing systems.

4. Bioventing and Biosparging Overview

Bioventing and biosparging encompass strategies that aim to stimulate natural biodegradation of petroleum hydrocarbons by providing oxygen to existing microorganisms. As organisms respire, they use oxygen to metabolize organic material, and release carbon dioxide and water (EPA 2012). The EPA estimates that approximately 3-3.5 pounds of oxygen are needed for degradation of each pound of aerobically biodegradable petroleum product (EPA 2012). Unlike soil vapor extraction systems, a typical bioventing system induces enough airflow to stimulate biodegradation but without causing volatilization. Soil vapor extraction (SVE) systems function by volatilization and removal of vapors (EPA 2012). Bioventing system designs are categorized as either passive, with venting wells open to atmospheric air, or active, with forced atmospheric air injection and use of vacuum wells (EPA 2012). Biosparging systems deliver air to the saturated zone, and are characterized by higher air flow rates (3-25 standard cubic feet per minute [scfm]) than those used for bioventing (0-3 scfm) (EPA 1994).

A site for which a bioventing or biosparging system is being considered should be evaluated to determine the potential effectiveness. Controls include soil permeability, contaminant constituent biodegradability, presence of microbes and their oxygen utilization rates, the presence of macro- and micro-nutrients in the soil, monitoring well areas of influence, and available utilities and equipment. A suitable site will have highly

permeable, sandy soils, biodegradable petroleum hydrocarbons, microbes with high oxygen utilization rates, and appropriate existing infrastructure or potential for implementation of a new system.

To evaluate the suitability of the DSCP Site for bioventing and biosparging, Site geology and hydrogeology will be presented through the current CSM. Bioventing testing results, petroleum constituent characteristics, current biodegradation conditions, and available utilities and equipment are also assessed. Further analysis regarding air flow rates will be completed and presented in future design and pilot test documents. Bioventing and biosparging strategies may be implemented alone or in conjunction with one another. This BOD report is largely based on information previously reported in quarterly progress reports and referenced throughout this report. For further detail, the reader is directed to these reports, listed in the references at the end of this document.

5. Conceptual Site Model (CSM)

An understanding of the CSM is important because it provides background information for the basis of the bioventing system design. The geology and CSM presented here are representative of the knowledge of the Site available as of the Third Quarter of 2013. As additional data, such as lithologic information derived from direct-push drilling assessments and LNAPL forensic information, become available, the CSM may evolve and the BOD presented here may require updates and amendments.

5.1 Geology and Hydrogeology

5.1.1 Regional Geology

Features in the overall regional geology impact the movement of water and contaminants through the aquifer system. Broadly, the region around the Site is divided into two aquifer systems: the consolidated Piedmont aquifer system (United States Geological Survey (USGS), 1991) that outcrops to the north and northwest of the Site, and the unconsolidated Coastal Plain sediment aquifer system (USGS, 1991), that directly underlies the Site. A Site location map and regional geology map are provided in Appendix A as Figure 1 and Figure 2, respectively. The Coastal Plain consists of numerous distinct geologic units which outcrop in bands striking northeast to southwest, parallel to the Fall Line, which divides the Coastal Plain from the Piedmont. The Site and surrounding area are underlain by a number of Coastal Plain units which together are termed the Potomac-Raritan-Magothy (PRM) aquifer system. The PRM consists of a wedge-shaped mass of Cretaceous age unconsolidated

sediments that are comprised of highly permeable sands and gravels separated by less-permeable layers of silts and clays (USGS, 2001).

Regionally and within the confined portions of the PRM aquifer, groundwater flows to the southeast in the down dip direction (USGS, 1996). In the shallow unconfined aquifer units, groundwater flow directions tend overall towards the southeast, but locally vary due to several influences, including hydraulic interactions with nearby surface water bodies and changes to land use accompanying urbanization.

5.1.2 Site Geology

Directly beneath the site and surrounding areas, two aquifer zones are identified within the PRM: the shallow zone, consisting of a silt layer, the Trenton gravel, and a clay layer, and the deep zone, consisting of a lower sand unit. The silt layer of the shallow aquifer zone is generally present within the site's subsurface, but thins or is absent in isolated locations, as shown through modeling developed by Ron Sloto of the USGS (PADEP meetings minutes, 2010 and 2012). The presence or absence of this silt layer is important locally for controlling LNAPL and soil gas migration, as well as movement of groundwater through the aquifer system. Underlying the silt layer is the Trenton Gravel, a unit that is variable in thickness, ranging from a few feet up to 30 feet, and is generally the unit in which the water table lies. The Trenton Gravel is mostly confined by the underlying Lower/Middle clay layer, which is the lowermost unit of the shallow aquifer, and by the overlying silt layer. Exceptions are observed where the overlying silt layer is missing due to natural erosive processes or the emplacement of utilities that required removal of soil. The clay layer underlying the Trenton Gravel has also been eroded in the past, resulting in localized areas where a connection between the overlying units and underlying deep aquifer zones is possible. The deep aquifer zone is comprised of the lower sand unit, or Farrington Sand, and unconformably overlies crystalline bedrock. Localized communication between the shallow and deep aquifer zones is apparent, and is discussed below.

5.1.3 Shallow and Deep Aquifer Communication

Hydraulic communication between the shallow and deep aquifer zones was originally explored by Ron Sloto of the USGS in 2010-2012. Mr. Sloto presented his research during a meeting with DLA and PADEP on January 19, 2012, where he showed updates to an existing MODFLOW groundwater flow model that represented the aquifers beneath the Site in order to determine possible flow paths for benzene in the system (PADEP Meeting Minutes, 2012). In his model, a "breach" was included,

corresponding to a region of absent confining units. The output from the model suggests that, within the vicinity of the "breach," hydraulic communication between the shallow and deep aquifer zones occurs. Further examination of this "breach" area by the current project team has generally defined the region as a linear feature trending southwest to northeast across the site, with a width of approximately 1000 ft, as shown on Figure 1, demarcated with a dashed blue line. Consistent with Sloto's model, the area is defined by the absence of a confining clay layer found in other nearby areas around a depth of 35 ft.

Delineation of the "breach" area is relevant to the site remediation, as the "breach" appears largely responsible for the distribution of LNAPL and related dissolved petroleum hydrocarbon constituents in the Site's shallow aquifer. Though water follows a downward gradient and flows through the "breach," LNAPL that sits above the water table instead collects within the "breach" due to its buoyancy. Current data regarding the extent of the LNAPL, especially within the "breach," are presented in the following section.

5.2 LNAPL Characteristics

The extent of the site's LNAPL as of the Third Quarter of 2013 is shown in Figure 1, from the Third Quarter 2013 Progress Report (ARCADIS, 2013). LNAPL is observed largely within the "breach" area described above, in an approximately linear fashion trending southwest to northeast. The greatest measured LNAPL thicknesses are observed down the center of the "breach," in a narrow linear feature also trending southwest to northeast. The measured LNAPL thins to the northwest and southeast, and appears to be bounded by the Packer Avenue sewer to the south.

In addition to the LNAPL thickness shown in Figure 1, hydrocarbons are also present in the subsurface in a "smear zone." This zone is present as a result of changes in groundwater elevation: as the water table fluctuates, LNAPL atop the water table also fluctuates, but some material adheres to the aquifer matrix in both the vadose and saturated zones. This residue comprises the smear zone. The zone is present in thicknesses generally ranging from15-40 ft. A data summary report by Aqui-Ver (2009), along with ongoing direct-push investigations, provides the basis for this information. The document shows that residual LNAPL is present above the water table onsite, and the region with the thickest smear zone above the saturated zone appears to be located near the southern end of the "breach" zone. For the purposes of this report, the smear zone represents the residue in the subsurface that may be

recoverable by bioventing and biosparging techniques, as biodegradation processes can occur within both the aquifer's vadose and saturated zones.

Additional information regarding LNAPL and smear zone delineation is expected based on results of direct-push work completed during the Third Quarter of 2013, and pending direct-push work in late 2013 and early 2014. As this information becomes available, the CSM will be updated to reflect any changes. The final bioventing and/or biosparging system will be based on the most complete CSM available at the time of design.

6. Bioventing and Biodegradation Testing

During the Second Quarter of 2012, preliminary bioventing optimization testing was performed to help determine suitability of the site for a bioventing strategy. Testing occurred during a series of optimization testing completed using the existing remediation infrastructures. Test descriptions and conclusions as reported in the Second Quarter 2012 Progress Report (ARCADIS, 2012) are given here, and results are provided in Appendix B.

6.1 Soil Vapor Extraction and Respirometry Testing

Preliminary testing was conducted by extracting soil vapor from a recovery well utilizing the existing VES system infrastructure, while using a nearby monitoring or recovery well as a passive air inlet well, and monitoring the changes in the biochemical parameters (volatile organic compounds [VOCs], oxygen [O_2], carbon dioxide [CO_2], and methane [CH_4]) in both the extracted soil vapor and headspace in the air inlet well. A summary of testing and results is provided below.

6.1.1 Bioventing Optimization Testing Procedures

A respirometry test was conducted on existing recovery and air inlet wells. Tests were conducted at the air inlet well using both ambient air inlet and pressurized air injection; the latter conducted via a one horsepower (Hp) regenerative blower connected to the inlet well. Headspace samples were collected from each well, and biochemical parameters were analyzed. The rate of depletion of the O_2 and return of VOCs, CH_4 and CO_2 were recorded and used to determine the O_2 utilization rate in the smear zone. Tabulated headspace and respirometry readings, as well as a summary of testing conclusions, are included in Appendix B. Optimization testing results in full are found in the Second Quarter 2012 Progress Report (ARCADIS, 2012).

6.1.2 Bioventing Optimization Testing Conclusions

The bioventing optimization testing results suggest that the former DSCP Site is a good candidate for remediation-scale bioventing for the following reasons:

- Generally permeable, sandier strata are present within the screened intervals that will allow for the movement of air;
- LNAPL at the Site consists of biodegradable Contaminants of Concern (COC), especially the lighter fractions of the Site's LNAPL (i.e. gasoline) (which are discussed in Section 7.1.2 of this report);
- Current anaerobic conditions indicate microbiological activity that may be converted to more effective aerobic activity through bioventing;
- Favorable oxygen utilization rates are observed at individual wells, based on respirometry tests (conclusions and tabulated results available in Appendix B); and
- Existing remediation infrastructure can be useful for bioventing system construction.

6.2 Geochemical Analyses

During the Third Quarter of 2013, 25 wells for sampled for geochemical parameters, in order to establish baseline geochemical data and identify characteristics of the biodegradation environment in the subsurface (ARCADIS 2013). Samples were analyzed using EPA method 8260B for VOCs, method 300.0 for sulfate, method 4500 S_2F for sulfide, method 353.2 for nitrate, method 4500 NO_2 B for nitrite, GAT 004-07 for dissolved CH_4 and CO_2, method 6010C for total Fe/Mn, and method 6010C for dissolved Fe/Mn. Results from the geochemical parameters, taken from the Third Quarter 2013 Progress Report (ARCADIS 2013), are given in Appendix C, Table 4c. Review of the results included the following observations:

- In the shallow aquifer zone, nitrate, nitrite, and sulfate were generally not detected in the central portion of the Site, where measureable LNAPL is present. Some detections were observed to the north (up-gradient) and south (down-gradient) of this area. These observations may indicate that different potential biodegradation metabolic pathways occur in the central portion of the Site as opposed to the northern and southern parts of the Site. These

observations indicate that anaerobic and reducing environments have developed in the center of the site (coincident with LNAPL and elevated COC), and that alternative electron acceptors, such as nitrate and sulfate have been preferentially utilized and depleted by microbes. Elevated nitrite would only be expected where nitrate is being consistently utilized and reduced.

- In the shallow aquifer zone, the relatively high values of CO_2 were observed in the region of measureable LNAPL and down-gradient of this area. This is indicative of ongoing bio-activity and the mineralization of hydrocarbons to CO_2.

- In the shallow aquifer zone, relatively low levels of CH_4 were observed up-gradient of the measureable LNAPL region, but higher levels were observed in the LNAPL region and down-gradient of it. The CH_4 is another indicator of a well-developed reducing environment, especially given the evidence of other electron acceptors being depleted.

- In the deep aquifer zone, relatively low levels of nitrate and nitrite and relatively high levels of CH_4 were observed at the southern end of the Site, down-gradient of the area of measureable LNAPL. The highest levels of CH_4 were seen at PH-DW-3.

- In the deep aquifer zone, the highest levels of sulfate, dissolved Fe, and CO_2 were observed at DSCP-MW-20D in the northwest portion of the Site, up-gradient of the area of measureable LNAPL.

6.3 VOC COC Detections

In addition to geochemical parameters, wells were sampled for VOC COC during the Third Quarter of 2013 (ARCADIS 2013). Data and accompanying figures are provided in Appendix C, as Table 4a and Figure 4 from the Third Quarter of 2013 progress report (ARCADIS 2013). Data from 141 wells showed the following observations:

- Of the 141 wells sampled, a total of 18 shallow and intermediate wells yielded results where total VOC COC exceeded 10,000 ug/L (shown in blue on Appendix C-Figure 4). Most of these wells are clustered within the central portion of the Site, including the VES well network on the PHA property and the general vicinity of the VES building. Five wells on the Former DSCP property have total VOC COC greater than 10,000 ug/L. Within the wells with

high total VOCs, benzene is the COC with the highest concentration.

- Overall, the highest reported groundwater VOC COC concentration data points generally cluster in the center of the Site and occupy an area with an elongated east to west axis, with points of lower VOC COC concentration surrounding the area. This spatial distribution of the high VOC wells coincides with the trough-like feature in the shallow aquifer zone potentiometric surface and measured LNAPL distribution.

- While locations of high VOC COC and locations of greatest measured LNAPL thickness both lie in trough feature in the center of the Site, a complete correlation between LNAPL thickness and groundwater VOC COC concentration was not observed. Areas of high measured LNAPL thickness, such as near DSCP-RW-6 (1.24 ft) or DSCP-RW-9 (1.08 ft), do not contain total VOC COC levels greater than 10,000 ug/L. This may be an indication of spatially variable composition of the Site's LNAPL, and specifically may indicate the presence of heavier or more weathered LNAPL in the vicinity of these wells.

The conclusions, along with those from the optimization testing and geochemical analyses, provide the framework for the evaluation of a potential bioventing and/or biosparging strategy. To develop the BOD, these conclusions will be combined with additional bioventing effectiveness criteria in subsequent sections.

7. Selection of Potential Bioventing Locations

The geology, optimization testing, and chemical analyses presented above indicate that some areas on the Site are suitable for bioventing and/or biosparging strategies. Criteria for selection of potential bioventing locations were identified, and include regions with sandy strata, favorable oxygen utilization rates, and the presence of biodegradable LNAPL. Three areas were outlined onsite as potential locations, and are marked as Areas 1, 2, and 3 on Figures 2-5. These areas were evaluated based on the selection criteria.

7.1 Site Suitability

7.1.1 Site Geology- Presence of Sandy Strata

As described in the CSM above, the Site subsurface geology is favorable in some locations for a bioventing strategy. The permeable, sandy strata that are present beneath the Site, along with the fact that many of the Site wells are screened in the interval of these strata, will allow for the airflow required for bioventing. Cross-sections are included in Appendix D.

Data for the construction of cross-sections were taken from original well construction logs, groundwater elevation data, and smear zone depths (Aqui-Ver 2009). These documents are also provided in Appendix D. Upon the anticipated attainment of additional direct-push data, these cross-sections will be updated to reflect the most recent CSM available at the time of system design.

The cross–section along A-A' (Appendix D) depicts a large sandy mixed unit (silt, sand, and gravel) interbedded with silt, silty sand, and sand layers. These units are found within the screened intervals of wells in cross-section A-A'. Nearly all of PH-RW-A's screened interval lies within this sandy unit; the uppermost portion lies within an overlying sand unit. This setup, with the well screen reaching a sandy unit, represents a well that could be favorable for bioventing. However, the cross-section also shows a relatively high water table that limits the length of well screen open to unsaturated sand, therefore also limiting the depths at which bioventing will be effective. These observations will be used in design of the bioventing system. Cross-section A-A', along with the others in Appendix D, will be useful for assigning well depths and screened intervals for wells in the final design.

An additional use of the cross-section for design, and for general conceptual understanding of the site, is to visualize the "breach" area, where confining clay layers are not present at depth and hydraulic communication between the shallow and deep aquifers is possible. Within the "breach," LNAPL tends to accumulate, and the greatest thickness of smear zone is observed. In cross-section A-A', no clay layers at depth (~35 ft or deeper) are seen; this section line likely maps within the "breach." Delineation of this collection area will help refine the areas considered for future remediation efforts.

7.1.2 Biodegradable Contaminants of Concern

The applicability of a bioventing and/or biosparging system also depends on the type of constituents in the ground. Bioventing remediation techniques can effectively treat aerobically biodegradable materials, including petroleum products (EPA 2012). Though many of the compounds within the range of petroleum products are biodegradable, lighter molecular weight constituents like those found in gasoline degrade quickly through bioremediation techniques, while heavier molecular weight constituents like those found in diesel fuel degrade slower. More importantly, the lighter end constituents are also a source of more toxic dissolved phase compounds, like those included in the PADEP Short List of petroleum hydrocarbon COC, than are heavier end constituents. Figure 2 shows the onsite spatial distribution of LNAPL composition, as differentiated by boiling point, which varies for different petroleum constituents. Figure 2 is based on Site LNAPL boiling point data obtained during sampling in 2003 and 2006. Weight ranges of petroleum compounds are differentiated on the figure using yellow for light, gasoline range hydrocarbons, green for intermediate, and blue for heavier, diesel range hydrocarbons. For bioventing purposes, the light gasoline regions shown in yellow indicate areas with potential for the most effective degradation through a bioventing strategy.

Areas to be considered for bioventing are shown on Figure 2 as Areas 1, 2, and 3. Area 1 is situated above lighter hydrocarbons, and is most suitable for bioventing based on hydrocarbon composition. Although Area 1 is not currently situated above measureable LNAPL (Figure 1), high detections of VOC COC were observed (Appendix C, Figure 4), indicating that lighter-end hydrocarbons are still likely present within the smear zone. Areas 2 and 3 are situated above LNAPL with a slightly higher percentage of heavier hydrocarbons, so use of bioremediation aimed at the PADEP Short List would be slightly less effective than in Area 1.

The potential for volatilization of lighter constituents such as light petroleum products with a bioventing strategy can be an issue (EPA 2012). In many areas onsite, engineering controls such as vapor barriers exist as safety measures against human exposure to volatilized compounds. Within the test areas being considered, vapor barriers are present beneath the Philadelphia Housing Authority (PHA) building on the southern portion of the Site and beneath commercial buildings at the former DSCP Site. However, it is unknown whether other nearby buildings, such as those within the storage unit facility on the central portion of the Site, are outfitted with engineering controls. In the event of selection of areas near such buildings for bioventing, further investigation into existing controls will be necessary.

7.1.3 Current Anaerobic Microbial Conditions

In order to degrade the hydrocarbons mentioned above, the environment for microorganisms must not be inhibitory, such that the microorganisms are sufficiently active in order to respond to the additional O_2 provided by a bioventing strategy. The previously described respirometry test results reported in the Second Quarter of 2012 Progress Report (ARCADIS, 2012) give evidence that microbiological activity is occurring in the site subsurface. Specifically, current microbiological activity is largely anaerobic, as shown through depressed O_2 levels in the subsurface, as well as CH_4 and hydrogen sulfide (H_2S) generation. By adding O_2 to the subsurface through bioventing/biosparging, aerobic activity, which yields a higher rate of contaminant destruction than anaerobic activity, will be encouraged. Additionally, biosparging can help promote both mass recovery and mass degradation in the saturated zone, where mass is trapped below the water table and is not accessible for recovery by the VES system.

The conclusions of the bioventing optimization testing, as presented above, further constrain areas suitable for bioventing based on O_2 utilization rates and levels of vapor constituents. Conclusions indicate favorable O_2 utilization rates in Area 1 (Figure 3), at recovery well RW-A when PH-1 was used as a forced air injection well. Similarly, favorable O_2 utilization rates were seen in the area near MW-32, as well as PH-2. In addition, levels of vapor constituents indicated favorable conditions around wells RW-A, PH-1, and PH-2. Levels of VOCs, CH_4, O_2, and CO_2 taken at the end of respirometry tests at each well are shown on Figure 3. High levels of CO_2 and the presence of CH_4 indicate that anaerobic biodegradation processes dominate the subsurface. These observations all indicate areas with existing microbial activity that may be enhanced by the addition of O_2 through bioventing.

Data from O_2 utilization rates, petroleum constituent distribution, and Site geology create a layered model that yields Site locations that are suitable for bioventing and/or biosparging. By viewing Figures 1-3, in conjunction with data and figures from previous quarterly progress reports, these suitable areas may be visualized.

7.2 Accessibility and Available Utilities

As outlined above, criteria for selection of potential bioventing locations include regions with sandy strata, appropriate oxygen utilization based on bioventing testing, and lighter gasoline-range petroleum constituents. In addition, access to utilities for the powering of the bioventing system is a consideration when selecting system locations.

Utilities are available in Areas 1, 2, and 3, as shown in Figure 4. Areas 1 and 3 are considered the best of the three areas marked in terms of utility access, as the existing power drops have the capacity to run the 220/230V motors that are available for use. The existing power drop in Area 2 would require modification to run the recommended bioventing system. In all three areas, remediation infrastructure, a building footprint, and security measures are already in place, such that the addition of a bioventing system would not require additional capital expenditures to modify the surrounding properties. However, the areas differ in predicted ease of access. Area 1 lies on PHA property, where existing remediation infrastructure is configured in a way that is easily accessed and would be easily modified to accommodate bioventing equipment. Area 2 also allows for easy access to infrastructure, but, as previously stated, would require modification to the power drop. Area 2 also lies just outside the current CSM's "breach" delineation, making it less favorable based on geology. Of the 3 areas, Area 3 currently has the most favorable infrastructure; however, access to Area 3 in order to fit additional bioventing equipment would be more difficult than in Areas 1 and 2.

8. Location Recommendations

Based on the criteria presented above, the following locations, shown in Figure 5, are recommended for an in-situ aerobic biodegradation system:

8.1 Area 1, near RW-A (Strongest Recommendation)

Area 1, near RW-A, is recommended for placement of a bioventing and/or biosparging system. This area is favorable when lithology (permeable subsurface sands), geographic location (proximity to areas of measureable LNAPL and smear zone associated with the "breach"), type of LNAPL (lighter molecular weight constituents), oxygen utilization rate (high), and available utilities (suitable for high voltage) are considered.

8.2 Area 2, near RW-2 (Moderate Recommendation)

Area 2, near RW-2, is also recommended as a reasonable location for bioventing and/or biosparging, though this location is not as strongly recommended as is Area 1. Area 2's permeable sand and lighter LNAPL constituents are favorable for bioremediation, but insufficient data regarding oxygen utilization and the location just north of the northern boundary of the "breach" make it a less favorable option than Area 1. In addition, the available power drop at Area 2 would require modification to run the system. If one bioremediation system is to be placed, Area 2 is recommended

only if Area 1 is determined to be unavailable for placement of the system. If multiple locations for bioventing and/or biosparging are desired, it is recommended that systems be placed at both Areas 1 and 2.

8.3 Area 3, near MW-65 (Recommendation, with caution)

A third option for bioventing and/or biosparging is Area 3. Area 3's permeable sand and favorable oxygen utilization rates indicate viability of a bioremediation solution in this location. However, the presence of more intermediate and heavy petroleum constituents and the requirement of modifications to the existing power drop and inaccessibility make this location less advantageous. This location is recommended only if Areas 1 and 2 are determined to be unavailable for placement of bioremediation systems. If Area 3 is selected for bioventing and/or biosparging, further investigation into the existence of vapor barriers beneath a nearby building and rental spaces is necessary.

9. Basis for Well Design

In addition to location recommendations, preliminary design considerations for bioventing system wells and equipment are needed. Detailed design calculations and recommendations will be presented in subsequent design documents.

9.1 Depth

The recommended design of the wells in the locations described above depends on the lithologies and depth of water table in each location. Specifically, hydrogeologic controls on well design include the presence and depth of the upper silt layer, as well as depth to the water table. Where present, the relatively impermeable silt layer permits little airflow through, therefore providing a static upper limit to the section of well open to air venting or injection. Similarly, the water table provides a variable lower limit, and the section between the water table and silt layer is that which is available for airflow. For existing wells, the length and position of the well screen provides an additional constraint, further limiting the airflow within the well screen interval. The cross-sections in Appendix D display this concept by showing existing wells, screened intervals, and lithology. Along cross-section B-B' (Appendix D), a relatively high groundwater table reaches almost to the top of the well screens, so the wells' screened intervals that are open to unsaturated sand are shown to be fairly small. Along some

portions of B-B', a silt layer is present, but at a shallow enough depth to have no effect on the amount of well screen available for airflow.

In addition to site geology, the capability of available equipment will also be considered when designing bioventing or biosparging well depths. A summary of available equipment is given in Section 10.

9.2 Well and Pipe Network Requirements and Options

9.2.1 Passive vs. Active Systems

The design of the bioventing system may include either, or a combination of, passive and active wells. Passive wells in a bioventing system are those that induce airflow by venting, while active wells function through forced air injection. The designation of a well at a particular location as passive or active depends on that well's Radius of Influence (ROI).

9.2.1.1 Well Radii of Influence

A well's ROI is defined as the distance, measured outward from the well, to the boundary within which sufficient airflow is induced through passive venting or active air injection at the well. Factors that affect ROI include soil permeability, stratification, and moisture, in addition to well construction. For a bioventing system, the well's ROI impacts design by limiting the allowable distance between inlet and extraction wells, therefore constraining the required number and spacing of wells. Soil properties such as permeability, and homogeneity or heterogeneity affect ROI. Wells with small ROI may require active systems, while wells with larger ROI may accommodate passive setups. A system's wells' ROI are typically determined by field pilot studies, or estimated through modeling or empirical methods.

For this Site, the aforementioned bioventing testing included determination of ROI for some existing wells. The detailed results of these tests are found in the Second Quarter and Third Quarter 2012 Progress Reports (ARCADIS, 2012). The ROI around an existing well, RW-A, was found to be large enough for bioventing using active forced-air injection, but too small for a passive bioventing technique. Results for RW-B showed no confirmed pneumatic connection between the well and nearby monitoring wells, indicating a small ROI that may be the result of a leaky well seal. Pilot studies or modeling would further define expected ROIs for design purposes. Based on ROIs, a system with a combination of active and passive wells may be appropriate.

9.2.1.2 Bioventing and Biosparging

Another variable within the system design is the designation of active air injection wells as bioventing or biosparging, based on air flow rates. Biosparging, while not tested at the site, is based on a similar principal to bioventing, and may be used to both physically strip mass trapped in the saturated zone (i.e. mass that is currently not accessible to the VES system) for recovery by the VES system, and to assist with bioremediation of dissolved impacts in the groundwater. As previously noted, biosparging rates are typically 3-25 scfm, and bioventing rates 0-3 scfm (EPA 1994). Further analysis is required to determine appropriate flow rates for a bioventing system in the recommended location(s). Variables that will be considered in this analysis include well ROI, equipment capability, and results of a pilot study.

9.2.2 Integrated Remediation Approach

Though the advantages of an in-situ bioremediation approach are presented in this BOD report, it should be noted that a bioventing or biosparging system likely does not have the capacity to remediate the Site on its own. Implementation of a bioventing/biosparging approach in combination with the existing VES remediation system is recommended. The design of the pilot study will determine the location and construction of additional recovery wells to provide capture of the stripped VOCs and vapors generated by the bioventing/biosparging activities. These additional recovery wells will also be utilized as VES system wells to recover additional LNAPL as vapor and VOCs in areas that are between the existing VES wells, and or replace VES wells that will not be effective in the pilot test area due to a high water table or bio-fouling.

The nature of the Site requires additional techniques to address petroleum hydrocarbon impacts in different phases, including LNAPL, residue in soil matrix, and volatiles. For effective remediation, an integrated approach is recommended. The current system, which includes skimming and vacuum extraction, should be integrated with additional techniques like bioventing for improved remediation in areas where LNAPL thicknesses are lower and anaerobic degradation is actively occurring. Biosparging efforts should be integrated where hydrocarbon impacts are present in the saturated zone, outside the influence of the VES system.

10. Available Equipment

An advantage to the selection of a bioventing and/or biosparging remediation approach at the Site is the availability of applicable equipment. Used remediation equipment was

obtained by the USACE (Philadelphia District) in May 2013 from a Superfund Site in Luzerne County, Pennsylvania. The equipment was used within a soil vapor extraction/air sparge (SVE/AS) system, and includes:

- Air sparge blower package skid (complete with sub-equipment)
- SVE blower package skid (complete with sub-equipment), including knockout tank, pump, storage tank, and control panels
- Steel SVE discharge stack with muffler/silencers
- Local electrical disconnect switch, conduit, conductor, and ground wires from disconnect to blower skids
- (32) SVE well head assemblies, including all valves, fittings, hose and flow meters and gauges
- (21) air sparge well head assemblies, including all valves, fittings, hose and flow meters and gauges
- Air sparge conveyance piping
- Temporary fence panels

The procurement of this equipment allows for the potential construction of a bioventing/biosparging system at a low cost. The equipment is government-owned, and is being offered by EPA Region 3 without cost for reuse at the former DSCP site by a government agency (the USACE, Philadelphia District). Rights to use the equipment are limited to the government agency onsite (USACE, Philadelphia District), and the equipment is not to be used for the benefit of ARCADIS or any other non-government entity.

11. Conclusions and Recommendations

11.1 Locations and Design

ARCADIS recommends consideration of a bioventing and/or biosparging system to augment the Site's ongoing remediation system. The existing VES system, while

productive, is limited to affecting liquid material and hydrocarbon mass in the unsaturated zone. A bioventing setup would function in cooperation with the existing system to increase aerobic biodegradation in the unsaturated zone. Biosparging may be used to recover mass trapped in the saturated zone (i.e. mass that is not currently accessible to the VES system) and assist with bioremediation of dissolved impacts in groundwater.

The recommended locations for bioventing and/or biosparging systems onsite, in order of highest recommendation, are Area 1 (near RW-A), Area 2 (near RW-2), and Area 3 (near MW-65), as shown in Figure 5. Preliminary design consideration of well depth included placement of the wells within the shallow aquifer, with screened intervals above the water table and below the silt layer, where present. Bioventing testing showed the ROI at some existing wells to be large enough for active injection wells, but too small for passive venting wells. In these areas, active bioventing injection wells or biosparging wells are recommended. Further clarification of existing well ROIs and estimation of design ROIs is necessary to establish an appropriate number and spacing of air injection, biosparging, and VES wells in the final system design.

11.2 Pilot Study

To confirm the hypotheses that the selected areas are favorable for in-situ bioremediation, and to aid in system design, it is recommended that a pilot study be conducted near the area being considered for placement of the system. A study will test the effectiveness of system options, including sparging and venting, active and passive wells, shallow and deep wells, vertical and horizontal wells, different well setups and pipe networks, and varying blower power. An example pilot study setup is shown in Figure 6.

Information gained from a pilot test completed in a recommended area will add to the understanding of the CSM, and will help in the eventual design of the bioventing and/or biosparging system to be added to the existing remediation setup.

11.3 Community Concerns

Concerns regarding any potential effects of the bioventing/biosparging strategy on the surrounding community are addressed through existing engineering controls. The potential hazard of exposure to volatilized petroleum products will be greatly reduced by the presence of the existing VES system, modification to the VES system recovery well network, and vapor barriers beneath buildings near Areas 1 and 2. If bioventing or

biosparging are considered in other areas, such as Area 3, an investigation should be directed to determine whether or not similar engineering controls are present.

Additionally, vapors produced during bioventing or biosparging processes could potentially enter the Packer Avenue sewer that runs across the southern end of the site (see Figures 1-6). However, a continuously-operating Sewer Vapor Extraction system is already in place, located on the PES property. This existing control limits the hazard of exposure to bioremediation-related vapors through the sewer line.

A bioventing and/or biosparging system may actually function to mitigate community risks, particularly through the reduction of the amount of methane produced by microorganisms. The concerns mentioned above exist presently due to the methanogenesis of LNAPL that occurs because of anaerobic degradation. Bioventing and biosparging, through encouraging aerobic degradation, can be used to mitigate the risk of methane accumulation, especially if implemented in areas where the highest methane concentrations are detected (Area 1).

11.4 Future Work and Detailed Design Report

This Basis of Design report provides the framework for a future pilot study, and an eventual full-scale site remediation system expansion and accompanying design documents. The expansion is intended to increase the rate of LNAPL destruction through the concurrent operation of skimming, vacuum extraction, and bioventing/biosparging techniques. Design documents will include details regarding the number of air injection, biosparging and recovery wells, individual well locations, pipe lengths and layouts, power requirements, and other design specifics, as well as address the integration of such a system with the existing setup.

Ongoing field work including additional direct-push investigations and groundwater sampling events will yield results that will augment understanding of the Site and the best approaches to remediation. The data and conclusions presented here are based on knowledge gained through the Third Quarter of 2013; with the addition of new sampling and testing results, conclusions may require modification before the final bioventing system design and report are established. Each new result adds to the body of knowledge regarding the site, and will contribute to a greater understanding of the best approach to remediation.

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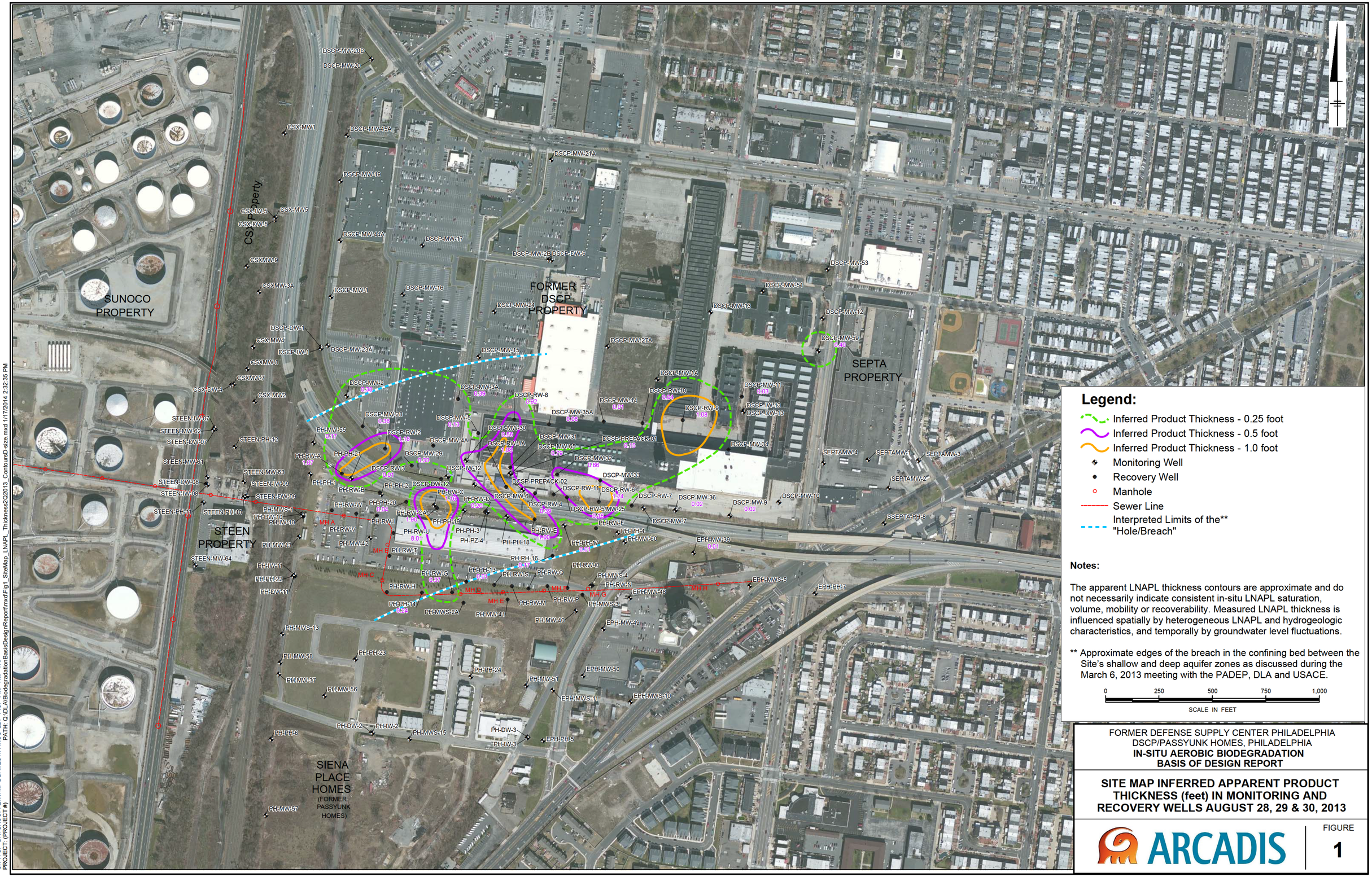
Figures



FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA
IN-SITU AEROBIC BIODEGRADATION BASIS OF DESIGN REPORT

SITE MAP INFERRED APPARENT PRODUCT THICKNESS (feet) IN MONITORING AND RECOVERY WELLS AUGUST 28, 29 & 30, 2013

ARCADIS

FIGURE 1

CITY: SF DIV/GROUP: ENV/IM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT: (PROJECT #) PATH: Q:\DLA\BiodegradationBasisDesignReport\mxd\Fig1_SiteMap_LNAPL_Thickness2Q2013_ContoursD-size.mxd 1/17/2014 2:32:35 PM

SUNOCO PROPERTY

CSX Property

Schuylkill Expressway

FORMER DSCP PROPERTY

SEPTA PROPERTY

STEEN PROPERTY

FORMER ARCO GAS STATION

SIENA PLACE HOMES (FORMER PASSYUNK HOMES)

DSCP-MW-15
DSCP-MW-3A
DSCP-MW-2
DSCP-MW-5
DSCP-RW-2
DSCP-RW-3
DSCP-MW-30
DSCP-MW-29
DSCP-RW-4
PH-PH-20
PH-RW-A
PH-RW-I
PH-PH-19
PH-PH-18
PH-RW-E
DSCP-RW-5
PH-PH-13
PH-PH-14
DSCP-MW-14
DSCP-RW-9
DSCP-MW-11
DSCP-MW-32
DSCP-MW-33
DSCP-MW-36
DSCP-RW-6
DSCP-MW-10
DSCP-MW-9

MH A
MH B
MH C
MH D
MH E
MH F
MH G
MH H

OREGON AVENUE
ROMA DRIVE
GENOA DRIVE
TRIESTE WAY
NAPOLI WAY
PIETRO WAY
GALABRIA WAY
SALERNO WAY
VOGGIA DRIVE
PENROSE FERRY ROAD
PENROSE AVENUE
HARTRANFT STREET
MESSINA WAY
SAN VINCENZO DRIVE

Legend:

- Sewer Line
- Manhole
- Indicates >10% Light Gasoline Range Hydrocarbons (Boiling Boint <200F)
- Indicates ≤10% Light Gasoline Range Hydrocarbons and ≤30% Diesel and Residual Range Hydrocarbons
- Indicates > 30% Diesel and Residual Range Hydrocarbons (Boiling Point >400F)
- Interpreted Limits of the Potential Area of Confining Bed thinning and/or Absence**
- # Area with existing remediation infrastructure and utilities
- Interpreted Most Biodegradable Region
- Interpreted Intermediately Biodegradable Region

Note:

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE.

0 420 840

SCALE IN FEET

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IN-SITU AEROBIC BIODEGRADATION BASIS OF DESIGN REPORT

LNAPL COMPOSITION BASED ON BOILING POINT CHARACTERISTICS

ARCADIS MALCOLM PIRNIE
infrastructure · Water · Environment · Buildings

FIGURE 2

CITY: San Francisco DIV/GROUP:(ENV/GIS) DB: ME LD: PIC: PM: TM:
Project #: 06262046.0000.00506
Q:\DLA Biodegradation Basis\Design Report\mxd\Fig2_DSCP_LNAPL_CompositionBoilingPtChar.mxd: 1/21/2014: 11:11:56 AM

FORMER DSCP PROPERTY

SEPTA PROPERTY

STEEN PROPERTY

SIENA PLACE HOMES

PH-1	
VOCs (ppm)	622
CH_4 (%)	0.6
O_2 (%)	3.9
CO_2 (%)	4.4

PH-21	
VOCs (ppm)	17.3
CH_4 (%)	0
O_2 (%)	21.7
CO_2 (%)	0

RW-B	
VOCs (ppm)	702
CH_4 (%)	0.1
O_2 (%)	20.1
CO_2 (%)	0.1

MW-32	
VOCs (ppm)	430
CH_4 (%)	6.3
O_2 (%)	8
CO_2 (%)	7.1

PH-2*	
VOCs (ppm)	553
CH_4 (%)	5.7
O_2 (%)	3.55
CO_2 (%)	7.2

RW-11*	
VOCs (ppm)	237
CH_4 (%)	0.05
O_2 (%)	19.8
CO_2 (%)	0.45

RW-7*	
VOCs (ppm)	156
CH_4 (%)	1.15
O_2 (%)	10.35
CO_2 (%)	6.05

RW-A	
VOCs (ppm)	404
CH_4 (%)	7.6
O_2 (%)	4.3
CO_2 (%)	7.7

MW-7*	
VOCs (ppm)	38
CH_4 (%)	0.05
O_2 (%)	15.7
CO_2 (%)	1.95

MH A
MH B
MH C
MH D
MH E
MH F
MH G
MH H
PH-20
RW-1

1
2
3

Legend:

- Monitoring Well
- Recovery Well
- Manhole
- Sewer Line
- Interpreted Limits of the Potential Area of Confining Bed thinning and/or Absence**
- # Area with existing remediation infrastructure and utilities

MW-7*	
VOCs (ppm)	38
CH_4 (%)	0.05
O_2 (%)	15.7
CO_2 (%)	1.95

Tabulated values for vapor constituents at the end of respirometry test

Notes:

Wells PH-21, RW-B and MW-32 noted as leaky

* Results taken from file Resiprometry- head space readings-with graph.xlsx, last revised 6/20/2012

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE.

0 120 240 360 480

SCALE IN FEET

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DSCP/PASSYUNK HOMES, PHILADELPHIA

IN-SITU AEROBIC BIODEGRADATION BASIS OF DESIGN REPORT

BIOVENTING OPTIMIZATION TESTING RESULTS: RESPIROMETRY & OXYGEN UTILIZATION

ARCADIS

FIGURE 3

CITY: SF DIV/GROUP: ENV/IM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT (PROJECT #)
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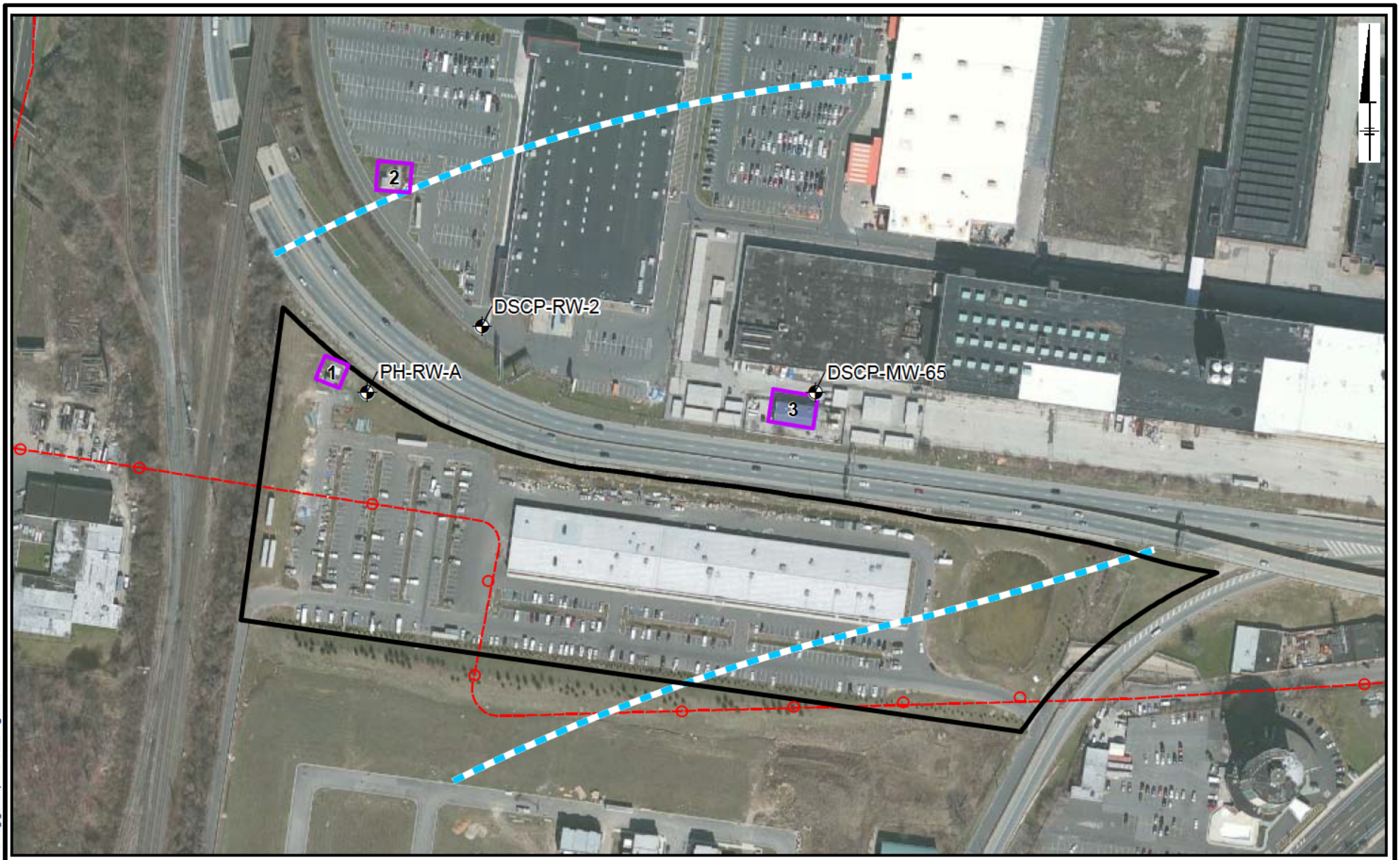

Legend

- Manhole
- # Area with existing remediation infrastructure and utilities
- Sewer Line
- Interpreted Limits of the Potential Area of Confining Bed thinning and/or Absence**
- PHA Properties Boundary

0 240 480
SCALE IN FEET

Note:
**Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2012 meeting with the PADEP, DLA and USACE.

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DSCP/PASSYUNK HOMES, PHILADELPHIA
IN-SITU AEROBIC BIODEGRADATION BASIS OF DESIGN REPORT

EXISTING REMEDIATION INFRASTRUCTURE & UTILITIES

ARCADIS

FIGURE
4

CITY: SAN FRANCISCO DIV/GROUP: ENV/GIS DB: User: MEstifanos LD: PIC: PM: TM:
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G:\GIS_Library\TileBlock\AndBorders\2011_ARCADIS_Templates\ANSI_B_Landscape.mxd - 5/20/2011 @ 2:50:38 PM



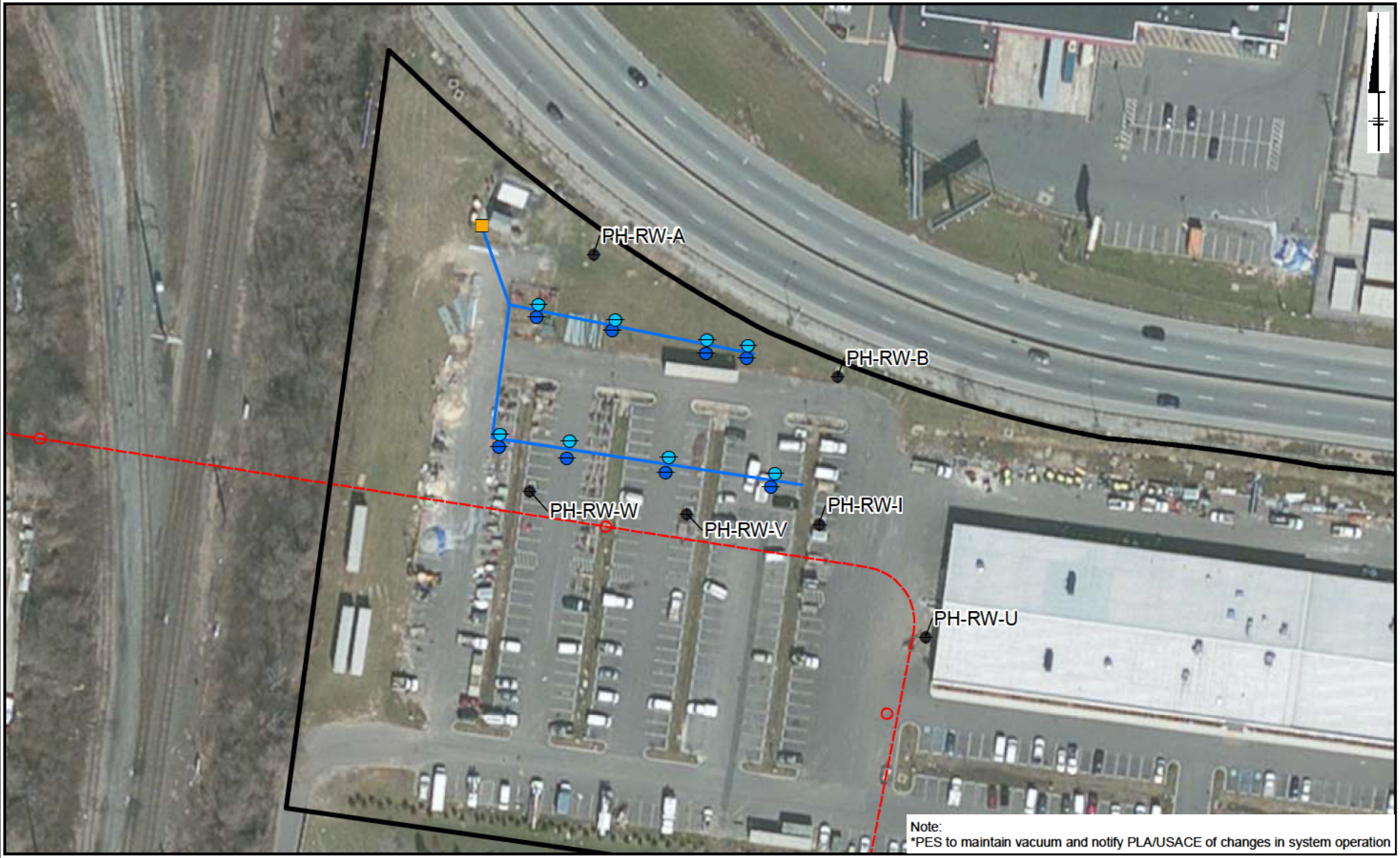
FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA
IN-SITU AEROBIC BIODEGRADATION BASIS OF DESIGN REPORT

RECOMMENDED BIOVENTING SYSTEM LOCATIONS

ARCADIS

FIGURE
5

CITY: SF DIV/GROUP: ENV/IM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT: (PROJECT #) PATH: Q:\DLA\BiodegradationBasisDesignReport\mxd\Fig5_RecommendedBioventingSystemLocs.mxd 1/17/2014 3:06:50 PM



Legend

- Recovery Well
- Manhole
- WellNetwork_In
- Sewer Line*
- Interpreted Limits of the Potential Area of Confining Bed thinning and/or Absence**
- Power source and equipment
- Vertical air-injection well, shallow
- Vertical air-injection well, deep
- Vacuum extraction well
- PHA Properties Boundary

0 100 200
SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA
IN-SITU AEROBIC BIODEGRADATION BASIS OF DESIGN REPORT

EXAMPLE PILOT STUDY SETUP

ARCADIS

FIGURE
6

Appendix A



FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

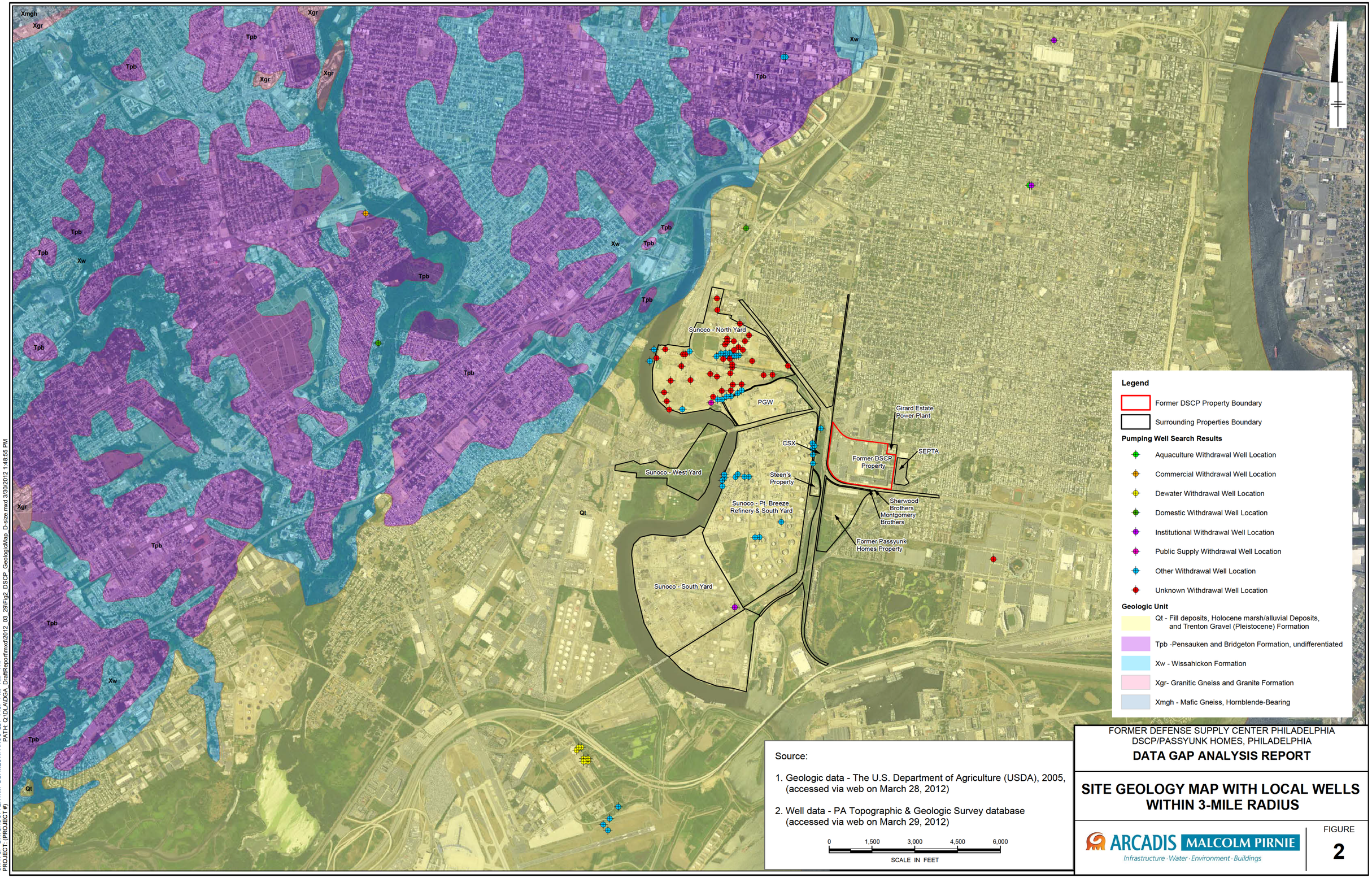
DATA GAP ANALYSIS REPORT

SITE LOCATION MAP

ARCADIS MALCOLM PIRNIE
Infrastructure · Water · Environment · Buildings

FIGURE
1

CITY: San Francisco DIV/GROUP:(ENV/GIS) DB: ME LD: PIC: PM: TM:
Project #: 06262046.0000.0506
Q:\DLA\DGA_DraftReport\mxd\2012_03_29\Fig1_DSCP_SiteLocationMap.mxd 3/29/2012 5:56:52 PM



Source:

1. Geologic data - The U.S. Department of Agriculture (USDA), 2005, (accessed via web on March 28, 2012)
2. Well data - PA Topographic & Geologic Survey database (accessed via web on March 29, 2012)

0 1,500 3,000 4,500 6,000

SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

DATA GAP ANALYSIS REPORT

SITE GEOLOGY MAP WITH LOCAL WELLS WITHIN 3-MILE RADIUS

ARCADIS MALCOLM PIRNIE
Infrastructure · Water · Environment · Buildings

FIGURE
2

CITY: SF DIVGROUP: ENV/M DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT: (PROJECT #) PATH: Q:\DLA\DGA_DraftReport\mxd\2012_03_29\Fig2_DSCP_GeologicMap_D-size.mxd 3/30/2012 1:48:55 PM

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QUITCLAIM DEED (3)

WHEREAS, pursuant to the Defense Base Closure and Realignment Act of 1990, Public Law 101-510, as amended ("BRAC law"), the military installation at Defense Supply Center Philadelphia, ("DSCP") County of Philadelphia, Commonwealth of Pennsylvania, formerly called Defense Personnel Support Center until January 13, 1998, was determined surplus by the Army on March 30,1995; and

WHEREAS, the City of Philadelphia, acting by and through the Philadelphia Authority For Industrial Development ("PAID") was granted the authority to oversee and implement the civilian reuse of DSCP in accordance with a local-approved reuse plan; and

WHEREAS, PAID, a Local Reuse Authority, made application for an Economic Development Conveyance ("EDC") for the purchase of a portion of DSCP including two buildings, Buildings 9 and 13; the 12.86 acre, more or less, parcel of land underlying said buildings; and a 4-acre parking lot parcel (collectively the "First EDC Property"); and

WHEREAS, the Army, as authorized by the BRAC law and implementing regulations, has determined that the application meets the criteria for conveyance to assist economic redevelopment and job creation and has accepted PAID's application and made a final disposal decision with regard to the First EDC Property; and

WHEREAS, the Army and PAID have entered into a Memorandum of Agreement ("MOA"), dated May 22, 1997 establishing the terms and conditions for an EDC conveyance of the First EDC Property to PAID and the lease of a portion of the First EDC Property to PAID pending and in furtherance of the conveyance of the First EDC Property; and

WHEREAS, the MOA provides for the conveyance of the First EDC Property in phases as Army mission requirements cease and environmental remediation is completed, with Building 9, Building 13, the 12.86 acre parcel underlying said buildings, and a 4 acre parking lot parcel conveyed separately; and

WHEREAS, in accordance with the MOA, dated on May 22, 1997 the Army leased to PAID the First EDC Property, with the exception of the parking lot parcel and certain portions of Building 9, (the "Lease"), giving PAID possession and control of said portion of the First EDC Property as of the date of the Lease; and

WHEREAS, pursuant to Public Law 101-510, as amended, the Army has the authority to convey and with this Deed conveys to PAID, pursuant to the terms and conditions of the MOA, the air rights as described in Exhibit A and all of the improvements contained therein; located in the County of Philadelphia, Commonwealth of Pennsylvania, at DSCP.

Quitclaim deed (3)

AIR Rts - 13

NOW THEREFORE,

KNOW ALL MEN BY THESE PRESENTS that the UNITED STATES OF AMERICA (the "Grantor"), acting by and through the Acting Deputy Assistant Secretary of the Army (I&H) pursuant to a delegation of authority from the SECRETARY OF THE ARMY (the "Army"), under and pursuant to the BRAC law, in consideration of ONE DOLLAR ($1.00) cash in hand paid, the receipt of which is hereby acknowledged, and other good and valuable consideration as provided for in the MOA between the parties, does hereby convey, grant, remise, release, and forever quitclaim unto the PHILADELPHIA AUTHORITY FOR INDUSTRIAL DEVELOPMENT (the "Grantee"), a body corporate, and politic, and existing under the laws of the Commonwealth of Pennsylvania ("Commonwealth") having its principal place of business at 2600 Centre Square West, 1500 Market Street, Philadelphia, PA 19102 and its successors and assigns, all its right, title, and interest in and to a portion of the First EDC Property, located in the County of Philadelphia, Commonwealth of Pennsylvania, at DSCP, more particularly described in Exhibit A, attached hereto and made a part hereof (hereinafter called the "Property").

The words "Grantor" and "Grantee" used herein shall be construed as if they read "Grantors" and "Grantees" respectively, whenever the sense of this Deed so requires and, whether singular or plural, such words shall be deemed to include in all cases the successors and assigns of the respective parties.

1. Property Conveyed.

The Property includes the air rights as described in Exhibit A and all of the improvements contained therein (including Building No. 13) together with all hereditaments and tenements therein and all easements, reversions, remainders, issues, profits, and other rights belonging or related thereto; except that the existing free-phase hydrocarbon recovery system on the Property for the NAPL Plume (as hereinafter defined) is not conveyed herewith.

The legal description of the Property has been provided by PAID and PAID shall be responsible for the accuracy of the description of the Property conveyed herein.

All of the related personal property ("Personal Property") listed in Exhibit B, will be transferred to Grantee pursuant to that certain Bill of Sale dated as of even date herewith.

2. Support Easements and Mutual Covenants.

Without in any way limiting, and subject to, the terms and provisions of that certain Declaration of Easements dated the same date as this Deed (which is to be

recorded in the Office of the Recorder of Deeds prior to the recordation of this Deed) (the "Declaration of Easements"), Grantor does hereby grant to Grantee the following described rights and easements, including but not limited to ingress and egress and for support, maintenance, and operation of any structures, buildings or other improvements of any kind whatsoever, now or at any time and from time to time hereinafter existing in, or about the Property hereby conveyed:

A. An easement appurtenant to the Property herein conveyed within the subjacent air space and the surface of the ground underlying the Property for ingress and egress from the building.

B. Subject to the conditions set forth in Paragraphs 5.C(1) and 9 of this Deed, all necessary or appropriate easements appurtenant to the Property herein conveyed and across, over, through, in, upon, under and within the air space and soil of the ground underlying the Property down to and including the Permitted Depth, to construct, develop, service, operate, maintain, alter, install, modify, repair and replace the structural support system of the buildings, structures or other improvements now or hereafter located on or in the Property and any part thereof in the ground underlying the Property to the extent of the Permitted Depth, which structural support system shall include, but not be limited to, all load-bearing members such as columns, footings, foundations, cross bracings and connections which support the building laterally, subjacent to the building grade, and/or otherwise, including the unlimited right to relocate, modify, repair, replace, shore-up or otherwise reinforce or in any other manner to deal with such structural support system. For the purposes of this Deed the term "Permitted Depth" shall mean the depth beneath the surface of the land surrounding the Property down to and including a depth of ten (10) feet or such greater depth, as determined by the Grantor in consultation with the appropriate environmental agencies having jurisdiction (including, but not limited to, U.S. Environmental Protection Agency ("EPA") and/or Pennsylvania Department of Environmental Protection ("PADEP"), as such terms are hereinafter defined), as is reasonably necessary for the re-use of the Property in accordance with the uses set forth and described in Paragraph 5(B) of this Deed;

C. An easement appurtenant to the Property herein conveyed for the service, operation, maintenance, alteration, installation, modification, repair or replacement of, in whole or in part, or additions to, all those areas in any part of the ground underlying the Property set aside for the function of mechanical facilities, communication lines, heating, ventilation, air conditioning systems, electrical power systems, plumbing and sewer systems and utility systems, including, but not limited to, all taps, laterals, lines, mains, conduits, facilities, pipes, systems, appurtenances, components, parts and equipment, fire protection systems, fuel systems including gas lines, sanitary sewer and storm sewer, fire suppression, and all other items, equipment and components relating to all or any part of the foregoing found in any part of the ground underlying the Property.

D. Grantor and Grantee agree that, to the extent rights substantially similar to those described in Paragraphs 2(A) through (C) above, inclusive, have been granted to, and then only for so long as such substantially similar rights exist in favor of, Grantee pursuant to a lease or other occupancy or use agreement with respect to the Property, the terms of such lease or other occupancy or use agreement with respect to such rights shall govern.

E. Grantor and Grantee do further mutually covenant and agree to assure Grantee's quiet enjoyment and full use and occupancy of the Property hereby conveyed, as follows:

(1) Grantor and Grantee each acknowledges and agrees that certain portions of the building herein conveyed share a party wall with other improvements that are not part of this conveyance and that certain portions of the building herein conveyed encroach into the air space of land adjacent to the Property herein conveyed and that certain portions of buildings adjacent to the Property herein conveyed encroach into the air space of the Property herein conveyed and Grantor and Grantee do hereby each covenant and agree that to the extent that any such buildings, structures or improvements extend over any boundary line herein described and constitute encroachments into the respective areas and estates owned by Grantor and Grantee, that the other shall suffer the same to continue and exist.

(2) Any buildings, structures or improvements as actually constructed now or from time to time may vary somewhat from the elevations and dimensions above set forth and it is hereby understood and agreed by and between Grantor and Grantee that said elevations and dimensions shall be subject to such variations therein as may exist in connection with any such buildings, structures or improvements as the same shall actually be constructed.

(3) By execution of this Deed the Grantee acknowledges receipt and acceptance of this Deed and affirms its agreement to observe the covenants and perform its obligations as set forth herein, which agreement shall be deemed to be a real covenant and shall run with the Property and burden the subjacent air space and land hereinabove described.

3. Reserved Easements.

A. The Property is conveyed subject to the easements for the benefit of the owners and collective redevelopment of the entire property that formerly comprised DSCP, as set forth in the Declaration of Easements.

B. Access Easement for Environmental Activities: The Grantor and its agents, employees, and contractors shall have access to and over the Property, from time to time, and only so long as may be necessary, to fulfill the Grantor's environmental responsibilities under this Deed or as necessary for any investigation, response, corrective action or ground water monitoring pursuant to CERCLA, a Record of Decision ("ROD") or amendment thereto, the National Contingency Plan ("NCP"), Resource Conservation and Recovery Act ("RCRA"), any order between the Grantor, and the PADEP and/or the EPA, or any Federal Facility Compliance Agreement ("FFCA") as well as the legal requirements of the Commonwealth such as Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S.§§ 691.1-691.1001 ("Clean Streams Law"); The Land Recycling and Environmental Remediation Standards Act, Act of May 19, 1996, 35 P.S. 6026.101 et seq. ("Land Recycling Act"); The Storage Tank and Spill Prevention Act, Act of August 7, 1989, P.L. 1989 No. 32, as amended, 35 P.S. 6021.101 et seq. ("Tank Act"); Section 1917-A of the Administrative Code of 1979, Act of April 9, 1929, P.L. 177, as amended, 71 P.S. § 510-17 ("Administrative Code") and the rules and regulations promulgated pursuant to these Acts (collectively called "Legal Requirements") with respect to the remediation of the Property and the NAPL Plume (as hereinafter defined) under the Property found to be necessary before or after the date of this Deed (hereinafter collectively referred to as "remediation of DSCP") and the Grantor shall notify the Grantee when it becomes necessary to exercise the easement rights herein reserved to fulfill the Grantor's environmental responsibilities. The Grantor, PADEP, and their authorized permittees and representatives shall have access to the Property to fulfill the Legal Requirements. The Grantee shall allow ingress and egress of all equipment necessary to accomplish the same. The Grantor shall provide the Grantee copies of any ROD, Order, or FFCA, or any amendments to said documents. This reservation includes the right of access to and use of, to the extent permitted by law, any available utilities at actual cost. In exercising the rights hereunder, except in case of imminent endangerment to human health or the environment, the Grantor shall give the Grantee, or the then record owner at least thirty (30) days prior written notice of actions to be taken in remediation of the DSCP and shall use reasonable means without significant additional cost to the Government to avoid and/or minimize interference with the use of the Property. Grantee agrees that notwithstanding any other provisions of this Deed, the United States assumes no liability to the Grantee, the then record owner or any other person, should remediation of the DSCP interfere with the Grantee's use of the Property, provided however that (1) the Grantor shall use its best efforts, without significant additional cost to the United States, to avoid significantly interfering with the use of the Property; and (2) if feasible, in the event of an imminent endangerment to human health or the environment, the Grantor shall provide seventy-two (72) hours advance notice of any remedial actions it intends to take on the Property. Subject to the provisions of this Section 3B, the Grantee, the then record owner, and any other person shall have no claim solely on account of any such interference resulting from actions taken under this Section 3B against the United States or any officer, agent, employee or contractors thereof. As of the date of this conveyance, the Grantor has provided the Grantee with an Environmental Baseline Survey ("EBS") and Finding of Suitability to Transfer

("FOST"), which, to the Grantor's knowledge and belief, accurately reflects the environmental condition of the Property, as presently known.

C. Notwithstanding any other provision of this Deed, the Grantee shall allow third parties under an Order with the United States and regulatory authorities to have access to, over, and through the Property, solely related to the remediation of the NAPL Plume, to implement the Legal Requirements in accordance with the Order, provided that such third parties shall be required to enter into a separate access agreement satisfactory to the Grantee, which access agreement will not impose any costs upon the United States.

D. Agents of Grantor. Solely for purposes of this Paragraph 3, the Defense Logistics Agency ("DLA") and DSCP shall be deemed to be "agents" of the Grantor.

4. CERCLA Covenants and Notice.

Pursuant to Sections 120(h)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. § 9601 et seq. ("CERCLA"):

A. The Grantor hereby notifies the Grantee that there was no storage, release, and disposal of hazardous substances on the Property in excess of reportable quantities. For the purpose of this Deed, "hazardous substances" shall have the same meaning as section 101(14) of CERCLA. Based upon the FOST, the information regarding this storage, release, and disposal indicates that there is no unacceptable risk to human health or the environment.

B. The Grantor hereby covenants that:

(1) all remedial action necessary to protect human health and the environment with respect to any such hazardous substances remaining on the Property has been taken before the date of conveyance hereunder; and

(2) any additional remedial action found to be necessary after the date of the conveyance in connection with any such hazardous substances remaining on the Property, except to the extent caused by the activities of the Grantee, its contractors, agents, sublessees, permittees, invitees, and licensees under the Lease, shall be conducted by the Grantor. This covenant in this Subsection B. shall not apply in any case in which the person or entity to whom the Property is transferred is a potentially responsible party under CERCLA with respect to the Property. For purposes of this Subsection B. the Grantor hereby covenants that previous tenancy, occupation or use by the Grantee or its lessee or sublessees of the portion of the Property so leased, occupied, or used by the Grantee or its lessee or sublessees will not cause the Grantee or its lessee or sublessees to be a potentially responsible party under this covenant or under CERCLA solely because or as a result of such tenancy, occupancy or use.

C. Prior to the determination by the United States that remediation of DSCP is complete, (i) the Grantee, its successors and assigns, shall not undertake activities on the Property that would significantly interfere with or impede the completion of the remediation of DSCP and shall give prior written notice to the Grantor, the EPA, and PADEP of any construction, alterations, or similar work on the Property that may significantly interfere with or impede said clean-up, and (ii) the Grantee shall comply with any institutional controls established or put in place by the Grantor relating to the Property as provided for in the Legal Requirements, and of which the Grantee or then subsequent owner has been provided notice. In imposing any such institutional controls, before or after the date of this Deed for the Property, the Grantor shall use reasonable means, without significant, additional cost to the Army, to avoid and/or minimize interference with the Grantee's use of the Property. Additionally, the Grantee shall ensure that any leasehold it grants in the Property or any fee interest conveyance of any portion of the Property provides for compliance with the institutional controls provided for by the Legal Requirements, and said Legal Requirements are binding upon subsequent transferees.

D. For any portion of the Property subject to a response action in accordance with the Legal Requirements, prior to the conveyance of an interest therein by the Grantee, the Grantee shall include in all conveyances provisions allowing for the continued operation of any monitoring wells, treatment facilities, or other response activities on the Property undertaken by the Grantor pursuant to the Legal Requirements and shall notify the Grantor, EPA, and PADEP by certified mail, at least fifteen (15) days prior to any such conveyance of an interest in said Property, which notice shall include a description of said provisions allowing for the continued operation of any monitoring wells, treatment facilities, or other response activities undertaken pursuant to the Legal Requirements.

E. The Grantee and all subsequent transferees of an interest in any portion of the Property, who have not received notice of a prior determination by the United States that remediation of DSCP is complete, will provide copies of the instrument evidencing a conveyance of any portion of the Property to the Grantor by certified mail, within fourteen (14) days after the effective date of such transaction.

F. The provisions of this Section 4 shall be deemed to run with the land and shall be binding on all subsequent transferees. The Grantee and all subsequent transferees shall include the provisions of this Section 4 in all subsequent lease, transfer, or conveyance documents relating to the Property, or any portion thereof, that are entered into prior to a determination by the United States that remediation of DSCP is complete.

5. Environmental Restrictions and Covenants.

A. The person or entity to whom the Property is transferred shall neither transfer the Property, lease the Property, nor grant any interest, privilege, or license whatsoever in connection with the Property without the inclusion of the environmental protection

provisions contained herein, and shall require the inclusion of such environmental protection provisions in all further deeds, transfers, leases, or grant of any interest, privilege, or license.

B. Commercial/Industrial Use:

(1) Purposes: The United States has undertaken careful environmental study of the Property and concluded that the best and highest use of the Property is currently limited to commercial and industrial uses, excluding child care. In order to protect human health and the environment and further the common environmental and use plans of the United States, the Commonwealth, and the Grantee, the covenants and restrictions set forth herein shall be included to assure the use of the Property is consistent with the environmental condition of the Property. These restrictions and covenants benefit the public generally and are consistent with state and federal environmental statutes.

(2) Restrictions and Covenants: The Grantee covenants for itself, its successors, and assigns to use in perpetuity the Property solely for commercial and industrial uses, excluding child care, and subject to Subsection (4), never to undertake or allow the construction on or usage of the Property for residential or any other purpose than the maintenance and use of commercial and industrial activities, excluding child care. The Grantee, its successors or assigns will never undertake nor allow any activity on or use of the Property that may adversely affect or detract from the restrictions contained herein. These restrictions bind and run with the Property and are forever hereinafter enforceable.

(3) Enforcement: The restrictions and covenants benefit, the United States, the common redevelopment of the DSCP property, and the buildings and area surrounding the Property and are enforceable by the United States Government and other appropriate governmental authorities as provided for by law. The Grantee covenants for itself, its successor, and assigns that it shall include and otherwise make legally binding these restrictions in all subsequent leases, and transfer or conveyance documents relating to the Property.

(4) Upon consent of PADEP or any successor thereto, other governmental agencies as appropriate, and the Grantor, additional uses may be made of the Property upon the Grantor's execution of and recording in the County and City of Philadelphia land records a restrictive covenant revising and amending this Section 5. Upon approval as provided for in this Subsection (4), the Grantor agrees to execute such revised restrictive covenant in recordable form within a reasonable time, provided that the Grantor shall not be required to expend any funds as a result thereof.

C. Groundwater And Soil Restriction.

The ground or soil below the transferred Property (including Building 13) is underlain by a subsurface plume of non-aqueous phase hydrocarbon products (the

"NAPL Plume") which is located at a depth of approximately 18 to 20 feet below grade. The Grantor acknowledges and agrees that the Grantee is not responsible for the existing subsurface NAPL Plume, and the Grantee is not responsible for any investigation, removal, or remediation, unless and only to the extent that their activities cause additional contamination. Due to the existence of the subsurface NAPL Plume, the following encumbrances apply:

(1) Restrictions and Conditions:

The Grantee covenants for itself, its successors and assigns not to:

(a) Access or use ground water underlying the Property for any purpose, other than water sampling and monitoring, until such time as PADEP agrees and certifies in writing ("Certification") that the ground water underlying the Property is suitable for the requested use and such Certification is placed of record in the County and City of Philadelphia land records. For the purpose of this restriction, "ground water" shall have the same meaning as in section 101(12) of CERCLA.

(b) Conduct any subsurface excavation, digging, drilling or other disturbance of the surface or subsurface underlying the Property below the Permitted Depth, without the prior written consent of the Army Material Command, with an address of Commander, U.S. Army Material Command, Attn: AMCEN, 5001 Eisenhower Avenue, Alexandria, Virginia 22333-0001, except as necessary to respond to an emergency situation where obtaining the Army's prior written consent is not feasible in which case the Grantor shall be notified as soon as practicable.

(c) Undertake nor allow any activity on or use of the Property that would violate the restrictions contained herein.

(2) Enforcement: The restrictions and covenants benefit the United States, the common redevelopment of the DSCP property, and the buildings and area surrounding the Property and are enforceable by the United States government and other appropriate governmental authorities, as provided for by law. The Grantee covenants for itself, its successors, and assigns that it shall include and otherwise make legally binding these restrictions in all subsequent leases, and transfer or conveyance documents relating to the Property.

D. Restriction Pertaining To Possible Elevated Volatile Organic Compound ("VOC") Levels:

Due to the present subsurface NAPL Plume below the Property, the basement of Building 13 on the Property may be subject to elevated levels of VOCs. The Grantee agrees not to use the crawl space or basement of Building 13 on the Property unless adequate ventilation is provided to reduce any harmful levels of VOCs at or below occupational health and safety or other applicable laws or regulations. PADEP has determined that the operation of the existing

ventilation system is necessary to reduce potential threats to human health. The Grantee agrees to maintain and continually operate, except during necessary repair and maintenance, the existing ventilation system until such time as PADEP gives their approval in writing, that operation of the ventilation system is no longer necessary. The Grantor acknowledges and agrees that Grantee's operation of the existing ventilation system shall not be deemed a component of the remedial or removal actions. The Grantee also agrees to maintain seals around pipes, seams and other openings in the subsurface wall of the Property.

E. Hazardous Waste Safety Plan:

While the fee interest to the ground underlying the Property is owned by the Grantor, prior to the storage of any hazardous waste, material, or substance, or petroleum products on the Property, if authorized under this document, the Grantee shall prepare and maintain a plan, certified by a Professional Engineer, for responding to hazardous waste, petroleum or petroleum products, and other chemical spills. The plan shall be submitted, to the Grantor for its review and approval. Such plan shall be independent of the DSCP and shall not rely on Grantor personnel or equipment. Should the Grantor provide any personnel or equipment, because the Grantee, was not, in the opinion of the Base Realignment and Closure Environmental Coordinator, conducting timely response actions, the Grantee agrees to reimburse the Grantor for its actual costs. A copy of the Grantee's plan shall be provided to the Grantor for approval, which shall not be unreasonably withheld or delayed. The Grantee shall also, provide the Grantor with copies of all RCRA manifests for hazardous wastes generated by the Property. Upon conveyance of the fee interest to the ground underlying the Property this requirement shall become void.

6. No Warranties.

Except as otherwise expressly provided for in this Deed or under federal law or any provision of the Lease and MOA, the Property is being conveyed "As Is" and "Where Is" without any representations, warranties, or guaranties as to quantity, quality, title, character, condition, size or kind, or that the Property is in a condition or fit to be used for the purpose for which it is intended, and the conveyance will be without any obligation on the part of the Grantor to make any alterations, repairs, or additions to the Property.

7. Notice Of The Presence Of Asbestos And Covenant.

A. The Grantee is hereby informed and does acknowledge that friable and non-friable asbestos or asbestos-containing materials ("ACM") have been found on the Property as described in the final base-wide EBS. ACM found on the Property has been marked with appropriate signs. As of the date of the Lease the Grantor determined that ACM on the Property did not pose a threat to human health or the environment for the intended use of the Property. All friable asbestos that posed a risk to human health has either been removed or encapsulated by the Grantor prior to the date of the Lease.

B. The Grantee covenants and agrees that its use and occupancy of the Property will be in compliance with all applicable laws relating to asbestos, and that as of the date of the Lease, the Grantor assumes no liability for future remediation of asbestos or damages for personal injury, illness, disability, or death, to the Grantee, or to any other person, including members of the general public, arising from or incident to the purchase, transportation, removal, handling, use, disposition, or other activity under this Deed causing or leading to contact of any kind whatsoever with asbestos on the Property, whether the Grantee has properly warned or failed to properly warn the individual(s) injured. The Grantee agrees to be responsible for any future remediation of asbestos found to be necessary on the Property. The Grantor agrees that the Grantee has no responsibility for damages for personal injury, illness, disability, or death to any person arising prior to the date of the Lease.

C. The Grantee assumes no liability for damages for personal injury, illness, disability, death or property damage arising from (i) any exposure or failure to comply with any legal requirements applicable to asbestos on any portion of the Property arising prior to the Grantor's conveyance or lease of such portion of the Property to the Grantee, or (ii) any asbestos or asbestos containing materials which were located on the Property at any time prior to the date of the Grantor's lease or transfer of the applicable portion of the Property to the Grantee but are no longer located thereon at the time of such lease or transfer, or (iii) any disposal, prior to the Grantor's transfer or lease of the applicable portion of the Property to the Grantee, of any asbestos or asbestos containing materials.

8. Lead-Based Paint Warning And Covenant.

A. The Property does not contain residential dwellings and is not being used for residential purposes. The Grantee is notified that the Property contains a building built prior to 1978 that contains lead-based paint. Such Property may present exposure, to lead from lead-based paint that may place young children at risk of developing lead poisoning. Lead poisoning in young children may produce permanent neurological damage, including learning disabilities, reduced intelligence quotient, behavioral problems and impaired memory.

B. The Grantor's conclusions and determinations concerning known lead-based paint and/or lead-based paint hazards, the location of lead-based paint and/or lead-based paint hazards, and the condition of painted surfaces on the Property is contained in the Environmental Baseline Survey, a copy of which has been provided to the Grantee. Additionally, the Grantee has been provided with a copy of the federally approved pamphlet on lead poisoning prevention. The Grantee hereby acknowledges receipt of all of the information described in this subparagraph.

C. The Grantee shall not permit use of any buildings or structures on the Property for residential habitation without first obtaining the written consent of the Grantor. As a condition of its consent, the Grantor may require the Grantee to: (i) inspect for the presence of lead-based paint and/or lead-based paint hazards; (ii)

abate and eliminate lead-based paint hazards by treating any defective lead-based paint surface in accordance with all applicable laws and regulations; and (iii) comply with the notice and disclosure requirements under applicable Federal and state law. The Grantee agrees to be responsible for any future remediation of lead-based paint found to be necessary on the Property.

D. The Grantee assumes no liability for damages for personal injury, illness, disability, death or property damage arising from (i) any exposure or failure to comply with any legal requirements applicable to lead-based paint on any portion of the Property arising prior to the Grantor's conveyance or lease of such portion of the Property to the Grantee, or (ii) any lead-based paint or lead-based paint containing materials which were located on the Property at any time prior to the date of the Grantor's lease or transfer of the applicable portion of the Property to the Grantee but are no longer located thereon at the time of such lease or transfer, or (iii) any disposal, prior to the Grantor's transfer or lease of the applicable portion of the Property to the Grantee, of any lead-based paint or lead-based paint containing materials.

9. Notice Of The Presence Soil Gas Vapors

A. Based on information obtained from a soil gas survey, the Grantor has documented the presence and determined the general location, extent, nature and source of soil gas vapors [primarily methane gas but also including VOC's] ("Soil Gas Vapors") which may accumulate in the sub-surface soils on the Property, including within the Permitted Depth. The Grantor has determined that the source of the Soil Gas Vapors is the biodegradation of the NAPL Plume underlying the Property. While the Grantor has determined that the Property is suitable for its intended purpose for non-residential uses, the Soil Gas Vapors could present a hazardous condition during ground construction activities or within confined subterranean building areas or underground utilities, unless properly managed. The Grantee is advised that certain federal, state and local laws or regulations (including, but not limited to occupational safety and health regulations regarding monitoring, control and preventive measures) may be applicable during construction and maintenance activity, and, with respect to construction activity, there may be a need to implement certain design features for buildings on the Property. Accordingly, the Grantee as its sole obligation with respect to such Soil Gas Vapors, shall ensure that appropriate measures, as required by applicable laws or regulations or common practice, are taken during any construction or maintenance activity on the Property to detect and mitigate, using common and precautionary engineering, construction, or, with respect to construction activity, design measures, any unacceptable levels of Soil Gas Vapors. If any unacceptable levels of Soil Gas Vapors are detected that cannot be controlled using common and precautionary engineering, construction or, with respect to construction activity, design measures, the Grantee shall ensure the cessation of such activities and ensure that the Grantor is promptly notified of these conditions. Upon notification, the Grantor shall promptly notify PADEP, and, in consultation with PADEP and Grantee (or the then current owner(s) of the Property) and any then current tenants or subtenant(s) of the Property who are or could be affected by such unacceptable levels of Soil Gas Vapors,

the Grantor shall, in its sole discretion, and at its sole cost and expense, promptly either (i) take any necessary remedial action to reduce the level of Soil Gas Vapors to a level that can be controlled with common and precautionary engineering, construction or, with respect to construction activity, design measures, or (ii) provide for precautionary mitigation measures to protect human health and safety. Any such remedial action or precautionary mitigation measures taken by the Grantor shall be coordinated with any affected Grantee (or the then current owner(s) of the Property) and any then current affected tenants or subtenants of the Property and approved in writing by PADEP, and shall not cause a significant increase in the cost of redeveloping the Property or cause a material adverse affect on the physical re-use of the Property.

B. Neither the Grantee nor any successor, successor-in-title, assignee, grantee or transferee of Grantee, or any other person or entity that acquires or possesses ownership or control of all or any part of the Property, shall transfer or convey the Property, lease or sublease the Property, or grant any interest, right, privilege or license whatsoever to or in connection with the Property without including the provisions contained in this Paragraph 9 verbatim or by express reference. The provisions of this Paragraph 9 shall be deemed to run with the land and shall be legally binding on the Grantee, its successors and assigns, and all subsequent grantees or transferees and all persons or entities that at any time hereafter acquire ownership or control, of all or any portion of the Property.

10. Preservation Covenant For The Property.

A. In consideration of the conveyance of the Property the Grantee hereby covenants on behalf of itself, its heirs, successors, and assigns at all times to the Pennsylvania State Historic Preservation Officer ("SHPO") to preserve and maintain the Property in accordance with the recommended approaches in the Secretary of the Interior's Standards for Rehabilitation and Illustrated Guidelines for Rehabilitating Historic Buildings (U. S. Department of the Interior, National Park Service 1992) (Standards) or design guidelines approved by the SHPO in order to preserve and maintain those qualities that make the Property eligible for inclusion in the National Register of Historic Places. If the Grantee desires to deviate from the Standards or SHPO approved design guidelines, the Grantee will notify and consult with the SHPO in accordance with paragraphs B, C, and D of this covenant.

B. The Grantee will notify the SHPO in writing prior to undertaking any construction, alteration, remodeling, demolition, or other modifications to the Property that would affect the integrity or appearance of the DSCP Historic District, Philadelphia, Pennsylvania ("District"), with the exception of those activities listed in paragraph C of this covenant. Such notice shall describe in reasonable detail the proposed undertaking and its effect on the integrity of the District.

C. The following activities have limited potential to affect the Property within the District and may be implemented without further review by the SHPO or the Advisory

Council on Historic Preservation ("Council") when they are limited solely to the following:

(1) Interior:

(a) Plumbing rehabilitation and replacement, including pipes and fixtures;

(b) Heating system rehabilitation and replacement, including furnaces, pipes, radiators or other heating units;

(c) Electrical wiring, including wiring and receptacles;

(d) Restroom improvements for handicapped access, provided that the work is contained within an existing restroom;

(e) Interior treatments (floors, walls, ceilings, woodwork), provided the work is limited to painting, refinishing, repapering or laying carpet or other suitable flooring material. Construction of temporary walls (timber or steel framed with drywall finish) is permitted. No removal of existing interior doors, permanent interior walls, floors, or support columns, original to the period of significance, will be permitted;

(f) Insulation, provided it is restricted to ceilings and attic spaces; and

(g) Building code compliance.

(2) Exterior:

(a) Caulking, weatherstripping, reglazing;

(b) Sidewalk and curbing replacement;

(c) Gutters and downspout replacement;

(d) Roof repair or replacement which uses in-kind materials and does not alter the pitch of the original roof;

(e) Storm windows, provided they conform to the original shape and size of the historic windows and that the meeting rail coincides with that of the existing sash. Color should match existing windows and trim;

(f) Clean and seal treatments which do not include sand blasting or the use of chemicals which have not been approved for use by the Pennsylvania State Historic Preservation Officer; and

(g) In-kind replacement is understood to mean that the new features or replacement items will duplicate the material, dimensions and detailing of the original. No removal of existing exterior doors, enlarging or filling in of door and window openings, or removal of permanent exterior walls, original to the period of significance, will be permitted. In-kind replacements apply to but are not limited to:

(1) Porches and loading platforms such as stairs, railings, posts and columns, brackets, cornices, and flooring;
(2) Roofs;
(3) Siding;
(4) Exterior architectural details and feature, including but not limited to brickwork, lintels, and trim;
(5) Windows, includes both trim and the sash; and
(6) Doors.

D. Within thirty (30) calendar days following receipt of notification provided by the Grantee pursuant to paragraph B of this covenant, the SHPO will respond to the Grantee in writing as follows:

(1) Notify the Grantee that the proposed project meets the Standards or approved design guidelines and may proceed; or

(2) Notify the Grantee that the proposed project does not meet the Standards or approved design guidelines or would otherwise adversely affect the District and will require further consultation with the SHPO to explore alternatives before the Grantee can proceed with the proposed undertaking.

If the SHPO fails to respond to the Grantee's written notice as described in paragraph B, within thirty (30) calendar days of the SHPO's receipt of the same, then the Grantee may proceed with the Proposed undertaking without further consultation with the SHPO.

E. If the response provided to the Grantee by the SHPO pursuant to paragraph D of this covenant requires consultation with the SHPO, both parties will consult in good faith to explore alternatives that will minimize, mitigate or avoid adverse effects to the District by adhering to a mutually agreeable treatment/mitigation plan that the Grantee will implement. If the parties are unable to arrive at such mutually agreeable treatment/mitigation plans, the Grantee shall request the recommendations of the Council. Within thirty (30) calendar days following receipt of pertinent documentation, the Council will provide the Grantee with recommendations to mitigate, minimize or avoid adverse effects to the District. The Grantee shall advise the SHPO and Council how it intends to respond to the Council's recommendations prior to initiating project activities.

Pursuant to this covenant, any treatment/ mitigation plans to which the Grantee and the SHPO or Council, as appropriate, agree shall be carried out solely at the expense of the Grantee.

F. The SHPO shall be permitted at all reasonable times to inspect the Property to ascertain its condition and to fulfill its responsibilities hereunder.

G. In the event of a violation of this covenant, and in addition to any remedy now or hereafter provided by law, the SHPO may, following reasonable notice to the Grantee, institute suit to enjoin said violation or to require the rehabilitation or maintenance of contributing buildings within the District. The successful party shall be entitled to recover all costs or expenses incurred in connection with such a suit, including all court costs and attorneys fees.

H. In the event the Property is substantially destroyed by fire or other casualty, or if not totally destroyed, the damage thereto is so serious that preservation and rehabilitation would be economically prohibitive in the reasonable judgment of the

Grantee, as concurred in by the SHPO, this covenant shall be terminated for the Property on the date the Grantee obtains the SHPO's concurrence. Upon such termination, the Grantee shall deliver a duly executed and acknowledged notice of such termination to the SHPO, and record a duplicate original of said notice in the Office of the Recorder of Deeds of Philadelphia County. Such notice shall be conclusive evidence in favor of every person dealing with the Property as to the facts set forth therein.

I. The Grantee agrees that the SHPO may at its discretion, without prior notice to the Grantee, convey and assign all or part of its rights and responsibilities contained herein to a third party.

J. This covenant is binding on the Grantee, its heirs, successors, and assigns in perpetuity, unless explicitly waived by the SHPO. Restrictions, stipulations, and covenants contained herein shall be inserted by the Grantee verbatim or by express reference in any deed or other legal instrument by which it divests itself of either the fee simple title or any other lesser estate in the Property, or any part thereof.

K. The failure of the SHPO to exercise any right or remedy granted under this Deed shall not have the effect of waiving or limiting the exercise of any other right or remedy or the use of such right or remedy at any other time.

L. This covenant shall be a binding servitude upon the Property, and shall be deemed to run with the land. Execution of this covenant shall constitute conclusive evidence that the Grantee agrees to be bound by the foregoing conditions and restrictions and to perform the obligations herein set forth.

11. Notice of Non-Discrimination.

With respect to activities related to the Property, the Grantee shall not discriminate against any person or persons or exclude them from participation in the Grantee's operations, programs or activities conducted on the Property, because of race, color, religion, sex, age, handicap, or national origin.

12. Statutory Indemnification of Grantee.

The Grantor recognizes and agrees to fulfill its obligation to hold harmless, defend, and indemnify the Grantee and any successor, assignee, transferee, lender, or lessee of the Grantee or its successors and assigns, as required by Section 330 of the Department of Defense Authorization Act of 1993, as amended, a copy of which is attached as Exhibit C and to otherwise meet its obligations under law.

13. ANTI-DEFICIENCY ACT

The GRANTOR'S obligation to pay or reimburse any money under this Deed is subject to the availability of appropriated funds to the Department of the Army, and

nothing in this Deed shall be interpreted to require obligations or payments by the United States in violation of the Anti-Deficiency Act provided that the Grantor shall otherwise comply with all applicable statutory requirements and its obligations under the terms of this Deed.

14. CONTINUING OBLIGATION

To the extent required by the terms of this Quitclaim Deed, Grantee agrees to include the terms, covenants, promises, obligations, undertakings, limitations and restrictions contained in this Quitclaim Deed in all subsequent documents or instruments by which Grantee conveys or transfers ownership or control of all property or any portion of the Property. The Grantor acknowledges that PAID, as Grantee hereunder, intends to be, and such subsequent documents and instruments shall provide that PAID, as the Grantee, shall be, released, relieved and discharged of all liability, responsibility and obligation of any kind with respect to the covenants, obligations, promises, undertakings, limitations and restrictions in this Quitclaim Deed not accruing during PAID's ownership of the Property (or portion thereof) so conveyed or transferred. However, PAID's obligation to comply with and observe such terms, covenants, promises, obligations, undertakings, limitations and restrictions during PAID's period of ownership of the Property shall not be conditioned upon PAID's obtaining such a release in subsequent documents and instruments conveying or transferring ownership or control of all or any portion of the Property.

End Of Text

IN WITNESS WHEREOF, the Grantor has caused this Deed to be executed in its name by the Acting Deputy Assistant Secretary of the Army (I&H), and the seal of the Department of the Army to be hereunto affixed as of the 3rd day of October 2001.

UNITED STATES OF AMERICA

By: Joseph W. Whitaker

Joseph W. Whitaker
Acting Deputy Assistant Secretary of the Army
(Installations and Housing)
OASA(I&E)

Signed and sealed and delivered
in the presence of:

Witness Theresa Persick Arnold

Witness Jane L Masters

COMMONWEALTH OF VIRGINIA)
COUNTY OF ARLINGTON) ss:

I, the undersigned, a Notary Public in and for the Commonwealth of Virginia; County of Arlington, whose commission as such expires on the 30th day of November 20 02 do hereby certify that this day personally appeared before me in the Commonwealth of Virginia, County of Arlington, Joseph W. Whitaker, Acting Deputy Assistant Secretary of the Army (I&H), whose name is signed to the foregoing instrument and who acknowledged the foregoing instrument to be his free act and deed, dated this 3rd day of October 2001, and acknowledged the same for and on behalf of the UNITED STATES OF AMERICA.

Karen A. Cooper
Notary Public

ACCEPTANCE: The Philadelphia Authority For Industrial Development, does hereby accept and approve this Quitclaim Deed and agrees to all of the terms and conditions thereof as of the 9th day of October 2001.

THE PHILADELPHIA AUTHORITY
FOR INDUSTRIAL DEVELOPMENT

BY: _____
James McManus, Chairman

COMMONWEALTH OF PENNSYLVANIA))
) SS:
COUNTY OF PHILADELPHIA)

I, the undersigned, a Notary Public in and for the Commonwealth of Pennsylvania, County of Philadelphia, whose commission as such expires on the 2nd day of April, 2005, do hereby certify that this day personally appeared before me in the Commonwealth of Pennsylvania, County of Philadelphia, JAMES McMANUS, whose name is signed to the foregoing instrument and acknowledged the foregoing instrument to be his free act and deed, dated this 9th day of October 2001, and acknowledged the same for and on behalf of the Philadelphia Authority For Industrial Development

_____
Notary Public

NOTARIAL SEAL
LORIE A. MELASECCA, Notary Public
City of Philadelphia, Phila. County
My Commission Expires April 2, 2005

DESCRIPTION OF BUILDING #13

DESCRIPTION OF AERIAL RIGHTS

All that certain lot or piece of ground with buildings and improvements thereon erected, situate in the 26th Ward of The City of Philadelphia and described according to a Survey and Plan of Property made by James P. Vesey, Surveyor and Regulator of the Second Survey District on May 16, 1997, as follows:

Beginning at a point on the Northwesterly side of 20th Street. (70' wide), lying above horizontal plane 17 feet above City Of Philadelphia Datum, at the distance of 769.09' Southwestwardly from the Southwesterly side of Oregon Avenue (120' wide); **Thence** extending, partly along the Southeasterly terminus of a proposed 25' wide easement for stormwater and sanitary purposes which extends Northwestwardly, and partly along the Southeasterly terminus of a proposed easement for ingress and egress which extends Northwestwardly, and along the Northwesterly side of said 20th Street S. 15° 00' 00" W., the distance of 820.91' to a point on the Northeasterly Right-of-Way Line of The Delaware River Port Authority; Thence extending along the said Northeasterly Right-0f-Way Line of the Delaware River Port Authority, N. 75° 00' 00" W., the distance of 195.01' to a point; Thence extending, partly along the Northwesterly terminus of said proposed easement for ingress and egress, partly crossing a proposed 25' wide easement for stormwater and sanitary purposes which extends Southeastwardly and Northwestwardly, and partly through a wall, N. 15° 00' 00" E., the distance of 327.57' to a point within a wall; Thence extending, through a wall, N. 75° 00' 00" W., the distance of 150.32' to a point; Thence extending N. 15° 00' 00" E., the distance of 20.77' to a point; Thence extending S. 75°00'00" E., the distance of 25.99' to a point; Thence extending, partly along the Northwesterly terminus of the said proposed 25' wide easement for stormwater and sanitary purposes, N. 15° 00' 00" E., the distance of 478.00' to a point; Thence extending S. 75° 00' 00" E., the distance of 287.60' to a point; Thence extending S. 15° 00' 00" W., the distance of 5.43' to a point; Thence extending S. 75° 00' 00" E., the distance of 31.74' to a point on the Northwesterly side of said 20th Street, being the first mentioned point and place of beginning.

Containing in Area 223,520.3 Sq. Ft. or 5.13132 Acres

James P. Vesey
Surveyor & Regulator
Second Survey District

EXHIBIT A

PERSONAL PROPERTY LIST

[INTENTIONALLY OMITTED]

Exhibit B

SEC. 330. INDEMNIFICATION OF TRANSFEREES OF CLOSING DEFENSE PROPERTY. 10 U.S.C. 2687 note.

(a) In GENERAL. - (1) Except as provided in paragraph (3) and subject to subsection (b), the Secretary of Defense shall hold harmless, defend, and indemnify in full the persons and entities described in paragraph (2) from and against any suit, claim, demand or action, liability, judgment, cost or other fee arising out of any claim for personal injury or property damage (including death, illness, or loss of or damage to property or economic loss) that results from, or is in any manner predicated upon, the release or threatened release of any hazardous substance or pollutant or contaminant as a result of Department of Defense activities at any military installation (or portion thereof) that is closed pursuant to a base closure law.

(2) The persons and entities described in this paragraph are the following:

(A) Any State (including any officer, agent; or. Employee of the State) that acquires ownership or control of any facility at a military installation (or any portion thereof) described in paragraph (1).

(B) Any political subdivision of a State (including any officer, agent, or employee of the State) that acquires such ownership or control.

(C) Any other person or entity that acquires such ownership or control.

(D) Any successor, assignee, transferee, lender, or lessee of a person or entity described in subparagraphs (A) through (C)

(3) To the extent the persons and entities described in paragraph (2) contributed to any such release or threatened release, paragraph (1) shall not apply.

(b) CONDITIONS.-No indemnification may be afforded under this section unless the person or entity making a claim for indemnification-

(1) notifies the Department of Defense in writing within two years after such claim accrues or begins action within six months after the date of mailing, by certified or registered mail, of notice of final denial of the claim by the Department of Defense;

(2) furnishes to the Department of Defense copies of pertinent papers the entity receives;

(3) furnishes evidence or proof of any claim, loss, or damage covered by this section; and

(4) provides, upon request by the Department of Defense, access to the records and personnel of the entity for purposes of defending or settling the claim or action.

EXHIBIT C

(c) AUTHORITY OF SECRETARY OF DEFENSE.-(1) In any case in which the Secretary of Defense determines that the Department of Defense may be required to make indemnification payments to a person under this section for any suit, claim, demand or action, liability, judgment, cost or other fee arising out of any claim for personal injury or property damage referred to in subsection (a)(1), the Secretary may settle or defend, on behalf of that person, the claim for personal injury or property damage.

(2) In any case described in paragraph (1), if the person to whom the Department of Defense may be required to make indemnification payments does not allow the Secretary to settle or defend the claim, the person may not be afforded indemnification with respect to that claim under this section.

(d) ACCRUAL OF ACTION.-For purposes of subsection (b)(1) the date on which a claim accrues is the date on which the plaintiff knew (or reasonably should have known) that the personal injury or property damage referred to in subsection (a) was caused or contributed to by the release or threatened release of a hazardous substance or pollutant or contaminant as a result of Department of Defense activities at any military installation (or portion thereof) described in subsection (a)(1).

(e) RELATIONSHIP TO OTHER LAW.-Nothing in this section shall be construed as affecting or modifying in any way section 120(h) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S.C. 9620(h)).

(f) DEFINITIONS.-In this section:

(1) The terms "facility", "hazardous substance", "release" and "pollutant or contaminant" have the meanings given such terms under paragraphs (9), (14), (22), and (33) of section 101 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, respectively (42 U.S.C. 9601 (9), (14), (22), and (33)).

(2) The term "military installation" has the meaning given such term under section 2687(e)(1) of title 10, United States Code.

(3) The term "base closure law" means the following:

(A) The Defense Base Closure and Realignment Act of 1990 (10 U.S.C. 2687 note).

(B) Title II of the Defense Authorization Amendments and Base Closure and Realignment Act (10 U.S.C. 2687

(C) Section 2687 of title 10, United States Code.

(D) Any provision of law authorizing the closure or realignment of a military installation enacted on or after the date of the enactment of this Act.

EXHIBIT C

Certificate of Address:

I certify that the precise street address of the grantee in the foregoing is as follows:

Philadelphia Authority for Industrial Development
2600 Centre Square West
1500 Market Street
Philadelphia, Pennsylvania 19102

Signed on behalf of the Grantee:

Print Name: JAMES McMANUS

Appendix B

RESPIROMETRY TEST RESULTS- SECOND QUARTER OF 2012

- The respirometry test conducted at PH-1 during the bioventing testing at both RW-A and PH-1 show O_2 depletion curves suggestive of microbial uptake (e.g., starting at 20% per hour O_2 at PH-1 and 11% per hour O_2 at RW-A during the same period). In contrast, the other tested pairs showed a 9 to 10% per hour O_2 utilization rate illustrating treatment is observed beyond the location immediately adjacent to the air introduction (PH-1) well.

- While the data for MW-32 seemed to indicate an air leak, the data collected on April 30th at 13:30 to 15:30 was useful for the evaluation of O_2 utilization in this area. O_2 utilization during this time period was favorable for a bioventing approach. A return to CO_2 production was then observed after turning off the applied vacuum. The results of this test at this well pair demonstrate that anytime this well is operating in extraction mode, additional mass removal will be generated. Leaks observed at this well pair provide benefits of bioventing, which act as passive venting outlets to provide air to the subsurface.

- The PH-2 respiration test also provided a strong O_2 utilization rate without showing linkage back to the extraction well, RW-B. Similar to the results of the respirometry test conducted at PH-1, the biodegradation at this well is achievable with a bioventing remedial strategy.

- RW-7 data is the only testing area of the four where the LNAPL signature was dominated by heavier end petroleum compounds (according to LNAPL fingerprinting data available in the Site geoenvironmental database inherited from Stratus Consulting in January 2012). The heavier signature means that the petroleum hydrocarbons in this area of the Site will contain less volatile fractions (that are preferentially degraded first), with the residual being biodegradable, but likely requiring more effort (or time). The difference in the constituents in this well is likely the reason for the muted response in this well (i.e. a longer test here with more sustained delivery of air may overcome a microbial lagged response).

- The leaking well seals observed during testing do hinder mass recovery by the VES system but actually assist with adding O_2 to the subsurface locally. As stated above, more mass removal via bioremediation is possible as opposed to pure mass recovery by vapor extraction, and has probably been ongoing at the site where leaking well seals are present given the age of the wells and site infrastructure. As a result, it is most likely not worth trying to replace or fix leaky wells/seals (especially on the perimeter) unless we are in an area with significant LNAPL that warrants more aggressive vacuum recovery.

- A background respirometry test conducted at MW-20 was completed, to be used to correct the O_2 utilization rates generated in the tests at the various test wells in impacted areas. As expected, the background test generated a much more muted response.

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

RW-A		Landfill Gas Meter with Carbon Filter Influent Methane Zone D RW-A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone D RW-A (%)	Influent LEL Zone D RW-A (%)	Influent CO_2 Zone D RW-A (%)	Influent O_2 Zone D RW-A (%)	Influent H_2S Zone D RW-A (%)	VOCs by PID Zone D RW-A (ppm)	Weather/Notes
4/9/2012	12:35	2.7	>	>	5	9.4	6	419	Vacuum applied to RW-A @ 30iw, no air inlet (induced vacuum check)
	13:00	4.8	>	>	5.5	8.2	7	446	Sunny, Windy 60°
	13:30	5.2	>	>	5.5	7.8	7	453	
	14:00	5.1	>	>	5.6	7.7	3	465	
	14:30	5.3	>	>	5.5	7.8	1	465	
	15:00	5.6	>	>	5.4	8	0	439	
4/10/2012	10:45	3.5	>	>	4.7	10.1	3	433	Vacuum applied to RW-A @ 60iw, no air inlet (induced vacuum check)
	11:15	4	>	>	5	9.3	1	483	Sunny, Windy 60°
	11:45	2.9	>	>	3.5	12.7	1	456	
	12:15	4.5	>	>	4.9	9.5	3	483	
	12:45	5.3	>	>	5.5	7.9	2	463	
4/11/2012	10:00	7	>	>	6.4	6.9	3	499	Vacuum applied to RW-A @ 60iw, atmospheric air inlet at PH-1
	10:30	6.1	>	>	6.2	7.1	3	539	
	11:00	6.7	>	>	6.2	6.9	2	425	
	12:00	2	54.7	>	2.2	15.6	0	490	Begin air injection into PH-1 @ 15 iw @ 11:30
	12:30	6.5	>	>	6.1	7	3	492	
	13:00	6.8	>	>	6.1	7	2	498	
	13:30	5.5	>	>	5.9	7.6	2	552	RW-A Vacuum off - PH-1 air injection off (testing for leaks in recovery well - none found)
	14:00	7.1	>	>	6	7.2	3	601	
	14:30	5.5	>	>	5.7	7.9	1	462	
	15:00	6.9	>	>	5.9	7.5	2	517	
	15:30	7.1	>	>	6	7.1	3	547	

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

4/12/2012	9:30	3.3	>	>	3.7	12.5	1	430	Resume vacuum @ 60iw, air injection at PH-1 @ 45 iw @905
	10:00	6.2	>	>	5.7	7.9	2	416	Sunny, Windy 50°
	10:30	6.3	>	>	5.3	8.5	3	392	
	11:00	2.4	73	>	2.4	14.9	0	447	
	11:30	6	>	>	5.1	8.1	3	426	
	12:00	6.4	>	>	5.8	7.2	3	389	
	12:30	6.9	>	>	4.9	9.7	2	412	RW-A Vacuum off - PH-1 air injection off
	4/12/12 13:00	3.9	>	>	3.8	11.4	0	346	Start Respirometry Test at extraction well RW-A (see air inlet well PH-1 on next tab)
	4/12/12 13:30	4.3	>	>	3.2	13	0	367	
	4/12/12 14:00	4.4	>	>	3.7	11.6	1	330	
	4/12/12 14:30	4.4	>	>	4.7	10.1	2	359	
	4/12/12 15:00	5.7	>	>	5.5	7.9	3	355	
	4/12/12 15:30	6.6	>	>	6	7.5	5	374	
	4/12/12 16:00	6.3	>	>	6.4	7	4	363	
	4/12/12 16:30	7.6	>	>	7.7	4.3	5	404	
4/13/2012	9:30	0	70.1	>	5.6	10.8	2	1366	Start RW-A vacuum @30iw with PH-21 air inlet at atmospheric pressure
	10:30	4.1	>	>	5.8	7.9	4	722	Sunny, Windy 50's
	11:00	5	>	>	6.2	7.1	5	581	
	11:30	5.3	>	>	5.5	8.6	6	573	
	12:00	5	>	>	6.1	7.2	6	571	
	12:30	3.9	>	>	5.3	8.9	5	570	
	13:00	5	>	>	5.5	8.2	5	582	RW-A vacuum @60iw with PH-21 air inlet at atmospheric pressure
	13:30	4.6	>	>	5.3	8.6	5	588	
	14:00	5.1	>	>	5.5	8.2	6	575	
	14:30	4.6	>	>	5.2	9	6	580	
	15:00	4.9	>	>	4.6	10.2	6	610	RW-A vacuum @60iw with PH-21 air inlet at atmospheric pressure (continued test over weekend)

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

4/16/2012	9:00	0.8	>	>	5.6	8.3	8	716	RW-A vacuum @60iw with PH-21 air inlet at atmospheric pressure (continued test over weekend)
	9:30	1.6	>	>	5.4	8.6	10	542	Sunny 60's
	10:00	2.1	>	>	5.9	7.3	8	516	
	10:30	0.8	>	>	5.6	7.5	8	504	RW-A vacuum @60iw with air injection @ 30iw into PH-21 starting at 10:10
	11:00	0.8	>	>	4.8	8.9	9	514	
	11:30	0.7	>	>	4.2	9.4	8	530	
	12:00	1.1	>	>	5.4	8.4	16	500	
	12:30	0.8	>	>	4.9	9.3	17	507	
	13:00	1	>	>	5.3	8.2	17	500	12:30 pressure air injection increased to 45 iw @ PH-21
	13:30	1	>	>	5.1	8.9	16	494	
	14:00	1.2	>	>	5.1	8.8	15	507	Turned off vacuum extraction at RW-A and pressure injection at PH-21
	14:30	1.9	>	>	5.3	8.3	19	511	Start PH-21 respirometry test
	15:00	0.8	>	>	3.6	12.9	11	507	
	15:30	1.3	>	>	5.7	8.1	14	494	sunny, 80's

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

PH-1		Landfill Gas Meter with Carbon Filter Influent Methane PH-1 (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane PH-1 (%)	Influent LEL PH-1 (%)	Influent CO_2 PH-1 (%)	Influent O_2 PH-1 (%)	Influent H_2S PH-1 (%)	VOCs by PID PH-1 (ppm)	Notes / Weather
4/9/2012	12:30	0	16.6	>	2.8	15.7	0	73.8	Vacuum applied to RW-A @ 30iw, no air inlet (induced vacuum check)
	13:00	8.6	>	>	7.7	5	9	346	Sunny, Windy 60°
	13:30	9.8	>	>	8	3.6	7	340	
	14:00	12	>	>	7.6	4.2	4	324	
	14:30	11.6	>	>	8.5	1.8	5	337	
	15:00	11.7	>	>	8.3	2.4	4	339	
4/10/2012	10:45	0	0.3	>	0	20.6	0	126	Vacuum applied to RW-A @ 60iw, no air inlet (induced vacuum check)
	11:15	0.2	11.1	>	1	17.5	0	476	Sunny, Windy 60°
	11:45	5.5	61.9	>	4.4	7.1	1	212	
	12:15	9.4	89.4	>	5.8	4.6	0	179	
	12:45	10.9	>	>	7.2	2.4	0	214	
4/11/2012	10:00	-	-	-	-	-	-	-	Vacuum applied to RW-A @ 60iw, atmospheric air inlet at PH-1
	10:30	-	-	-	-	-	-	-	
	11:00	-	-	-	-	-	-	-	
	11:30	-	-	-	-	-	-	-	Begin air injection into PH-1 @ 15 iw
	12:00	-	-	-	-	-	-	-	
	12:30	-	-	-	-	-	-	-	
	13:00	-	-	-	-	-	-	-	

baselines

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

	13:30	-	-	-	-	-	-	-	RW-A Vacuum off - PH-1 air injection off	O2	CO2	CH4
4/12/2012	4/12/12 13:00	0	0	0	0	20.8	0	0	Start Respirometry Test at PH-1 (see RW-A tab for extraction well)	2.4	7.3	10.9
	4/12/12 13:30	0	0	0	0	21.2	0	0	Respirometry test conducted after air injection into PH-1 at 45iw for 3 hrs			
	4/12/12 14:00	0	0	0	0	21.2	0	0				
	4/12/12 14:30	0	0	0	0	21	0	0				
	4/12/12 15:00	0	0.4	9	0.1	20.9	0	50.5				
	4/12/12 15:30	0.1	3.2	63	1.3	14.5	0	271				
	4/12/12 16:00	0.2	4.2	86	1.2	14.1	0	290				
	4/12/12 16:30	0.4	6.8	>	1.6	12.3	0	326				
	4/12/12 17:00	0.6	14.7	>	1.7	10.8	0	387	System left off overnight to continue respirometry test			
4/13/2012	4/13/12 9:00	0.6	31.3	>	4.4	3.9	1	622	End PH-1 respirometry test the next morning - Sunny, Windy 50°	2.4	7.3	10.9

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

PH-21 (RW-A)		Landfill Gas Meter with Carbon Filter Influent Methane Zone D PH-21 (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone D PH-21 (RW-A) (%)	Influent LEL Zone D PH-21 (RW-A) (%)	Influent CO_2 Zone D PH-21 (RW-A) (%)	Influent O_2 Zone D PH-21 (RW-A) (%)	Influent H_2S Zone D PH-21 (RW-A) (%)	VOCs by PIDZone D PH-21 (RW-A) (ppm)	Weather/Notes
4/9/2012	12:30	2.7	5.5	10	0.1	20.5	0	212	Vacuum applied to RW-A @ 30iw, no air inlet (induced vacuum check)
	13:00	4.4	5.1	>	0.4	19.9	0	472	Sunny, Windy 60°
	13:30	0.1	1.7	33	0.1	20.5	0	634	
	14:00	0.1	1.1	22	0.1	20.7	0	468	
	14:30	0.4	5	99	0.3	20.4	0	598	
	15:00	0.2	6	>	0.2	20.5	0	853	
4/10/2012	10:45	0.2	0.7	14	0.2	20.1	0	433	Vacuum applied to RW-A @ 60iw, no air inlet (induced vacuum check)
	11:15	0.2	0.8	16	0.1	20.3	0	458	Sunny, Windy 60°
	11:45	0.2	0.7	14	0.1	20.8	0	415	
	12:15	0	0.6	12	0.1	20.7	0	476	
	12:45	0.3	2	41	0.2	20.4	0	584	
4/11/2012	10:00	0.3	1.2	24	0.2	20.6	0	583	Vacuum applied to RW-A @ 60iw, atmospheric air inlet at PH-1
	10:30	0	0.7	14	0.1	20.9	0	280	
	11:00	0.1	0.6	11	0.1	20.9	0	222	
	12:00	0.1	0.6	12	0.2	20.4	0	187	Begin air injection into PH-1 @ 15 iw
	12:30	0.2	1.2	24	0.1	20.7	0	377	
	13:00	0	0.6	13	0.1	20.6	0	259	
	13:30	0.2	2.3	46	0.2	20.8	0	459	
	14:00	0.2	1.7	33	0.2	20.7	0	445	RW-A Vacuum off - PH-1 air injection off (testing for leaks in recovery well - none found)
	14:30	0.1	0.8	16	0.1	20.8	0	308	

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

	15:00	0.1	1.1	22	0.1	20.9	0	473	
	15:30	0.1	0.8	17	0.1	20	0	322	
4/12/2012	9:30	0	0.1	5	0.1	20.8	0	87.8	Resume vacuum @ 60iw, air injection at PH-1 @ 45 iw @905
	10:00	0.2	1.8	37	0.2	20.5	0	334	Sunny, Windy 50°
	10:30	0.1	0.6	12	0.1	20.3	0	203	
	11:00	0	0	0	0.1	20.8	0	1	
	11:30	0	0	0	0	20.7	0	2.2	
	12:00	0	0	0	0.1	20.7	0	5.9	
	12:30	0	0	0	0.1	20.7	0	20.2	RW-A Vacuum off - PH-1 air injection off
	13:00	0	0	0	0.1	20.5	0	0	PH-21 monitored during respirometry test at extraction well RW-A and air inlet well PH-1
	13:30	0	0	0	0.1	20.9	0	0	
	14:00	0	0	0	0.1	20.9	0	0	
	14:30	0	0	0	0.1	20.9	0	1.5	
	15:00	0	0	0	0.1	20.9	0	9.1	
	15:30	0	0.1	3	0.1	20.9	0	37.1	
	16:00	0	0.1	2	0.1	20.9	0	31.5	
	16:30	0	0.1	1	0.1	20.9	0	17.8	
4/13/2012	9:00	0	0.1	3	0.2	20.4	0	54.6	Sunny, Windy 50's
	10:30	-	-	-	-	-	-	-	PH-21 open to Atmosphere with vacuum extraction @ RW-A @ 30iw
	15:00	-	-	-	-	-	-	-	PH-21 left open to atmosphere over weekend with vacuum extraction at RW-A @ 60iw
4/16/2012	14:30	0	0.3	0	0	21.1	0	11.1	Start Respirometry test at PH-21 after pressure injection from 30 to 45iw for 3.5 hrs
	15:00	0	0.3	0	0	21.3	0	5.8	
	15:30	0	0.3	0	0	21.7	0	17.3	Respirometry test discontinued - PH-21 appears to be compromised / leaking based on baseline concentrations

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

RW-B		Landfill Gas Meter with Carbon Filter Influent Methane Zone D RW-B (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone D RW-B (%)	Influent LEL Zone D RW-B (%)	Influent CO_2 Zone D RW-B (%)	Influent O_2 Zone D RW-B (%)	Influent H_2S Zone D RW-B (%)	VOCs by PID Zone D RW-B (ppm)	Weather/Notes
4/17/2012	9:30	0	0.3	0	0	20.7	1	29.4	Sunny 60's - Baseline
	13:00	4.3	>	>	8.9	4.2	18	458	RW-B vacuum started @10:45 @ 30iw
	13:30	12.2	>	>	7.5	6.3	9	491	PH-2 opened to atmosphere for air inlet
	14:00	5.9	>	>	7.4	5.7	14	502	
	14:30	4.5	>	>	8.3	4.1	13	524	
	15:00	3	>	>	8	4.8	12	524	Vacuum left on overnight due to issue with LEL meter calibration on Tox-200
4/18/2012	9:00	0.1	>	>	7.3	7.1	7	944	cloudy 60°
	9:30	0	>	>	7.5	7	8	1069	
	10:00	0	>	>	6.8	8.3	9	1241	RW-B vacuum increased to 60 iw with atmospheric air inlet at PH-2
	10:30	0	>	>	7.1	7.6	9	1114	
	11:00	0	>	>	7.5	6.9	6	1093	
	11:30	0	>	>	6.5	8.6	7	1165	
	12:00	0	>	>	3.7	13.5	5	975	
	12:30	0	>	>	4.9	11.2	3	1053	decreased RW-B vacuum to 45 iw (mounding of groundwater may have been obscuring screen)
	13:00	0	>	>	6.1	9.3	1	926	
	13:30	0	>	>	6.9	8	3	967	
	14:00	0	>	>	7	7.3	2	935	
	14:30	0	>	>	6.6	8.4	3	1055	
	15:00	0	>	>	6.5	8.6	4	1058	Left operational overnight vacuum extraction at RW-B @ 45iw, atmospheric air inlet at PH-2

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

4/19/2012	9:00	1.3	>	>	8.3	4.7	8	784	cloudy 60°
	9:30	3.1	>	>	8.2	4.7	8	810	Start pressure air injection to PH-2 @ 9:15 - 15 iw
	10:00	2.5	>	>	8.2	4.6	7	804	Generator failure - continue atmospheric air inlet
	10:30	3.2	>	>	8.2	4.6	4	785	
	11:00	7.7	>	>	8.1	4.6	6	654	
	11:30	21	>	>	8.1	4.5	5	614	
	12:30	23	>	>	8.1	4.4	7	611	
	14:30	6.1	>	>	8	4.5	9	596	Generator repaired - start pressure injection of air @ PH-2 (15 iw) @ 14:00
	15:00	6.8	>	>	8.1	4.5	6	552	
4/20/2012	8:30	5.6	>	>	8.3	4.7	7	620	Pt Sunny 60's
	9:00	4.9	>	>	8.3	4.5	8	690	Start pressure injection @ 8:42 on PH-2 (15 iw)
	9:30	5	>	>	8.3	4.5	6	717	
	10:00	5.3	>	>	8.3	4.3	9	717	
	10:30	5	>	>	8.2	4.3	6	702	
	11:00	4.9	>	>	8.2	4.3	7	698	pressure injection increased to 30iw on PH-2 @ 10:45
	11:30	5	>	>	7.9	4.7	6	699	
	12:00	4.6	>	>	7.7	4.9	6	686	
	12:30	4.7	>	>	7.7	4.9	7	674	
	13:00	5	>	>	7.7	5	10	658	
	13:30	0.3	1.4	27	0	20.3	2	891	Discontinued vacuum and pressure injection. Start RW-B, PH-2 respirometry test.
	14:00	0.2	15	>	0.4	19.3	5	1161	Extraction well RW-B test mostlikely compromised by faulty seal - (see PH-2 respirometry test on next tab)
	14:30	0.3	2.9	58	0.2	19.8	1	547	
	15:00	0.1	3.4	68	0.1	20.1	2	702	

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

PH-2		Landfill Gas Meter with Carbon Filter Influent Methane Zone D PH-2 (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone D PH-2 (RW-A) (%)	Influent LEL Zone D PH-2 (RW-A) (%)	Influent CO_2 Zone D PH-2 (RW-A) (%)	Influent O_2 Zone D PH-2 (RW-A) (%)	Influent H_2S Zone D PH-2 (RW-A) (%)	VOCs by PIDZone D PH-2 (RW-A) (ppm)	Weather/Notes
4/17/2012	9:30	69.4	>	>	8.1	4.3	29	377	Sunny, 60's - Baseline
	13:00	18.8	>	>	6.7	6.8	15	258	
	13:30	-	-	-	-	-	-	-	Opened PH-2 to atmosphere
4/20/2012	13:30	0.1	0.7	15	0	20.3	1	406	Start PH-2 respirometry test after air injection at 15 to 30iw for 4hrs.
	14:00	1.7	45.5	>	1.3	16	4	604	
	14:30	7.7	>	>	8.3	4.1	4	402	
	15:00	8	>	>	8.8	3.3	6	394	
4/26/2012	9:00	10.6	>	>	10.7	1.1	13	642	Rain, 50, Baseline
	10:30	-	-	-	-	-	-	-	Start Air injection into PH-2 @10:05, 45 iw
	4/26/12 13:00	0.8	1.6	35	0.1	20.4	0	641	Start respirometry test on PH-2 after air injection into PH-2 @ 45iw for 3hrs.
	4/26/12 13:30	1.1	2.2	45	0.1	20.5	0	487	
	4/26/12 14:00	2.2	10.6	>	1.2	16.3	0	564	
	4/26/12 14:30	1.7	5.9	>	1.5	15.9	0	465	
	4/26/12 15:00	3.2	27	>	6	5.7	0	702	
	4/26/12 15:30	3.4	30.6	>	7.2	3.8	2	712	

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

MW-32		Landfill Gas Meter with Carbon Filter Influent Methane Zone A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone A (%)	Influent LEL Zone A (%)	Influent CO_2 Zone A (%)	Influent O_2 Zone A (%)	Influent H_2S Zone A (%)	VOCs by PID (ppm)	Weather/Notes
4/30/2012	9:00	0.5	2.7	55	0.6	19.6	0	258	Sunny 60, Baseline with Vacuum @ 43iw
	9:30	0.4	1.5	30	0.5	19.4	0	162	Start 30iw vacuum @ MW-32 with RW-11 open to atmosphere for air inlet
	10:00	0.6	3.3	66?	0.7	19	0	235	
	10:30	0.4	1.3	37	0.4	19.5	0	146	
	11:00	0.4	1.1	22	0.4	20.3	0	121	
	11:30	0.2	0.4	9	0.2	19.9	0	56.1	
	12:00	0.1	0.2	4	0	20.2	0	24.4	Vacuum at MW-32 increased to 60iw with RW-11 open to atmosphere for air inlet
	12:30	0.1	0.2	5	0.1	20.2	0	33.4	
	13:00	0.1	0.3	6	0.1	20.5	0	29.2	
	13:30	0.2	0.3	6	0.1	20.7	0	27.7	Vacuum at MW-32 discontinued, start MW-32 and RW-11 respirometry test.
	14:00	0.1	0.5	10	0.1	21.1	0	93.3	
	14:30	0.4	4.2	84	0.4	20.1	1	429	
	15:00	4.6	>	>	5.1	11.4	4	416	
	15:30	6.3	>	>	7.1	8	6	430	
5/3/2012	11:33	0.1	0.9	19	0.3	20	1	331	Baseline
	12:30	0.7	2.8	57	0.5	19.7	0	249	11:40 Vacuum started @ 30iw in MW-32 with air injection into RW-11 @ 15 iw
	13:00	0.4	1	20	0.3	20.3	0	114	
	13:30	0.3	0.7	15	0.2	20.4	0	111	
	14:00	0.2	0.6	11	0.2	20.4	0	82.7	
	14:30	8.9	>	>	8.6	4.8	8	427	1410: Vacuum and air inlet off for respirometry test at RW-11
	15:00	7.5	>	>	7.3	6.9	5	412	

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

RW-11		Landfill Gas Meter with Carbon Filter Influent Methane Zone A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone A (%)	Influent LEL Zone A (%)	Influent CO_2 Zone A (%)	Influent O_2 Zone A (%)	Influent H_2S Zone A (%)	VOCs by PID (ppm)	Weather/Notes
4/30/2011	9:00	0	0.2	4	0.4	20.4	0	80.4	Sunny 50's/60's - Baseline
	14:00	0.1	0.4	9	0.1	21.1	0	127	Start RW-11 respirometry test after 4hrs of atmospheric air inlet.
	14:30	0.1	0.6	11	0.2	20.8	0	169	
	15:00	0.1	2.3	46	0.6	20	1	458	
	15:30	0.1	1.4	28	0.8	19.4	1	362	
5/3/2012	11:25	0	0.4	8	1.2	19.3	0	147	Baseline - Start Air Injection @ 15iw
	14:30	0.2	1.6	1.6	0.3	20.2	0	331	Start RW-11 respirometry test after 3hrs of pressure injection @ 15iw
	15:00	0	0.2	0.2	0.1	20.2	0	112	Respirometry testing discontinued to suspected leak in well / lack of change from ambient conditions

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

RW-7		Landfill Gas Meter with Carbon Filter Influent Methane Zone A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone A (%)	Influent LEL Zone A (%)	Influent CO_2 Zone A (%)	Influent O_2 Zone A (%)	Influent H_2S Zone A (%)	VOCs by PID (ppm)	Weather/Notes
5/1/2012	8:30	0	0.3	6	0.4	20.1	0	117	cloudy, 50 - Baseline
	9:00	1.6	3.7	73	9.1	6.9	0	129	RW-7 @ 30 iw vacuum with MW-7 open to atmospheric air inlet
	9:30	1.6	4.1	83	8.5	7.9	0	32	
	10:00	1.5	4.3	87	8	8.5	0	153	
	10:30	1.6	4.3	87	7.6	8.9	0	157	
	11:00	1.4	4.1	82	7.5	9.2	0	161	RW-7 vacuum increased to 60iw @ 10:45, MW-7 remains open to atmospheric air inlet
	11:30	1.5	4	80	7.4	9.4	0	155	
	12:00	1.4	4	82	7.2	9.7	0	183	
	12:30	1.3	3.9	79	7	9.9	0	157	
	13:00	1	2.8	57	6.5	10.6	0	172	Vacuum off at RW-7 - start respirometry tests at RW-7 and MW-7
	13:30	0.9	2.4	49	6.4	11	0	138	
	14:00	1	2.7	54	6.4	10.7	0	148	
	14:30	0.9	2.4	49	6.4	10.6	0	137	
	15:00	0.9	2.5	51	6.6	10.1	0	133	

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

RW-7		Landfill Gas Meter with Carbon Filter Influent Methane Zone A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone A (%)	Influent LEL Zone A (%)	Influent CO_2 Zone A (%)	Influent O_2 Zone A (%)	Influent H_2S Zone A (%)	VOCs by PID (ppm)	Weather/Notes
5/2/2012	9:30	1.1	3	60	7.7	9	1	149	Rain, 50 - baseline
	10:00	1.3	3.5	71	7.3	9.6	1	155	Focused Vacuum Test on RW-7 at 30iw with no air inlet (testing vacuum influence)
	10:30	1.3	3.8	72	7.2	9.9	1	123	
	11:00	1.4	4	81	7.1	10	0	165	
	11:30	1.4	4.2	84	7	10.3	1	103	Focused Vacuum Test on RW-7 at 60iw with no air inlet (testing vacuum influence)
	12:00	1.4	4.1	82	6.9	10.4	0	97.1	
	12:30	1.5	4.3	87	6.7	10.6	1	133	
	13:00	1.4	4.2	84	6.6	10.8	0	102	
	13:30	1.4	3.7	73	6.4	11.1	0	125	Focused Vacuum Test on RW-7 at 90iw with no air inlet (testing vacuum influence)
	14:00	1.3	3.4	68	6	11.5	0	99.5	
	14:30	1.4	3.8	77	6.4	11.1	0	148	
	15:00	0.3	3.7	76	6.5	11	0	49.4	

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

RW-7		Landfill Gas Meter with Carbon Filter Influent Methane Zone A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone A (%)	Influent LEL Zone A (%)	Influent CO_2 Zone A (%)	Influent O_2 Zone A (%)	Influent H_2S Zone A (%)	VOCs by PID (ppm)	Weather/Notes
5/4/2012	9:15	0.8	2.7	54	3.6	15.2	0	162	Cloudy, 60's Baseline
	10:00	1.4	4.5	90	5.3	12.4	0	187	Start 30 iw vacuum @ RW-7, air injection 15 iw @ MW-7
	10:30	1.5	5.1	>	5.4	12.1	0	196	
	11:00	1.5	5.3	>	5.4	12	0	187	Vacuum at 30 iw @ RW-7, Air injection increased to 45 iw @ MW-7
	11:30	1.6	5.2	>	5.5	11.8	0	174	
	12:00	1.6	5.4	>	5.4	11.8	0	174	
	12:30	1.7	5.7	>	5.4	11.8	0	176	
	13:00	1.7	5.7	>	5.5	11.5	0	165	Air Injection off @ 13:10, vacuum off at RW-7, system shut down at 13:30
	13:30	1.7	5.7	>	5.1	11.7	0	168	Start Respirometry test at RW-7 and MW-7 (air inlet well MW-7 on next tab)
	14:00	1.6	5.8	>	5.3	11.4	0	178	
	14:30	1.6	5.4	>	5.3	11.2	0	169	
	15:00	1.4	5.3	>	5.5	10.6	0	179	

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

MW-7		Landfill Gas Meter with Carbon Filter Influent Methane Zone A (%)	Landfill Gas Meter without Carbon Filter						
Date	Time		Influent Methane Zone A (%)	Influent LEL Zone A (%)	Influent CO_2 Zone A (%)	Influent O_2 Zone A (%)	Influent H_2S Zone A (%)	VOCs by PID (ppm)	Weather/Notes
5/1/2012	8:30	0	0.1	2	7.6	8.8	0	44.8	Rain, 50's - Baseline
	13:00	0	0.1	2	1.1	18.2	0	21.6	Start Respirometry test at MW-7 after 4hrs of atmospheric air inlet
	13:30	0	0	0	2.2	16.2	0	8.1	
	14:00	0	0.1	2	2.7	15.3	0	29.1	
	14:30	0	0	0	3.2	14.6	0	10.8	
	15:00	0	0.1	3	3.5	14	0	24.7	
5/4/2012	9:15	0.1	0.1	2	4.6	16.8	0	31.9	Cloudy, 60's Baseline, start air injection @9:30 @ 11-45iw
	13:00	1.4	2	41	0.3	18.7	0	32.8	Start Respirometry test at MW-7 after 3hrs of air injection @ 30-45iw
	13:30	2.3	3.2	67	0.2	15.3	0	44.7	
	14:00	0.6	1	21	0.4	15.5	0	60.2	
	14:30	0	0.2	5	0.2	18.1	0	33.8	
	15:00	0.1	0.2	5	0.4	17.4	0	51.3	

Respirometry test shaded for clarity

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

MW-20S			Landfill Gas Meter without Carbon Filter						
Date	Time	Landfill Gas Meter with Carbon Filter Influent Methane (%)	Influent Methane Zone D (%)	Influent LEL Zone D (%)	Influent CO_2 Zone D (%)	Influent O_2 Zone D (%)	Influent H_2S Zone D (%)	VOCs by PID Zone D (ppm)	Weather/Notes
6/12/2012	6/12/12 8:45	0	0	0	2.9	15.2	0	1.6	Rain
	6/12/12 12:25	0	0	0	0.1	21	0	0.8	Shut blower off at 12:15
	6/12/12 13:00	0	0	0	0.1	20.3	0	1.3	
	6/12/12 13:30	0	0	0	0.1	20.1	0	1.4	
	6/12/12 14:00	0	0	0	0.2	19	0	1.5	
6/13/2012	6/13/12 8:30	0	0	0	0.5	16	0	1.5	

Former DSCP
Well Headspace and Respirometry Readings
Bioventing Testing

MW-40			Landfill Gas Meter without Carbon Filter						
Date	Time	Landfill Gas Meter with Carbon Filter Influent Methane (%)	Influent Methane (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	VOCs by PID (ppmv)	Weather/Notes
11/29/2012	11/29/2012 11:04	No Filter	0	0	9	10.5	0	0.9	Baseline
	11/29/12 11:20	Start/Baseline							30 IOW
	11/29/12 13:00	No Filter	0	0	0	20.3	0	0	Blower off @1300
	11/29/12 13:15	No Filter	0.6	12	0.1	20.5	0	96.1	30's to low 40's, clear
	11/29/12 13:30	No Filter	2.3	48	0.3	19.9	0	196	
	11/29/12 13:45	No Filter	3.6	75	0.5	19.3	0	222	
	11/29/2012 14:00	No Filter	4.6	Off Scale	0.6	19.2	0	237	
	11/29/2012 14:15	1.2	5.4	Off Scale	0.8	19.3	0	247	
	11/29/2012 14:30	1.3	6.1	Off Scale	1	19.1	0	254	
	11/29/12 14:45	1.3	6.3	Off Scale	1.1	18.9	0	273	
	11/29/12 15:00	1.2	6.4	Off Scale	1.3	18.7	0	275	
11/30/2012	11/30/12 11:30	0	0	0	4.6	9.8	0	22.1	Mostly Cloudy, 39°F

Appendix C

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	CSX-DW-4	CSX-DW-5	CSX-IW-5	CSX-MW1	CSX-MW2	CSX-MW3A	CSX-MW4	CSX-MW5	CSX-MW7	CSX-MW8	CSX-MW9	DSCP-DW-1	DSCP-DW-12	DSCP-DW-13	DSCP-DW-6	DSCP-IW-1
			Date Collected:	9/3/2013	9/3/2013	9/3/2013	9/4/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/5/2013	9/12/2013	9/6/2013	9/5/2013	9/5/2013
			Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Analyte	T/D	Units																
Anion	Nitrate/Nitrite	N	mg/l	--	--	--	0.32	--	--	--	--	--	--	--	--	0.1 U	--	--	--
Anion	Nitrate-N	N	mg/l	--	--	--	0.3	--	--	--	--	--	--	--	--	0.11 U	--	--	--
Anion	Nitrite	N	mg/l	--	--	--	0.016	--	--	--	--	--	--	--	--	0.01 U	--	--	--
Anion	Sulfate	N	mg/l	--	--	--	101	--	--	--	--	--	--	--	--	10 U	--	--	--
Anion	Sulfide	N	mg/l	--	--	--	2 U	--	--	--	--	--	--	--	--	2 U	--	--	--
Gases	Carbon Dioxide	N	ug/l	--	--	--	20800	--	--	--	--	--	--	--	--	5090	--	--	--
Gases	Methane	N	ug/l	--	--	--	1.5	--	--	--	--	--	--	--	--	9690	--	--	--
Metals	Arsenic	D	ug/l	3 U	5.6	20.4	3 U	10.1	3.6	6.7	12.4	12.6	12.8	15.1	3 U	6	3 U	3 U	18.1
Metals	Iron	D	ug/l	--	--	--	254	--	--	--	--	--	--	--	--	22500	--	--	--
Metals	Iron	T	ug/l	--	--	--	100 U	--	--	--	--	--	--	--	--	23000	--	--	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	6	3 U	3 U	5.3	3 U	3 U	16.8	3 U	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	--	3560	--	--	--	--	--	--	--	--	1290	--	--	--
Metals	Manganese	T	ug/l	--	--	--	2640	--	--	--	--	--	--	--	--	1320	--	--	--
VOC	Iso-octane	N	ug/l	--	--	--	5 U	--	--	--	--	--	--	--	--	25 U	--	--	--
VOC	Ethanol	N	ug/l	--	--	--	100 U	--	--	--	--	--	--	--	--	500 U	--	--	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	DSCP-IW-12	DSCP-IW-13	DSCP-MW-1	DSCP-MW-10	DSCP-MW-11	DSCP-MW-12	DSCP-MW-13	DSCP-MW-14	DSCP-MW-15	DSCP-MW-16	DSCP-MW-17	DSCP-MW-19	DSCP-MW-1A
			Date Collected:	9/13/2013	9/6/2013	9/4/2013	9/6/2013	9/4/2013	9/6/2013	9/6/2013	9/4/2013	9/5/2013	9/4/2013	9/4/2013	9/5/2013	9/4/2013
			Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N
	Analyte	T/D	Units													
Anion	Nitrate/Nitrite	N	mg/l	--	--	--	--	--	--	--	--	--	--	2	--	--
Anion	Nitrate-N	N	mg/l	--	--	--	--	--	--	--	--	--	--	2	--	--
Anion	Nitrite	N	mg/l	--	--	--	--	--	--	--	--	--	--	0.01 U	--	--
Anion	Sulfate	N	mg/l	--	--	--	--	--	--	--	--	--	--	187	--	--
Anion	Sulfide	N	mg/l	--	--	--	--	--	--	--	--	--	--	2 U	--	--
Gases	Carbon Dioxide	N	ug/l	--	--	--	--	--	--	--	--	--	--	22200	--	--
Gases	Methane	N	ug/l	--	--	--	--	--	--	--	--	--	--	0.11 U	--	--
Metals	Arsenic	D	ug/l	110	3 U	4.1	3 U	3 U	11.7	9.3	5.5	17.1	6.2	3 U	4.6	6.2
Metals	Iron	D	ug/l	--	--	--	--	--	--	--	--	--	--	65.2 J	--	--
Metals	Iron	T	ug/l	--	--	--	--	--	--	--	--	--	--	55.5 J	--	--
Metals	Lead	D	ug/l	3 U	3 U	6	3 U	3 U	3 U	3 U	3 U	3.3	6.1	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	--	--	--	--	--	--	--	--	24.5	--	--
Metals	Manganese	T	ug/l	--	--	--	--	--	--	--	--	--	--	19.9	--	--
VOC	Iso-octane	N	ug/l	--	--	--	--	--	--	--	--	--	--	5 U	--	--
VOC	Ethanol	N	ug/l	--	--	--	--	--	--	--	--	--	--	100 U	--	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	DSCP-MW-2	DSCP-MW-20	DSCP-MW-20D	DSCP-MW-21A	DSCP-MW-23A	DSCP-MW-24	DSCP-MW-27A	DSCP-MW-28	DSCP-MW-28	DSCP-MW-29	DSCP-MW-2B	DSCP-MW-30	DSCP-MW-31
			Date Collected:	9/6/2013	9/4/2013	9/4/2013	9/4/2013	9/3/2013	9/5/2013	9/6/2013	9/3/2013	9/3/2013	9/3/2013	9/5/2013	9/12/2013	9/5/2013
			Sample Type:	N	N	N	N	N	N	N	FD	N	N	N	N	N
	Analyte	T/D	Units													
Anion	Nitrate/Nitrite	N	mg/l	--	--	0.1 U	0.27	--	--	--	--	--	--	--	0.1 U	--
Anion	Nitrate-N	N	mg/l	--	--	0.015 B	0.27	--	--	--	--	--	--	--	0.11 U	--
Anion	Nitrite	N	mg/l	--	--	0.01 U	0.01 U	--	--	--	--	--	--	--	0.01 U	--
Anion	Sulfate	N	mg/l	--	--	271	38.5	--	--	--	--	--	--	--	10 U	--
Anion	Sulfide	N	mg/l	--	--	2 U	2 U	--	--	--	--	--	--	--	0.74 J	--
Gases	Carbon Dioxide	N	ug/l	--	--	69100	20300	--	--	--	--	--	--	--	8200	--
Gases	Methane	N	ug/l	--	--	6.4	80.6	--	--	--	--	--	--	--	10500	--
Metals	Arsenic	D	ug/l	6.3	3 U	3 U	3 U	20	4.8	29.5	65	41.3	64.4	5.4	4	21.7
Metals	Iron	D	ug/l	--	--	41900	747	--	--	--	--	--	--	--	17300	--
Metals	Iron	T	ug/l	--	--	39200	686	--	--	--	--	--	--	--	17800	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2.2 J	6.1	2.1 J	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	6870	1240	--	--	--	--	--	--	--	64.2	--
Metals	Manganese	T	ug/l	--	--	6270	1190	--	--	--	--	--	--	--	67.6	--
VOC	Iso-octane	N	ug/l	--	--	5 U	5 U	--	--	--	--	--	--	--	100 U	--
VOC	Ethanol	N	ug/l	--	--	100 U	100 U	--	--	--	--	--	--	--	2000 U	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	DSCP-MW-32	DSCP-MW-33	DSCP-MW-33	DSCP-MW-34	DSCP-MW-35A	DSCP-MW-36	DSCP-MW-3A	DSCP-MW-44A	DSCP-MW-45A	DSCP-MW-4A	DSCP-MW-5	DSCP-MW-53	DSCP-MW-54
			Date Collected:	9/5/2013	9/5/2013	9/5/2013	9/4/2013	9/4/2013	9/9/2013	9/5/2013	9/4/2013	9/4/2013	9/5/2013	9/4/2013	9/6/2013	9/6/2013
			Sample Type:	N	FD	N	N	N	N	N	N	N	N	N	N	N
	Analyte	T/D	Units													
Anion	Nitrate/Nitrite	N	mg/l	0.1 U	0.1 U	0.1 U	--	--	--	--	--	--	--	--	--	--
Anion	Nitrate-N	N	mg/l	0.11 U	0.11 U	0.11 U	--	--	--	--	--	--	--	--	--	--
Anion	Nitrite	N	mg/l	0.0043 J	0.0085 J	0.01 U	--	--	--	--	--	--	--	--	--	--
Anion	Sulfate	N	mg/l	1.8 J	11.5	12.6	--	--	--	--	--	--	--	--	--	--
Anion	Sulfide	N	mg/l	0.74 J	2 U	2 U	--	--	--	--	--	--	--	--	--	--
Gases	Carbon Dioxide	N	ug/l	25200	53500	54300	--	--	--	--	--	--	--	--	--	--
Gases	Methane	N	ug/l	13700	9920	9870	--	--	--	--	--	--	--	--	--	--
Metals	Arsenic	D	ug/l	17.2	--	11.5	3 U	19.4	44.7	8.2	3 U	2.3 J	21.3	26.7	3 U	2.1 J
Metals	Iron	D	ug/l	33600	--	57000	--	--	--	--	--	--	--	--	--	--
Metals	Iron	T	ug/l	28100	57100	50200	--	--	--	--	--	--	--	--	--	--
Metals	Lead	D	ug/l	3 U	--	3 U	10.9	3 U	4.2	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	2530	--	3050	--	--	--	--	--	--	--	--	--	--
Metals	Manganese	T	ug/l	1980	2700	2560	--	--	--	--	--	--	--	--	--	--
VOC	Iso-octane	N	ug/l	100 U	--	5 U	--	--	--	--	--	--	--	--	--	--
VOC	Ethanol	N	ug/l	2000 U	--	100 U	--	--	--	--	--	--	--	--	--	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	DSCP-MW-59	DSCP-MW-6	DSCP-MW-65	DSCP-MW-7	DSCP-MW-9	DSCP-RW-10	DSCP-RW-11	DSCP-RW-1A	DSCP-RW-2	DSCP-RW-3	DSCP-RW-4	DSCP-RW-5/MW-25	DSCP-RW-5/MW-25
			Date Collected:	9/5/2013	9/13/2013	9/13/2013	9/9/2013	9/9/2013	9/4/2013	9/5/2013	9/5/2013	9/3/2013	9/5/2013	9/4/2013	9/5/2013	9/5/2013
			Sample Type:	N	N	N	N	N	N	N	N	N	N	N	FD	N
	Analyte	T/D	Units													
Anion	Nitrate/Nitrite	N	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Anion	Nitrate-N	N	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Anion	Nitrite	N	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Anion	Sulfate	N	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Anion	Sulfide	N	mg/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Gases	Carbon Dioxide	N	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Gases	Methane	N	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals	Arsenic	D	ug/l	17.4	3	7.3	2.1 J	3 U	10.5	4	42.9	99.6	28.1	3 U	66	64.5
Metals	Iron	D	ug/l	--	--	--	--	--	--	--	--	--	--	--	15400	--
Metals	Iron	T	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2.1 J	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	--	--	--	--	--	--	--	--	--	5740	--
Metals	Manganese	T	ug/l	--	--	--	--	--	--	--	--	--	--	--	--	--
VOC	Iso-octane	N	ug/l	--	--	--	--	--	--	--	--	--	--	--	10 U	--
VOC	Ethanol	N	ug/l	--	--	--	--	--	--	--	--	--	--	--	200 U	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	DSCP-RW-6	DSCP-RW-7	DSCP-RW-8	DSCP-RW-9	DSCP-RW-9	EPH-MW-39	EPH-MW-48	EPH-MW-49	EPH-MW-50	EPH-MW-50	EPH-MWS-10	EPH-MWS-11	EPH-MWS-5	EPH-PH-5	EPH-PH-7
			Date Collected:	9/6/2013	9/5/2013	9/4/2013	9/4/2013	9/4/2013	9/12/2013	9/9/2013	9/10/2013	9/10/2013	9/10/2013	9/10/2013	9/9/2013	9/9/2013	9/9/2013	9/13/2013
			Sample Type:	N	N	N	FD	N	N	N	N	FD	N	N	N	N	N	N
	Analyte	T/D	Units															
Anion	Nitrate/Nitrite	N	mg/l	--	--	--	--	--	0.1 U	--	--	--	--	--	--	--	1.9	--
Anion	Nitrate-N	N	mg/l	--	--	--	--	--	0.11 U	--	--	--	--	--	--	--	1.9	--
Anion	Nitrite	N	mg/l	--	--	--	--	--	0.01 U	--	--	--	--	--	--	--	0.01 U	--
Anion	Sulfate	N	mg/l	--	--	--	--	--	10 U	--	--	--	--	--	--	--	46.3	--
Anion	Sulfide	N	mg/l	--	--	--	--	--	2 U	--	--	--	--	--	--	--	2 U	--
Gases	Carbon Dioxide	N	ug/l	--	--	--	--	--	35700	--	--	--	--	--	--	--	26100	--
Gases	Methane	N	ug/l	--	--	--	--	--	16700	--	--	--	--	--	--	--	0.11 U	--
Metals	Arsenic	D	ug/l	96.7	13.4	33.7	62.8	61.1	39.3	6.4	6.3	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Metals	Iron	D	ug/l	--	--	--	--	--	53400	--	--	--	--	--	--	--	100 U	--
Metals	Iron	T	ug/l	--	--	--	--	--	56100	--	--	--	--	--	--	--	117	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	--	--	--	188	--	--	--	--	--	--	--	2.1 J	--
Metals	Manganese	T	ug/l	--	--	--	--	--	199	--	--	--	--	--	--	--	7.2 J	--
VOC	Iso-octane	N	ug/l	--	--	--	--	--	50 U	--	--	--	--	--	--	--	5 U	--
VOC	Ethanol	N	ug/l	--	--	--	--	--	1000 U	--	--	--	--	--	--	--	100 U	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	PH-DW-10	PH-DW-11	PH-DW-2	PH-DW-3	PH-IW-10	PH-IW-11	PH-IW-2	PH-IW-3	PH-MW-37	PH-MW-40	PH-MW-41	PH-MW-42	PH-MW-43	PH-MW-51	PH-MW-55	PH-MW-56	PH-MW-57
			Date Collected:	9/11/2013	9/10/2013	9/9/2013	9/9/2013	9/11/2013	9/10/2013	9/9/2013	9/9/2013	9/11/2013	9/10/2013	9/13/2013	9/11/2013	9/11/2013	9/10/2013	9/11/2013	9/11/2013	9/9/2013
			Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Analyte	T/D	Units																	
Anion	Nitrate/Nitrite	N	mg/l	0.027 J	0.1 U	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	0.1 U	--	--
Anion	Nitrate-N	N	mg/l	0.11 U	0.11 U	--	0.11 U	--	--	--	--	--	0.11 U	--	--	--	--	0.11 U	--	--
Anion	Nitrite	N	mg/l	0.01 U	0.01 U	--	0.01 U	--	--	--	--	--	0.01 U	--	--	--	--	0.01 U	--	--
Anion	Sulfate	N	mg/l	67.2	22.2	--	0.71 J	--	--	--	--	--	0.55 J	--	--	--	--	1.8 J	--	--
Anion	Sulfide	N	mg/l	2 U	2 U	--	2 U	--	--	--	--	--	2 U	--	--	--	--	2 U	--	--
Gases	Carbon Dioxide	N	ug/l	34200	6180	--	31800	--	--	--	--	--	31700	--	--	--	--	17700	--	--
Gases	Methane	N	ug/l	310	10200	--	12200	--	--	--	--	--	12800	--	--	--	--	11800	--	--
Metals	Arsenic	D	ug/l	2 J	3.7	3 U	3.6	30.2	27.3	3 U	3 U	3 U	40.1	8.2	3 U	3.5	3 U	8.1	2.1 J	3 U
Metals	Iron	D	ug/l	15200	34900	--	37700	--	--	--	--	--	78100	--	--	--	--	31300	--	--
Metals	Iron	T	ug/l	16200	34200	--	37700	--	--	--	--	--	77300	--	--	--	--	35100	--	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2.3 J	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	2510	565	--	10200	--	--	--	--	--	686	--	--	--	--	1300	--	--
Metals	Manganese	T	ug/l	2690	543	--	10300	--	--	--	--	--	648	--	--	--	--	1520	--	--
VOC	Iso-octane	N	ug/l	5 U	130 U	--	500 U	--	--	--	--	--	5 U	--	--	--	--	100 U	--	--
VOC	Ethanol	N	ug/l	100 U	2500 U	--	10000 U	--	--	--	--	--	100 U	--	--	--	--	2000 U	--	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	PH-MW-58	PH-MW-60	PH-MWS-1	PH-MWS-13	PH-MWS-15	PH-MWS-2A	PH-MWS-3	PH-MWS-4	PH-PH-1	PH-PH-13	PH-PH-14	PH-PH-16	PH-PH-17	PH-PH-17	PH-PH-18	PH-PH-19
			Date Collected:	9/10/2013	9/12/2013	9/11/2013	9/10/2013	9/9/2013	9/11/2013	9/9/2013	9/6/2013	9/11/2013	9/6/2013	9/11/2013	9/10/2013	9/12/2013	9/12/2013	9/13/2013	9/12/2013
			Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N
	Analyte	T/D	Units																
Anion	Nitrate/Nitrite	N	mg/l	--	--	--	--	--	0.1 U	0.044 J	--	--	--	--	--	--	--	--	0.1 U
Anion	Nitrate-N	N	mg/l	--	--	--	--	--	0.11 U	0.035 J	--	--	--	--	--	--	--	--	0.11 U
Anion	Nitrite	N	mg/l	--	--	--	--	--	0.01 U	0.0093 J	--	--	--	--	--	--	--	--	0.01 U
Anion	Sulfate	N	mg/l	--	--	--	--	--	1.3 J	0.86 J	--	--	--	--	--	--	--	--	15.1
Anion	Sulfide	N	mg/l	--	--	--	--	--	2 U	2 U	--	--	--	--	--	--	--	--	1.3 J
Gases	Carbon Dioxide	N	ug/l	--	--	--	--	--	33900	5780	--	--	--	--	--	--	--	--	9700
Gases	Methane	N	ug/l	--	--	--	--	--	16100	7440	--	--	--	--	--	--	--	--	10400
Metals	Arsenic	D	ug/l	3 U	32.7	8.8	3.7	3 U	16.9	3	12.3	13.7	15.2	38.2	11.4	30.3	31.2	10.2	6.8
Metals	Iron	D	ug/l	--	--	--	--	--	85800	35600	--	--	--	--	--	--	--	--	3960
Metals	Iron	T	ug/l	--	--	--	--	--	90800	23800	--	--	--	--	--	--	--	--	5740
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	2.2 J	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	--	--	--	357	10300	--	--	--	--	--	--	--	--	3030
Metals	Manganese	T	ug/l	--	--	--	--	--	359	554	--	--	--	--	--	--	--	--	3050
VOC	Iso-octane	N	ug/l	--	--	--	--	--	100 U	5 U	--	--	--	--	--	--	--	--	100 U
VOC	Ethanol	N	ug/l	--	--	--	--	--	2000 U	100 U	--	--	--	--	--	--	--	--	2000 U

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	PH-PH-2	PH-PH-20	PH-PH-21	PH-PH-22	PH-PH-23	PH-PH-24	PH-PH-3	PH-PH-4	PH-PH-6	PH-PZ-4	PH-RW-A	PH-RW-B	PH-RW-C	PH-RW-CA	PH-RW-D	PH-RW-E	PH-RW-F
			Date Collected:	9/10/2013	9/10/2013	9/11/2013	9/10/2013	9/10/2013	9/10/2013	9/12/2013	9/12/2013	9/9/2013	9/12/2013	9/10/2013	9/10/2013	9/13/2013	9/13/2013	9/12/2013	9/13/2013	9/10/2013
			Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	Analyte	T/D	Units																	
Anion	Nitrate/Nitrite	N	mg/l	--	--	--	--	--	--	--	0.1 U	--	--	0.1 U	26.2	--	--	0.1 U	--	--
Anion	Nitrate-N	N	mg/l	--	--	--	--	--	--	--	0.11 U	--	--	0.11 U	21.7	--	--	0.11 U	--	--
Anion	Nitrite	N	mg/l	--	--	--	--	--	--	--	0.01 U	--	--	0.01 U	4.5	--	--	0.01 U	--	--
Anion	Sulfate	N	mg/l	--	--	--	--	--	--	--	0.7 J	--	--	0.61 J	147	--	--	27	--	--
Anion	Sulfide	N	mg/l	--	--	--	--	--	--	--	2 U	--	--	0.97 J	2 U	--	--	10	--	--
Gases	Carbon Dioxide	N	ug/l	--	--	--	--	--	--	--	59000	--	--	29200	8230	--	--	23100	--	--
Gases	Methane	N	ug/l	--	--	--	--	--	--	--	14000	--	--	13000	7790	--	--	4450	--	--
Metals	Arsenic	D	ug/l	6	4.7	3 U	3 U	6.3	2.2 J	2.2 J	30.9	3.5	3.1	42.4	35.1	19	24.4	6.1	21.1	3 U
Metals	Iron	D	ug/l	--	--	--	--	--	--	--	76600	--	--	53400	20400	--	--	1920	--	--
Metals	Iron	T	ug/l	--	--	--	--	--	--	--	77000	--	--	54200	23300	--	--	2390	--	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	--	--	--	--	--	--	--	163	--	--	1320	13500	--	--	218	--	--
Metals	Manganese	T	ug/l	--	--	--	--	--	--	--	168	--	--	1330	13500	--	--	188	--	--
VOC	Iso-octane	N	ug/l	--	--	--	--	--	--	--	5 U	--	--	500 U	250 U	--	--	5 U	--	--
VOC	Ethanol	N	ug/l	--	--	--	--	--	--	--	100 U	--	--	10000 U	5000 U	--	--	100 U	--	--

Summary of Geochemical Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

			Location ID:	PH-RW-G	PH-RW-H	PH-RW-H	PH-RW-I	PH-RW-I	PH-RW-M	PH-RW-M	PH-RW-N	PH-RW-O	PH-RW-P	PH-RW-Q	PH-RW-S	PH-RW-T	PH-RW-U	PH-RW-V	PH-RW-W	SSEPTA-PH-8
			Date Collected:	9/12/2013	9/11/2013	9/11/2013	9/6/2013	9/6/2013	9/9/2013	9/9/2013	9/6/2013	9/9/2013	9/6/2013	9/9/2013	9/13/2013	9/6/2013	9/6/2013	9/13/2013	9/11/2013	9/12/2013
			Sample Type:	N	FD	N	FD	N	FD	N	N	N	N	N	N	N	N	N	N	N
	Analyte	T/D	Units																	
Anion	Nitrate/Nitrite	N	mg/l	0.1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1 U	--
Anion	Nitrate-N	N	mg/l	0.11 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11 U	--
Anion	Nitrite	N	mg/l	0.01 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01 U	--
Anion	Sulfate	N	mg/l	13.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.7 J	--
Anion	Sulfide	N	mg/l	4.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2 U	--
Gases	Carbon Dioxide	N	ug/l	27300	--	--	--	--	--	--	--	--	--	--	--	--	--	--	25100	--
Gases	Methane	N	ug/l	11500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12600	--
Metals	Arsenic	D	ug/l	45.7	17.4	18.4	15.9	18	3 U	2.1 J	6.9	2.1 J	3 U	3 U	--	6	3 U	3 U	6.2	3 U
Metals	Iron	D	ug/l	5260	--	--	--	--	--	--	--	--	--	--	--	--	--	--	212000	--
Metals	Iron	T	ug/l	8730	--	--	--	--	--	--	--	--	--	--	--	--	--	--	217000	--
Metals	Lead	D	ug/l	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	3 U	--	3 U	3 U	3 U	3 U	3 U
Metals	Manganese	D	ug/l	845	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2240	--
Metals	Manganese	T	ug/l	757	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2370	--
VOC	Iso-octane	N	ug/l	50 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	250 U	--
VOC	Ethanol	N	ug/l	1000 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5000 U	--

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	CSX-DW-4	CSX-DW-5	CSX-IW-5	CSX-MW1	CSX-MW2	CSX-MW3A	CSX-MW4	CSX-MW5	CSX-MW7	CSX-MW8	CSX-MW9	DSCP-DW-1	DSCP-DW-12	DSCP-DW-13	DSCP-DW-6	DSCP-IW-1
		Date Collected:	9/3/2013	9/3/2013	9/3/2013	9/4/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/3/2013	9/5/2013	9/12/2013	9/6/2013	9/5/2013	9/5/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500																
1,2,4-Trimethylbenzene	ug/l	62	2 U	2 U	2 U	2 U	678	2 U	2 U	2 U	2 U	2 U	5 U	2 U	10 U	2 U	2 U	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	1 U	1 U	1 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	2.5 U	1 U	5 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	2 U	2 U	2 U	2 U	192	2 U	2 U	4.8	2 U	2 U	5.5	2 U	10 U	2 U	2 U	0.88 J
2,2,4-Trimethylpentane	ug/l					5 U									25 U			
Benzene	ug/l	5	1 U	1 U	5.4	1 U	3030	12.4	7.1	698	13.5	9.5	1220	0.56 J	728	1 U	1 U	0.61 J
Ethanol	ug/l					100 U									500 U			
Ethylbenzene	ug/l	700	1 U	1 U	1 U	1 U	688	1	1 U	6.7	1 U	0.84 J	16	1 U	47.7	1 U	1 U	0.56 J
Isopropylbenzene	ug/l	3500	2 U	2 U	1 J	2 U	47.3	16.1	8.8	26.3	6.2	27.4	66.6	2 U	62.4	2 U	2 U	6.8
Methyl-Tert-Butylether	ug/l	20	32.3	53.6	20.1	1 U	5 U	1 U	1 U	1 U	1 U	1 U	2.5 U	91.7	5 U	1 U	1 U	22.7
Naphthalene	ug/l	100	5 U	5 U	5 U	5 U	519	5 U	5 U	5 U	5 U	5 U	13 U	5 U	25 U	5 U	5 U	5 U
Tert-Butyl Alcohol	ug/l		20.3 J	25 U	25 U	25 U	158	25 U	25 U	25 U	23 J	25 U	35.1 J	52.6	176	25 U	25 U	25 U
Toluene	ug/l	1000	1 U	1 U	1 U	1 U	153	1.4	1.4	2.8	1 U	1 U	5.3	1 U	93.3	1 U	1 U	1 U
Total Xylenes	ug/l	10000	1 U	1 U	1 U	1 U	1120	7.4	2.2	21.9	0.27 J	0.91 J	42	1 U	238	0.62 J	1 U	4.3
Total VOCs	ug/l		52.6	53.6	26.5	1 U	6585.3	38.3	19.5	760.5	42.97	38.65	1390.5	144.86	1345.4	0.62	1 U	35.85

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	DSCP-IW-12	DSCP-IW-13	DSCP-MW-1	DSCP-MW-10	DSCP-MW-11	DSCP-MW-12	DSCP-MW-13	DSCP-MW-14	DSCP-MW-15	DSCP-MW-16	DSCP-MW-17	DSCP-MW-19	DSCP-MW-1A
		Date Collected:	9/13/2013	9/6/2013	9/4/2013	9/6/2013	9/4/2013	9/6/2013	9/6/2013	9/4/2013	9/5/2013	9/4/2013	9/4/2013	9/5/2013	9/4/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500													
1,2,4-Trimethylbenzene	ug/l	62	27 J	2 U	2 U	2 U	2.2	2 U	2 U	347	158	2 U	2 U	2 U	3
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	20 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	36.9 J	2 U	1.7 J	2 U	0.63 J	1.1 J	26.2	81.2	73.2	2 U	2 U	2 U	6.4
2,2,4-Trimethylpentane	ug/l												5 U		
Benzene	ug/l	5	15800	1 U	1 U	1 U	1	103	56.5	7880	1090	1 U	1 U	1 U	122
Ethanol	ug/l												100 U		
Ethylbenzene	ug/l	700	637	1 U	7.3	1 U	1 U	3.4	116	79.4	179	1 U	1 U	1 U	3.1
Isopropylbenzene	ug/l	3500	34.2 J	2 U	39.2	2 U	2 U	2 U	82	50.9	57.3	2 U	2 U	2 U	4.6
Methyl-Tert-Butylether	ug/l	20	71.9	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	1 U	1 U	1 U
Naphthalene	ug/l	100	66.1 J	5 U	5 U	5 U	5 U	5 U	40.8	147	121	5 U	5 U	5 U	5 U
Tert-Butyl Alcohol	ug/l		301 J	25 U	25 U	25 U	25 U	25 U	25 U	500 U	250 U	25 U	25 U	25 U	25 U
Toluene	ug/l	1000	335	1 U	1	1 U	1 U	14.8	96.2	43.6	301	1 U	1 U	1 U	5.2
Total Xylenes	ug/l	10000	775	1 U	22.7	1 U	0.47 J	24.4	202	322	384	1 U	1 U	1 U	8.8
Total VOCs	ug/l		18084.1	1 U	71.9	1 U	4.3	146.7	619.7	8951.1	2363.5	1 U	1 U	1 U	153.1

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	DSCP-MW-2	DSCP-MW-20	DSCP-MW-20D	DSCP-MW-21A	DSCP-MW-23A	DSCP-MW-24	DSCP-MW-27A	DSCP-MW-28	DSCP-MW-28	DSCP-MW-29	DSCP-MW-2B	DSCP-MW-30	DSCP-MW-31
		Date Collected:	9/6/2013	9/4/2013	9/4/2013	9/4/2013	9/3/2013	9/5/2013	9/6/2013	9/3/2013	9/3/2013	9/3/2013	9/5/2013	9/12/2013	9/5/2013
		Sample Type:	N	N	N	N	N	N	N	FD	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500													
1,2,4-Trimethylbenzene	ug/l	62	195	2 U	2 U	2 U	2 U	2 U	187	839	780	7.7	2 U	614	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	20 U	1 U	1 U	1 U	1 U	1 U	2.5 U	10 U	5 U	1 U	1 U	20 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	89.4	2 U	2 U	2 U	2 U	2 U	27.6	243	253	4.7	2 U	162	2 U
2,2,4-Trimethylpentane	ug/l				5 U	5 U								100 U	
Benzene	ug/l	5	5870	1 U	1 U	1 U	1 U	1 U	44.1	3240	3450	1.7	1 U	6970	2.4
Ethanol	ug/l				100 U	100 U								2000 U	
Ethylbenzene	ug/l	700	272	1 U	1 U	1 U	1.2	10.7	410	836	599	1 U	1 U	526	1 U
Isopropylbenzene	ug/l	3500	102	2 U	2 U	2 U	47.5	22.2	35.9	60.6	66.4	4.9	2 U	45.2	2 U
Methyl-Tert-Butylether	ug/l	20	20 U	1 U	2.9	1 U	1 U	1 U	2.5 U	10 U	5 U	1 U	1 U	17.6 J	1 U
Naphthalene	ug/l	100	128	5 U	5 U	5 U	5 U	5.1	112	524	490	5 U	5 U	289	5 U
Tert-Butyl Alcohol	ug/l		500 U	25 U	25 U	25 U	25 U	25 U	63 U	151 J	89.7 J	24.1 J	25 U	227 J	25 U
Toluene	ug/l	1000	204	1 U	1 U	1 U	1.3	1.1	31.1	178	98.3	1 U	1 U	331	1 U
Total Xylenes	ug/l	10000	695	1 U	1 U	1 U	2.7	12.1	482	1340	1950	2.1	1 U	1220	1 U
Total VOCs	ug/l		7555.4	1 U	2.9	1 U	52.7	51.2	1329.7	7411.6	7776.4	45.2	1 U	10401.8	2.4

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	DSCP-MW-32	DSCP-MW-33	DSCP-MW-34	DSCP-MW-35A	DSCP-MW-36	DSCP-MW-3A	DSCP-MW-44A	DSCP-MW-45A	DSCP-MW-4A	DSCP-MW-5	DSCP-MW-53	DSCP-MW-54	DSCP-MW-59
		Date Collected:	9/5/2013	9/5/2013	9/4/2013	9/4/2013	9/9/2013	9/5/2013	9/4/2013	9/4/2013	9/5/2013	9/4/2013	9/6/2013	9/6/2013	9/5/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500													
1,2,4-Trimethylbenzene	ug/l	62	552	148	2 U	269	36.8	604	2 U	2 U	249	515	2 U	1.7 J	1.3 J
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	20 U	1 U	1 U	20 U	1 U	20 U	1 U	1 U	20 U	10 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	144	136	2 U	76.4	78.3	181	2 U	2 U	236	220	2 U	7.4	3.7
2,2,4-Trimethylpentane	ug/l		100 U	5 U											
Benzene	ug/l	5	8180	387	1 U	7000	66	9630	1 U	1 U	4300	1170	1 U	1 U	47.6
Ethanol	ug/l		2000 U	100 U											
Ethylbenzene	ug/l	700	720	400	1 U	401	88.4	777	1 U	1 U	78.7	131	1 U	12	29.4
Isopropylbenzene	ug/l	3500	87.7	95.1	2 U	35.7 J	51.5	69.3	2 U	2 U	45.3	29.1	2 U	47.2	59.9
Methyl-Tert-Butylether	ug/l	20	20 U	1 U	1 U	20 U	1 U	20 U	1 U	1 U	36.4	10 U	1 U	1 U	1 U
Naphthalene	ug/l	100	412	180	5 U	164	53.7	298	5 U	5 U	47.8 J	264	5 U	24.1	10.4
Tert-Butyl Alcohol	ug/l		500 U	40.4	25 U	500 U	57.8	500 U	25 U	25 U	500 U	250 U	25 U	25 U	25 U
Toluene	ug/l	1000	96.3	31.9	1 U	89.5	55.8	270	1 U	1 U	169	53.7	1 U	1 U	38.8
Total Xylenes	ug/l	10000	732	313	1 U	414	148	2040	1 U	1 U	426	969	1 U	85	81.5
Total VOCs	ug/l		10924	1731.4	1 U	8449.6	636.3	13869.3	1 U	1 U	5588.2	3351.8	1 U	177.4	272.6

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	DSCP-MW-6	DSCP-MW-65	DSCP-MW-7	DSCP-MW-9	DSCP-RW-10	DSCP-RW-11	DSCP-RW-1A	DSCP-RW-2	DSCP-RW-3	DSCP-RW-4	DSCP-RW-5/MW-25	DSCP-RW-5/MW-25	DSCP-RW-6
		Date Collected:	9/13/2013	9/13/2013	9/9/2013	9/9/2013	9/4/2013	9/5/2013	9/5/2013	9/3/2013	9/5/2013	9/4/2013	9/5/2013	9/5/2013	9/6/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	FD	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500													
1,2,4-Trimethylbenzene	ug/l	62	584	888	2 U	7.6	239	2.4	857	251	449	372	556	594	64
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	10 U	50 U	1 U	1 U	5 U	1 U	20 U	5 U	5 U	2.5 U	2 U	5 U	2 U
1,3,5-Trimethylbenzene	ug/l	53	231	263	2 U	10.7	78.5	1.5 J	304	120	219	130	238	232	87.3
2,2,4-Trimethylpentane	ug/l												10 U		
Benzene	ug/l	5	3380	25700	0.66 J	250	2080	2.8	2330	1530	1120	69.8	902	919	255
Ethanol	ug/l												200 U		
Ethylbenzene	ug/l	700	344	1310	0.96 J	16.2	143	1 U	637	295	328	95	318	322	120
Isopropylbenzene	ug/l	3500	17.8 J	79.8 J	10.2	14.5	48.1	2 U	76.3	24.4	31.2	19.1	78.5	75.4	55.2
Methyl-Tert-Butylether	ug/l	20	10 U	50 U	1 U	1 U	5 U	1 U	20 U	5 U	5 U	2.5 U	2 U	5 U	2 U
Naphthalene	ug/l	100	164	405	5 U	4.7 J	95.3	5 U	594	401	240	215	281	295	189
Tert-Butyl Alcohol	ug/l		133 J	573 J	25 U	25 U	130 U	25 U	500 U	389	130 U	63 U	34 J	130 U	50 U
Toluene	ug/l	1000	187	1070	1 U	18.8	26.3	1 U	73	59.2	85.5	5.7	19.6	20.6	44.5
Total Xylenes	ug/l	10000	1380	4640	0.69 J	42.3	214	2.8	892	537	1260	337	553	565	104
Total VOCs	ug/l		6420.8	34928.8	12.51	364.8	2924.2	9.5	5763.3	3606.6	3732.7	1243.6	2980.1	3023	919

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	DSCP-RW-7	DSCP-RW-8	DSCP-RW-9	DSCP-RW-9	EPH-MW-39	EPH-MW-48	EPH-MW-49	EPH-MW-50	EPH-MW-50	EPH-MWS-10	EPH-MWS-11	EPH-MWS-5	EPH-PH-5	EPH-PH-7	PH-DW-10
		Date Collected:	9/5/2013	9/4/2013	9/4/2013	9/4/2013	9/12/2013	9/9/2013	9/10/2013	9/10/2013	9/10/2013	9/10/2013	9/9/2013	9/9/2013	9/9/2013	9/13/2013	9/11/2013
		Sample Type:	N	N	FD	N	N	N	N	FD	N	N	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500															
1,2,4-Trimethylbenzene	ug/l	62	2.5	656	253	253	20 U	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	1 U	10 U	5 U	5 U	10 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.4
1,3,5-Trimethylbenzene	ug/l	53	4.6	187	92.5	93.2	52	2 U	10 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2,2,4-Trimethylpentane	ug/l						50 U								5 U		5 U
Benzene	ug/l	5	117	5160	538	543	1560	7.4	863	1 U	1 U	0.59 J	1 U	1 U	1 U	1 U	15.1
Ethanol	ug/l						1000 U								100 U		100 U
Ethylbenzene	ug/l	700	16.6	639	141	139	19.7	0.71 J	2.7 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/l	3500	28.3	72.8	53.9	53.7	42.4	25.1	35.4	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl-Tert-Butylether	ug/l	20	1 U	10 U	5 U	5 U	10 U	1 U	5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	42.4
Naphthalene	ug/l	100	4 J	264	215	215	50 U	5 U	25 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tert-Butyl Alcohol	ug/l		25 U	198 J	130 U	130 U	250 U	25 U	130 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Toluene	ug/l	1000	38.5	103	23.6	23.7	24.4	3.7	11.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Xylenes	ug/l	10000	31.5	952	215	217	15.5	4.2	8.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.34 J
Total VOCs	ug/l		243	8231.8	1532	1537.6	1714	41.11	921.1	1 U	1 U	0.59	1 U	1 U	1 U	1 U	59.24

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	PH-DW-11	PH-DW-2	PH-DW-3	PH-IW-10	PH-IW-11	PH-IW-2	PH-IW-3	PH-MW-37	PH-MW-40	PH-MW-41	PH-MW-42	PH-MW-43	PH-MW-51	PH-MW-55	PH-MW-56	PH-MW-57	PH-MW-58
		Date Collected:	9/10/2013	9/9/2013	9/9/2013	9/11/2013	9/10/2013	9/9/2013	9/9/2013	9/11/2013	9/10/2013	9/13/2013	9/11/2013	9/11/2013	9/10/2013	9/11/2013	9/11/2013	9/9/2013	9/10/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500																	
1,2,4-Trimethylbenzene	ug/l	62	50 U	2 U	200 U	200 U	200 U	20 U	2 U	2 U	1.5 J	35.1	11.6	65	2 U	1190	2 U	2 U	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	25 U	1 U	100 U	100 U	100 U	10 U	1 U	1 U	1 U	4 U	2.5 U	10 U	1 U	20 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	50 U	2 U	200 U	200 U	200 U	20 U	2 U	2 U	1.1 J	44	7.7	17.9 J	2 U	374	2 U	2 U	2 U
2,2,4-Trimethylpentane	ug/l		130 U		500 U						5 U					100 U			
Benzene	ug/l	5	3880	265	12100	36100	13600	1320	1 U	1 U	219	1100	1680	4100	1 U	5480	1 U	1 U	1 U
Ethanol	ug/l		2500 U		10000 U						100 U					2000 U			
Ethylbenzene	ug/l	700	15.2 J	1 U	100 U	284	61.8 J	24.3	1 U	1 U	6.5	25.3	7.3	56	1 U	989	1 U	1 U	1 U
Isopropylbenzene	ug/l	3500	61.4	1.9 J	200 U	200 U	200 U	65.6	2 U	2 U	61.3	25.5	9.7	13.1 J	2 U	69.4	4.1	2 U	2 U
Methyl-Tert-Butylether	ug/l	20	15.9 J	4.4	16.6	100 U	50 U	10 U	1 U	1 U	1 U	4 U	12.4	10 U	1 U	20 U	1 U	1 U	1 U
Naphthalene	ug/l	100	130 U	5 U	500 U	500 U	500 U	117	5 U	5 U	5 U	34	34	79.9	5 U	491	5 U	5 U	5 U
Tert-Butyl Alcohol	ug/l		630 U	45.5	2500 U	2500 U	1300 U	250 U	25 U	25 U	10.7 J	100 U	55.4 J	5640	25 U	500 U	25 U	25 U	25 U
Toluene	ug/l	1000	65.9	1 U	100 U	150	163	35.7	1 U	1 U	32.1	11.3	13.4	123	1 U	238	15.7	1 U	1 U
Total Xylenes	ug/l	10000	81	0.43 J	148	232	510	197	1 U	1 U	10.3	45.6	29.7	162	1 U	2800	1 U	1 U	1 U
Total VOCs	ug/l		4119.4	317.23	12264.6	36766	14334.8	1759.6	1 U	1 U	342.5	1320.8	1861.2	10256.9	1 U	11631.4	19.8	1 U	1 U

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	PH-MW-60	PH-MWS-1	PH-MWS-13	PH-MWS-15	PH-MWS-2A	PH-MWS-3	PH-MWS-4	PH-PH-1	PH-PH-13	PH-PH-14	PH-PH-16	PH-PH-17	PH-PH-17	PH-PH-18	PH-PH-19	PH-PH-2
		Date Collected:	9/12/2013	9/11/2013	9/10/2013	9/9/2013	9/11/2013	9/9/2013	9/6/2013	9/11/2013	9/6/2013	9/11/2013	9/10/2013	9/12/2013	9/12/2013	9/13/2013	9/12/2013	9/10/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500																
1,2,4-Trimethylbenzene	ug/l	62	40 U	15.1	2 U	2 U	75.6	14.6	2 U	797	386	390	53	369	386	1110	672	698
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	20 U	5 U	1 U	1 U	20 U	1 U	1 U	50 U	2.5 U	1 U	20 U	10 U	20 U	10 U	20 U	200 U
1,3,5-Trimethylbenzene	ug/l	53	19.5 J	321	2 U	2 U	67.2	1.8 J	2 U	250	212	188	274	125	134	178	43.4	201 J
2,2,4-Trimethylpentane	ug/l						100 U	5 U									100 U	
Benzene	ug/l	5	3500	1880	185	1 U	11300	96.5	3.3	15800	443	766	3500	6050	6480	9930	11100	24400
Ethanol	ug/l						2000 U	100 U									2000 U	
Ethylbenzene	ug/l	700	68.7	214	2.6	1 U	221	1.7	0.55 J	1040	159	179	70.7	237	243	980	749	943
Isopropylbenzene	ug/l	3500	60.3	35.1	1.2 J	2 U	85	13.4	42.1	39.4 J	32.7	72.6	19.4 J	40.8	41.9	70.5	29.6 J	400 U
Methyl-Tert-Butylether	ug/l	20	20 U	5 U	1 U	1 U	20 U	1 U	1 U	50 U	2.5 U	1 U	20 U	10 U	20 U	10 U	20 U	200 U
Naphthalene	ug/l	100	100 U	276	5 U	5 U	85.1 J	5 U	5 U	282	167	193	59.2 J	136	139	468	215	1000 U
Tert-Butyl Alcohol	ug/l		500 U	282	25 U	25 U	500 U	30.1	25 U	1300 U	63 U	171	500 U	250 U	500 U	313	500 U	5000 U
Toluene	ug/l	1000	77.2	168	4.9	1 U	179	2.5	1 U	766	18.3	71.8	20 U	33.3	35.7	335	199	709
Total Xylenes	ug/l	10000	86.2	141	3.1	1 U	271	10.1	2	1980	369	715	93.9	434	442	2450	1060	1810
Total VOCs	ug/l		3811.9	3332.2	196.8	1 U	12283.9	170.7	47.95	20954.4	1787	2746.4	4070.2	7425.1	7901.6	15834.5	14068	28761

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	PH-PH-20	PH-PH-21	PH-PH-22	PH-PH-23	PH-PH-24	PH-PH-3	PH-PH-4	PH-PH-6	PH-PZ-4	PH-RW-A	PH-RW-B	PH-RW-C	PH-RW-CA	PH-RW-D	PH-RW-E	PH-RW-F	PH-RW-G
		Date Collected:	9/10/2013	9/11/2013	9/10/2013	9/10/2013	9/10/2013	9/12/2013	9/12/2013	9/9/2013	9/12/2013	9/10/2013	9/10/2013	9/13/2013	9/13/2013	9/12/2013	9/13/2013	9/10/2013	9/12/2013
		Sample Type:	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500																	
1,2,4-Trimethylbenzene	ug/l	62	996	7	2 U	2 U	2 U	287	3.1	2 U	3.1	836	689	121	780	387	76.7	3.3 J	158
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	40 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	100 U	50 U	5 U	20 U	1 U	10 U	2.5 U	10 U
1,3,5-Trimethylbenzene	ug/l	53	308	0.98 J	2 U	2 U	2 U	78.4	6.5	2 U	1.4 J	274	231	44.8	256	68.4	106	5 U	160
2,2,4-Trimethylpentane	ug/l								5 U			500 U	250 U			5 U			50 U
Benzene	ug/l	5	10900	675	31.3	1 U	1 U	18.8	228	1 U	3.5	11300	7090	3090	10700	244	6700	382	1880
Ethanol	ug/l								100 U			10000 U	5000 U			100 U			1000 U
Ethylbenzene	ug/l	700	1200	8.7	1.5	1 U	1 U	56.3	26.5	1 U	0.83 J	400	355	119	751	101	279	2 J	148
Isopropylbenzene	ug/l	3500	66.7 J	4.8	0.61 J	2.9	1 J	22.7	65	2 U	2 U	200 U	100 U	11.4	44.2	18.1	40.3	5 U	18.7 J
Methyl-Tert-Butylether	ug/l	20	40 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	50 U	5 U	20 U	1 U	10 U	2.5 U	10 U
Naphthalene	ug/l	100	383	5 U	5 U	5 U	5 U	46.1	2.3 J	5 U	5 U	426 J	347	67.8	408	127	63.8	13 U	115
Tert-Butyl Alcohol	ug/l		1000 U	25 U	75.7	25 U	25 U	25 U	25 U	25 U	25 U	338 J	1300 U	94 J	496 J	13.2 J	250 U	63 U	250 U
Toluene	ug/l	1000	420	9.4	1 U	1 U	1 U	1.6	73.9	1 U	1 U	219	155	37.2	344	13.5	91.2	2.5 U	25.5
Total Xylenes	ug/l	10000	2340	21.9	0.64 J	1 U	1 U	94.6	41.2	1 U	1.5	1360	975	243	2110	440	459	6	294
Total VOCs	ug/l		16613.7	727.78	109.75	2.9	1	605.5	446.5	1 U	10.33	15153	9842	3828.2	15889.2	1412.2	7816	393.3	2799.2

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	PH-RW-H	PH-RW-H	PH-RW-I	PH-RW-I	PH-RW-M	PH-RW-M	PH-RW-N	PH-RW-O	PH-RW-P	PH-RW-Q	PH-RW-S	PH-RW-T	PH-RW-U	PH-RW-V	PH-RW-W	SSEPTA-PH-8	FIELD BLANK
		Date Collected:	9/11/2013	9/11/2013	9/6/2013	9/6/2013	9/9/2013	9/9/2013	9/6/2013	9/9/2013	9/6/2013	9/9/2013	9/13/2013	9/6/2013	9/6/2013	9/13/2013	9/11/2013	9/12/2013	9/4/2013
		Sample Type:	FD	N	FD	N	FD	N	N	N	N	N	N	N	N	N	N	N	FB
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500																	
1,2,4-Trimethylbenzene	ug/l	62	43.2	41.5	255	266	7.8	7.6	2 U	3.9	2 U	2 U	2 U	2.9	82.9	26.4	803	2 U	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	50 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	14.4	14	117	122	11.1	2 U	2 U	5.2	0.77 J	2 U	0.78 J	2 U	55.6	9.7	159	2 U	2 U
2,2,4-Trimethylpentane	ug/l																250 U		
Benzene	ug/l	5	364	346	1630	1680	245	53.5	46.8	8.6	25.1	48	144	44.1	156	129	15900	1 U	1 U
Ethanol	ug/l																5000 U		
Ethylbenzene	ug/l	700	28.4	28.2	115	122	17.1	18.7	1.5	1.1	0.92 J	1 U	3.8	0.54 J	11.3	16.4	1060	1 U	1 U
Isopropylbenzene	ug/l	3500	17.8	17	11 J	12.2 J	15.2	11.6	69.8	3.3	38.7	0.5 J	16	1 J	1.9 J	1.4 J	41 J	2 U	2 U
Methyl-Tert-Butylether	ug/l	20	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	50 U	1 U	1 U
Naphthalene	ug/l	100	11.8	11.3	86	95.9	4.6 J	5 U	5 U	2 J	5 U	5 U	5 U	5 U	25.5	5.8	240 J	5 U	5 U
Tert-Butyl Alcohol	ug/l		28.1	26.2	250 U	250 U	25 U	25 U	25 U	25 U	25 U	25 U	17.1 J	25 U	25 U	25 U	1300 U	25 U	25 U
Toluene	ug/l	1000	7.5	7.3	61.1	60.9	19.1	4.2	12.5	1.5	6.2	1 U	1.8	1 U	3.6	4.3	731	1 U	1 U
Total Xylenes	ug/l	10000	37.3	36.4	338	356	44.6	2.8	9.2	1.8	3.7	1 U	6.5	1	88.2	45.2	2500	1 U	1 U
Total VOCs	ug/l		552.5	527.9	2613.1	2715	364.5	98.4	139.8	27.4	75.39	48.5	189.98	49.54	425	238.2	21434	1 U	1 U

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	FIELD BLANK	RINSE BLANK	RINSE BLANK	RINSE BLANK	RINSE BLANK	RINSE BLANK	RINSE BLANK	RINSE BLANK
		Date Collected:	9/5/2013	9/6/2013	9/9/2013	9/10/2013	9/11/2013	9/12/2013	9/13/2013	9/4/2013	9/5/2013	9/6/2013	9/9/2013	9/10/2013	9/11/2013	9/12/2013
		Sample Type:	FB	FB	FB	FB	FB	FB	FB	RB	RB	RB	RB	RB	RB	RB
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500														
1,2,4-Trimethylbenzene	ug/l	62	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
1,2-Dichloroethane	ug/l	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2,2,4-Trimethylpentane	ug/l		5 U			5 U					5 U			5 U		
Benzene	ug/l	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethanol	ug/l		100 U			100 U					100 U			100 U		
Ethylbenzene	ug/l	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/l	3500	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl-Tert-Butylether	ug/l	20	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	ug/l	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tert-Butyl Alcohol	ug/l		25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Toluene	ug/l	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Xylenes	ug/l	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs	ug/l		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Summary of VOC Analytical Results
Former Defense Supply Center Philadelphia
Third Quarter 2013

		Location ID:	RINSE BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK
		Date Collected:	9/13/2013	9/3/2013	9/4/2013	9/5/2013	9/9/2013	9/10/2013	9/11/2013	9/12/2013
		Sample Type:	RB	TB	TB	TB	TB	TB	TB	TB
Volatile Organics	Units	PADEP_MSC_2011 NR_UAQ_TDS<2500								
1,2,4-Trimethylbenzene	ug/l	62	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
1,2-Dibromoethane	ug/l	0.05	0.02 U	0.02 U	0.02 U			0.02 U	0.02 U	
1,2-Dichloroethane	ug/l	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	ug/l	53	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
2,2,4-Trimethylpentane	ug/l					5 U	5 U	5 U	5 U	5 U
Benzene	ug/l	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethanol	ug/l					100 U	100 U	100 U	100 U	100 U
Ethylbenzene	ug/l	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	ug/l	3500	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl-Tert-Butylether	ug/l	20	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Naphthalene	ug/l	100	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Tert-Butyl Alcohol	ug/l		25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Toluene	ug/l	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Xylenes	ug/l	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs	ug/l		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

PH-MW-55	
Date	9/11/2013
1,2,4-Trimethylbenzene	1,190
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	374
2,2,4-Trimethylpentane	4.5 U
Benzene	5,480
Ethanol	660 U
Ethylbenzene	989
Isopropylbenzene	69.4
Methyl-Tert-Butylether	3.3 U
Naphthalene	491
Tert-Butyl Alcohol	37 U
Toluene	238
Total Xylenes	2,800
Total VOCs	11,631

PH-PH-1	
Date	9/11/2013
1,2,4-Trimethylbenzene	797
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	13 U
1,3,5-Trimethylbenzene	250
Benzene	15,800
Ethylbenzene	1,040
Isopropylbenzene	39.4 J
Methyl-Tert-Butylether	8.2 U
Naphthalene	282
Tert-Butyl Alcohol	92 U
Toluene	766
Total Xylenes	1,980
Total VOCs	20,954

PH-RW-W	
Date	9/11/2013
1,2,4-Trimethylbenzene	803
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	13 U
1,3,5-Trimethylbenzene	159
2,2,4-Trimethylpentane	11 U
Benzene	15,900
Ethanol	1,700 U
Ethylbenzene	1,060
Isopropylbenzene	41 J
Methyl-Tert-Butylether	8.2 U
Naphthalene	240 J
Tert-Butyl Alcohol	92 U
Toluene	731
Total Xylenes	2,500
Total VOCs	21,434

PH-IW-10	
Date	9/11/2013
1,2,4-Trimethylbenzene	19 U
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	26 U
1,3,5-Trimethylbenzene	36 U
Benzene	36,100
Ethylbenzene	284
Isopropylbenzene	45 U
Methyl-Tert-Butylether	16 U
Naphthalene	110 U
Tert-Butyl Alcohol	180 U
Toluene	150
Total Xylenes	232
Total VOCs	36,766

PH-MW-43	
Date	9/11/2013
1,2,4-Trimethylbenzene	65
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	2.6 U
1,3,5-Trimethylbenzene	17.9 J
Benzene	4,100
Ethylbenzene	56
Isopropylbenzene	13.1 J
Methyl-Tert-Butylether	1.6 U
Naphthalene	79.9
Tert-Butyl Alcohol	5,640
Toluene	123
Total Xylenes	162
Total VOCs	10,257

PH-RW-A	
Date	9/10/2013
1,2,4-Trimethylbenzene	836
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	26 U
1,3,5-Trimethylbenzene	274
2,2,4-Trimethylpentane	23 U
Benzene	11,300
Ethanol	3,300 U
Ethylbenzene	400
Isopropylbenzene	45 U
Methyl-Tert-Butylether	3.3 U
Naphthalene	426 J
Tert-Butyl Alcohol	338 J
Toluene	219
Total Xylenes	1,360
Total VOCs	15,153

PH-PH-2	
Date	9/10/2013
1,2,4-Trimethylbenzene	698
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	52 U
1,3,5-Trimethylbenzene	201 J
Benzene	24,400
Ethylbenzene	943
Isopropylbenzene	89 U
Methyl-Tert-Butylether	33 U
Naphthalene	220 U
Tert-Butyl Alcohol	370 U
Toluene	709
Total Xylenes	1,810
Total VOCs	28,761

PH-IW-11	
Date	9/10/2013
1,2,4-Trimethylbenzene	19 U
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	26 U
1,3,5-Trimethylbenzene	36 U
Benzene	13,600
Ethylbenzene	61.8 J
Isopropylbenzene	45 U
Methyl-Tert-Butylether	8.2 U
Naphthalene	110 U
Tert-Butyl Alcohol	92 U
Toluene	163
Total Xylenes	510
Total VOCs	14,335

PH-PH-20	
Date	9/10/2013
1,2,4-Trimethylbenzene	996
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	10 U
1,3,5-Trimethylbenzene	308
Benzene	10,900
Ethylbenzene	1,200
Isopropylbenzene	66.7 J
Methyl-Tert-Butylether	6.6 U
Naphthalene	383
Tert-Butyl Alcohol	73 U
Toluene	420
Total Xylenes	2,340
Total VOCs	16,614

DSCP-IW-12	
Date	9/13/2013
1,2,4-Trimethylbenzene	27 J
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	36.9 J
Benzene	15,800
Ethylbenzene	637
Isopropylbenzene	34.2 J
Methyl-Tert-Butylether	71.9
Naphthalene	66.1 J
Tert-Butyl Alcohol	301 J
Toluene	335
Total Xylenes	775
Total VOCs	18,084

PH-RW-CA	
Date	9/13/2013
1,2,4-Trimethylbenzene	780
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	256
Benzene	10,700
Ethylbenzene	751
Isopropylbenzene	44.2
Methyl-Tert-Butylether	3.3 U
Naphthalene	408
Tert-Butyl Alcohol	496 J
Toluene	344
Total Xylenes	2,110
Total VOCs	15,889

DSCP-MW-3A	
Date	9/5/2013
1,2,4-Trimethylbenzene	604
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	181
Benzene	9,630
Ethylbenzene	777
Isopropylbenzene	69.3
Methyl-Tert-Butylether	3.3 U
Naphthalene	298
Tert-Butyl Alcohol	37 U
Toluene	270
Total Xylenes	2,040
Total VOCs	13,869

PH-MWS-2A	
Date	9/11/2013
1,2,4-Trimethylbenzene	75.6
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	67.2
2,2,4-Trimethylpentane	4.5 U
Benzene	11,300
Ethanol	660 U
Ethylbenzene	221
Isopropylbenzene	85
Methyl-Tert-Butylether	3.3 U
Naphthalene	85.1 J
Tert-Butyl Alcohol	37 U
Toluene	179
Total Xylenes	271
Total VOCs	12,284

DSCP-MW-30	
Date	9/12/2013
1,2,4-Trimethylbenzene	614
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	162
2,2,4-Trimethylpentane	4.5 U
Benzene	6,970
Ethanol	660 U
Ethylbenzene	526
Isopropylbenzene	45.2
Methyl-Tert-Butylether	17.6 J
Naphthalene	289
Tert-Butyl Alcohol	227 J
Toluene	331
Total Xylenes	1,220
Total VOCs	10,402

PH-PH-18	
Date	9/13/2013
1,2,4-Trimethylbenzene	1,110
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	2.6 U
1,3,5-Trimethylbenzene	178
Benzene	9,930
Ethylbenzene	980
Isopropylbenzene	70.5
Methyl-Tert-Butylether	1.6 U
Naphthalene	468
Tert-Butyl Alcohol	313
Toluene	335
Total Xylenes	2,450
Total VOCs	15,835

DSCP-MW-65	
Date	9/13/2013
1,2,4-Trimethylbenzene	888
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	13 U
1,3,5-Trimethylbenzene	263
Benzene	25,700
Ethylbenzene	1,310
Isopropylbenzene	79.8 J
Methyl-Tert-Butylether	8.2 U
Naphthalene	405
Tert-Butyl Alcohol	573 J
Toluene	1,070
Total Xylenes	4,640
Total VOCs	34,929

DSCP-MW-32	
Date	9/5/2013
1,2,4-Trimethylbenzene	552
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	144
2,2,4-Trimethylpentane	4.5 U
Benzene	8,180
Ethanol	660 U
Ethylbenzene	720
Isopropylbenzene	87.7
Methyl-Tert-Butylether	3.3 U
Naphthalene	412
Tert-Butyl Alcohol	37 U
Toluene	96.3
Total Xylenes	732
Total VOCs	10,924

PH-PH-19	
Date	9/12/2013
1,2,4-Trimethylbenzene	672
1,2-Dibromoethane	0.011 U
1,2-Dichloroethane	5.2 U
1,3,5-Trimethylbenzene	43.4
2,2,4-Trimethylpentane	4.5 U
Benzene	11,100
Ethanol	660 U
Ethylbenzene	749
Isopropylbenzene	29.6 J
Methyl-Tert-Butylether	3.3 U
Naphthalene	215
Tert-Butyl Alcohol	37 U
Toluene	199
Total Xylenes	1,060
Total VOCs	14,068

Legend:

Total VOCs (Shallow Acquifer Wells)
- ≤ 1,000 ppb
- ≥ 1000 & < 10,000 ppb
- ≥ 10,000 ppb

Total VOCs (Intermediate Acquifer Wells)
- ≤ 1,000 ppb
- ≥ 1000 & < 10,000 ppb
- ≥ 10,000 ppb

Value — Exceedes Non-Residential Used aquifer (TDS<2500 mg/L) Groundwater MSCs for VOCs

Value — Exceedances is due to an elevated detection limit

- Monitoring Well
- Recovery Well
- Manhole
- Sewer Line
- Interpreted Limits of the** "Hole/Breach"

PADEP Short List of Petroleum Products*	
VOCs	PADEP MSC
1,2,4-Trimethylbenzene	62 µg/L
1,2-Dibromoethane	0.05 µg/L
1,2-Dichloroethane	5 µg/L
1,3,5-Trimethylbenzene	53 µg/L
Benzene	5 µg/L
Ethylbenzene	700 µg/L
Isopropylbenzene	3500 µg/L
Methyl tert-butyl ether	20 µg/L
Naphthalene	100 µg/L
Toluene	1000 µg/L
Xylenes (total)	10000 µg/L

Notes:

1. VOCs are screened against Action Level of Non-Residential Used aquifer (TDS <2500 mg/L) Groundwater MSCs for VOCs.
2. All units are in micrograms per liter (µg/L).
3. Results shown are for Total VOCs greater than or equal to 10,000 µg/L.
4. MSC - Medium-Specific Concentration
5. VOC - Volatile Organic Compound
6. TDS - Total Dissolved Solids
7. J - The analyte was positively identified; the quantitation is an estimation
8. D - The reported value is from a dilution
9. U - Undetected at the Limit of Detection

*For stored leaded gasoline, aviation gasoline, and jet fuel.

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE.

0 250 500 750 1,000
SCALE IN FEET

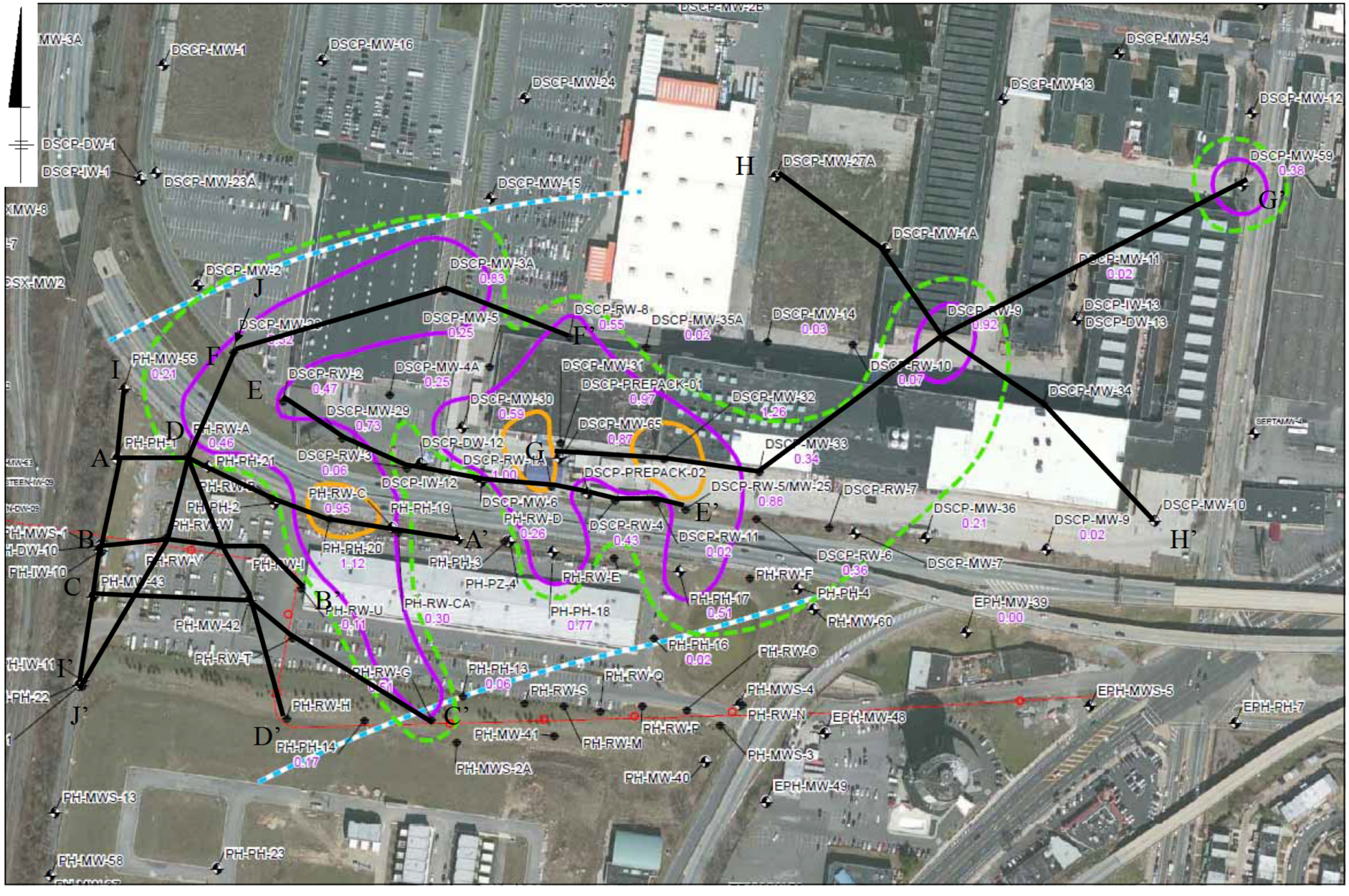
FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

SITE TOTAL VOCs CONCENTRATION GREATER THAN 10,000 µg/L- SHALLOW AQUIFER GROUNDWATER

ARCADIS

CITY: SF DIV/GROUP: ENV/IM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT: (PROJECT #)
PATH: Q:\DLA\3Q2013ProgressReportmxd\Fig4_TotalVOCsGreater10K_3Q2013_Site_Shallow_D-size.mxd 12/18/2013 4:09:32 PM

Appendix D



Transects:

A — A’: PH-1, RW-A, PH-21, RW-B, PH2-0, PH-19

B — B’: MSW-1, RW-W, RW-V, RW-U

C — C’: MW-43, MW-42, RW-T, RW-G

D — D’: RW-A, RW-V, MW-42, RW-H

E — E’: RW-2, MW-29, RW-3, MW-6, RW-1A, Pre-pack-2, RW-4, RW-11, RW-5

F — F’: MW-28, MW-3A, RW-8

G — G’: Pre-pack-1, MW-32, MW-33, RW-9, MW-59

H — H’: MW-27A, MW-1A, RW-9, MW-34, MW-10

I — I’: MW-55, PH-1, MWS-1, MW-43, PH-22

J — J’: MW-28, RW-A, RW-W, PH-22

LEGEND:

- Inferred Product Thickness ~ 0.25 ft
- Inferred Product Thickness ~ 0.50 ft
- Inferred Product Thickness ~ 1.00 ft
- Monitoring Well
- Recovery Well
- Manhole
- Sewer Line
- Interpreted Limits of the “Hole/ Breach” **

Notes:
LNAPL thickness contours calculated from Q2 June 2013 gauging results.

The apparent LNAPL thickness contours are approximate and do not necessarily indicate consistent in-situ LNAPL saturation, volume, mobility, or recoverability. Measured LNAPL thickness is influenced spatially by heterogeneous LNAPL and hydrogeologic characteristics, and temporally by groundwater level fluctuations.

** Approximate edges of the breach in the confining bed between the Site’s shallow and deep aquifer zones as discussed during the March 6, 2012 meeting with the PADEP, DLA, and USACE

FORMER DEFENSE SUPPLY CENTER, PHILADELPHIA, PA

CROSS SECTION LOCATIONS

ARCADIS

FIGURE 1

A

A’

PH-PH-1
Elev: 22.72 ft

PH-RW-A
Elev: 21.51 ft

PH-PH-21
Elev: 21.25 ft

PH-RW-B
Elev: 21.39 ft

PH-PH-20
Elev: 21.06 ft

PH-PH-19
Elev: 20.75 ft

Elevation (ft amsl NAVD88)

40
35
30
25
20
15
10
5
0
-5
-10
-15
-20

0
50
100
150
200
250
300
350
400
450
500
550
600
650
700

Distance Along Transect (ft)

Clay

Top soil, organics, and silt

Silt

Silt, sand and gravel

Sand

Silty sand

GW Elev. Dec 2011

GW Elev. July 2012

GW Elev. June 2013

GW Elev. Aug 2013

Avg GW Elevation

Approx. smear zone

Approximate max sparge depth with 7.5 Hp blower motor

Approximate max sparge depth with 10 Hp blower motor

Air sparge well approximations

Downward head potential

Average smear zone boundary approximation (Aqui-Ver, Inc., December 2009)

FORMER DEFENSE SUPPLY CENTER, PHILADELPHIA, PA

Cross Section A — A’

ARCADIS

FIGURE
2

B

B’

PH-MWS-1
Elev: 23.21 ft

PH-RW-W
Elev: 23.22 ft

PH-RW-V
Elev: 22.03 ft

PH-RW-I
Elev: 20.24 ft

PH-RW-U
Elev: 20.68 ft

Elevation (ft amsl NAVD88)

40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30

-20
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340

Distance Along Transect (ft)

Clay

Top soil, organics, and silt

Silt

Silt, sand and gravel

Sand

Silty sand

GW Elev. Dec 2011

GW Elev. July 2012

GW Elev. June 2013

GW Elev. Aug 2013

Avg GW Elevation

Approx. smear zone

Approximate max sparge depth with 7.5 Hp blower motor

Approximate max sparge depth with 10 Hp blower motor

Air sparge well approximations

Downward head potential

Average smear zone boundary approximation (Aqui-Ver, Inc., December 2009)

FORMER DEFENSE SUPPLY CENTER, PHILADELPHIA, PA

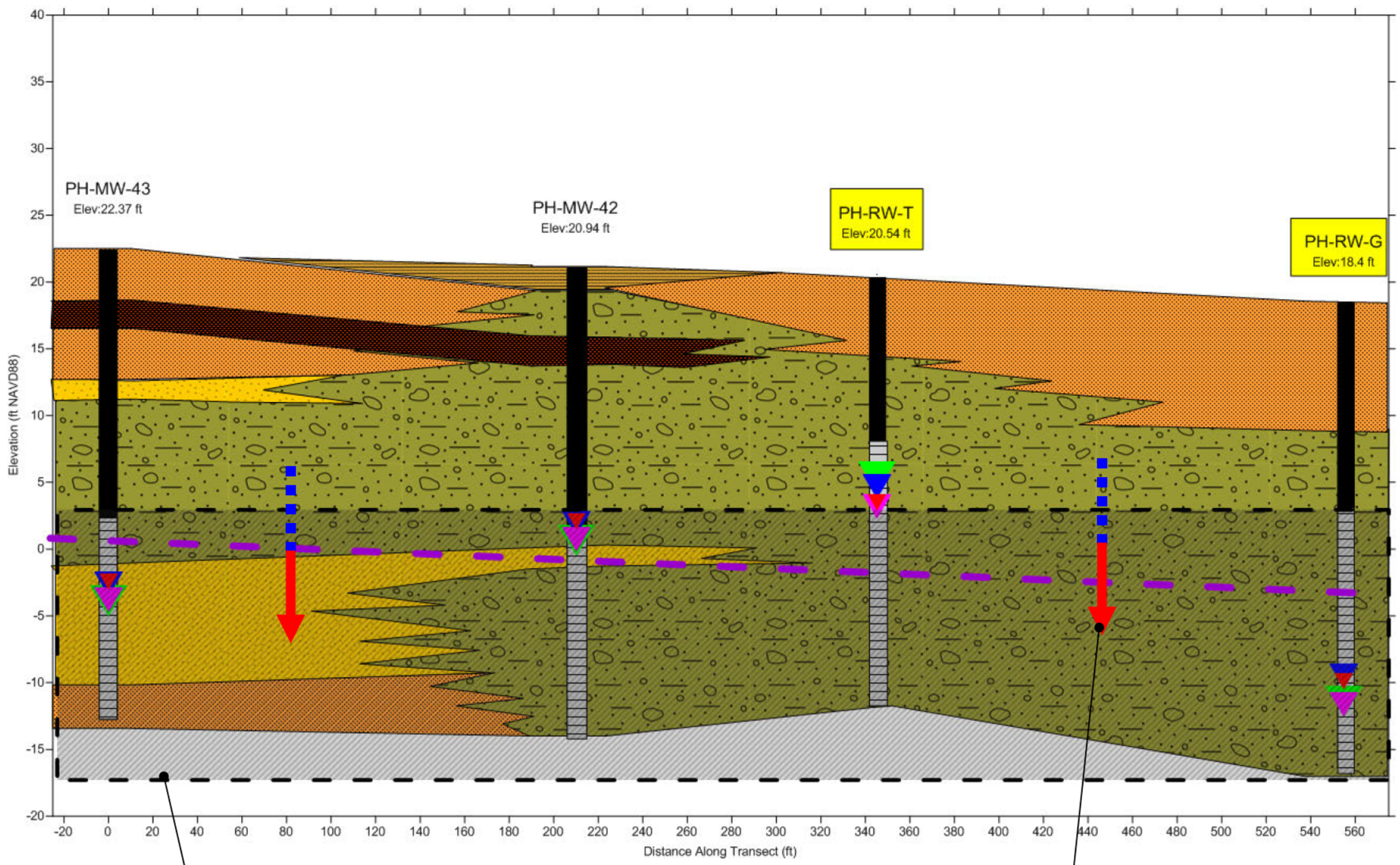
Cross Section B — B’

ARCADIS

FIGURE 3

C

C’



Average smear zone boundary approximation (Aqui-Ver, Inc., December 2009)

Downward head potential

FORMER DEFENSE SUPPLY CENTER, PHILADELPHIA, PA

Cross Section C — C’

ARCADIS

FIGURE 4

D

D’

PH-RW-A
Elev:21.51 ft

PH-RW-V
Elev:22.03 ft

PH-MW-42
Elev:20.94 ft

PH-RW-H
Elev:19.44 ft

Elevation (ft amsl NAVD88)

40
35
30
25
20
15
10
5
0
-5
-10
-15
-20

0
50
100
150
200
250
300
350
400
450
500
550
600
650

Distance Along Transect (ft)

Clay

Top soil, organics, and silt

Silt

Silt, sand and gravel

Sand

Silty sand

GW Elev. Dec 2011

GW Elev. July 2012

GW Elev. June 2013

GW Elev. Aug 2013

Avg GW Elevation

Approx. smear zone

Average smear zone boundary approximation (Aqui-Ver, Inc., December 2009)

Downward head potential

FORMER DEFENSE SUPPLY CENTER, PHILADELPHIA, PA

Cross Section D — D’

ARCADIS

FIGURE
5

Appendix W

Subsection Two: Biovent/Biosparge System

System Upgrades, Pilot Design, and Study

Defense Supply Center Philadelphia

SYSTEM UPGRADES, PILOT DESIGN AND STUDY

Biovent/Biosparge System

Former Defense Supply Center Philadelphia
Philadelphia, Pennsylvania

November 2016

SYSTEM UPGRADES, PILOT DESIGN AND STUDY

Former Defense Supply Center Philadelphia
Philadelphia, Pennsylvania

Prepared for:

USACE

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Date:

November 2016

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CONTENTS

1 Executive Summary 1

2 Introduction 4

2.1 Purpose and Scope 4

2.2 Report Organization 5

3 Site Overview 6

3.1 Site History and Description 6

3.2 Extent of Contamination 7

3.3 Regulatory Framework 7

4 Conceptual Site Model 9

4.1 LNAPL and COC 9

4.2 Hydrogeologic and Hydrostratigraphic Framework 11

5 Pilot System Design 12

5.1 Pilot Study Basis and Objectives 12

5.2 Injection Well Network Layout and Design Basis 14

5.2.1 Biosparging Wells 15

5.2.2 Bioventing Wells 16

5.2.3 Performance Monitoring Wells 17

5.3 Conveyance Piping 17

5.4 Pilot System Equipment and Design Basis 18

5.4.1 Pilot System Equipment 19

6 Pilot System Mass removal Estimates 21

6.1 Pre-Design Testing 21

6.2 Mass Removal Rate Calculations 21

7 System ProveOut 22

8 Permit Ledger 24

9 Construction Quality Management 25

10 Estimated cost of Construction 26

11 References 28

TABLES

Table 1	Permit Ledger
Table 2	Estimated Cost to Construct- Expanded Case
Table 3	Estimated Cost to Construct- Base Case

APPENDICES

Appendix A	Supplemental Investigation Letter Report
Appendix B	Design Report Figures
Appendix C	Construction Drawings
Appendix D	Supporting Calculations

1 EXECUTIVE SUMMARY

This System Upgrades, Pilot Design and Study Report (Design Report) has been prepared under Task Order No. [redacted] of Contract Number [redacted] (the Contract) for the United States Army Corps of Engineers (USACE), Philadelphia District. This work builds upon the January 2014 In-situ Aerobic Biodegradation Basis of Design (BOD) report, which discussed a flexible bioventing/biosparging-focused strategy for the treatment of light non-aqueous phase liquid (LNAPL) impacts at the former Defense Supply Center Philadelphia (DSCP) Site (Site), located in Philadelphia, PA. Both the BOD and this Design Report focus on the utilization of soil vapor extraction and air sparging remediation equipment obtained by the USACE from the United States Environmental Protection Agency's (USEPA's) Valmont Superfund (Valmont) project.

This report includes a Site overview, bioventing/biosparging strategy, description and results of bioventing testing, supporting conceptual site model updates and criteria and recommendations for well locations, depths, and functionality (vadose zone forced air injection, biosparging or sparging).

Closed under the 1993 Base Realignment and Closure (BRAC) program, the former DSCP property has been redeveloped for commercial and industrial use. The Site's petroleum hydrocarbon impacts and related human health exposure pathways are associated with LNAPL that is present above and below the groundwater table. LNAPL is also present in a "smear zone" where residual liquid phase is entrapped in pore spaces both above and below the average water table. Remediation began in 1996 using skimmer pumps installed to remove LNAPL from the shallow aquifer beneath the Site. A full-scale Vapor Enhanced Skimming (VES) system has been in operation since its installation in 2005. Ongoing Site remediation activities continue as required by the 1999 Administrative Order (Order) between the Defense Logistics Agency (DLA) and the Pennsylvania Department of Environmental Protection (PADEP).

While the existing VES system remains productive, its effectiveness is limited to impacts above the water table. Bioventing and biosparging remedial techniques may be implemented to improve remediation by affecting impacts above and below the water table and thereby shorten the overall lifecycle at the Site. Bioventing techniques, characterized by use of air venting or injection to induce airflow in the subsurface, are used to increase oxygen levels and enhance natural microbial biodegradation of organic constituents in the unsaturated soil zone. Biosparging techniques operate similarly, but deliver air below the water table, thereby increasing dissolved oxygen levels and promoting bioremediation in the saturated zone.

The 2014 BOD report proposed the evaluation of both bioventing and biosparging, remedial techniques as effective means for removal of otherwise immobile and inaccessible residual LNAPL in saturated and unsaturated soils. Locations at the Site, shown in the BOD report, are suitable for a bioventing or biosparging approach through the following criteria:

- The presence of sandy strata that allow for air movement in the subsurface
- The presence of biodegradable targets, especially lighter (lower molecular weight), and more quickly remediated petroleum constituents like those found in gasoline
- Evidence of currently anaerobic redox environments with low degradation rates that could be improved toward more aerobic conditions with higher degradation rates

- For bioventing, field respirometry testing that indicates that oxygen utilization rates are favorable for enhancing biodegradation rates
- The presence of existing utilities, remediation infrastructures, and building footprints
- Available equipment

The BOD report initially identified three potential Site locations for the design and installation of a remediation system based around the procured Valmont equipment. BOD “Area 1”, located on Philadelphia Housing Authority (PHA) property in the southern portion of the Site was ultimately selected based on key criteria including:

- Proximity to Site LNAPL and associated petroleum hydrocarbon constituents of concern (COC),
- Proximity to an important hydrostratigraphic feature known informally as “the breach”, an area where an increase in coarser materials within the lithology separating the shallow aquifer from the deep aquifer contributes to a flux from the shallow to the deep aquifer, and
- Location in a relatively open area of the Site proximal to an occupied building with an installed indoor air vapor mitigation system.

Using interpreted hydrogeological conditions and localized “inward” groundwater flow directions while adjusting to account for the surface constraints and related constructability considerations, a well layout consisting of four groups has been identified for the bioventing/biosparge system. The proposed layout represents a balance between the conceptual site model (CSM) and constructability. The four groups will contain a total of 32 biosparge wells and 16 bioventing wells.

Mass biodegradation rates of the bioventing/biosparging wells were estimated under two different scenarios: Scenario One (“Base Case”) involves the installation of one group of biosparge/bioventing wells while Scenario Two (“Expanded Case”) includes all four groups of biosparge/bioventing wells. The equipment obtained from the Valmont Site provides flexible and scalability capabilities with which to enhance the pursuit of Site cleanup goals. Estimated costs for construction are summarized below:

Scenario	Number of Groups	Number Bioventing Wells	Estimated Hydrocarbon Biodegradation Rate by Bioventing	Number Biosparging Wells	Estimated Mass Degradation by Biosparging[1,2]	Pilot Treatment System Installation	Controls Installation	Total Cost[3]
Scenario 1 "Base Case"	1	4	209 lbs/day	8	0.1 lbs/day	$[redacted]	$[redacted]	$[redacted]
Scenario 2 "Expanded Case"	4	16	627 lbs/day	32	2.9 lbs/day	$[redacted]	$[redacted]	$[redacted]

Notes:
1 – Assumes that approximately 3 lbs of oxygen are required to degrade 1 lb of hydrocarbon, injection of atmospheric air with an oxygen concentration of 20.9% and an oxygen transfer efficiency ranging from a low of 0.1% to a high of 1% (for Scenario 2).
2 – Additional assumptions discussed further in Section 6.2 of the report.
3 – O&M costs not included. It is assumed O&M costs will be covered under existing O&M contract(s).

Scenario1 represents an approach focused on a discrete portion of the BOD Area 1 subsurface that could be scaled up as needed in response to future operation performance. Scenario 2 represents a maximized balance of hydrostratigraphic CSM elements, Site surface constraints and the capabilities of the Valmont equipment. Either scenario represents remedial enhancements that would help accelerate the attainment of Site cleanup goals. The estimated hydrocarbon and mass degradation is mass degraded in addition to the existing VES system. The existing remediation system degrades approximately 1,100 lbs/day of hydrocarbon. Adding the estimated hydrocarbon biodegradation rate from the expanded case would increase the degradation rate to 1,727 lbs/day, or approximately 37%.

2 INTRODUCTION

ARCADIS has prepared this System Upgrades, Pilot Design and Study Report (Design Report) in accordance with, Task Order No. [redacted] of Contract Number [redacted] (the Contract) for the United States Army Corps of Engineers (USACE), Philadelphia District. This task order complements work both completed and ongoing under Contract task order numbers [redacted] and [redacted] in pursuit of cleanup goals defined in the 1999 Administrative Order (Order) between the Defense Logistics Agency (DLA) and the Pennsylvania Department of Environmental Protection (PADEP). The Order includes:

- Remedial activities to remove petroleum hydrocarbon light non-aqueous phase liquid (LNAPL) at the former DSCP Site (Figure 1) to the maximum extent practicable, and
- Required the Site meet "one or a combination of the remedial standards set forth in the Land Recycling Act and the regulations found in 25 Pa. Code Chapter 250."

This report describes a bioventing and biosparging system designed to increase the rate of Site cleanup in tandem with existing Site remediation infrastructure, while pursuing the definition of the Order. The design is based around remediation equipment, specifically two positive displacement-style rotary lobe blowers obtained from the United States Environmental Protection Agency's (USEPA's) Valmont Superfund (Valmont) Site by the USACE Philadelphia District.

2.1 Purpose and Scope

The purpose of the Design Report is to produce detailed plans and specifications for the design of a flexible and scalable pilot biovent/biosparge remediation system utilizing equipment obtained by the USACE from the USEPA's Valmont project. The potential use of equipment obtained from the USEPA will increase the rate of LNAPL remediation at the DSCP Site and ultimately help decrease the time to Site closure under the PADEP Act 2 Program. An evaluation of the Valmont equipment's potential to help further remediation objectives at the Site was provided in the January 2014 In-situ Aerobic Biodegradation Basis of Design (BOD) report. The BOD report discussed a flexible bioventing strategy for the treatment of LNAPL impacts over a range of shallow aquifer depth intervals at three Site locations. This strategy was evaluated and prepared in support of the Site's principal remediation objectives, specifically; 1) the cleanup of Site LNAPL per the requirements of the Order, and 2) closure of the Site under an applicable Act 2 remediation standard. Through consideration of these criteria, and the additional data collected since publication of the BOD report, the Philadelphia Housing Authority (PHA) property and area adjacent to the Site's southern skimming system became the focus of the remediation system design described in this report. The additional data includes recent direct push investigation of BOD "Area 1" provided in the Supplemental Investigation to Support System Upgrades, Pilot Design and Study, Former Defense Supply Center Philadelphia (DSCP) Facility (Letter Report) (Pars, August 2016) (Appendix A).

Updates to the CSM, discussed in the BOD, led the project team to consider biosparging and bioventing as viable components of an aerobic in-situ remediation approach that could complement existing Site cleanup infrastructure. An improved understanding of the distribution of petroleum hydrocarbon COC,

geochemistry, and shallow aquifer zone hydrostratigraphy, supported the design of a biovent/biosparge system focus on BOD Area 1. The combined bioventing and biosparging pilot test approach is further supported by the receipt and testing of the Valmont remediation equipment at the former DSCP Site where the equipment is currently stored. The scope of this design includes the elements defined in the USACE scope of services document dated November 5, 2015 (amended) and in accordance with Contract Number [redacted], Task Order No. [redacted].

2.2 Report Organization

In addition to this introduction, the report consists of the following sections:

Section 3 Site Overview

Section 4 Conceptual Site Model

Section 5 Pilot System Design

Section 6 Pilot System Mass Removal Estimates

Section 7 Performance Monitoring

Section 8 Permit Ledger

Section 9 Construction Quality Management

Section 10 Estimated Cost of Construction

Section 11 References

3 SITE OVERVIEW

3.1 Site History and Description

The Former DSCP property was closed under the 1993 Base Realignment and Closure (BRAC) program. In 2001, the United States Army (Army) transferred the air and surface rights to the Philadelphia Authority for Industrial Development (PAID). All subsurface rights (deeper than 10 feet) belong to the Army. Shortly after the air rights were transferred, PAID began selling portions of the former DSCP property for re-development; however, redevelopment within the former DSCP property has been limited to commercial/industrial use as required by the Quitclaim Deeds for the various former DSCP property parcels.

Site remediation began in 1996 using skimmer pumps installed to remove LNAPL from the shallow aquifer zone. The 1999 Order established the regulatory framework for the Site and set specific cleanup objectives for the shallow aquifer zone (i.e., LNAPL recovery to the maximum extent practicable) and the larger Site (i.e., closure under an applicable Act 2 standard or set of standards). A full-scale vacuum enhanced skimming (VES) System was installed in 2005 to enable achievement of these objectives. The VES system is currently in operation as described in quarterly reports and as required by the Order. The VES system consistently recovers mass, but is limited in effectiveness due to current aquifer conditions at historic highs. The total amount of LNAPL recovered to date is approximately 1,048,410 gallons (Arcadis 2016).

The Site, as visible in Appendix B, Figure B-1, is generally defined by the land area bordered by Oregon Avenue, 20th Street, Penrose Avenue and South 26th Street, and covers approximately 87 acres in south Philadelphia, Pennsylvania. An east-west portion of Interstate 76 (I-76) bisects the Site, and along the western side of the Site, parallel to South 26th Street lie elevated railroad tracks located atop fill soil bedding approximately 20 feet thick. On the western parcel portion of the former DSCP property (44 acres) a shopping center known as Quartermaster Plaza was constructed in 2004. It currently contains approximately 18 retail stores and 4 restaurants. While most of the buildings on the eastern parcels of the former DSCP property are vacant, some are currently being used for commercial purposes and/or storage facilities. Buildings on the northern and eastern portions of the former DSCP property are owned and managed by Defense Realty. The balance of the land surrounding the Site is a mixture of commercial and residential properties. Immediately west of the Site is a large petrochemical refinery complex, the Sunoco Point Breeze Refinery, currently owned by Philadelphia Energy Solutions (PES). South of the former DSCP property across I-76 is the 55-acre former Passyunk Homes property.

The buildings on the former Passyunk Homes property were demolished in 2002. In 2009, the PHA constructed a building that reportedly included an integrated petroleum hydrocarbon vapor mitigation barrier and venting system on the northern portion of the former Passyunk Homes property. The southern portion of the former Passyunk Homes property is being redeveloped as privately owned residential dwellings (Siena Place Homes). The new construction included crawl space barriers designed to prevent subsurface to indoor air vapor intrusion.

3.2 Extent of Contamination

Petroleum hydrocarbon COC and LNAPL are present in the Site's shallow (i.e., water table) aquifer zone and dissolved COC are present in the underlying deep aquifer zone. At the Site, both aquifer zones are hydraulically connected by a central hydrostratigraphic feature that is hypothesized to be a paleochannel and informally known as "the breach." "The breach" is an area where an increase in coarser materials within the lithology separating the shallow aquifer from the deep aquifer contributes to a flux from the shallow to the deep aquifer. The location of Site LNAPL as defined by inferred thickness-based contour maps provided in quarterly reports has remained largely stable through time and focused above this feature. The distribution of dissolved phase COC in the shallow aquifer zone has also remained stable and above the breach through this time. Like the LNAPL, the COC distribution suggests a spatially stable shallow aquifer zone impact area composed of lighter end (e.g., gasoline to middle-distillate) constituents above the central and western portions of "the breach", with generally lower concentrations of these constituents elsewhere beneath the Site. These areas are also coincident with an area of largely downward head potentials as indicated by quarterly reported measurements obtained from paired shallow and deep aquifer zone wells (Arcadis 2015; Arcadis 2016).

3.3 Regulatory Framework

The Site is under an Order, dated December 10, 1999 between the Commonwealth of Pennsylvania (PADEP), and the Department of the Army and DSCP (implemented by the DLA). The Order requires that remediation be conducted as needed to remove as much petroleum LNAPL as is practicable from beneath the former DSCP property, including Quartermaster Plaza, and the following contiguous properties: the CSX railroad right of way, the Steen property, and the Former Passyunk Homes property (currently the PHA property and the Siena Place property). Collectively, these properties are defined in the Order as the "Affected Area", and under the Land Recycling Act (Act 2) the Affected Area is the "Site".

The Order also requires attainment of one or a combination of remedial standards under Act 2. Potential human health exposure pathways at the Site exist via vapor intrusion into occupied buildings due to LNAPL and petroleum hydrocarbon COC impacts present at shallow aquifer zone depths (e.g., from 15-30 feet below ground surface [ft bgs]). It is anticipated under Act 2, a Site Specific Standard (SSS) exposure pathway elimination- based cleanup approach will be pursued. This assumption is supported by the presence of existing Site buildings, specifically at Quartermaster Plaza, PHA and Siena Place, that have been constructed with integral vapor intrusion controls (i.e., "engineering controls" as defined under Act 2). To demonstrate pathway elimination, these existing engineering controls will be documented, and where necessary, new controls will be developed and implemented under a future, separate scope of work.

To obtain a SSS-based closure under Act 2 for Site LNAPL, remediation to the "maximum extent practicable" will entail demonstration of the stability of Site LNAPL (i.e., the post-remedial presence of weathered residual LNAPL), specifically through attainment of physical and chemical LNAPL stability criteria. These criteria will be defined in pending Act 2 submittals to the PADEP. It is anticipated that attainment will be demonstrated via statistical evaluation of:

- LNAPL and groundwater quality data collected to date, and
- Data to be collected at specific Site point of compliance wells as part of continued remediation performance monitoring events.

The biovent/biosparge system described herein is designed specifically to help existing Site remedial infrastructure achieve the aforementioned LNAPL stability criteria, and ultimately to attain Act 2 closure for Site LNAPL under the Order through a demonstration of residual LNAPL stability. It is assumed that Site closure under Act 2 (i.e., release of liability) for LNAPL and related groundwater COC will be further enabled through the elimination of all potential groundwater-drinking water exposure pathways via the future implementation of Site land use controls.

4 CONCEPTUAL SITE MODEL

The purpose of the BOD report was to evaluate the potential use of remediation equipment obtained from the USEPA to increase the rate of LNAPL remediation at the DSCP Site and ultimately to help decrease the time to Site closure under the PADEP Act 2 Program. As stated in the BOD report, "an understanding of the CSM is important because it provides background information for the basis of the bioventing system design." The BOD identified three Site areas where CSM elements, engineering considerations (e.g., proximity to buildings with installed VI controls), VES system optimization testing (e.g., respirometry and radius of influence testing) and O&M data collectively supported the design and installation of a biovent/biosparge system based around the aforementioned remediation equipment. Through consideration of these criteria, and the additional data collected since publication of the BOD report, BOD Area 1, located on PHA property and adjacent to the Site's southern skimming system became the focus of this Design Report.

CSM elements near BOD Area 1 that support the design of a biovent/biosparge system are summarized below. These elements include; 1) the nature and extent of Site petroleum hydrocarbon LNAPL and related shallow aquifer zone groundwater COCs, and 2) the BOD Area 1 hydrogeologic and hydrostratigraphic framework.

Appendix B presents figures from the Fourth Quarter of 2015 and Calendar Year (CY) 2015 Summary Progress Report (Q4 2015 Progress Report) for the Former Defense Supply Center Philadelphia (DSCP). The nature and extent of Site petroleum hydrocarbon LNAPL and related shallow aquifer zone groundwater COC are shown in these figures. These figures were used in lieu of similar figures included in the First or Second Quarter 2016 Progress Reports since nearly the entire Site's well network were sampled during the Fourth Quarter of 2015. On each figure, including the shallow aquifer zone potentiometric map, shallow aquifer zone groundwater VOC map and LNAPL thickness maps, BOD Area 1 is shown as a blue bordered polygon covering the parking lot and grassy area west of the PHA building and south of I-76.

Appendix A includes the Pars Environmental Letter Report (Pars, August 2016). Based on the integration of recent direct push-direct sensing data with existing Site and Area 1 CSM information, the report presents a BOD Area 1-focused interpretation of the Site's hydrogeologic and hydrostratigraphic framework within the larger context of Site and regional hydrogeological conditions.

4.1 LNAPL and COC

Appendix B presents three figures from the Q4 2015 Progress Report. These include:

- Figure B-1: LNAPL thickness map titled "Inferred Apparent Product Thickness (feet) in Monitoring and Recovery Wells";
- Figure B-2: A map from December 7, 2015 showing the extent of the petroleum hydrocarbon COCs in the shallow aquifer zone (titled "Site Total VOCs Concentration Greater than 10,000 ug/L – Shallow Aquifer Groundwater"); and
- Figure B-3: The shallow aquifer zone potentiometric surface map titled "Shallow Groundwater Potentiometric Contours".

Summarized below are key observations on the location of BOD Area 1 with respect to interpreted LNAPL extent and shallow aquifer zone groundwater COCs:

- Figure B-1: LNAPL distribution appears to be constrained within an elongated area, following an east-west trend that appears to roughly coincide with the recurring east-west "trough" in the shallow potentiometric surface (i.e., the 'breach'). In terms of interpreted extent and thickness, this LNAPL distribution has been consistently observed and documented throughout the project history and as recently as the second quarter of 2016 gauging and sampling event, occupied an area of similar extent and orientation. BOD Area 1, shown as a blue bordered polygon, is located immediately adjacent to the western edge of the interpreted LNAPL impact area and coincident potentiometric "breach."
- Past fingerprinting analysis (i.e., simulated boiling point and others) show the LNAPL in the south and west portions of the LNAPL impact area to be relatively rich in light end or low molecular weight petroleum hydrocarbon COC (i.e, conditions indicative of LNAPL that has yet to undergo weathering sufficient to achieve a Site specific standard based closure under the PADEP Act 2 program). As discussed in subsequent sections of this report, optimization test results presented in past quarterly reports has revealed that these COC and their source LNAPL to be amenable to in-situ biodegradation via the introduction of air (i.e. atmospheric oxygen) to the shallow aquifer zone in and around BOD Area 1. These COC are also very amenable to removal via sparging and biosparging driven stripping.
- Figure B-2: A total of 14 of the shallow and intermediate wells show results where total VOC COC exceeded 10,000 ug/L (shown as blue dots). These wells are generally clustered within the central portion of the Site, including the VES well network on the PHA property and the general vicinity of the VES building. Collectively, these wells define a dissolved phase groundwater impact area that correlates with the aforementioned LNAPL extent. Within the wells with high total VOCs, benzene is the COC with the highest concentration, with reported concentrations ranging from approximately 1,500 ug/L to 15,500 ug/L in monitoring and recovery wells located within and around BOD Area 1.
- In addition to the aforementioned interpreted Site LNAPL thickness extent, petroleum hydrocarbons are also present in a well-developed "smear zone" beneath BOD Area 1. For the purposes of this report, the smear zone represents the petroleum hydrocarbon residue in the subsurface that may be remediated by biovent/biosparge techniques. This zone exists as a result of changes in groundwater elevation: as the water table fluctuates, LNAPL atop the water table also fluctuates, but some material adheres to the aquifer matrix in both the vadose and saturated zones. This residue comprises the smear zone.
- A data summary report by Aqui-Ver (2009) suggested the bulk of the smear zone's petroleum hydrocarbon mass to be present in a band generally ranging from15-30 ft bgs in the vicinity of BOD Area 1. However, in places the smear zone has been found to extend downward to approximately 40 ft bgs, the approximate depth to the confining bed that forms the base of the Site's shallow aquifer zone. Where the confining bed is absent, this depth is hypothesized to approximate the contact between the sands and gravel admixture of the shallow aquifer zone and the finer sandy-gravelly units of the underlying deep aquifer. Supportive findings obtained from recent direct push-direct sensing investigations around the Site and specifically in the location of BOD Area 1 are described in the sections below.

4.2 Hydrogeologic and Hydrostratigraphic Framework

Appendix A includes the Letter Report (Pars, August 2016). To support an updated understanding of the CSM, specifically in the vicinity of BOD Area 1, the Letter Report integrated the findings of direct push-direct sensing investigations conducted in BOD Area 1 with past Site direct push-direct sensing and traditional subsurface investigation (i.e., well installation) data.

The Letter Report includes cross sections AA', BB', CC' and DD'. Centered on BOD Area 1, these have been arrayed to support a three-dimensional interpretation of the subsurface, and to show key hydrogeological features germane to the design of the proposed biovent/biosparge system. The Letter Report also includes figures showing sub horizontal "slices" of the BOD Area 1 subsurface at altitudes of 0 feet above mean sea level (AMSL), the approximate shallow aquifer zone water table elevation, -5 feet AMSL and -10 feet AMSL. Each "slice" (Figures 6, 7 and 8 in Appendix A) presents interpreted views of horizontal changes in key aquifer design criteria including estimated hydraulic conductivity and degree of smear zone impact at stated depth intervals. As discussed further in Section 5, to maximize the effectiveness of the injection of oxygen to the subsurface, and to remove COC mass through stripping if desired, potential biovent/biosparge well locations within BOD Area 1 were initially selected on the basis of these interpretations. Specifically, these well locations and their screened intervals target what appear to be co-located zones of highly conductive shallow aquifer zone sandy-gravelly units (e.g., with a hydraulic profiling tool [HPT]-estimated range of 30 to 60 ft/day), and groundwater-shallow aquifer matrix smear zone impacts (i.e., as indicated by membrane interface probe [MIP] data).

Figure 9 of the Letter Report in Appendix A presents the "clay surface". This figure presents an interpretation of the topography of the confining bed (where present) at the base of the shallow aquifer zone, defining the bottom of the "treatment box" (i.e., the portion of the aquifer volume targeted for remediation by the biovent/biosparge system). For a complete discussion of the Area 1 BOD hydrogeologic and hydrostratigraphic frame work in the context of the Site CSM please refer to Appendix A.

5 PILOT SYSTEM DESIGN

5.1 Pilot Study Basis and Objectives

The primary objective of a future pilot study based around the design described herein is to evaluate biovent/biosparge performance in conjunction with the existing VES system, and in support of stated Order and Act 2 cleanup goals.

The idea of using an air-injection in-situ biodegradation remedy to augment the existing VES system was supported by observations of the chemistry of extracted soil vapor during VES system optimization testing. Specifically, the high levels of carbon dioxide (CO_2) and methane (CH_4) were observed in the vapor stream of the VES system combined with the declining VOC mass recovery by VES, which indicates that in-situ biodegradation of petroleum hydrocarbons is actively occurring in the shallow aquifer. However, the presence of CH_4 combined with a lack of oxygen (O_2) in the vapor stream indicates that this process is currently largely anaerobic, and that aerobic biodegradation is O_2 limited. Bioventing/biosparging was proposed as a means to oxygenate the shallow aquifer zone's smear zone and transition biodegradation from an anaerobic to an aerobic process (i.e., to a faster and more effective process for in-situ petroleum hydrocarbon degradation).

As discussed in the BOD report, bioventing and biosparging encompass strategies that aim to stimulate natural biodegradation of petroleum hydrocarbons by providing oxygen to existing microorganisms. As organisms respire, they use oxygen to metabolize organic material, and release carbon dioxide and water. The process can be represented by the following hypothetical equation describing the metabolization/mineralization of benzene:

$$C_6H_6 + 2.5\ O_2 + HCO_3 + NH_4 \rightarrow C_5H_7O_2N + 2\ H_2O + 2\ CO_2$$

In this equation, benzene (C_6H_6) is metabolized in the presence of oxygen, biocarbonate (HCO_3), and ammonium (NH_4) (and/or other nutrients) to produce microbial cell mass ($C_5H_7O_2N$), carbon dioxide and water. The USEPA estimates that approximately 3-3.5 pounds of oxygen are needed to biodegrade of one pound of petroleum hydrocarbon product aerobically (USEPA 2012).

Bioventing involves providing airflow to vadose zone soils, to stimulate biodegradation of hydrocarbon mass in the smear zone. This can be accomplished using either a passive approach, active approach or combination thereof. In a passive approach, venting wells are open to the atmosphere, and are subject to flow-inducing atmospheric pressure changes that can induce airflow through the vadose zone. In an active approach, atmospheric air is either delivered to the vadose zone under pressure using injection wells, or delivered from vent wells via the extraction of soil gas via soil vacuum extraction (SVE) wells. Active bioventing is similar to SVE in that both technologies remove mass by creating airflow through the vadose zone; however, in bioventing the objective is to deliver oxygen to the subsurface, not to promote volatilization of hydrocarbon mass to the vapor-phase. For this reason, bioventing systems typically operate at lower airflow rates than SVE.

Biosparging is an active process in which atmospheric air is delivered to the saturated zone through injection wells screened below the water table. The injected air increases dissolved oxygen concentrations in groundwater and stimulates biodegradation of hydrocarbon mass in the saturated zone. Biosparging is similar to air sparging; however, as with bioventing, the objective is to deliver oxygen to the formation rather than volatilization of hydrocarbon mass. A successful biosparge system elevates and sustains concentrations of dissolved oxygen to create aerobic conditions conducive to microbial degradation while minimizing volatilization of the contaminants. To this end, air injection flowrates are relatively low in a biosparging application, typically ranging from 1 – 3 standard cubic feet per minute (scfm), as dictated by Site conditions and formation response.

Bioventing and biosparging are generally effective when applied to permeable strata that will allow for the movement of air with aerobically biodegradable target compounds. The BOD report identified three locations within the "breach" area at the Site as candidates for the potential installation of biovent/biosparge pilot test system. The BOD Area 1 spans both grassy and paved areas on the PHA property. Located immediately south of the bend in I-76, west of the PHA building, north of the Packer Avenue sewer line, and east of the elevated CSX railroad tracks, it was determined to be the best of the three locations for the pilot study design based on the evaluation criteria discussed in Section 4. The center of the Pilot Study Area is defined by the shape outlined by the four cross sections described in Section 4.2. BOD Area 1 location was selected for the following additional reasons:

- The location is open and used for parking and equipment storage by the PHA. The occupied PHA building was built with engineering controls designed to preclude the intrusion of soil gas.

- The shallow aquifer "smear zone" lies within the Trenton Gravel formation. The Trenton Gravel is generally composed of a mixture of sands and gravels, but with varying degrees of cementation and some discontinuous beds of lower permeability, the formation is highly conductive with respect to both air and water flow. This statement is supported by the direct push-direct sensing derived estimated hydraulic conductivities discussed in Appendix A, and the results of vacuum radius of influence testing conducted on the VES wells located in and around BOD Area 1.

- As described in the previous section, BOD Area 1 is immediately adjacent to the western edge of the Site's LNAPL impact area. Fingerprinting data revealed the LNAPL in the western impact area to be a lighter, gasoline to middle distillate range petroleum product. Containing a greater quantity of lighter and more volatile COC than are present in other portions of the LNAPL impact area, LNAPL in this area is amenable to "weathering" and COC degradation via aerobic biodegradation. Evidence supportive of this has been provided through respirometry testing performed in this area of the Site.

- BOD Area 1 is located on PHA property adjacent to the existing fenced in south side skimming system compound where access is readily available for operations and maintenance (O&M) and construction/installation activities. An electrical power drop that is believed to be sufficient for the design and other remediation infrastructure (e.g., VES wells) are already present.

5.2 Injection Well Network Layout and Design Basis

Proposed construction drawings for the pilot study have been prepared, and are provided in Appendix C. The biovent/biosparge pilot system layout is illustrated in Appendix C, Sheet C-2. In addition, this layout was superimposed onto the 0, -5, and -10 AMSL "slice maps" from the Letter Report described above. These new figures are provided in Appendix B as Figures B-4, B-5, and B-6. Biosparge and biovent well locations were first selected on the basis of interpreted hydrogeological conditions and localized "inward" groundwater flow directions toward the "breach" (see Section 3.2 and Appendix A) within the shallow aquifer zone of BOD Area 1 (i.e., the nature, extent and estimated hydraulic conductivity of aquifer materials) and then adjusted to account for surface constraints and related constructability considerations. The well layout represents a balance between CSM and constructability criteria as described below:

- Lithology - Biosparge and biovent wells were grouped in areas where the pre-design investigation revealed the approximate depth and extent of more conductive units within the Trenton Gravel permeable strata.

- Hydrocarbon Mass – Well locations were also selected to target areas where high MIP responses were reported during the pre-design investigation. These areas correlate well with the findings of previous subsurface investigations which evaluated the thickness and extent of the "smear zone" in this area of the Site.

- Capacities of Existing Equipment - The pilot system will be constructed using repurposed blowers and other equipment from an air sparge/SVE system that was obtained by the USACE from the Valmont Site. The number and arrangement of wells considers the maximum airflow attainable by the blowers (with the biosparge blower motor upgraded from its current 7.5 horsepower (Hp) to 10Hp) at pressures based on estimated formation entry pressures, biosparge and biovent well depths and pipeline losses along "home run" piping runs (i.e., dedicated air lines for each type of remediation well).

- Constructability – Well locations were selected to minimize interference with existing utilities, disruption of PHA's operations in the area, and construction and restoration costs.

- Safety and Control of Fugitive Emissions – The proximity of existing BOD Area 1 to VES well infrastructure and potential receptors, such as the PHA Building, was considered in the pilot well network layout. The PHA building includes engineering controls designed to preclude soil gas vapor intrusion to occupied building areas. The proposed well fields are located away from the PHA building and beneath a PHA parking lot and equipment laydown area. The results of optimization testing performed on VES wells in the BOD Area 1 vicinity indicate that the wells further from the Packard-Pollock sewer (PH-RW-A2 and PH-RW-B2) exhibit robust ROIs ranging from approximately 75 to 90 feet. These estimates were based on the practice described in *Practical Design Calculations for Groundwater and Soil Remediation* (Kuo, 1999), where it is suggested that ROI is commonly chosen to be the point where induced vacuum is observed to be 1% of the applied vacuum. The wells closer to the sewer appear to have smaller ROI, potentially indicating that pipe bedding near the sewer alignment may act as a boundary, or at least cause a limited

amount of short circuiting of the applied vacuum from these wells. Wells PH-RW-I2, PH-RW-W2 and PH-RW-V2 appear to have a ROI ranging from 30 to 50 feet, and should provide adequate capture of any volatile vapors generated during pilot study operations.

- Flexibility of Design – Wells are arranged into four groups within the pilot test area, which will allow the biovent/biosparge system to cycle flows between these groups continuously during operation. Employing this more efficient operating approach allows the pilot system to treat a much larger area of the Site. Each group represents the maximum output of the selected Valmont-procured blower at the expected pressures and flow rates for BOD Area 1.

- Installation Scenarios – Two scenarios were considered for installation of the biovent/biosparge system. Scenario 1 ("Base Case") includes installation of one group of biosparge/bioventing wells. Scenario 2 ("Expanded Case") includes installation of all four groups of biosparge/bioventing wells. Further explanation of the two scenarios are discussed in Section 10, Estimated Cost of Construction.

5.2.1 Biosparging Wells

A total of 32 biosparge wells for the Expanded Case are proposed to be installed at the Site in four groups, consisting of 8 wells each. The Base Case would include one group of 8 wells. The layout of the individual biosparge wells within each well group is based on a 13-foot ROI. The layout of the well groups is based on other criteria, as discussed in the previous section. Since Site-specific data are not available to use as the basis for estimating biosparging influence in the subsurface, a 13-foot ROI was selected based on an assumed 45-degree cone of influence extending from the top of well screen to the average water table surface elevation within the pilot test area. This method is generally considered to provide a conservative estimate for ROI in aquifer sparging applications.

A maximum total depth of 35 feet bgs was selected for the biosparge well design, based on review of subsurface lithology and permeability modeling data from the pre-design investigation as well as the capabilities of the biosparge blower. Appendix B, Figures B-5 and B-6 provide views of the direct push-direct sensing (i.e., MiHPT) estimated hydraulic conductivity and general lithology beneath the pilot test area at elevations of -5 ft mean sea level (MSL) and -10 ft MSL, respectively, and provide justification for the selected biosparge well design depth. These figures illustrate that the contact between the relatively permeable and sandy material of the Trenton Gravel and the lower permeability intermittent clay layer generally occurs at elevations deeper than -15 ft to -20ft MSL beneath much of the pilot test area (35 to 40 ft bgs). Additionally, the MIP responses are generally highest at approximately -10ft MSL (approximately 30ft bgs), which indicates that the majority of the residual hydrocarbon mass is also concentrated within and above the permeable material where the biosparge wells will be screened. Final biosparge well depths well will be field-determined based on the actual subsurface lithology encountered at each location during drilling, and may be adjusted slightly high or lower in order to install the wells within the permeable material near the base of the Trenton Gravel and not the lower permeability clay layer below.

Biosparge wells will be 2-inches in diameter and constructed of Sch 40 PVC with a 2-foot screen length. The wells will be completed at the surface within flush-mounted road-boxes set within an 18-inch square concrete collar. Well vaults installed in paved areas of the Site will be constructed with larger 36-inch square concrete collars to provide additional protection against potential damage from snow removal equipment during the winter. Well construction details and specifications are provided in the pilot study construction drawings which are included as Appendix C.

Biosparging wells will be developed following installation to remove fine-grained sediment accumulated in the casing and sand filterpack and improve hydraulic communication with the surrounding formation. Well development procedures are provided in the construction drawings in Appendix C.

5.2.2 Bioventing Wells

A total of 16 bioventing pilot wells for the Expanded Case will be install in 4 groups with 4 wells each. The Base Case would include one group of four wells. A 30-foot design ROI is estimated for the bioventing wells using the pore volume exchange method. This ROI estimate was developed based on an average pneumatic conductivity of approximately 2.8 $x10^{-4}$ cm/s. This estimate for the permeable, sandy/gravelly unsaturated zone material within the pilot test area was derived using wellhead pressure response readings measured during respiration testing. The 30-foot ROI is fairly conservative in that it assumes a bioventing airflow rate of 10 scfm per well, based on air injection flow rates used during respiration testing, and an exchange rate of 2 pore volumes per day. Pore volume exchange calculations are provided in Appendix D for reference.

The bioventing pilot system is designed to target residual hydrocarbon mass in the permeable smear and unsaturated zone material above the water table within the pilot test area. Since the targeted zone is narrow at most locations, it is important that the wells are screened appropriately for the system to achieve its objective. The bioventing well screen interval was therefore selected based on hydrogeologic controls using the upper silt layer and water table depth as upper and lower bounds, respectively. As shown in cross sections AA', BB', CC' and DD' in Appendix A, the relatively impermeable upper silt layer is located from approximately 5ft to 11feet bgs beneath the pilot test area, thereby providing a static upper limit to the section of well open to air venting or injection. Similarly, the water table provides a variable lower limit (typically between 18 to 22 feet bgs). The section of permeable material between the water table and silt layer is that which is available for airflow. A screen interval of 15 to 25 ft bgs was selected for the bioventing wells to target the section of permeable material between these two low flow boundaries. The wells are designed to penetrate below the water table. This is not expected to impact performance as the positive pressure applied by the bioventing blower will displace the water downward somewhat during active bioventing operations. Rather, this will provide additional design flexibility and value allowing these wells to be used for other purposes if desired, either as part of Site-wide groundwater monitoring efforts, or for pilot test performance monitoring purposes. Additionally, in the event additional vacuum ROI is needed, these wells could potentially be converted to VES wells at some point in the future.

The bioventing wells will be constructed of 4-inch diameter Sch 40 PVC, with 10-foot screen lengths and identical surface completions as the bioventing wells. Construction details for the bioventing wells are provided in the Pilot System Construction Specifications included as Appendix C.

5.2.3 Performance Monitoring Wells

Several existing Site monitoring and extraction wells, including PH-RW-A, PH-RW-A2, PH-RW-B, PH-RW-B2, PH-PH-2, and PH-PH-21, are located close enough to the proposed bioventing/biosparge well groups to be used as performance monitoring points. However, most of these existing wells are located in the vicinity of the northernmost bioventing/biosparge well Group 1 (proposed Base Case). Only a few are located close enough to the other 3 well groups to be suitable as performance monitoring points, especially for the biosparging wells which have an estimated ROI of 13 feet. Four new monitoring wells are proposed at the locations shown in Appendix C, Sheet C-2, to provide additional performance monitoring points in the vicinity of bioventing/biosparge well Groups 2, 3 and 4 for the Expanded Case. Each of these new performance monitoring wells would be installed approximately 10 feet from one or more of the proposed biosparge wells, to provide data within the assumed 13-foot ROI. Performance monitoring wells would be constructed of 4-inch diameter Sch 40 PVC, installed with 20-foot screens, extending from approximately 13 to 33 feet bgs across most of the permeable Trenton Gravel. This longer screen interval will allow the wells to monitor performance of both the biosparge and bioventing pilot systems. Longer screens coupled with the 4-inch well diameter with allow these wells to be used for other purposes, such as groundwater monitoring at discrete depth intervals within the aquifer, or operation as extraction wells with the VES system at some point in the future as needed. Performance monitoring well construction specifications are provided in the pilot study design drawings included as Appendix C.

The four new monitoring wells would only be installed if all four bioventing/biosparge well groups are installed (i.e., the Expanded Case). No new monitoring wells are required if only the Base Case Group 1 wells are installed. If some other combination of two or three pilot well groups are selected for the pilot system, then a total of one to three monitoring wells will be installed at locations determined based on the well groups selected.

5.3 Conveyance Piping

Airflow will be conveyed from the remediation system to each of the wells using dedicated individual piping runs (home runs) installed below grade in common trenches. Piping runs to the biosparging wells will be installed using 1-inch diameter SDR-11 high-density polyethylene (HDPE) pipe. HDPE is flexible at this small diameter and is available as long continuous rolls, which should greatly reduce the number of joints required (each of which is a potential failure point along the line) and should accelerate construction and reduce costs. Piping runs to the bioventing wells will be 2-inch diameter Sch 40 PVC. The larger diameter conveyance piping will serve to improve design flexibility by allowing the bioventing wells to operate at higher airflow rates if desired during the pilot test without experiencing excessive losses.

Subsurface piping runs in trenches and piping connections to biosparge and bioventing wellheads will be installed a minimum of 21-inches below grade. Although the maximum frost depth per Philadelphia building code is 30-inches; a 21-inch burial depth is considered appropriate for this application as the piping will convey air, not water. Generation and potential freezing of condensation in the conveyance piping is not as great of a concern for an air injection system, as it might be in a vapor extraction application, since the moisture content of the ambient air injected is generally fairly low during the wintertime. Subsurface conveyance piping will also be sloped towards individual biosparge and biovent wells to allow any

accumulated condensate to drain back into the wells. Finally, the system will be designed to allow condensate to be physically cleared from the conveyance piping using compressed air delivered under a low pressure. Therefore, condensate in the piping should not be an issue, and freezing of pipes during cold weather should not be a concern.

Subsurface piping will connect directly to the individual biosparging and bioventing well riser pipes at piping tees installed below-grade. Subsurface piping runs from the wells will be stubbed-up above grade at the remediation system enclosure and connected to the manifold by flexible rubber compressed air hose at piping penetrations through the wall of the remediation system enclosure. Each of the individual manifold legs will be fitting with a ball valve and gate for on/off control and flow adjustment, a rotometer style flowmeter to measure airflow (repurposed from the former Valmont Site remediation system) and a pressure gauge. The manifolds will be constructed with four branches corresponding to each of the well groups, and all of the wells in each flow group will be connected to their respective branches. This setup of individually metered and controlled piping runs will allow for a much greater degree of system operation control and optimization and will improve flexibility of the design.

5.4 Pilot System Equipment and Design Basis

Since the objective of biosparging is to distribute oxygen to the saturated zone and not volatilization of hydrocarbon constituents, air is typically delivered to the formation at low flow rates, generally between 1 to 3 scfm. In keeping with this, biosparging airflow rates will likely be within this range during the pilot study, with the actual airflow rates determined based on formation response and performance monitoring data. In the interest of design flexibility however, the biosparing blower, system and air distribution piping network will be designed to operate at airflow rates of 120 scfm at 12 psi pressure, allowing airflow to be delivered at approximately 15 scfm to all 8 wells within a single group at once, assuming the formation will allow for it. Excess airflow will be discharged to the atmosphere by the bleed airline when the system is operating in biosparging mode with lower air injection flow rates. This flexible design will enable the biosparge system to perform air sparging at an aggressive rate should it be desired at some point in the future.

The formation breakout pressure that must be overcome for air to begin flowing from the biosparge wells into the formation was calculated following the procedure outlined in the USACE In-Situ Air Sparging Manual (USACE 2013), and is estimated to vary between approximately 6.26 and 6.91 psi for the pilot test area depending the water table depth. The Valmont system blower will be configured to supply a maximum pressure of 12 psi, which will be more than sufficient to overcome this pressure. The theoretical formation fracture pressure was also calculated following the method outlined in the USACE In-Situ Air Sparging Manual (USACE 2013), and is estimated to be approximately 30 psi. This is well above the maximum pressure attainable by the blower. The current SCADA system that controls the VES system is not currently connected to the south or north skimming systems, and there is currently no provision for connection of a separate PLC on the south side for control of the proposed pilot biovent/sparge system.

As discussed previously, a 10 scfm design airflow was selected for the bioventing system based on achieving 2 pore volume exchanges of air per day with a 30-foot ROI. Air injected at 10 scfm to the saturated zone within the pilot test area during respiration testing demonstrated that this is attainable. During the test, wellhead pressures at this flow rate averaged approximately 40 inches of water column (iwc). Similar

pressures should be expected during the described BOD Area 1 pilot test. As with the biosparge system, the bioventing blower and conveyance piping network is designed with additional capacity to provide for flexibility of operation. The bioventing blower is designed to operate at an airflow rate of approximate 310 scfm and a pressure of approximately 4.2 psi. This will allow the system to deliver airflow to all 16 bioventing wells simultaneously at a flow of 20 scfm, or to smaller groups of biovent wells at higher flow rates as tolerated by the formation.

Airflow will be applied to the biosparge well groups in a cyclic approach during the pilot study, where one or more groups are operated in a rotating cycle controlled automatically by the programmable logic controller (PLC.). Bioventing may also be applied this way. Cycling airflow to the wells can lead to increased mass removal over full time operation as a result of the effect of varying the pressure gradients applied to the smear zone. Additionally, the pulsed strategy is a way to supply air to more injection points utilizing a smaller equipment (i.e. less capital cost).

5.4.1 Pilot System Equipment

The pilot treatment system will be constructed onsite within a shipping container type enclosure (Sea Box). Insulation and drywall will be installed on the interior walls of the system enclosure to help protect the equipment inside. Lights, an exhaust fan, air intake louvers and a heater will also be installed inside the enclosure. Much of the equipment used to construct the system will be repurposed from the Valmont Site AS/SVE system which is currently staged at the Site. The remaining equipment will be purchased new. The blowers are both Tuthill-MD Pneumatics positive displacement-style rotary lobe blowers obtained from the Valmont Site. Each of these blowers is currently equipped with a 7.5 HP motor and mounted inside of a Pnuemax-300 sound-deadening cabinet. The proposed layout of blowers and the system enclosure are shown on the pilot system construction drawings included as Appendix C. The construction drawings also include an equipment list identifying all of the equipment from the Valmont Site to be re-used as well as additional major equipment that must be purchased to build the system. Note that this list of major equipment to be included in the construction of the pilot treatment system is not intended to be a comprehensive list of every component necessary for construction. The Contractor will be responsible for obtaining all equipment for construction of the pilot system.

The Valmont Site blower that will be used to supply airflow for the biosparge system is already designed as a pressure package, equipped with an air bleed valve and silencer. However, the existing 7.5 HP motor must be replaced by a new larger 10 HP minimum motor and the drive pulley setup reconfigured in order to operate at a higher pressure required to overcome the expected formation entry and line losses required to deliver airflow to the saturated zone. A heat exchanger will also need to be installed and operated with the blower in order to reduce blower effluent air temperatures to levels appropriate for the conveyance piping and injection into the formation. The other Valmont-sourced blower was originally an SVE package that will be converted for pressure operation to supply airflow to the bioventing system. The blower can supply the design airflow and pressure for the bioventing system with the existing 7.5Hp motor after the drive pulley setup has been reconfigured.

The system enclosure will be installed on a new level concrete pad. The system will be anchored to the pad at all four corners using anchor bolds installed through hold-down tabs designed the resist the snow, wind

and seismic loads applicable for the Site and construction in accordance with the structural International Building Codes (IBCs). Supporting calculations for the system anchoring design prepared by a Pennsylvania-Licensed Structural Professional Engineer are provided in Appendix D. A chain link fence with access gates will be installed around the system enclosure compound with concrete bollard posts placed around the exterior in areas with vehicle traffic is expected. Details for the system enclosure area, concrete pad, anchoring and similar details are provided in the construction drawing included as Appendix C.

A PLC will be installed on the pilot treatment system which will control system operations. The PLC on the pilot system will be connected to the main PLC on the VES system via an Ethernet cable to allow for utilization of the above referenced radio telemetry upgrade for communication to the existing components of the treatment system. Both the south and north skimmer system control panels shall be designed to accommodate the pilot treatment system should it need to move between them. While a local control panel will be located in the building, the system will be able to be controlled from the supervisory control and data acquisition (SCADA) system. This installation will provide flexibility as well as remote monitoring of the pilot treatment system alongside the main VES treatment system.

The current SCADA system that controls the VES system is not currently connected to the south or north skimming systems, and no provision for connection of a separate PLC on the south side for control of the proposed pilot biovent/biospage system from the SCADA [redacted] in the VES control room. While some information is relayed from the north skimmer system via copper wire, it is not all inclusive, and no information is currently provided from the south skimmer system to the VES system SCADA [redacted] in the control room.

As part of the electrical upgrade scope of this design, the south and north skimmer systems, in addition to the new PLC for control of the proposed pilot biovent/biosparge system, will be connected to the main SCADA system via Ethernet radios. This requires the existing control panels at the skimmer systems to be upgraded to include a PLC and radio located within the pilot system enclosure. Additionally, a radio would need to be installed in the Main Control Panel (MCP) inside of the VES control room. This hardware along with the necessary antennas will allow for the three systems to communicate with each other. Once the data is all in one location, previous upgrades to the SCADA system can be utilized to improve remote reporting of data and events. It is anticipated that this scope of work will ultimately lead to less operator time onsite, allow quicker reaction to changes when the operator is not onsite, and not significantly increase the operator's workload with respect to the concomitant operation of the VES and pilot biovent/biosparge systems.

Electrical power for the pilot system enclosure will be installed as shown in Appendix C. The electrical design has determined that the current distribution provided to the transformer located adjacent to the south side skimming system compound should be sufficient at the anticipated electrical load (described in detail on electrical drawings in Appendix C, Sheets E-2 through E-4). The electrical design will require that the current south side skimming compound power drop be upgraded from 208 volts (V) to 480 V. Coordination with the service provider, PECO Energy will be necessary to confirm that the existing south side power drop transformer has lugs appropriate for a 480 V connection. The pilot system enclosure is designed for an electrically non-classified environment, with all equipment and electrical components designed for operation in a non-hazardous atmosphere.

6 PILOT SYSTEM MASS REMOVAL ESTIMATES

Presented below are preliminary estimates of hydrocarbon mass biodegradation rates for both the bioventing and biosparging components of the pilot system. These estimates were calculated based on a combination of Site data obtained from Pre-Design Testing in the case of bioventing (which has been tested at the Site) and guidance found in engineering publications on the subject in the case of biosparging (which has not been tested previously at the Site) as discussed below.

6.1 Pre-Design Testing

Bioventing testing was conducted by extracting soil vapor from a recovery well utilizing the existing VES system infrastructure, while using a nearby monitoring or recovery well as an air inlet well, and monitoring the changes in the biochemical parameters (VOCs, O_2, CO_2, CH_4) in both the extracted soil vapor and headspace in the air inlet well. Tests were conducted at the air inlet well using both ambient air inlet and pressurized air injection; the latter conducted via a one horsepower (hp) regenerative blower connected to the inlet well. Locations of the bioventing tests are shown in figure B-7.

After operation with air inlet to the subsurface for a period of time, a respirometry test was conducted on both the recovery and air inlet wells by stopping vacuum extraction and air inlet and collecting samples of the headspace in each well for monitoring of biochemical parameters. The rate of depletion of the O_2 and return of VOCs, CH_4 and CO_2 were recorded and then used to determine the rate of respiration, or O_2 utilization, in the smear zone.

The respirometry test conducted at PH-1 during the bioventing testing at both RW-A and PH-1 show O_2 depletion curves suggestive of microbial uptake (e.g., starting at 20% per hour O_2 at PH-1 and 11% per hour O_2 at RW-A during the same period). In contrast, other tested well pairs showed a 9 to 10% per hour O_2 utilization rate illustrating treatment is observed beyond the location immediately adjacent to the air introduction (PH-1) well.

The PH-2 respiration test also provided a strong O_2 utilization rate without showing linkage back to the extraction well, RW-B. Similar to the results of the respirometry test conducted at PH-1, the biodegradation at this well is achievable with a bioventing remedial strategy.

Leaking well seals observed during testing do hinder mass recovery by the VES system but also assist with adding O_2 to the subsurface locally. More mass removal via bioventing is possible as opposed to mass recovery by vapor extraction alone, and has probably been ongoing at the Site where leaking well seals are present given the age of the wells and Site infrastructure. It is most likely not worth trying to replace or fix leaky wells/seals (especially on the perimeter) unless located in an area with significant LNAPL that warrants more aggressive vacuum recovery.

6.2 Mass Removal Rate Calculations

An initial mass degradation rate estimate was developed for the biosparge pilot system based on oxygen utilization rates estimated from in-situ respiration testing performed in the pilot test area in 2012 and 2016 as described above. Results were interpreted in accordance with methods specified in Volume II of the 1995 EPA Bioventing Principles and Practice Manual. Field-measured well headspace oxygen readings collected from the air injection test well and surrounding observation wells were plotted against time, and

the oxygen utilization rate was obtained from the slope of the resultant best-fit line. A hydrocarbon biodegradation rate of approximately 627 lbs/day was estimated for the pilot test area, including all four well groups with sixteen bioventing wells (Expanded Case). This estimate assumes an available 2-foot smear zone thickness within the vadose zone across the extent of the bioventing treatment coverage area, as defined based on a 30-foot design ROI at each of the bioventing wells. The estimated hydrocarbon mass degradation rate is approximately 209 lbs/day for the Base Case scenario in which only the four bioventing wells in Group 1 are installed. Supporting calculations are provided in Appendix D. This mass degradation rate should be considered an estimate based on many assumptions, with each assumption introducing a margin of error into the calculation. These calculations do not include mass degraded by the VES system. However, the modeled estimated results do bode well for a potential bioventing pilot study.

An estimated mass biodegradation rate was also calculated for the pilot biosparging system based on the assumption that approximately 3 lbs of oxygen are required to degrade 1 lb of hydrocarbon. The calculation was performed assuming injection of atmospheric air with an oxygen concentration of 20.9% and an oxygen transfer efficiency ranging from a low of 0.1%, which is considered more typical for aquifer sparging applications, to a high of 1% in a best case scenario (“In Situ Remediation Engineering.”, Suthersan, Payne, 2004). The low end of this range assumes a biosparging airflow rate of 2 scfm per well with the system operating continuously through the one biosparge well group (Base Case). The high end of this range assumes a biosparging airflow rate of 2 scfm per well with the system cycling continuously through the four sparge well groups (Expanded Case), operating two groups at a time, with one hour on, and one hour off. Calculations predict a hydrocarbon mass degradation rate ranging from approximately 0.1 lbs/day to 2.9 lbs/day for the pilot biosparging system. This may seem low compared to that of the bioventing; however, it must be considered that the solubility of petroleum hydrocarbon COCs is also low, as is the transfer efficiency of oxygen into water. Just as with the calculations for bioventing mass removal, there are many assumptions and potential sources of effort involved in the calculation for biosparge mass removal which will be refined during the course of the pilot study with actual data from the Site.

Additionally, and while not the primary focus of this report, the pilot biovent/biosparge system described herein has been designed with flexibility sufficient to allow for subsurface air injection rates higher than that of a biosparge system, if desired. Air flow rates more typical of air sparging applications (i.e., those with an emphasis on COC removal via stripping) can be provided by the proposed pilot biosparge system. To evaluate the full capabilities of the system in pursuit of Site cleanup goals it is assumed that a future pilot test O&M and integrated system optimization plan will be developed and implemented. This plan will be developed assuming concomitant operation of the proposed pilot biovent/biosparge system and the Site’s existing VES system to ensure that fugitive emissions are controlled. If the existing VES system provides adequate capture of soil vapor such that biosparge air injection flow rates can be increased to that of an air sparge system, additional mass removal beyond that addressed through in-situ aerobic biodegradation above can be realized.

7 SYSTEM PROVEOUT

The selected contractor installing the pilot system will be responsible for system prove-out upon completion of construction. This will be performed over approximately a three-day period, starting with a

final inspection of all system equipment followed by startup/shakedown testing of the system. Some examples of prove-out inspections and testing activities that the contractor will perform are listed below.

- Checking motor rotation
- Testing set points of process safety devices (e.g., pressure relief valves)
- Testing PLC inputs, outputs, alarms and interlocks
- Testing solenoid valves and cycling sequence operation
- Testing accuracy and calibration of instrumentation (e.g., flow meters)
- Testing blower and heat exchanger operation and operational settings
- Testing piping and equipment for leakage
- Measuring groundwater and total depths in bioventing, biosparging and new performance monitoring wells
- Checking pressure drop from manifold to wellheads
- Checking amp draw on motors

A detailed startup and shakedown inspection and testing procedure will be developed and provided to the contractor prior to completion of construction.

8 PERMIT LEDGER

Permits required for the installation and operation of the biovent/biosparge system where identified as part of the design process. Three types of permits were determined to be necessary to install and startup the system, as summarized in Table 1. The necessary permits are a building permit, a zoning permit, and electrical permits. The Site currently has a valid air permit with Philadelphia Air Management Services, a division of the City of Philadelphia Public Health Department. The pilot system will not warrant a change to the current air permit as air will only be injected into the formation at low flow rates and not extracted. The contractor selected to build this Study will be responsible for confirming and obtaining all permits.

9 CONSTRUCTION QUALITY MANAGEMENT

Per ER1180-1-6, the [successful bidder/contractor] implementing this design will be required to prepare a contractor Construction Quality Management (CQM) Plan that includes; definable features of work (DFOW), staffing and inspections, testing to show compliance with the contract, system prove-out to demonstrate operability and the requirements of the contract, and as-built drawings. The CQCP will address all issues related to construction quality management and describe the “Three-Phase Quality Control System required of the contractor to plan and schedule work to ensure proper preparation before and during each new Definable Feature of Work (DFOW). The three phases of control (preparatory, initial and follow up) are the core of the Construction Quality Management System, which is designed to enhance success in completing the work to comply with requirements of the contract. A complete description of the CQM and instructions on how to prepare such plan can be found in the “Construction Quality Management For Contractors Student Study Guide” and the associated CQCM training offered by the USACE.

10 ESTIMATED COST OF CONSTRUCTION

The equipment obtained from the Valmont Site, specifically the two positive displacement blower packages and associated hardware, provide capabilities with which to enhance the pursuit of Site cleanup goals. One of the main goals of this pilot biovent/biosparge design is to develop a system with as much built in flexibility and scalability as possible. Two construction cost estimate scenarios have been developed: Scenario 1 ("Base Case") and Scenario 2 ("Expanded Case"). Within BOD Area 1 and in terms of remediation well field size and extent, the Base Case construction scenario resembles the hypothetical remediation system and biovent/biosparge well field layout presented in the BOD report, but with a key difference. The well field presented in this report has been indexed to one of the collocated high conductivity/high smear zone impact areas as discussed in Section 4 above (Appendix A, Figures 6, 7 and 8). The Base Case wellfield would include only those Group 1 biovent/biosparge wells shown along the northern edge of BOD Area 1, and primarily within the grassy area adjacent to I-76 (Appendix C, Sheet C-2).

The Expanded Case, presented in Table 2, is the estimated cost of construction for the design presented in this report. It represents what is believed to be the best balance of the capabilities of the Valmont Site equipment in the context of the CSM and the larger cleanup goals for the Site. The Expanded Case utilizes four groups of biosparge and biovent wells installed in the most favorable areas as previously defined (32 biosparge wells and 16 biovent wells). Each of these four groups would be installed utilizing a solenoid valve controlled by the PLC so that each group of wells could be cycled, to facilitate aquifer pulsing within BOD Area 1.

Included in the Expanded Case is an estimated 1125 feet of total trenching to allow the installation of 7,375 feet of 1-inch conveyance piping to biosparge wells, and 3,775 feet of 2-inch conveyance piping to the biovent wells.

The total estimate cost of construction of the Optimal scenario is [redacted], broken down as follows:

- $[redacted] - Pilot Treatment System Installation including enclosure with, blowers and infrastructure minus controls
- $[redacted] - Total cost for controls installation comprised of:
    - $[redacted] – PLC, Control Panel, and Instrumentation for Pilot Biovent/Biosparge Treatment System enclosure
    - $[redacted] - Controls Upgrades for the South Side Skimming System, Radio Integration with the VES System SCADA

The Base Case construction scenario, presented in Table 3, utilizes a smaller pilot treatment area but retains the flexibility for future expansion (i.e. the base system can be scaled up in the future to take full advantage of the equipment and CSM details identified). This scenario involves reducing the overall size of the Pilot Treatment Area to incorporate just one of the four groups of biosparge and biovent wells. Group 1, the cluster closest to I-76, is selected for the Base Case because it is in the most favorable location from a standpoint of access, lower trenching and restoration costs, the most favorable geochemistry, and lithology that is favorable to the technology. The Base Case utilizes 8 biosparge wells and 4 biovent wells. These wells could be operated continuously by the blowers obtained from Valmont; however, the controls are still provided to allow cycling of smaller groups if desired to provide a pulsing

effect. Included in the Base Case is an estimated 450 feet of total trenching to allow the installation of 3,050 feet of 1-inch conveyance piping to biosparge wells, and 1,550 feet of 2-inch conveyance piping to the biovent wells. The Base Case is smaller in terms of the area affected by the bioventing/biosparging Pilot Study, and therefore will provide a more limited effect on VOCs within the Pilot Treatment Area. This scenario could be used as a proof of concept that allows for future expansion if beneficial results are observed.

The total estimate cost of construction of the Base Case is $[redacted], broken down as follows:

- $[redacted] - Pilot Treatment System Installation including enclosure with, blowers and infrastructure minus controls
- $[redacted] - Total cost for Controls Installation comprised of:
    - o $[redacted] – PLC, Control Panel, and Instrumentation for Pilot Biovent/Biosparge Treatment System enclosure
    - o $[redacted] - Controls Upgrades for the South Side Skimming System, Radio Integration with the VES System SCADA

There are no other major changes in the elements of the construction between the scenarios, other than what is discussed above. There are additional elements of the Pilot Biovent/Biosparge where an iterative design and construction approach can be used to keep the cost minimal regardless of the scenario implemented. One example of this iterative process is with upgrades to the Valmont blowers' pulleys to allow operation at faster speeds to provide additional flow and pressure. This change is something that may be necessary based on the estimated breakout pressures and flow rates presented in this design. However, these calculations are based on estimates in some cases (when Site data is not available) established from relevant engineering references. Thus, it is recommended that the system be installed first with the upgraded motor in the sparge blower, but the decision to re-pully the blowers can be deferred until after start-up testing if it is determined to be necessary.

Arcadis welcomes the opportunity to discuss and refine the options presented above with USACE so that the best product is provided for DLA with the greatest possible positive effect on the ongoing remediation of the former DSCP.

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Tables

TABLE 1- PERMIT LEDGER

Location: Philadelphia, PA

Permit	Permit Type	Permitee	Issuer	Deliverables	Estimated Cost	Procurement Period
Construction						
	Building Permit	Contractor	City of PHL	Application for Building Permit Form; L&I Zoning and Use Registration Permit; 3 sets of Building Plans; Geotechnical soil investigation report; Energy Conservation Forms	$[redacted] filing fee; $[redacted] permit fee	20 business days
	Electrical Permit	Electrician	City of PHL	Application by Electrician	Application by Electrician	Not Specified
	Zoning permit	Contractor	City of PHL	App for Building permit; Valid L&I Zoning + Use Registration Permit; 3 sets of building plans; Energy Conservation Forms	$[redacted] filing fee	20 business days

Appendix A

Letter Report - **Supplemental Investigation to Support System Upgrades, Pilot Design, and Study**

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RE: Supplemental Investigation to Support System Upgrades, Pilot Design, and Study
Former Defense Supply Center Philadelphia (DSCP) Facility
Philadelphia, Pennsylvania

Introduction

This letter report and attachments describes recent subsurface investigative work that was completed to support the design of system upgrades, pilot design, and study (the Design) at the Former Defense Supply Center Philadelphia (DSCP), Philadelphia, Pennsylvania (the Site). Work was completed by PARS Environmental Inc. (PARS) and Arcadis US (Arcadis) under Work Authorization WA03 as part of Master Subcontract Agreement D13-0178 between PARS and Arcadis, and under Arcadis contract W912BU-13-D-0002 to the United States Army Corps of Engineers, Philadelphia District (USACE). The work was completed on the western portion of the Philadelphia Housing Authority (PHA) property located south of the DSCP, focused specifically in "Area 1" as described in the In-Situ Aerobic Biodegradation Basis of Design (BOD) Report[1]. On background, the BOD evaluated the viability of re-using remediation equipment procured from the Valmont Superfund Site (Valmont) to increase the rate of Site light non-aqueous phase liquid (LNAPL) remediation as required by the 1999 Administrative Order (Order) between the PADEP and the Defense Logistics Agency (DLA). The BOD determined that design and installation of a bioventing/biosparge system in Area 1 based on obtained Valmont equipment (e.g., positive displacement blowers) could supplement the Site's existing Vacuum Enhanced Skimming (VES) remediation system in pursuit of Order-defined LNAPL cleanup goals.

This supplemental investigation was aimed specifically at filling data gaps key to further understanding of subsurface conditions in Area 1 to support the well field design of a bioventing/biosparge remediation system to augment the existing VES system. Furthermore it is the intent of this investigation and report to identify within Area 1 the most favorable conditions for the implementation of additional remediation infrastructure based on the hydrogeologic framework and contaminant distribution within Area 1. The field investigation was completed between April 8th and April 20th, 2016 and included the following activities:

- Subsurface utility screening using an inductive utility locating tool and Ground Penetrating Radar (GPR)
- Direct-push drilling outfitted with subsurface direct sensing technology
- Installation of four vapor monitoring probes within the direct-push boreholes
- Survey of utilities and vapor monitoring probes

[1] In-Situ Aerobic Biodegradation Basis of Design (BOD) Report, Arcadis, 2014.

The information collected during the field phase of the work was integrated into the existing 3-dimensional Site model created using CTech Earth Volumetric Studio (EVS) software from which various subsurface cross-sections and images of the study area could be extracted. The resulting subsurface views illustrated where the best overlap between petroleum hydrocarbon contamination and high-permeability zones occurred which were then used to support the selected locations for additional remediation infrastructure.

Since 2001, direct-push/direct sensing work has been conducted on the various properties that occupy the Site including: the former DSCP, within the Quartermaster Plaza parking lot (near Home Depot and BJ's), on the Siena Place residential housing property, the PHA maintenance facility, the Defense Realty property, and within the SEPTA south bus terminal. Direct observation, several downhole direct sensing tools, and sampling methods were employed on these various properties depending on data needs from each area. A total of 34 Membrane Interface Probe (MIP) and Hydraulic Profiling Tool (HPT) (combined-MiHPT), four Electrical Conductivity (EC), two fuel fluorescence detector (FFD), and two direct-observation (direct-push core) borings were advanced, while two piezometers and one monitoring well have been installed at the Site since 2012. Soil pore gas samples were collected from the four EC locations south of the Siena Place housing development from specific vertical intervals. A description of the various investigations completed at the Site has been presented previously in Quarterly Progress Reports[2]. This most recent investigation included advancing an additional four MiHPT borings within BOD Area 1, located in portions of the PHA parking lot and the grassy area between the parking lot and I-76 (Attachment 1; Figures 1, and 6 through 9).

In support of the Design and specifically to relate hydrogeological elements to the details of the proposed Valmont equipment-based bioventing/biosparge remediation system, this letter report: 1) summarizes the Site geology and hydrogeology framework, 2) describes each of the subsurface direct-sensing tools utilized at the PHA property (i.e., Area 1), and 3) presents the results of the investigation through figures and cross-sections developed through integration of recently generated data with historical Site information.

Site Location and Regional Geology

The former DSCP property lies to the east of the Schuylkill River and north of the Delaware River and Former Philadelphia Navy Yard (Figure 1). The Site is bounded to the west by the Sunoco Refinery, to the north and east by residential areas, and to the south by the Schuylkill Expressway and the Former Passyunk Homes property. The former Passyunk Homes property is currently the location of the PHA building and the Sienna Homes housing development. The land surface topography of the Site and surrounding area is relatively flat with the land surface elevation generally around 20 feet (ft) above mean sea level (ft amsl).

Broadly, the region around the Site is divided into two aquifer systems: the consolidated Piedmont aquifer system and the unconsolidated Coastal Plain sediment aquifer system[3]. These two systems are separated

[2] Fourth Quarter 2014 and Calendar Year 2014 Summary Progress Report for the Former Defense Supply Center Philadelphia Facility, Philadelphia, PA, Arcadis, 2015.

[3] Geohydrology and Ground-Water Resources of Philadelphia, Pennsylvania, USGS Water-Supply Paper 2346, 1991.

by the Fall Line, which follows the landward extent of the Coastal Plain across Philadelphia, trending southwest to northeast[3]. The crystalline bedrock of the Piedmont Physiographic Province outcrops northwest of the Fall Line and northwest of the Site. The Site and the surrounding area lie to the south and east of the Fall Line within the Atlantic Coastal Plain Physiographic Province. The coastal plain begins at the Fall Line as a very thin veneer of unconsolidated sediment which thickens to the south and east[3].

The Coastal Plain consists of numerous distinct geologic units which outcrop in bands striking northeast to southwest, parallel to the Fall Line. The Site and surrounding area are underlain by a number of these units which together are termed the Potomac-Raritan-Magothy (PRM) aquifer system consisting of a wedge-shaped mass of Cretaceous age unconsolidated sediments that are comprised of highly permeable sands and gravels separated by less-permeable layers of silts and clays[4]. The PRM system unconformably overlies Paleozoic age bedrock, and at the Site and adjacent area underlies Quaternary age silt and gravel. Not all units of the PRM system are present near the Fall Line or at the Site; some only appear to the south and east. The PRM system is thinnest near the Fall Line and gradually thickens to the southeast toward the coast, where these deposits are several thousand feet thick. Regionally, the aquifers are largely confined, except in isolated areas where younger permeable sediments are in direct contact with underlying Cretaceous sediments as a result of Pleistocene erosion and deposition.

Regionally and within the confined portions of the PRM aquifer, groundwater flows to the southeast in the down dip direction[3]. Locally within the outcrop area, groundwater flow is impacted by many factors including the presence of rivers, changes to land use accompanying urbanization, and the effects of pumping from wells completed in the lower aquifer zone. In the past, two large groundwater pumping facilities were active in the area: the Former Philadelphia Navy Yard to the south and Publicker Industries to the east[4]. Withdrawals from these facilities resulted in changes to groundwater flow directions such that water flowed toward the pumping centers[4]. In addition, as hydraulic heads in lower units dropped below those in upper units, a downward vertical groundwater flow pattern developed[4]. Though pumping at the naval shipyard and at Publicker Industries was discontinued in the mid-1960s and 1990s, respectively, pumping increased in New Jersey across the Delaware River. As a result, water levels recovered, but the downward vertical gradients remained[4].

Site Geology and Hydrogeology

The Site's hydrogeological framework has been described in previous Site documents. To provide a frame of reference for subsequent interpretations of BOD Area 1 direct push/MiHPT data, the summary below, from the *Final Data Gap Analysis Report Former Defense Supply Center Philadelphia Facility, Philadelphia, Pennsylvania* (Arcadis, June 2013) is presented:

[4] Simulation of Ground-Water Flow in the Potomac-Raritan-Magothy Aquifer System Near the Defense Supply Center Philadelphia, and the Point Breeze Refinery, Southern Philadelphia County, Pennsylvania, (USGS), 2001.

The Site, Sunoco Refinery, and surrounding area are underlain by the PRM aquifer system that consists of Coastal Plain sediments that range in age from Late Cretaceous to Holocene. The PRM aquifer system is divided into numerous distinct and laterally extensive units that are present at the Site and throughout the adjacent investigation area. These sediments consist of highly permeable sands and gravels separated by less-permeable layers of silts and clays. The PRM aquifer system in Pennsylvania is divided into several units including an upper clay, upper sand, middle clay, middle sand (only present in the southernmost portion of the investigation area), lower clay, and lower sand. Not all units are continuous; near the Fall Line, pinching out of upper units, including confining units, results in regions of the lower sand unit that are directly overlain by alluvium (USGS 2001). The PRM is overlain by Pleistocene age deposits referred to informally as the Trenton gravel, which are overlain by Holocene fine grained alluvial materials (i.e., informally known at the Site as “the upper silt layer”) and fill (USGS, 2001). The PRM aquifer system is underlain throughout the study area by relatively impermeable crystalline rocks of the Wissahickon Formation. Throughout the system, all beds dip to the southeast (USGS, 1991).

Subsurface/Shallow Aquifer Zone

As discussed above, the upper silt layer and Trenton gravel constitute the shallow aquifer at the Site and surrounding area. Each of these units is discussed in more detail below.

Urban Historic Fill

Throughout south Philadelphia and as observed during subsurface investigations at the Site, there exists a layer of historic fill that lies between the ground surface and the top of the silt layer (where present) and the Trenton Gravel. This fill is a result of generations of construction and development throughout the area; the origins of the materials themselves is unknown and certainly is a mix of various sources. The constant property redevelopment in and near the Site has created a mix of historic fill, the upper silt layer and Trenton Gravel to varying degrees at the Site.

Upper Silt Layer

In the vicinity of the Site and the surrounding area, natural surficial materials reportedly consists primarily of a silt layer with varying amounts of sand and clay deposited by the Schuylkill and Delaware Rivers during alluvial processes and periodic flood events. The silt layer is generally present across the entire area of the Site, the Sunoco Refinery, and the surrounding area although excavation has disturbed or removed this layer in some areas. Throughout much of the area the silt layer has either been replaced or covered over by fill. The fill layer is generally thin and discontinuous, but is much thicker at locations that were excavated during installation of underground utilities or construction of buildings or roads. Both the fill and silt layers are identified in boring logs and in cross-sections in numerous documents describing investigative activities at the Site, the adjacent Sunoco Refinery property, and other parcels within the larger investigation area.

Heterogeneous Sand & Gravel (Trenton gravel)

At the Site and surrounding area, the heterogeneous sand and gravel is generally synonymous with the Trenton gravel but may locally include portions of the upper sand of the PRM aquifer system (where the upper clay is missing) or coarser portions of the overlying silt or fill layer. The Trenton

gravel was noted to underlie the silt/fill layer throughout much of the study area with the exception of the southernmost portion of the Sunoco Refinery site where the gravel layer is absent as noted on cross sections in published reports by Langan Engineering (2011). While the Trenton gravel is described as consisting of gravel, sand, and minor amounts of clay suggesting relatively high permeability, observation made of these materials during various field investigations indicate that there is a fair amount of cementation and mineralization that potentially decreases hydraulic permeability. In boring logs and cross sections from the Sunoco Refinery and the Site, the thickness of the unit, where present, varies from a few feet to over 30 feet with the thickness increasing to the southeast. Most of the unconfined aquifer system consists of the Trenton gravel. Where the shallow aquifer has a defined bottom confining unit, the water table is generally encountered between 13 and 20 feet bgs. Where there is a connection between upper and lower aquifer (e.g. the breach) water is encountered between 17 and 20'bgs.

Confining Units

The lower/middle clay layer is an extensive and important component of the confining unit throughout most of the investigation area, except where it was affected by Pleistocene erosion and re-deposition. This unit separates the unconfined to semi-confined shallow aquifer from all of the underlying deep aquifer; however, in discreet areas the confining unit is laterally discontinuous, allowing for hydraulic connection of the shallow to the deep aquifer. One such 'breach' has been identified and is centrally located at the Site. (Sloto, 2010). The lower/middle clay is identified in boring logs and cross section at both the Site, the Sunoco Refinery, and in the surrounding area.

Deep Aquifer Zone

The deep aquifer zone at the Site and the surrounding area consists of the units directly below the lower clay unit, most notably the lower sand unit. The lower sand unit (also called the Farrington Sand) of the PRM consists of fine gravel and coarse sand grading upward into medium to fine sand with a few layers of clay (USGS 1991). Portions of this unit lie unconformably on the crystalline bedrock, while others are separated from the bedrock by a layer of saprolite (USGS 1991). Thickness varies at the Site and surrounding areas. The lower sand unit forms a wedge that thickens from very thin at the Fall Line to about 90 ft to the southeast, where the sands filled in paleo-river channels of the ancestral Delaware and Schuylkill rivers (USGS 1991).

Groundwater Flow in the Shallow Aquifer Zone

Groundwater in the shallow aquifer generally flows from the northwest corner of the Site to the southeast and then more to the south. Groundwater recharging the shallow aquifer from the former DSCP property ultimately exits the southwest corner of the property under current hydrologic conditions or enters the deeper aquifer zone through leakage through the confining unit (lower/middle clay). This leakage occurs through the above described breach. Recent (i.e., 2016) potentiometric contours for the shallow and deep aquifers indicate that in the vicinity of the breach, groundwater flow is toward the breach and then downward into the deep aquifer. This gradient indicates a downward flow, where groundwater is transmitted from the shallow aquifer to the deep. Shallow groundwater in

the larger area ultimately discharges to surface water or descends through leaky portions of the confining unit into the deeper aquifer.

Groundwater Flow in the Deeper Aquifer Zone

As indicated above, groundwater flow in the deeper aquifer in the area surrounding the Site has historically been controlled by recharge to the aquifer from the outcrop area and the presence of large pumping centers located to the east and south of the Site (USGS 2001). Since the cessation of large-scale removal and use of groundwater from the deeper aquifer in recent times, flow in the aquifer has largely returned to more natural conditions, although continued pumping in nearby New Jersey preserves the vertical hydraulic gradients that allow for downward leakage (USGS 2001). Regionally, groundwater within the deeper aquifer flows to the southeast along dip. Locally significant recharge from the shallow aquifer occurring through leaky portions of the confining unit may impact this overall flow direction. At the Site, for that portion of the deeper aquifer where data are available, groundwater flow is largely to the south-southeast.

Direct Push and Direct Sensing Technology

Electrical Conductivity (EC)

Traditionally, EC logging is used to determine variations in subsurface lithology, such as defining permeable sand zones and impermeable clay confining layers. EC logging is achieved by passing an electrical current through the formation between two probe contacts. This current is measured along with the resultant voltage. The conductivity is a ratio of current to voltage times a constant which results in EC readings in milli-Siemens per meter (mS/m). The electrical conductivity of unsaturated unconsolidated materials is a function of the moisture content of the material and the conducting properties of the pore fluids and sediments. In the saturated zone (below the water table), where variations in moisture content are small, fluid properties (chemistry variations) and matrix properties (fine vs. coarse grained sediments; mineralogy) are the major factors that influence EC. Silt and sand-sized particles are generally less conductive than clays – clay-sized particles, such as phyllosilicates, humic substances, and iron and manganese oxides and oxyhydroxides, tend to be highly conductive due to their extremely small size, relatively high surface area per unit volume, and charge characteristics. Thus, in geologic settings such as at the DSCP Site where fine and coarse-grained materials are inter-bedded, EC logs provide a very detailed profile of the vertical distribution of various geologic materials.

Typically EC results range from 0.1 to 10 mS/m for sands and gravels and 10 to 400 for clays. Results greater than 400 with specific patterns potentially suggest the presence of fill material. The attached logs show EC values that vary across this range; higher values (line shifting to the right) indicate increasing amounts of silt, clay, and other fines, while lower values (shifts left) are indicative of coarser-grained units such as sands and gravels.

Hydraulic Profiling Tool (HPT)

The HPT system is designed to evaluate the hydraulic characteristics of unconsolidated materials. Clean water is pumped through a screen on the side of the probe at a low flow rate (i.e., 300 mL/min) while the HPT probe is pushed or hammered at a constant rate (approximately 2 cm/s). Injection pressure and injection water flow rate are measured and plotted with depth which provide an indication of the hydraulic properties of the soil. A relatively low pressure response would indicate a relatively large grain size and the ability to easily transmit water while higher pressures would indicate a smaller grain sizes and a reduced ability to transmit water.

Pressure values typically range between 20 pounds per square inch (psi) for coarse grained materials and 100 psi for very clays or indurated/cemented materials. Similar to the EC logs, the attached HPT logs show HPT values that vary across this range; higher values (line shifting to the right) indicate increasing amounts of silt, clay, and other fines, while lower values (shifts left) are indicative of coarser- grained units such as sands and gravels. Post-processing of the pressure log data involves an empirical derivation of estimates of hydraulic conductivity (K) and water table elevation. Estimated K values generally range between 0 and 80 feet per day (ft/day). When observing the estimated K logs, the opposite is true of the pressure logs – higher values (to the right) indicate coarser/more permeable materials. These K values are used in conjunction with the EC information to cross-reference lithological interpretations with expected corresponding hydraulic properties to arrive at a “multi-proxy” solution of the geologic profile.

Membrane Interface Probe (MIP)

The MIP is used to provide semi-quantitative concentrations of volatile organic compounds (VOCs) in the gaseous, sorbed, dissolved or free phases in the subsurface. A semi-permeable polymer “Membrane” is installed on the probe within a block that is heated to approximately 120 degrees C. Diffusion of VOCs through the membrane occurs due to the concentration gradient imparted between the impacted soil and the clean carrier gas behind the membrane. A constant gas flow of 35-45 mL/min sweeps behind the membrane and carries the diffused VOCs to the gas phase detectors at the surface. Two detectors are typically used – a flame ionization detector (FID) and a photoionization detector (PID).

MIP values are measured in microvolts (uV) and typically range from 104 uV where no contamination is encountered to 107 uV in the smear zone. Detection limits for typical MIP configurations generally correspond to 1ppm and 150ppb or less, depending upon contaminant concentrations and soil matrix. Travel time from the membrane interface to the detector(s) is approximately 60-75 seconds (depending on the length of trunkline, flow rate, and ambient air temperature). Increasing values (shift right) indicates higher concentrations of total VOCs in the subsurface.

Field Investigation Results

Results of the utility survey are included in Attachment 1. As shown therein, there are buried electric, water, sewer, and other unidentified utilities in BOD Area 1. Some of the unidentified utilities are likely associated with the DSCP remediation system infrastructure such as vacuum and LNAPL lines. From these figures and from discussions with PHA staff, most of the utilities are located within the medians between the parking lot bays oriented north-south in the parking lot.

The MiHPT logs for each of the four vapor probe locations (VP-1, VP-2, VP-3, and VP-5) are included in Attachment 2. From left to right, the logs include the EC and estimated hydraulic conductivity (K), maximum HPT pressure and piezometric pressure, the flame ionization detector (FID) (Detector 1 Max) and the photoionization detector (PID) (Detector 2 Max) which are the two MIP components.

As described above, the EC response is generally used to determine changes in material grain size with depth. Each of the EC logs show EC shifting to the right between approximately 2 and 12 feet bgs before shifting left. This shift is indicative of the silt layer that has been identified in several other EC logs on the PHA property and across the Site. Between approximately 20 and 40 feet, the EC response generally shifts to the right until about 40 feet bgs before again moving left until the total depth. This patters appears less pronounced in VP-1; however, this appearance is largely due to the differing horizontal scales on each plot. The EC plot for VP-1 also shows a significant shift to the right at about 21 feet bgs which indicated the presence of a fine-grained layer most likely associated with a clay.

The HPT data sets do not begin until the probe has reached the water table as shown by the start of the data set between 20 and 21.5 feet bgs. The large red dot on the piezometric pressure log marks the top of the groundwater table. The HPT plots generally follow the same trends as the EC plots. These concomitant shifts are due to the increasing pressures measured by the HPT due to the finer grained layers being less hydraulically conductive than coarser grained materials. The estimated K values shown on the EC plot naturally vary inversely with HPT pressure; as more highly conductive layers will allow more water flow into the formation from the probe and exert less pressure. So in general, EC and HPT logs are directly related while K is inversely related to EC and HPT. Of note and as seen in the HPT for all four logs, there is a zone of very low K between 38 and 44 feet bgs which likely represents the presence of the “lower/middle clay” at those depths in these four logs. Below those depths, relatively high K values are observed together with low EC and HPT pressure values suggesting coarse and conductive materials associated with the Farrington sand (lower sand unit).

The MIP response (FID and MIP) shown in the two plots on the right of the logs illustrate the presence and character of the LNAPL “smear zone”. Starting at approximately 19 to 21 feet bgs, the MIP shifts rapidly to the right with depth before gradually shifting back to the left at approximately 40 feet bgs. The thickness of this smear zone is likely due to historical fluctuations in groundwater elevation that have carried LNAPL contamination vertically through this zone and “smeared” it onto the soil matrix. Values above 1.0×10^7 microvolts (uV) are indicative of the highest concentrations and in some cases suggest the presence of free-phase LNAPL. Values of this magnitude can be seen in each of the logs but generally are limited to small vertical intervals. It is important to recognize that the gradual decay of MIP values with depth is also due, in small part, to the smearing imparted by the probe as it is advances, and the delay in the clearing of the sweep gas as it flows through the MIP trunkline.

Data Analysis with Earth Volumetric Studio (EVS)

Data generated from each of the direct push events were synthesized together with existing traditional boring log data to generate a 3-dimensional representation of the subsurface geology, hydrogeology, and contaminant architecture using C-Tech’s EVS software. EVS allows for fully three-dimensional visualization

rendering of geology as well and can be used to estimate volumes and masses of contaminant plumes. The geologic and chemical models are generated independently (using the various different direct push data sets), and then combined to generate 3-D interactive cross-sections and fence diagrams.

The geologic portion of the model was created using existing shallow and deep aquifer zone monitoring well boring logs from the Site and the newly-acquired MiHPT data. This information was viewed in the context of the Site hydrogeological conceptual model elements described in various reports (and above), including investigation, remedial design and risk assessment reports published under the Order prior to 2011 and local/regional reports published by the United States Geological Survey (USGS) and other agencies. A bedrock surface was first created using all bedrock contact elevations included in existing boring logs to define the model "bottom". Various contacts or lithology "picks" within the unconsolidated aquifer systems were selected using both borehole and downhole data. These "picks" were then correlated between Site locations (e.g., direct push borings, existing Site wells, etc.) and then bridged by EVS to generate a volumetric representation of each hydrostratigraphic unit identified by the "picks". With the volumetric model generated, any cross-section, plan view, fence diagram, or horizontal slice can be viewed and exported.

The process described above was followed to create the four cross sections from the 3-D model at the locations shown in Figure 1. Figures 2, 3, 4, and 5 each contain 3 different data sets (geologic, MPT, and MIP) for cross-sections A-A', B-B', C-C', and D-D', respectively. Figures 6, 7, and 8 are horizontal slices of the subsurface cut at 0 feet amsl (above mean sea level), -5 feet amsl, and -10 feet amsl, and show the estimated K values at those elevations.

Figure 1 shows the traces of the four cross sections selected for analysis and the data points used to create each section. The points included in each section are a combination of monitoring wells, extraction wells, and MiHPT borings. These four slices were selected because they define a "box" centered within the BOD Area 1. The corners of the box are defined by VES wells PH-RW-A, PH-RW-B, PH-RW-I, and PH-RW-W. This sub-area of BOD Area 1 also is in an area that is largely within the grass to the north of the PHA parking lot, is clear of many utilities, is close to existing VES infrastructure, and has relatively elevated benzene concentrations and contains free-phase LNAPL.

Cross section A-A' runs west to east along the northern portion of the PHA property just south of the Schuylkill Freeway, or I-76 (Figure 1). Figure 2A illustrates the Site stratigraphy along A-A', which includes the hydrostratigraphic units described above, and shows the position of the 16 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections C-C' and D-D'. Figure 2B shows the same section but adds the estimated K values that were derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 2A. Finally, Figure 2C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Cross section B-B' runs west to east along the northern-middle portion of the PHA property, through the parking lot and is just north of the Packer Avenue sewer (Figure 1). Figure 3A illustrates the Site stratigraphy along B-B', which includes the hydrostratigraphic units described above, and shows the position of the 13 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections C-C' and D-D'. Figure 3B shows the same section but adds the estimated K values that were

derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 3A. Finally, Figure 3C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Cross section C-C' runs south to north along the western edge of the PHA property and cuts across the entire PHA property (Figure 1). Figure 4A illustrates the Site stratigraphy along C-C', which includes the hydrostratigraphic units described above, and shows the position of the 7 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections A-A' and B-B'. Figure 4B shows the same section but adds the estimated K values that were derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 4A. Finally, Figure 4C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Cross section D-D' also runs south to north along the western portion of the PHA property but to the east of section C-C' and west of the PHA maintenance building (Figure 1). Figure 5A illustrates the Site stratigraphy along D-D', which includes the hydrostratigraphic units described above, and shows the position of the 7 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections A-A' and B-B'. Figure 5B shows the same section but adds the estimated K values that were derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 5A. Finally, Figure 5C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Data Discussion and Interpretation

Major features common to all of the cross sections shown in Figures 2A, 3A, 4A, and 5A are the geologic/hydrostratigraphic units shown in the legends. The two predominant features are the upper and lower aquifer systems defined by the Pleistocene Trenton Gravel and the Cretaceous Lower Sand (Farrington), respectively. These two aquifers are separated in certain locations by a confining unit – defined here as the upper, middle, and lower sand and clay, collectively. These three beds together are collectively treated as the confining unit that largely hydraulically separates the upper (water table) aquifer from the lower aquifer. Where the Trenton Gravel and Lower Sand are not separated, that is where they are in direct contact with one another, is what has been described as the trough-like feature or "breach" hypothesized to be a paleochannel. This feature has been referenced in the Site Quarterly Status reports and has been mentioned in previous meetings with PADEP (e.g., March 2016). The local presence and absence of this separating feature has been the focus of much of the mapping and characterization efforts conducted at the Site to date.

It should be noted that the position of the heavy line delineating the top of the confining unit does not necessarily match at all depths and locations with the geologic contacts presented in the "Site Stratigraphy" cross section series (Figures 2A, 3A, 4A, and 5A). The positions of the geologic contacts shown in these cross sections between boreholes are in part a function of the kriging algorithm used by EVS that interpolates the contact between points and how it handles "pinch-outs" and beds that extinguish from one borehole to the next. A key example of this artifact can be seen in Figure 2A (cross section A-A'') between DSCP-MiHPT-17 and well PH-PH-20, where the confining unit appears to drape over a thicker section of

the lower clay (where they should be shown as having being eroded into by the Trenton Gravel. A second example is near DSCP-MiHPT-09 where the heavy contact line rises up from the lower Sand into the upper aquifer. The discrepancy between the two contact positions in this example is due to the fact that the heavy line uses the HPT data set to modify the position of the contact based on the differing hydraulic properties of the upper and lower aquifers.

With the above overall description being said, below are key take-away points in each cross-section.

Cross-Section A-A' (Figures 2A, 2B, and 2C)

- Section A-A' appears to cut the breach longitudinally between well PH-PH-20 and boring DSCP-MiHPT-09, with the edges of the breach shown west of PH-RW-B2 and east of DSCP-MiHPT-09.
- The northern boundary of the BOD Area 1 "box" (along A-A' between Section Lines C-C' and D-D' and wells PH-RW-A2 and PH-RW-B2) appears to lie atop a relatively thick sequence of the confining unit (approximately 20 feet) and lies to the west of the breach.
- The dashed portions of the heavy blue line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above. This line is generally positioned coincident with the top of the confining unit.
- The most vertically contiguous areas of high K values occur within the "breach".
- In general, the areas with the highest kriged MIP-FID values are collocated with the areas of highest hydraulic conductivity as illustrated by the HPT response.
- Note that on this cross section and on every other, it is in the upper zone where the highest MIP-FID values occur and; the MIP response always lies in the shallow, as such we believe this to represent the known petroleum hydrocarbon "smear zone" in the upper aquifer.

Cross-Section B-B' (Figures 3A, 3B, and 3C)

- As with A-A', section B-B' also appears to cut the breach longitudinally but is closer to the southern edge of the breach. This is supported by the confining unit being more pronounced and thicker across the section.
- The southern boundary of the BOD Area 1 "box" (between Section Lines C-C' and D-D' and wells PH-RW-W2 and PH-RW-I2) lies atop a slightly thinner sequence of the confining unit where the breach edges are just to the east and south.
- The heavy blue dashed line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above.
- The areas of highest K values occur within the "breach", but are more punctuated by the presence of the confining unit. This suggests "sub-channels" or multiple cuts through the confining unit.
- The portion of the blue line that is denoted as "breach" is not as laterally contiguous as it is further to the north as seen in section A-A''.
- In general, the areas with the highest kriged MIP-FID values are collocated with the areas of highest hydraulic conductivity as illustrated by the HPT response in the upper aquifer.

Cross-Section C-C' (Figures 4A, 4B, and 4C)

- Section C-C' appears to cut the breach laterally which is most pronounced between DSCP-MiHPT-12 and PH-RW-W2. On either side of these points, the confining unit is greater than 10 feet thick.
- The western boundary of the BOD Area 1 "box" (between Section Lines B-B' and A-A' and wells PH-RW-W2 and PH-RW-A2) lies atop a thick sequence of the confining unit (greater than 10') with the breach just to the south of the BOD Area 1 "box".
- The heavy blue dashed line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above.
- As with the other sections, the highest K values occur in both aquifer units where they are hydraulically connected within the breach.
- The highest MIP-FID values again occur at the edge of the breach near PH-RW-W2 and DSCP-MiHPT-02.
- The MIP-FID response is greatest in the upper aquifer, but also extends slightly into the confining unit.

Cross-Section D-D' (Figures 5A, 5B, and 5C)

- Similar to section C-C', Section D-D' appears to cut the breach laterally which is well-defined between points DSCP-MiHPT-05 and RW-H.
- The eastern boundary of the BOD Area 1 "box" (between Section Lines B-B' and A-A' and wells PH-RW-I2 and PH-RW-B2) lies atop a slightly thinner sequence (< 5 feet) of the confining unit with the breach just to the south and east of the BOD Area 1 "box".
- The heavy black dashed line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above.
- The high K values derived from DSCP-MiHPT-05 are over the within the breach and in contact with the lower aquifer high K zones.
- The MIP-FID response is greatest in the upper aquifer most of the way across the section and is coincident with areas of high K.

Horizontal slices at 0', -5', and -10' amsl (Figures 6, 7, and 8)

- Figures 6, 7, and 8 show HPT-derived K values in horizontal "slices" at various depths in BOD Area 1, together with the kriged MIP-FID isolines.
- As is the case with each of the cross-sections described above, there is a high degree of correlation between areas of high K and high MIP-FID response.
- The areas where high K and high MIP-FID areas collocate are within and near the BOD Area 1 "box".
- MIP-FID values are generally greater at -5' and -10' amsl than they are at 0' amsl, this elevation corresponds to depth of approximately 25 to 30 feet bgs.
- In the -5' amsl slice, there is a small sub-circular-shaped area around well PH-RW-W2 of maximum MIP response within an area of K values between 30 and 45 feet/day.

- In the -10' amsl slice, there is an hourglass-shaped area near Cross-Section C-C' of maximum MIP response that contains two discrete areas of maximum K values (greater than 60 feet/day); the southern portion of which corresponds to the circular area observed at -5' amsl.

Figure 9 presents a depth-to-top of confining unit contour map. It is important to recognize that this map contours depths to, not elevations of, the top of the confining unit as determined through making geologic unit assignments (picks) to various boring logs advanced in the area. While the contoured surface is based on geologic picks made at boring locations, it is interpolated by EVS at distances away from each boring, and therefore subject to verification. Future work will re-evaluate the picks originally made from the boring logs by considering the HPT data set that provides a secondary line of evidence for making such geologic picks. This presentation explains the anomalous feature that trends north to south along the western margins of the figure which is the surface elevation of the elevated CSX Railway bed skewing depth to confining unit values.

The surface topography of the area within the BOD Area 1 "box", however, is relatively flat, which eliminates anomalous values of depth to the top of the confining unit resulting from changing surface topography (like with the CSX railway). Therefore, while depth contours are shown, the topography of the top of the confining unit, which appears as a circular feature within the "box" represents a thicker portion or "hill" in the confining unit. That this feature also represents the bottom or "floor" of the "Subsurface/Shallow Aquifer Zone". As this "floor" underlies the relatively permeable shallow aquifer zone within the "box", a resulting "sandbox-like" feature occurs which is a favorable volume for petroleum hydrocarbon removal through bioventing/biosparge, as described in the BOD Report. Furthermore, this area is largely within a grassy portion off the PHA property, away from PHA activities and parking infrastructure.

The BOD Area 1 "box" is entirely underlain by the confining unit, but lies to the northwest of the breach feature. As described in the BOD Report, the ideal target areas in BOD Area 1 are those that contain both highly permeable geology (i.e., high K) and contain elevated levels of LNAPL impacts (in dissolved phase and as NAPL). These two attributes generally overlap in the smear zone that exists between the bottom of the silt and the confining unit. In addition, the presence of the confining unit beneath the entire BOD Area 1 "box" (the "floor") precludes the downward vertical migration of petroleum hydrocarbon impacts, as observed through the MIP response in MiHPT borings advanced in this area, and demarcates the theoretical maximum depth to which to install biosparge wells.

PARS
Environmental
Inc.

Attachment 1:

Geophysical Utility Screen Results

ACE Geophysics

April 18, 2016

Mr. Eric White, PG
Senior Project Manager
PARS Environmental Inc
500 Horizon Drive
Suite 540
Robbinsville, NJ 08691

Re: Utility Location
DSCP-Philadelphia
Project 16014

Dear Mr. White:

ACE Geophysics (ACE) has prepared this letter report for PARS Environmental Inc. to document the geophysical survey performed at the DSCP facility located in Philadelphia. ACE screened six drilling locations prior to intrusive activities. Utilities detected during the investigation are shown on Figure 1.

A two-phased geophysical survey was performed at the site. The first phase included using a utility locator to perform inductive or conductive tracing. Inductive locating is used for locating a particular object or several points along a buried pipeline or cable and is the preferred method for locating unknown or lost conductors. Conductive tracing is used for tracing an individual pipe or cable (conductive) or for use when other conductors or metal objects are nearby. As part of this phase, ACE also utilized a 50/60 Hertz locator to screen or loaded (active) underground power lines.

The second phase of the investigation was conducted using a SIR-3000 GPR control unit with a 400 MHz GPR antenna manufactured by Geophysical Survey Systems located in Salem, New Hampshire. The GPR survey was conducted along traverses oriented in multiple directions. The GPR profiles were reviewed in the field for anomalies with characteristics of possible underground

utilities. Parabolic shaped anomalies are characteristic of possible underground utilities when the GPR antenna crosses the utility at a perpendicular angle.

Figure 1 presents the results of the geophysical investigation. Utilities detected by the utility locator and the GPR are shown on Figure 1. Whenever possible, ACE marked the utilities with the appropriate spray paint color (orange=communications; green=sewer; red=electric; yellow=gas; blue=water). Unknown utilities were marked with white or pink spray paint on the ground surface.

Figure 2 includes photographs taken at Borings A and B. As shown on Figure 1, there are two unknown anomalies at Boring A and at Boring B there is the electrical line for the parking lot lights and a storm sewer pipe located in the landscaping between the parking areas.

Figure 3 includes photographs from Borings C and D. As shown on Figure 1 and Figure 3, there is a storm sewer pipe located in the landscaping between the parking areas. Boring D is located in the grass area on the north side of the parking area. The GPR and utility locators showed the presence of several utilities in the area. The original location of Boring D had to be moved to the east away from several water and electrical lines. These lines are part of the remediation treatment system.

Figure 4 includes photographs taken at Borings E and F. Boring E is near the fire hydrant; however, the utility locator followed the line to the east away from the boring location. An electrical conduit bank was marked (red) in the vicinity during a previous investigation. During this geophysical investigation, the utility locator did not detect the presence of electrical signals. One unknown utility was marked traversing from southwest to northeast. The original location of Boring E was moved to the west away from these marked utilities. Boring F is located on the west side of the building. Several unknown anomalies with features similar to pipes were marked on the ground surface.

SURVEY LIMITATIONS

The results stated and the conclusions drawn from this report furnished by ACE Geophysics to the client hereunder shall represent the opinion, efforts and judgment of ACE Geophysics, based on standard industry practices; however, ACE Geophysics cannot and does not warrant or guarantee that the accuracy or correctness thereof will always meet desired results and expectations. Any action which client (or those associated with client) may take as a result of or based on such reports and the data to which it refers shall be client's own responsibility and ACE Geophysics shall not be liable or responsible for any loss, cost, damages or expenses whatsoever, including incidental or consequential damages, incurred or sustained by client resulting therefrom for which client hereby releases ACE Geophysics; provided that all such reports, data and information, as well as the basic data upon which they are based, are acquired, compiled and prepared, as the case may be, in accordance with the contract.

SUMMARY

ACE scanned grids approximately 10 feet by 10 feet around each planned boring location. This survey was not a site wide utility survey. It is possible that utilities are present in other sections of

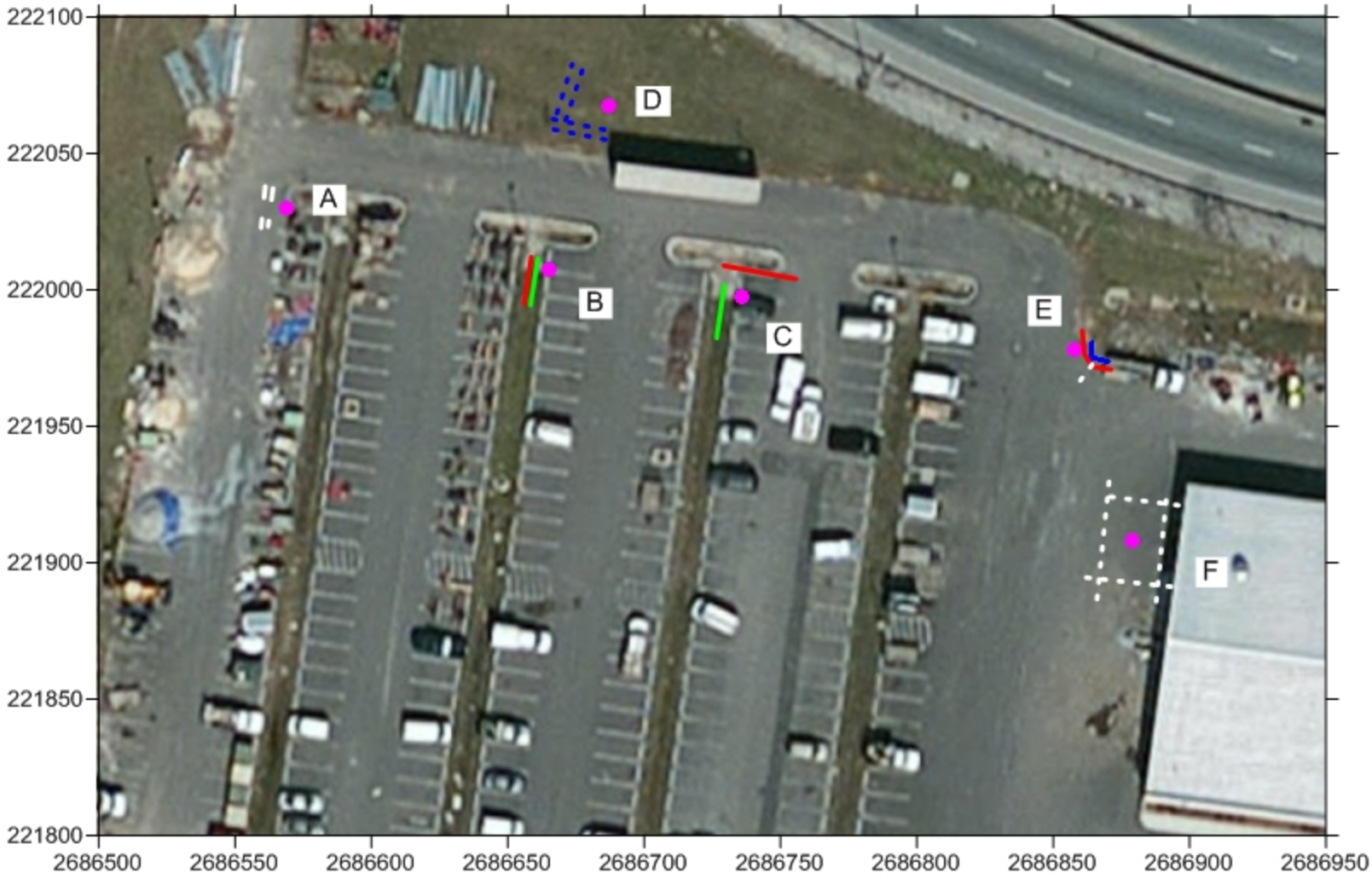
the property. If you have any questions or require any further information, please feel free to contact us at your convenience.

Sincerely,

ACE Geophysics LLC

Beth A. Williams

Beth A. Williams, P.G.
President - Senior Geophysicist



Feet

0 25 50 75 100

Underground Electric

Sewer

Water

Unknown Utility

Unknown Utility

Coordinates are in NAD83
Pennsylvania-South, Feet, WGS 1984

N

Boring Locations	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 1



Boring A



Boring B

Photographs of Borings A and B	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 2



Boring C



Boring D

Photographs of Borings C and D	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 3

Boring E









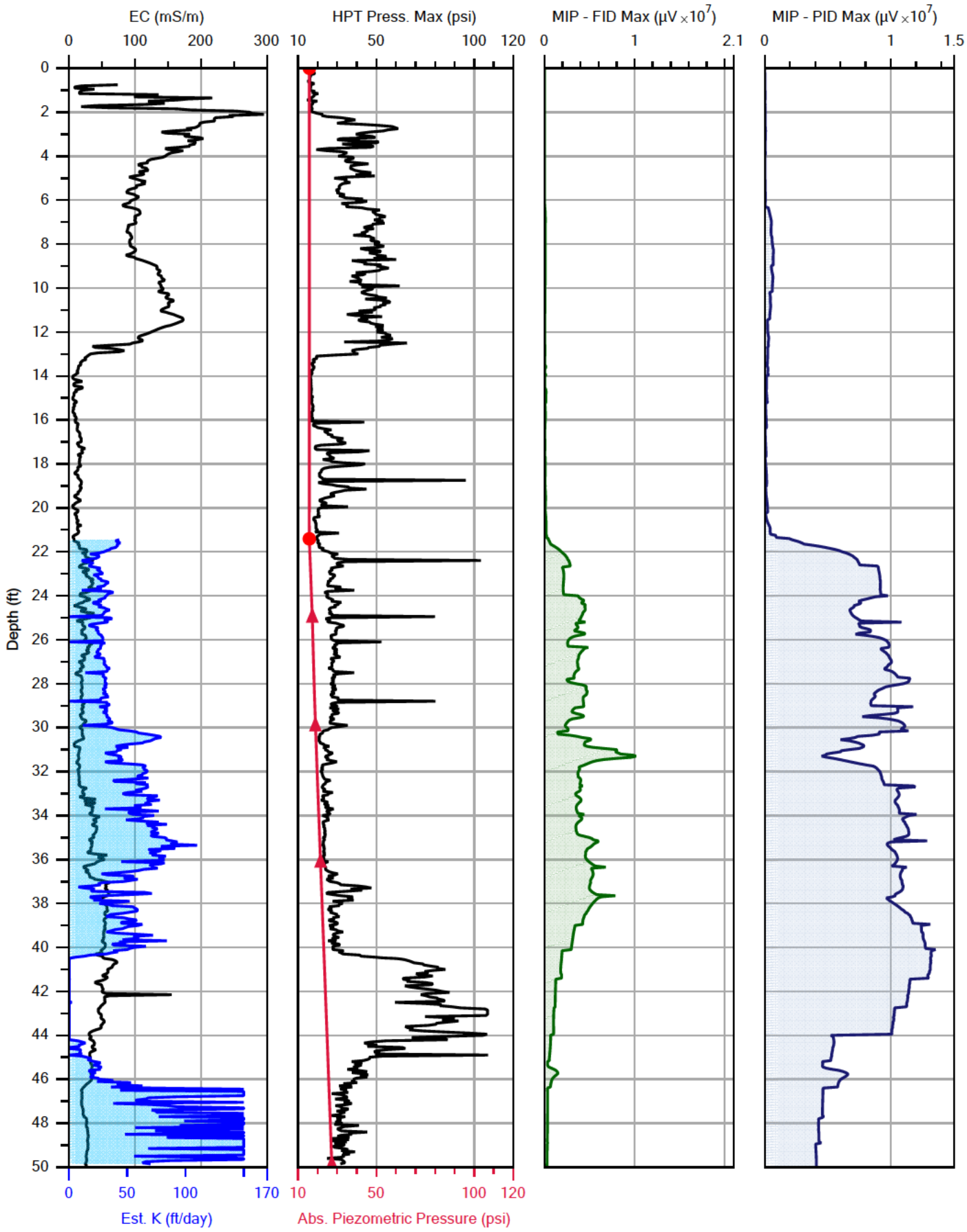
Boring F

Photographs of Borings E and F	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 4

PARS
Environmental
Inc.

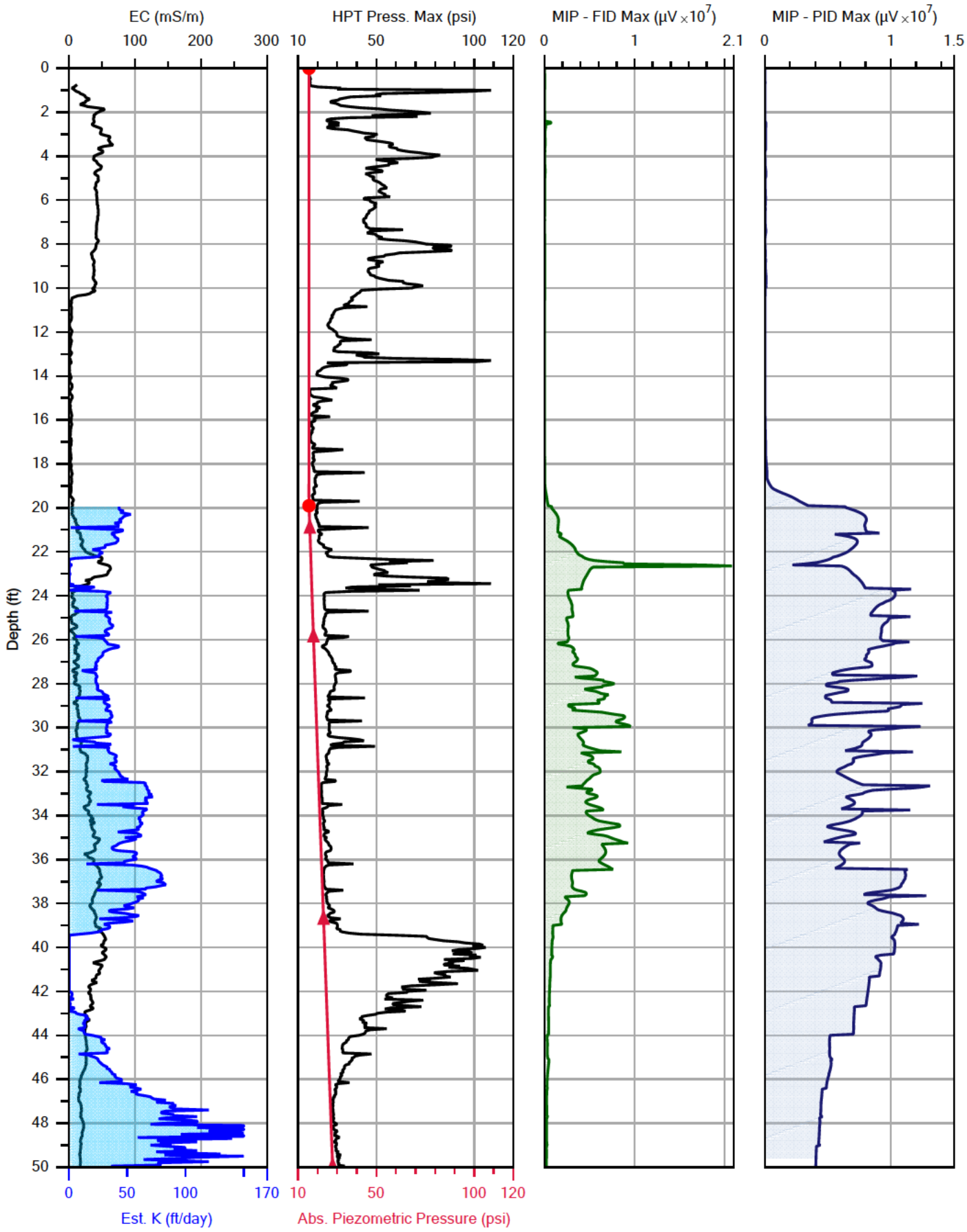
Attachment 2:

MiHPT Logs and Construction Summaries of Vapor Monitoring Probes VP-1, VP-2, VP-4, and VP-5



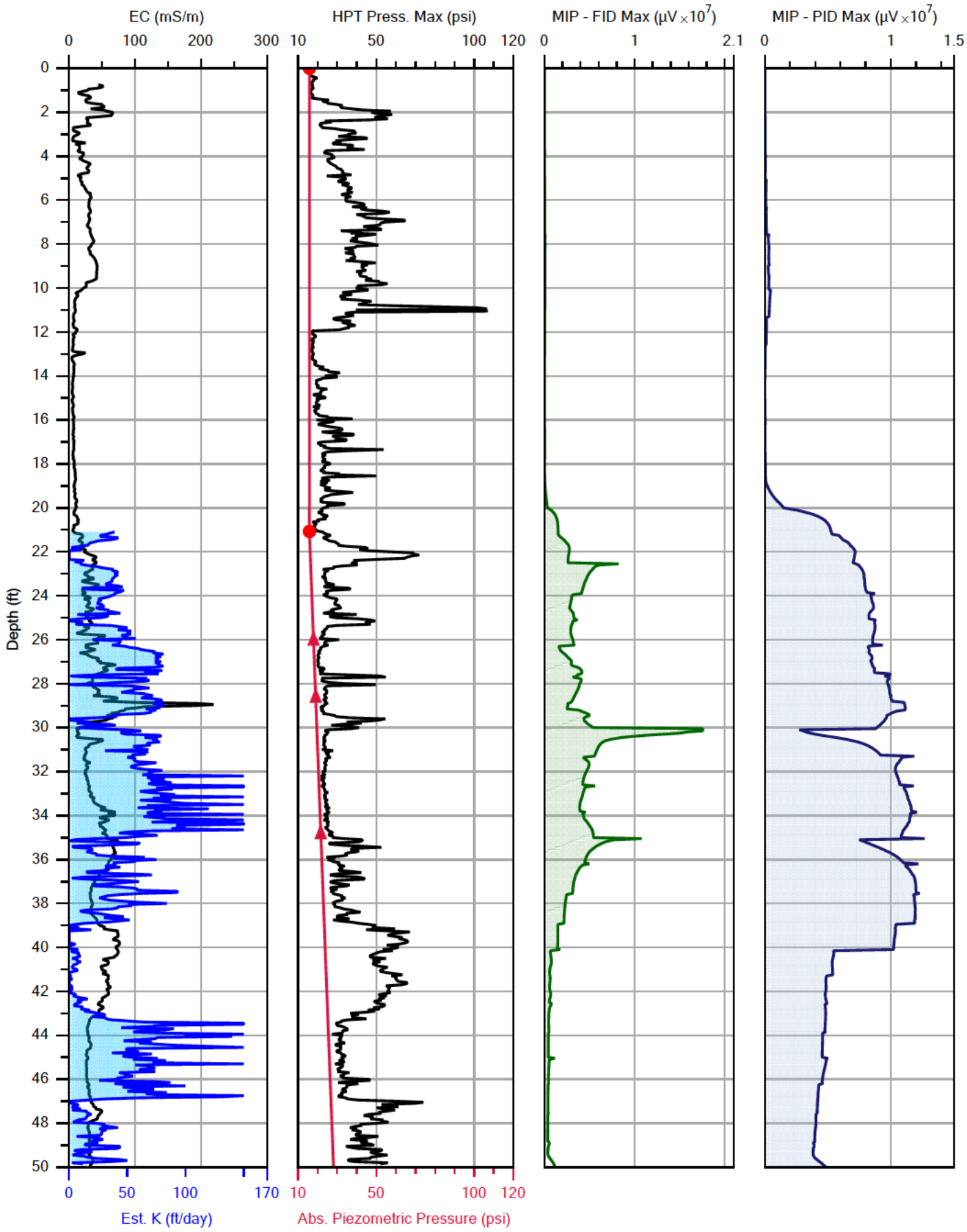
PARS ENVIRONMENTAL INC.

		File: PH-MiHPT-01
Company: S2C2	Operator: TK	Date: 4/13/2016
Project ID: DSCP-PHA 2016	Client: PARS	Location:



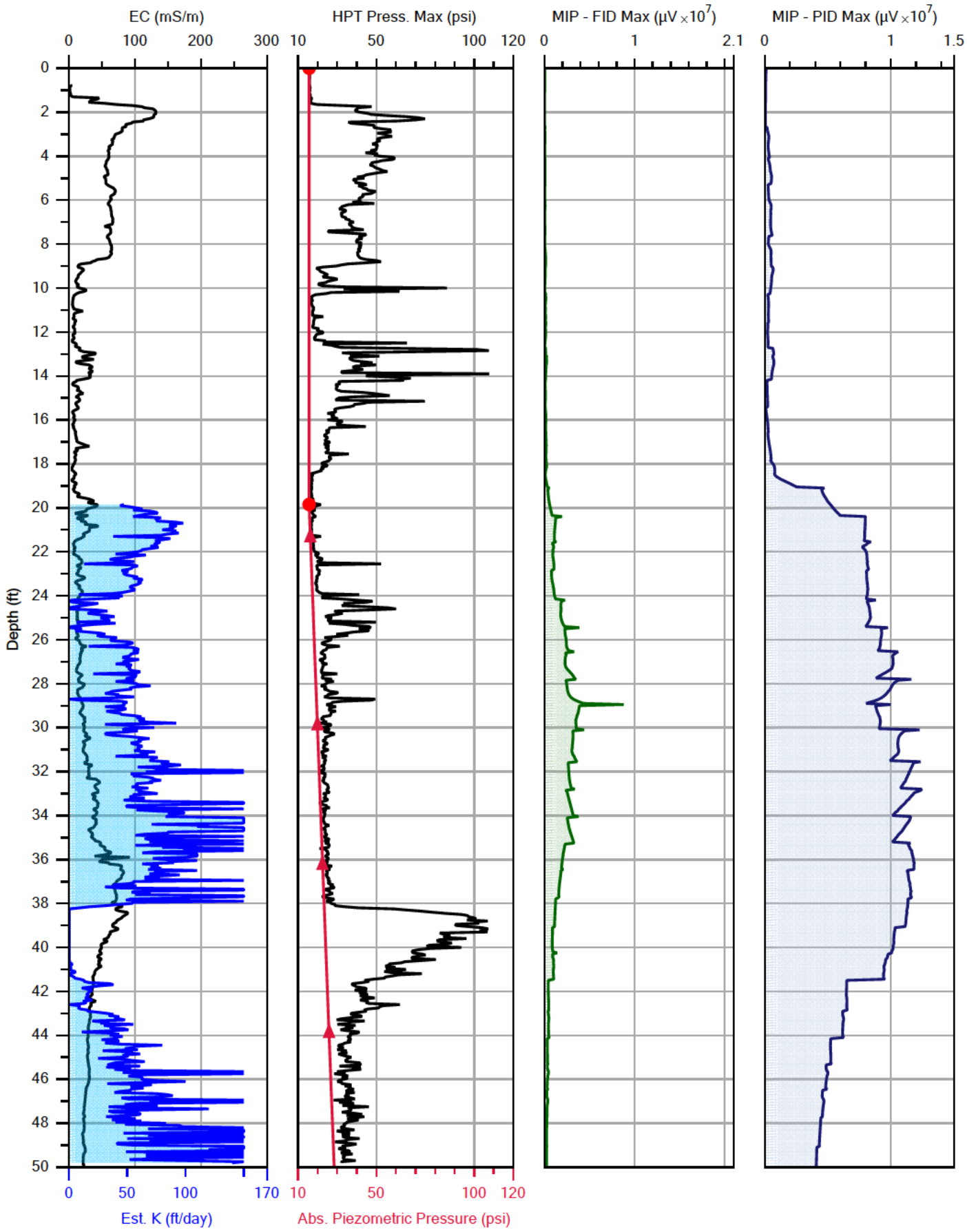
PARS ENVIRONMENTAL INC.

Company: S2C2	Operator: TK		File: PH-MiHPT-02
Project ID: DSCP-PHA 2016	Client: PARS		Date: 4/12/2016
			Location:



PARS ENVIRONMENTAL INC.

		File: PH-MiHPT-04
Company: S2C2	Operator: TK	Date: 4/13/2016
Project ID: DSCP-PHA 2016	Client: PARS	Location:



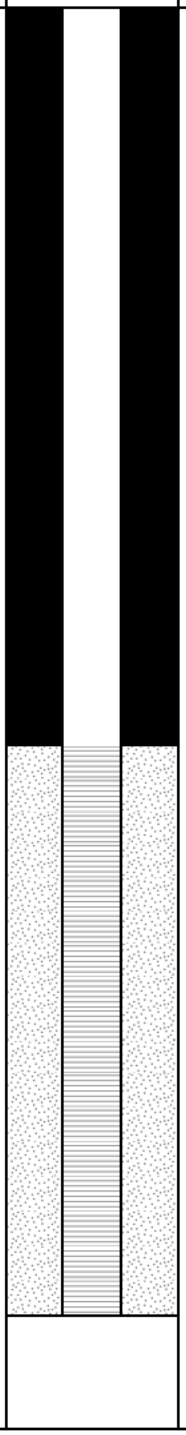
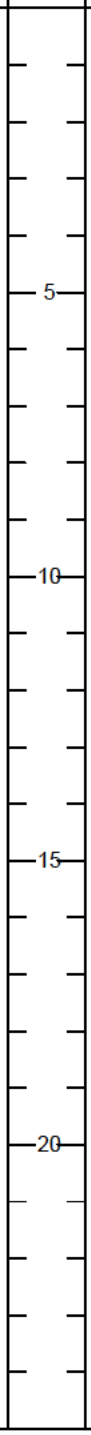
PARS ENVIRONMENTAL INC.

Company: S2C2	Operator: TK	File: PH-MiHPT-05
Project ID: DSCP-PHA 2016	Client: PARS	Date: 4/12/2016
		Location:

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-1 (PH-MiHPT-01)

Drill Method: Direct Push	**Date Drilled:** 4/13/2016	**Logged By:** Dan Habecker
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
							DTW - 22.5' bgs

Completion Notes:

VP-1 installed to a depth of 23' bgs with 10' of screen from 13' to 23' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 23' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

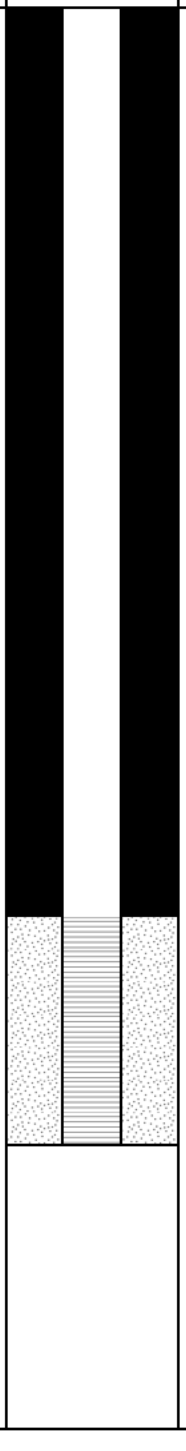
Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-2 (PH-MiHPT-02)

Drill Method: Direct Push	**Date Drilled:** 4/12/2016	**Logged By:** Pasquale Pozzolano
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
					5 10 15 20		DTW - 19.5' bgs

Completion Notes:

VP-2 installed to a depth of 20' bgs with 4' of screen from 16' to 20' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 20' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

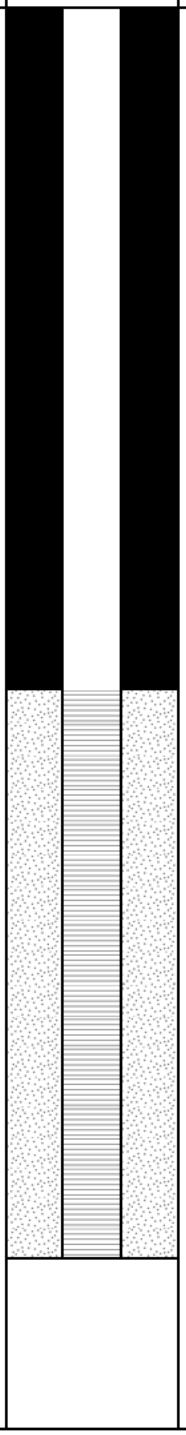
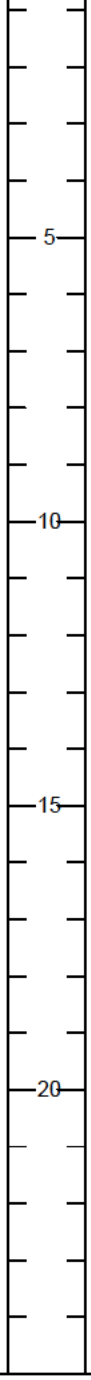
Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-4 (PH-MiHPT-04)

Drill Method: Direct Push	**Date Drilled:** 4/13/2016	**Logged By:** Dan Habecker
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
							DTW - 21' bgs

Completion Notes:

VP-4 installed to a depth of 22' bgs with 10' of screen from 12' to 22' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 22' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

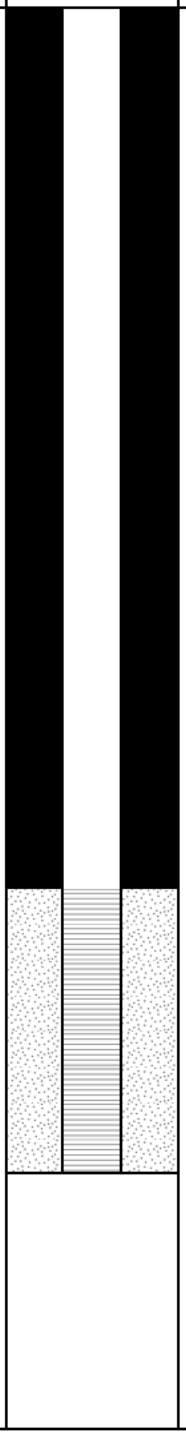
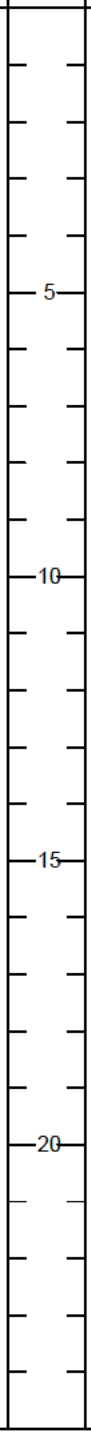
Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-5 (PH-MiHPT-05)

Drill Method: Direct Push	**Date Drilled:** 4/12/2016	**Logged By:** Pasquale Pozzolano
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
							DTW- 20' bgs

Completion Notes:

VP-5 installed to a depth of 20.5' bgs with 10' of screen from 15' to 20.5' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 20.5' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

Attachment 3:

Figures 1-9

SUNOCO PROPERTY

CSX Property

FORMER DSCP PROPERTY

SEPTA PROPERTY

STEEN PROPERTY

SIENA PLACE HOMES (FORMER PASSYUNK HOMES)

DSCP-MW-20D
DSCP-MW-20
CSX-MW1
DSCP-MW-45A
DSCP-MW-21A
DSCP-MW-19
DSCP-MiHPT-27
CSX-IW-5
CSX-MW-5
CSX-DW-5
DSCP-MW-44A
DSCP-MiHPT-05
DSCP-MW-17
CSXMW-9
DSCP-DW-6
DSCP-MW-25
DSCP-MiHPT-23
DSCP-MW-53
DSCP-MiHPT-24
CSXMW-3A
DSCP-MW-1
DSCP-MW-16
DSCP-MiHPT-03
DSCP-MW-54
DSCP-MW-13
DSCP-MW-12
DSCP-MW-24
SEP-MiHPT-01
SEP-MiHPT-04
SEP-MiHPT-05
DSCP-DW-1
DSCP-IW-1
DSCP-MW-26A
DSCP-MiHPT-06
DSCP-MW-27A
DSCP-MiHPT-25
DSCP-MiHPT-26
DSCP-MW-59
CSX-MW4
DSCP-MiHPT-02
DSCP-MW-15
CSXMW-8
CSXMW-7
DSCP-MW-1A
SEP-MiHPT-02
SEP-MiHPT-06
DSCP-MiHPT-04
C'
CSX-DW-4
CSX-MW2
DSCP-MiHPT-01
DSCP-MW-3A
DSCP-MW-11
DSCP-MW-2
DSCP-MW-28
DSCP-IW-3
DSCP-DW-13
STEEN-IW-07
A
STEEN-PH-12
DSCP-MW-5
DSCP-RW-8
DSCP-MW-35A
DSCP-MW-14
DSCP-RW-9
DSCP-MiHPT-07
STEEN-MW-62
DSCP-RW-2
DSCP-RW-10
PH-MW-55
DSCP-MW-4A
DSCP-MW-31
STEEN-DW-07
DSCP-MiHPT-14
D'
PH-RW-A2
DSCP-MiHPT-11
DSCP-PREPACK-01
DSCP-MW-34
SEPTAMW-4
SEPTAMW-1
SEPTAMW-3
STEEN-IW-09
STEEN-MW-63
PH-RW-A
PH-PH-21
DSCP-MW-29
DSCP-MW-30
DSCP-MiHPT-10
DSCP-MW-32
SEP-MiHPT-03
A'
STEEN-MW-61
PH-PH-1
DSCP-DW-12
DSCP-MW-65
STEEN-DW-08
DSCP-MiHPT-16
PH-MiHPT-04
DSCP-RW-3
DSCP-MiHPT-13
DSCP-PREPACK-02
DSCP-MW-33
DSCP-MiHPT-09
DSCP-MiHPT-28
SEPTAMW-2
B
DSCP-MiHPT-15
PH-MiHPT-02
DSCP-IW-12
DSCP-RW-4
STEEN-IW-08
PH-MiHPT-01
PH-RW-B
PH-RW-C
PH-PH-19
DSCP-MW-6
DSCP-RW-5/MW-25
DSCP-RW-7
STEEN-PH-11
PH-RW-W2
PH-PH-2
DSCP-RW-1A
DSCP-RW-11
DSCP-MW-36
DSCP-MW-9
DSCP-MW-10
STEEN-PH-10
DSCP-MiHPT-17
PH-RW-I
DSCP-RW-6
DSCP-MW-7
SSEPTA-PH-8
PH-DW-10
PH-DW-10
PH-PH-20
PH-PH-3
PH-RW-E
PH-PH-17
PH-RW-F
PH-RW-W
PH-RW-V2
PH-RW-I2
PH-MiHPT-05
PH-PZ-4
PH-PH-4
DSCP-MW-43
DSCP-MiHPT-18
PH-RW-U
PH-RW-CA
PH-PH-18
PH-PH-16
PH-MW-60
EPH-MW-39
STEEN-MW-64
DSCP-MiHPT-19
PH-RW-V
DSCP-MiHPT-20
PH-RW-T
PH-RW-O
PH-MW-42
PH-PH-13
DSCP-MiHPT-21
PH-RW-Q
DSCP-MiHPT-22
PH-MW-41
PH-PH-22
PH-RW-S
PH-MWS-4
B'
EPH-MWS-5
PH-DW-11
PH-RW-G
PH-RW-H
PH-RW-N
EPH-PH-7
DSCP-MiHPT-12
PH-PH-14
PH-RW-P
PH-MWS-3
EPH-MW-48
PH-MW-41
PH-MW-40
PH-MWS-2A
DSCP-MiHPT-08
PH-MWS-13
EPH-MW-49
PH-MW-58
PH-PH-23
PH-MW-37
PH-PH-24
EPH-MW-50
PH-MW-51
EPH-MWS-11
PH-MW-56
EPH-MWS-10
PH-DW-2
PH-DW-3
PH-PH-6
PH-MWS-15
PH-IW-2
PH-IW-3
EPH-PH-5
DSCP-EC-01
DSCP-EC-03
DSCP-EC-02
PH-MW-57
DSCP-EC-04

MH A
MH B
MH C
MH D
MH E
MH F
MH G
MH H

Legend:

- Monitoring Well
- Recovery Well
- MiHPT Boring
- Manhole
- Sewer Line
- Interpreted Limits of the Potential Area of Confining Bed thinning and/or Absence**
- A A' Cross Section Line Location and Label

Notes:

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE.

0 250 500 750 1,000
SCALE IN FEET

Source: Esri, DigitalGlobe, GeoEye

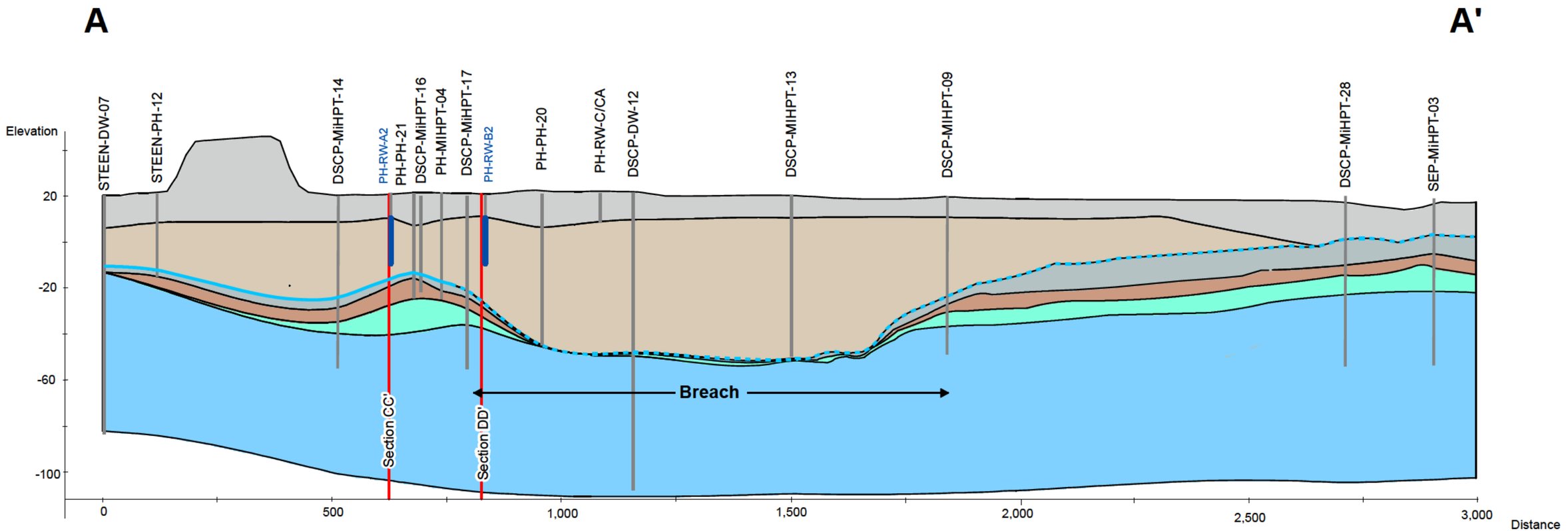
FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

CROSS SECTION LINE LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

PATH: Z:
CITY: SF DIV:
PROJECT: (PROJECT #)



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Recovery Well Screen
- Projected Boring
- Cross Section Intersection
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

0 135 270 540 Feet

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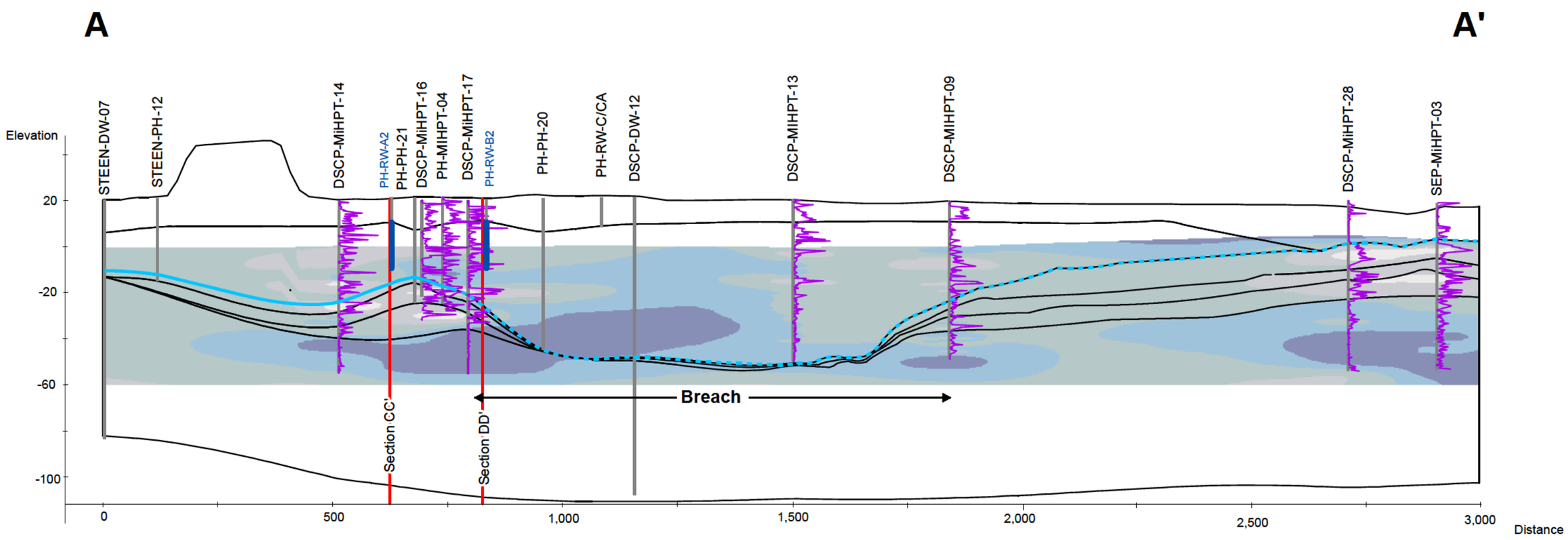
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/12/2016	**SCALE:** 1:2,640
PROJECT NO.	DSCP
DRAWN BY:	
CHECKED BY:	

FIGURE 2A - CROSS SECTION AA'
SITE STRATIGRAPY



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Recovery Well Screen
- Projected Boring
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

0 135 270 540 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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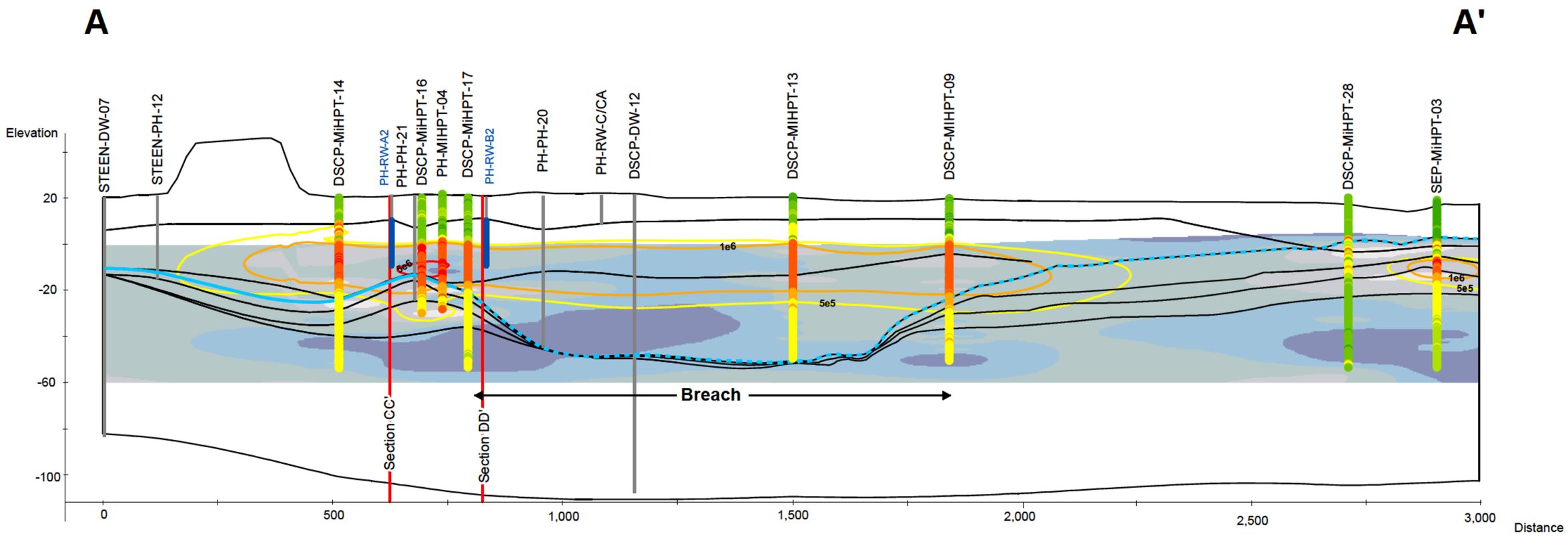
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/10/2016	**SCALE:** 1:2,640
PROJECT NO.	DSCP
DRAWN BY:	[redacted]
CHECKED BY:	

FIGURE 2B - CROSS SECTION AA'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Recovery Well Screen
- Cross Section Intersection
- Projected Boring
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

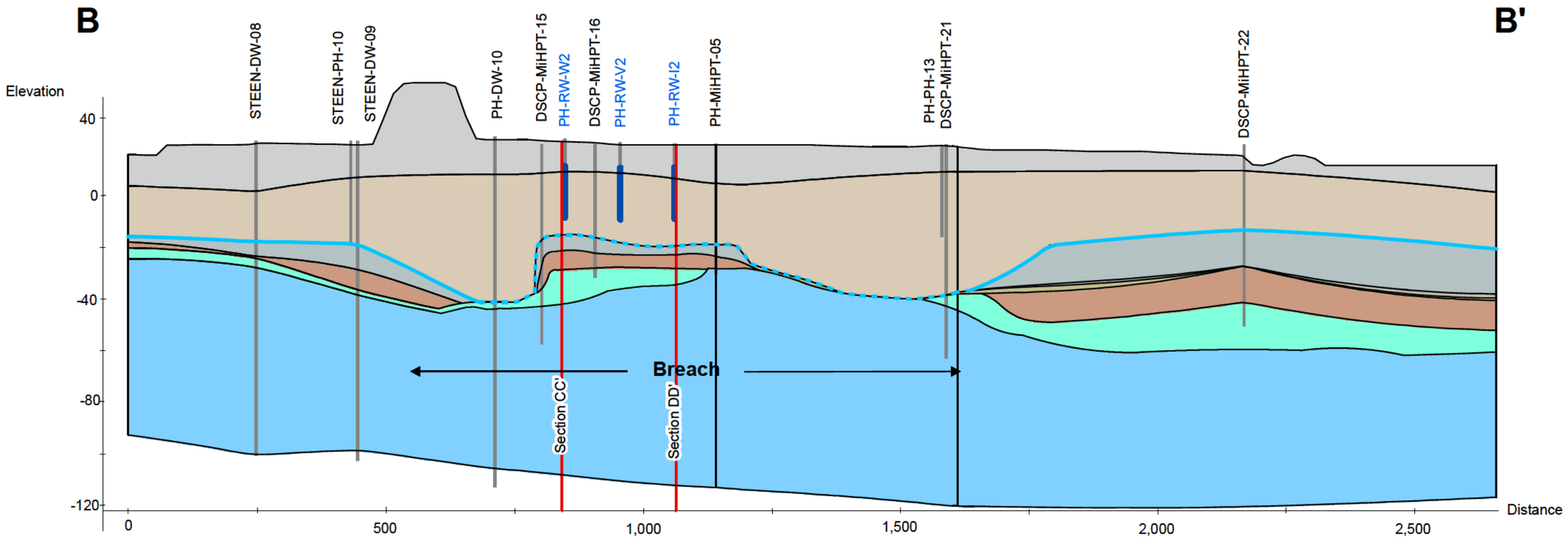
- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

0 135 270 540 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,640
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE 2C - CROSS SECTION AA'
ESTIMATED K & MIP-FID RESPONSE



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

0 125 250 500 Feet

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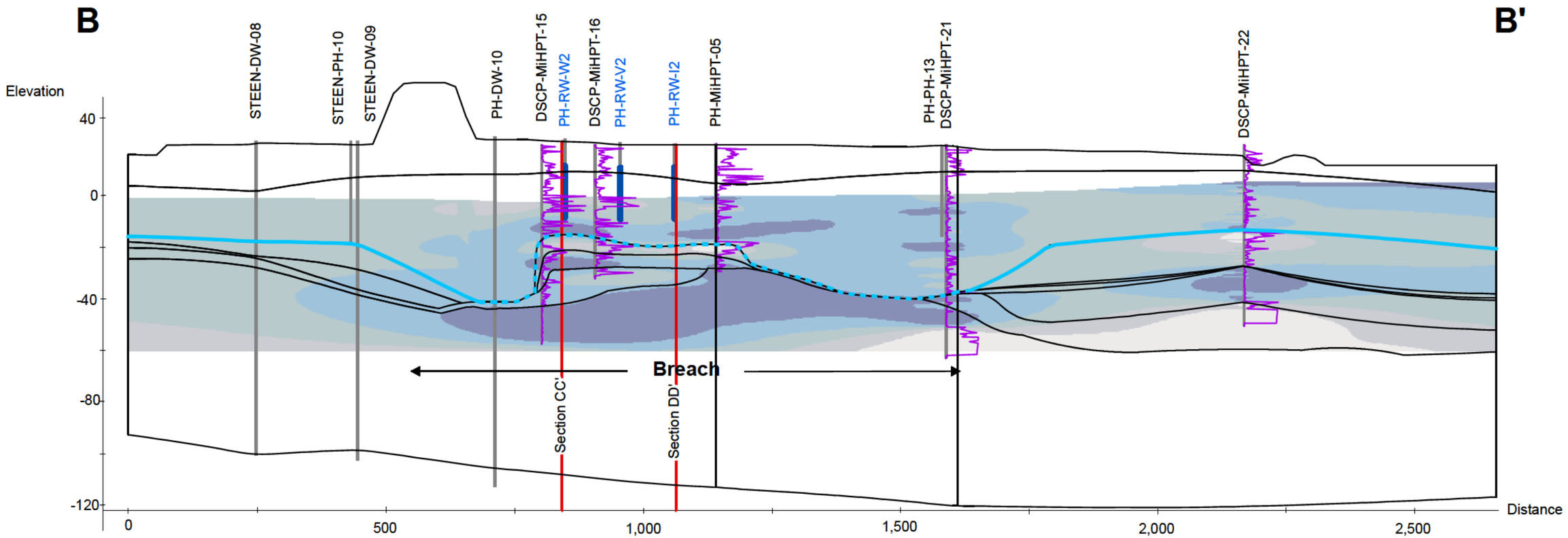
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/14/2016	**SCALE:** 1:2,400
PROJECT NO.	DSCP
DRAWN BY:	[redacted]
CHECKED BY:	

FIGURE 3A - CROSS SECTION BB' SITE STRATIGRAPY



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

0 125 250 500 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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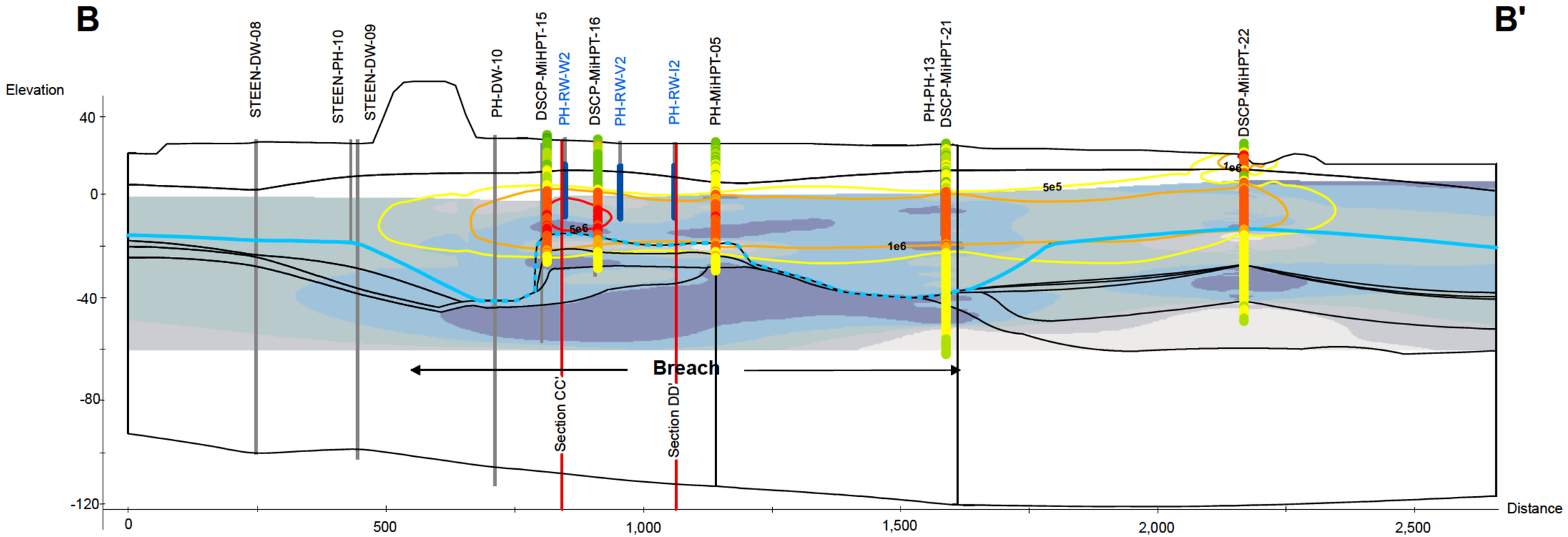
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,400
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE 3B - CROSS SECTION BB'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

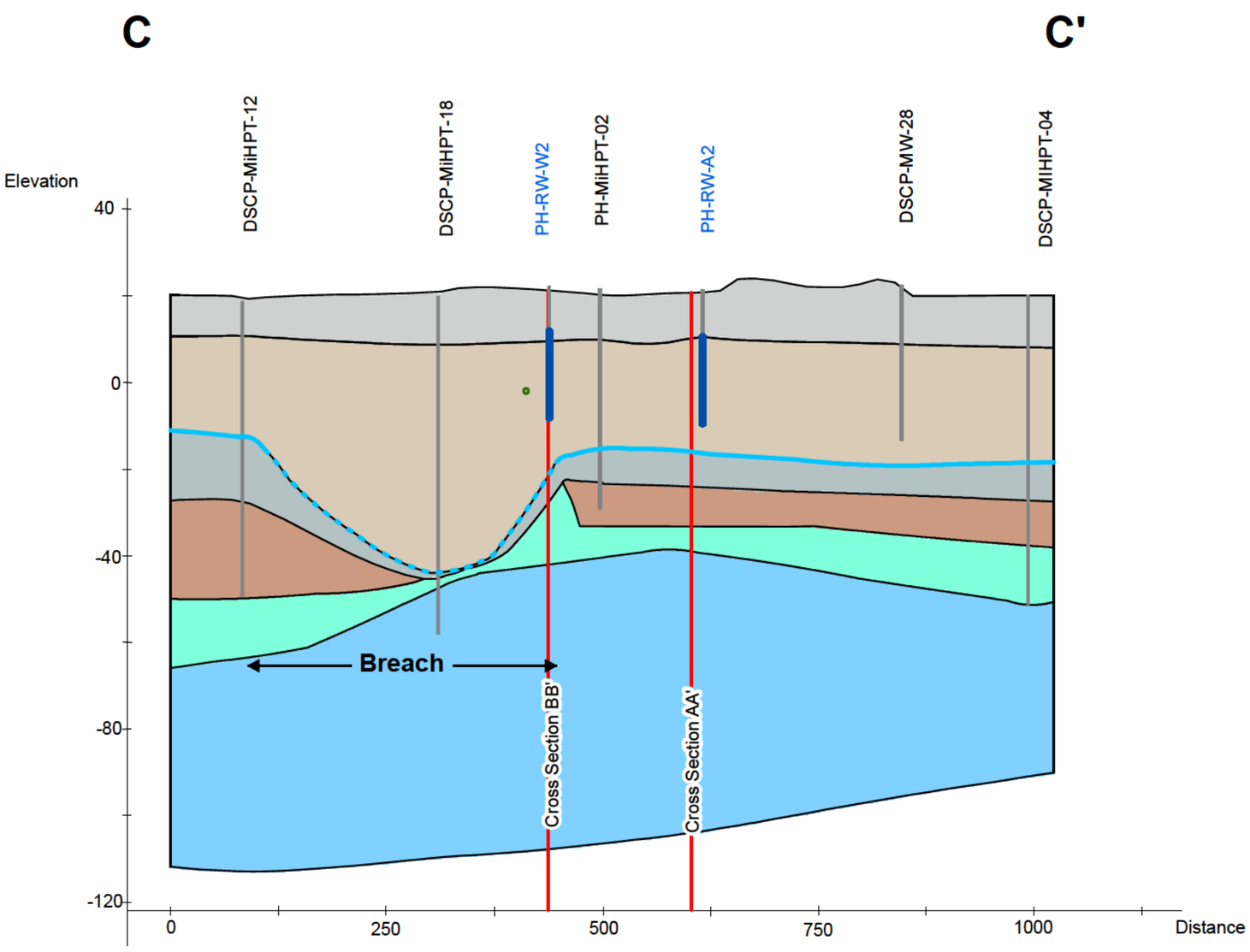
- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

0 125 250 500 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,400
	PROJECT NO.	DSCP
	DRAWN BY:	[redacted]
	CHECKED BY:	

FIGURE 3C - CROSS SECTION BB'
ESTIMATED K & MIP-FID RESPONSE



Vertical Exaggeration is 5x

0 95 190 380 Feet

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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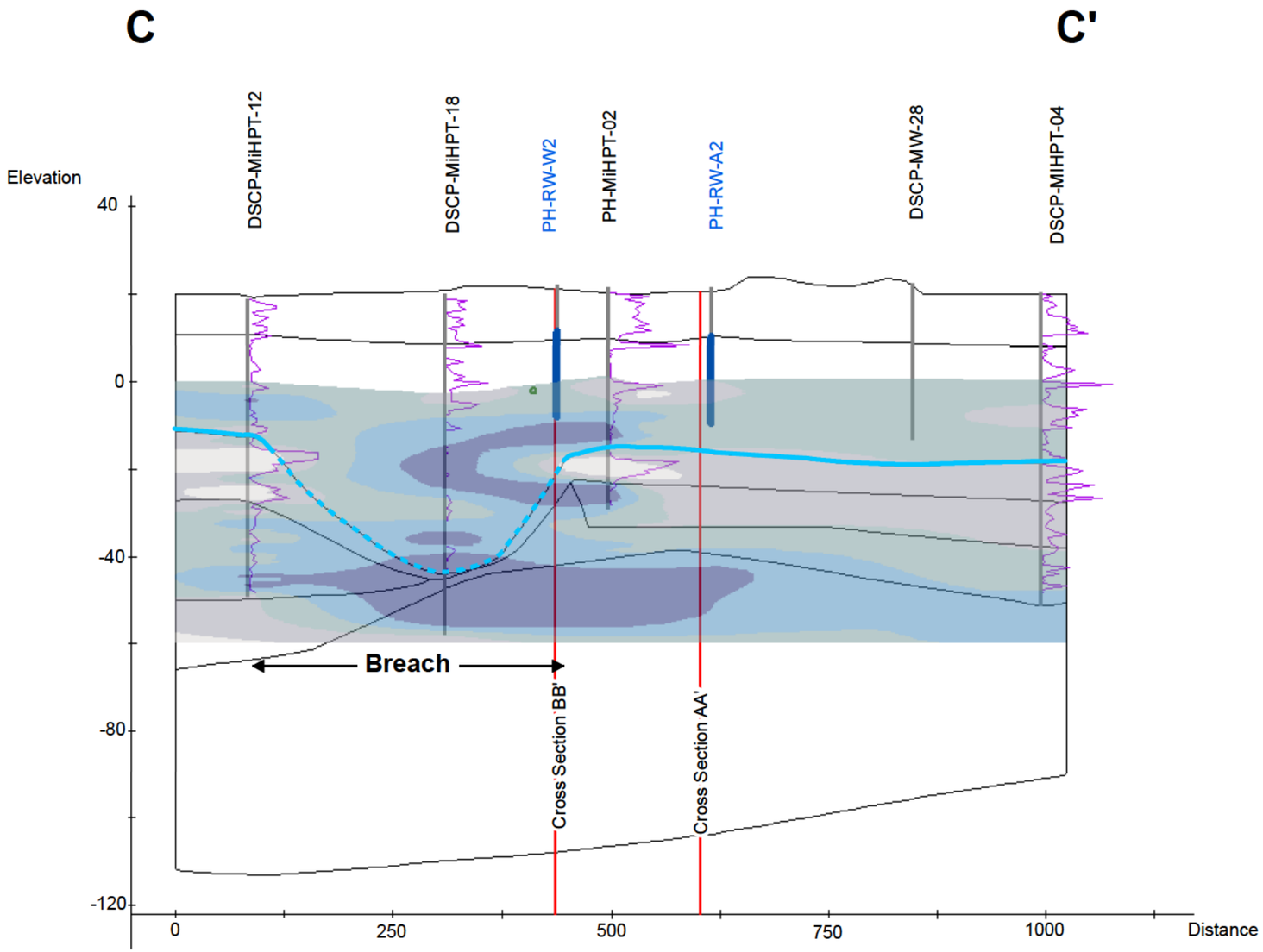
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/12/2016	**SCALE:** 1:1,800
PROJECT NO.	DSCP
DRAWN BY:	[redacted]
CHECKED BY:	

FIGURE 4A - CROSS SECTION CC'
SITE STRATIGRAPY



Vertical Exaggeration is 5x

0 95 190 380 Feet

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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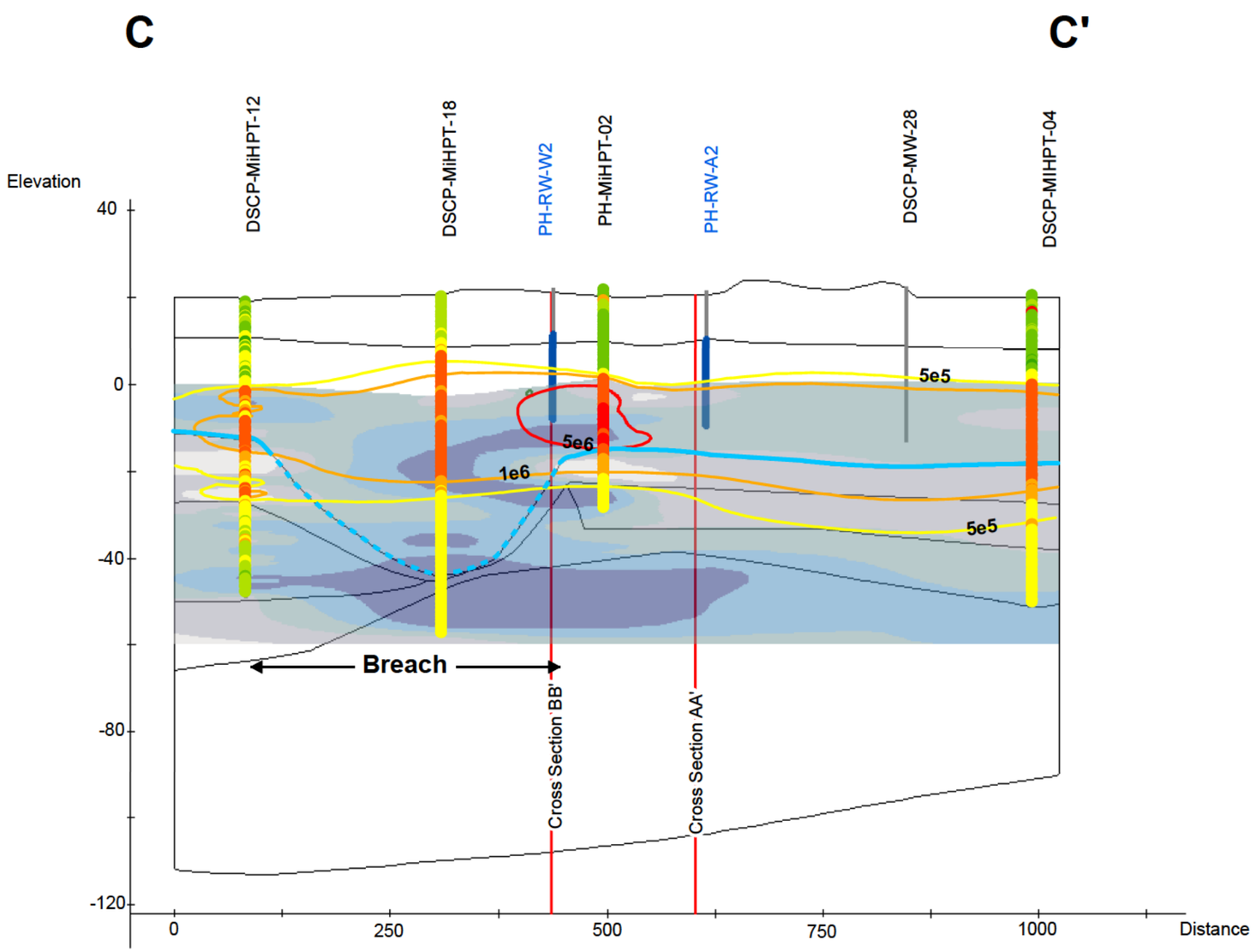
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:1,800
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE 4B - CROSS SECTION CC'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)



Vertical Exaggeration is 5x

0 95 190 380 Feet

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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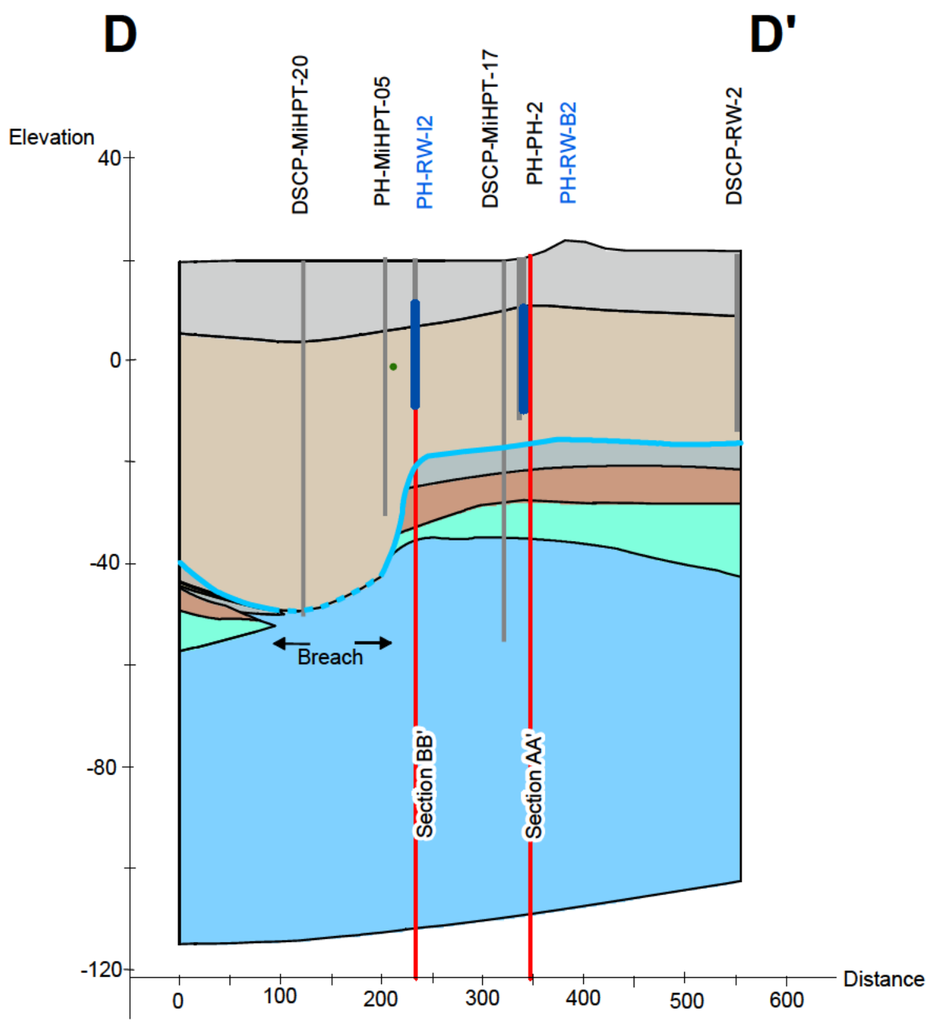
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study	**DATE:** 10/14/2016	**SCALE:** 1:1,800
FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE 4C - CROSS SECTION CC'
ESTIMATED K 7 MIP-FID RESPONSE



Vertical Exaggeration is 5x

Legend

Projected Wells and Borings

- Projected Borings
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

0 125 250 500 Feet

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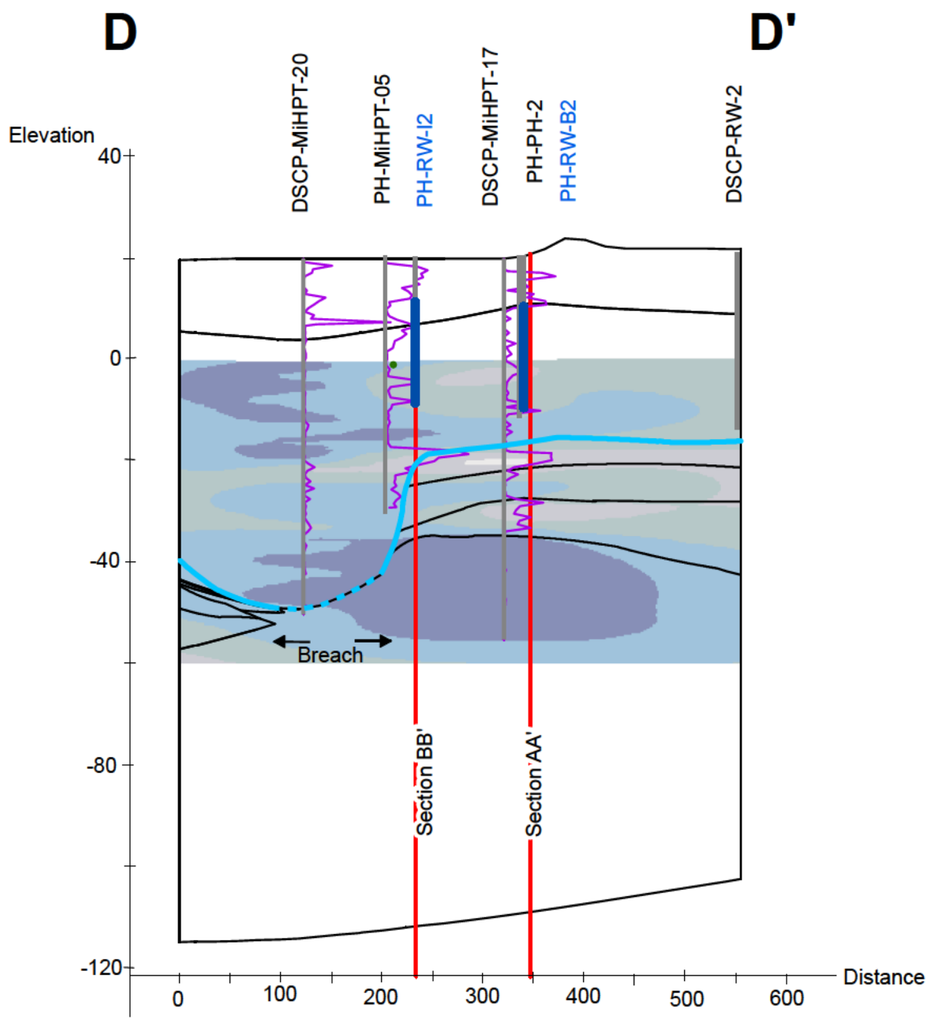
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/13/2016	**SCALE:** 1:1,800
PROJECT NO.	DSCP
DRAWN BY:	
CHECKED BY:	

FIGURE 5A - CROSS SECTION DD'
SITE STRATIGRAPHY



Vertical Exaggeration is 5x

Legend

Projected Wells and Borings

- Projected Borings
- Recovery Well Screen
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

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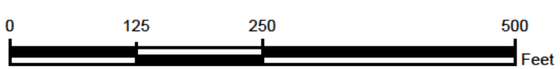
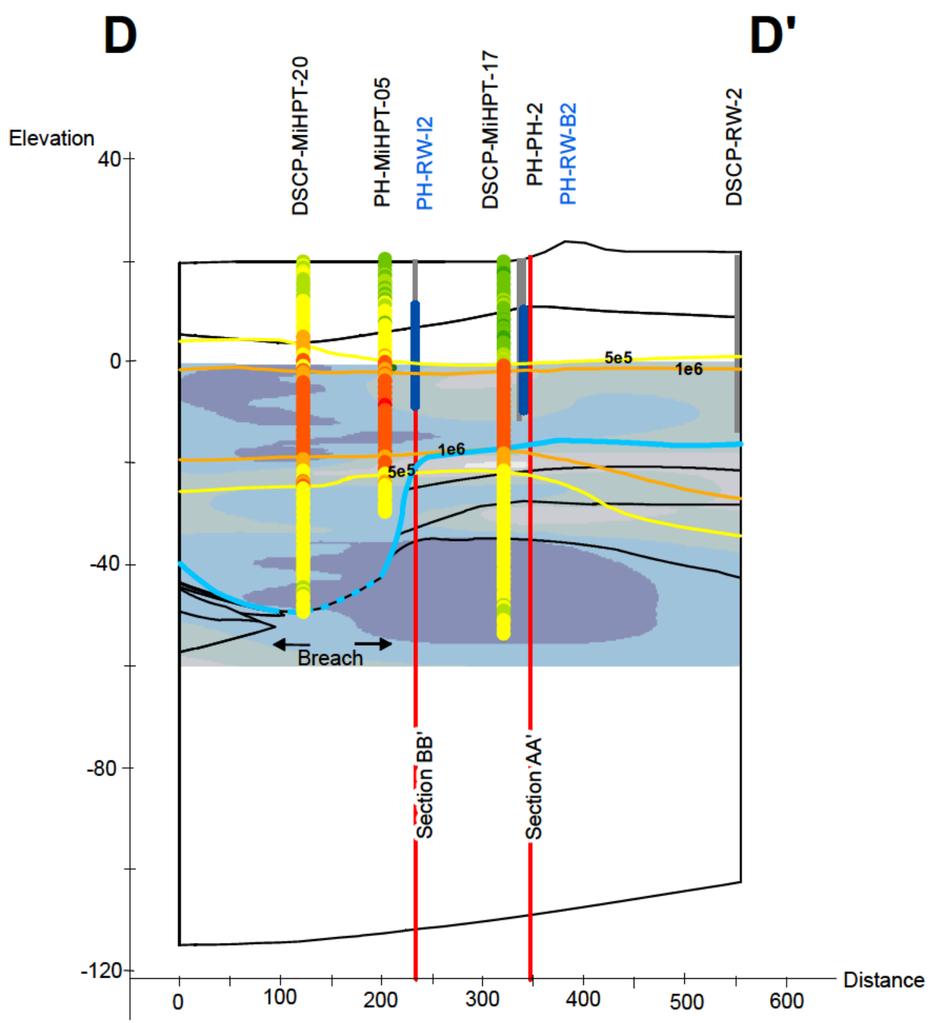


ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:1,800
	PROJECT NO.	DSCP
	DRAWN BY:	[redacted]
	CHECKED BY:	

FIGURE 5B - CROSS SECTION DD'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)



Vertical Exaggeration is 5x

Legend

Projected Wells and Borings

- Projected Borings
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

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- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

0 125 250 500 Feet

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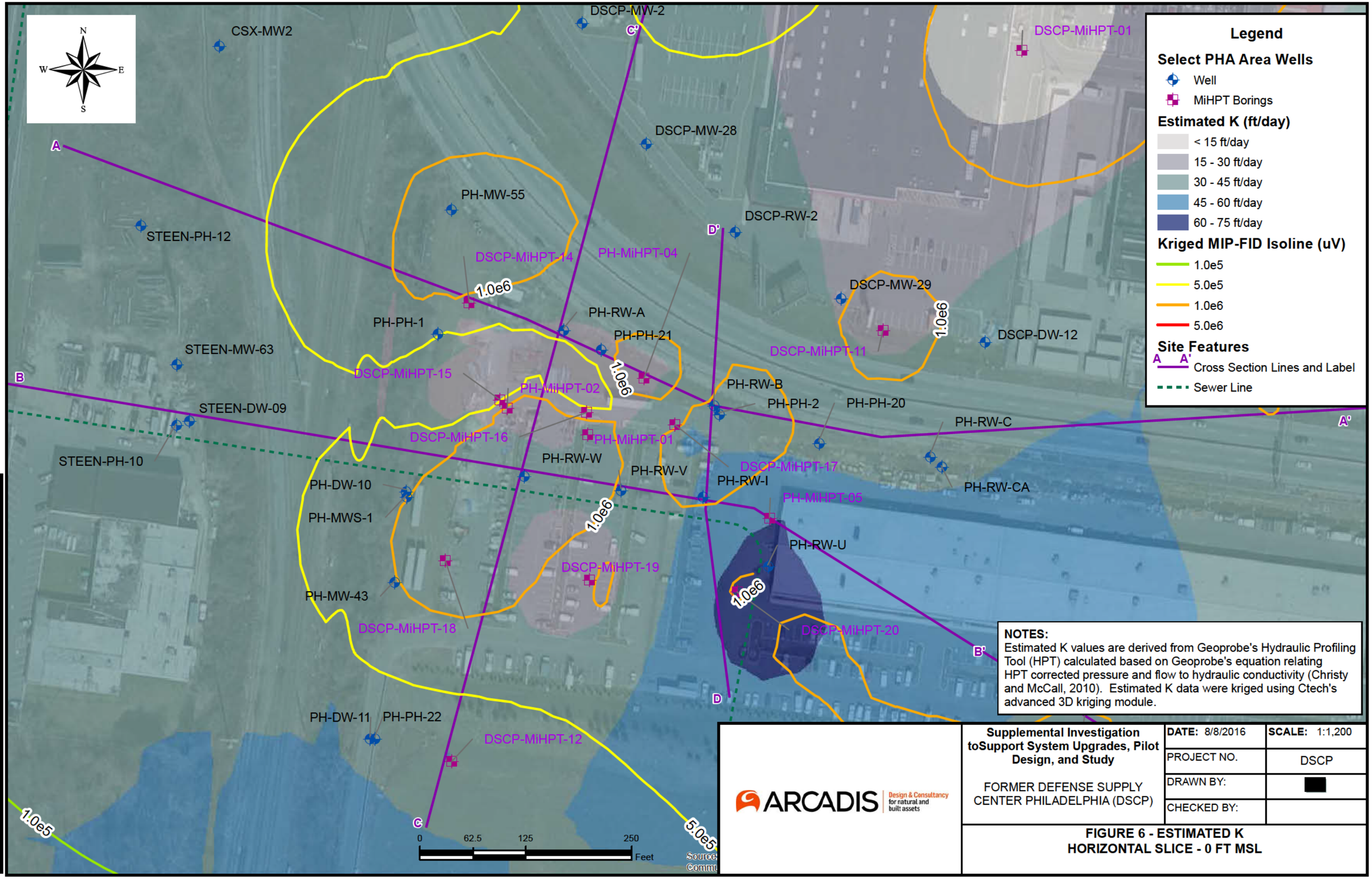
Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/14/2016	**SCALE:** 1:1,800
PROJECT NO.	DSCP
DRAWN BY:	[redacted]
CHECKED BY:	

FIGURE 5C - CROSS SECTION DD'
ESTIMATED K & MIP-FID RESPONSE



NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 8/8/2016	**SCALE:** 1:1,200
PROJECT NO.	DSCP
DRAWN BY:	[redacted]
CHECKED BY:	

FIGURE 6 - ESTIMATED K HORIZONTAL SLICE - 0 FT MSL

N
W
E
S

CSX-MW2
DSCP-MW-2
C'
DSCP-MiHPT-01
5.0e6
A
DSCP-MW-28
PH-MW-55
STEEN-PH-12
DSCP-RW-2
D'
DSCP-MiHPT-14
PH-MiHPT-04
DSCP-MW-29
PH-RW-A
PH-PH-1
PH-PH-21
DSCP-DW-12
STEEN-MW-63
DSCP-MiHPT-11
DSCP-MiHPT-15
PH-MiHPT-02
PH-RW-B
B
PH-PH-2
PH-PH-20
A'
STEEN-DW-09
PH-RW-C
DSCP-MiHPT-16
PH-MiHPT-01
STEEN-PH-10
PH-RW-W
PH-RW-V
DSCP-MiHPT-17
PH-RW-I
5.0e5
PH-DW-10
PH-RW-CA
PH-MiHPT-05
PH-MWS-1
PH-RW-U
1.0e6
DSCP-MiHPT-19
PH-MW-43
DSCP-MiHPT-18
DSCP-MiHPT-20
B'
D
PH-DW-11
PH-PH-22
DSCP-MiHPT-12
C
0
62.5
125
250
Feet

Legend

Select PHA Area Wells
- Well
- MiHPT Borings

Estimated K (ft/day)
- < 15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

Kriged MIP-FID Isoline (uV)
- 1.0e5
- 5.0e5
- 1.0e6
- 5.0e6

Site Features
- A A' Cross Section Lines and Label
- Sewer Line

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

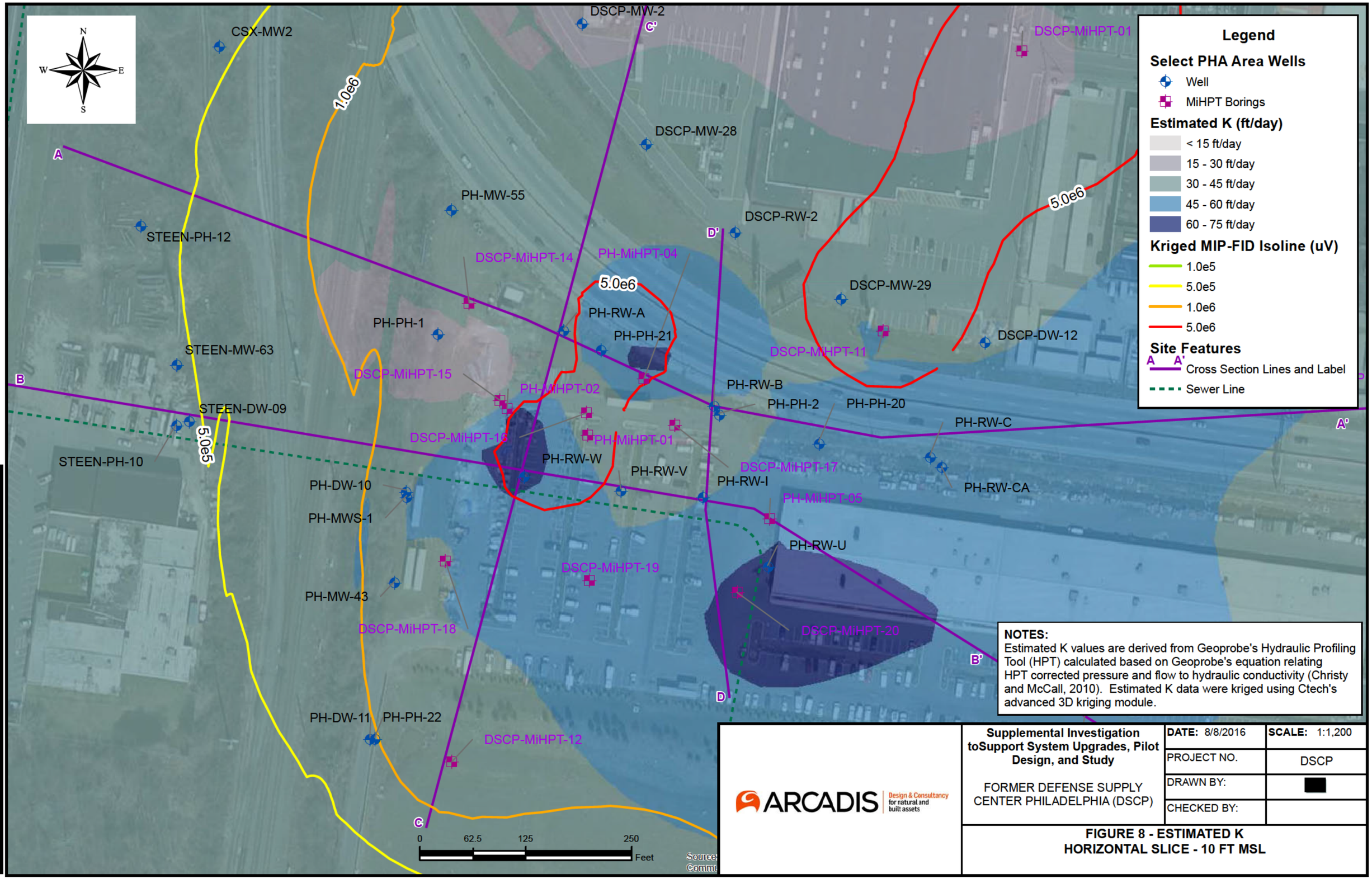
ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 8/8/2016	**SCALE:** 1:1,200
PROJECT NO.	DSCP
DRAWN BY:	
CHECKED BY:	

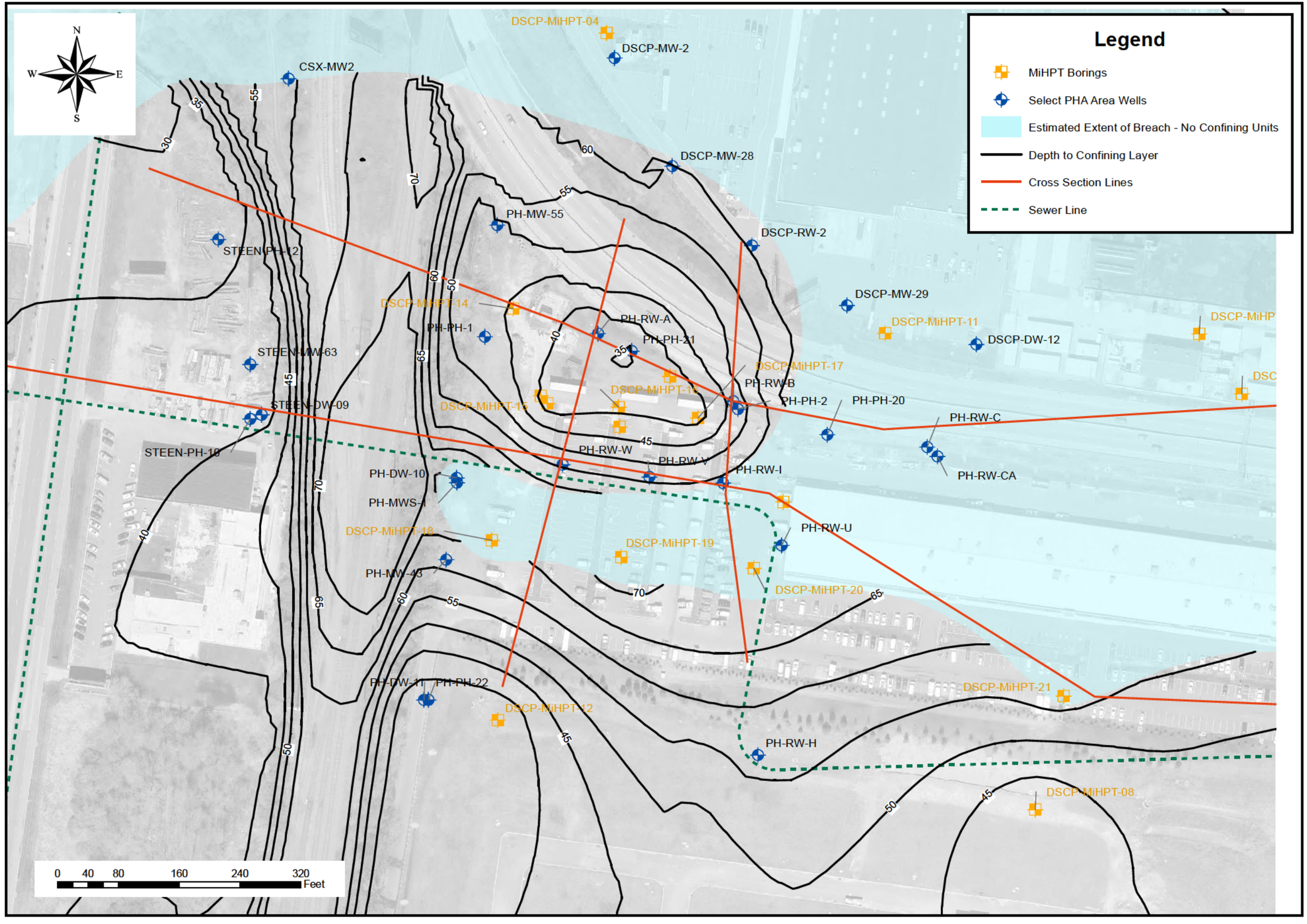
FIGURE 7 - ESTIMATED K HORIZONTAL SLICE -5 FT MSL



ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 8/8/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE 8 - ESTIMATED K HORIZONTAL SLICE - 10 FT MSL



S2C2 inc.

DEFENSE SUPPORT CENTER
PHILADELPHIA, PA

TITLE

PHILADELPHA HOUSING AUTH.
TOP OF CONFINING UNITS

FIGURE 9

SCALE 1:1,500

Appendix B

Design Report Figures

SUNOCO PROPERTY

CSX Property

STEEN PROPERTY

FORMER DSCP PROPERTY

SEPTA PROPERTY

SIENA PLACE HOMES (FORMER PASSYUNK HOMES)

Legend:

- Inferred Product Thickness - 0.25 ft
- Inferred Product Thickness - 0.5 ft
- Inferred Product Thickness - 1.0 ft
- Monitoring Well
- Recovery Well
- Manhole
- Sewer Line
- Interpreted Limits of the** "Hole/Breach"
- A A' Cross Section Lines and Label
- Pilot Test Treatment Area

Notes:

The apparent LNAPL thickness contours are approximate and do not necessarily indicate consistent in-situ LNAPL saturation, volume, mobility or recoverability. Measured LNAPL thickness is influenced spatially by heterogeneous LNAPL and hydrogeologic characteristics, and temporally by groundwater level fluctuations.

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE

0 250 500 750 1,000

SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

FOURTH QUARTER OF 2015 PROGRESS REPORT

INFERRED APPARENT PRODUCT THICKNESS (feet) IN MONITORING AND RECOVERY WELLS DECEMBER 07, 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE **B-1**

CITY: SF DIV/GROUP: ENV/M DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT: (PROJECT #)

PH-PH-2	
Date	12/16/2015
1,2,4-Trimethylbenzene	470
1,2-Dibromoethane	0.0084 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	265
Benzene	18,700
Ethylbenzene	828
Isopropylbenzene	35.4
Methyl-tert-butylether	10 U
Naphthalene	304
tert-Butyl alcohol	213
Toluene	661
Total Xylenes	1,230
Total VOCs	22,706

DSCP-MW-28	
Date	12/17/2015
1,2,4-Trimethylbenzene	577
1,2-Dibromoethane	0.0084 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	211
Benzene	7,380
Ethylbenzene	534
Isopropylbenzene	43.5
Methyl-tert-butylether	10 U
Naphthalene	382
tert-Butyl alcohol	335
Toluene	118
Total Xylenes	1,400
Total VOCs	10,981

DSCP-MW-3A	
Date	12/18/2015
1,2,4-Trimethylbenzene	577
1,2-Dibromoethane	0.0082 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	165
Benzene	11,800
Ethylbenzene	886
Isopropylbenzene	74.6
Methyl-tert-butylether	10 U
Naphthalene	370
tert-Butyl alcohol	200 U
Toluene	368
Total Xylenes	1,460
Total VOCs	15,721

DSCP-IW-12	
Date	12/15/2015
1,2,4-Trimethylbenzene	50 U
1,2-Dibromoethane	0.0082 U
1,2-Dichloroethane	50 U
1,3,5-Trimethylbenzene	30.6 J
Benzene	16,000
Ethylbenzene	565
Isopropylbenzene	42.3 J
Methyl-tert-butylether	25 U
Naphthalene	100 U
tert-Butyl alcohol	500 U
Toluene	354
Total Xylenes	907
Total VOCs	17,899

DSCP-MW-65	
Date	12/18/2015
1,2,4-Trimethylbenzene	870
1,2-Dibromoethane	0.0083 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	246
Benzene	28,800
Ethylbenzene	1,260
Isopropylbenzene	65
Methyl-tert-butylether	10 U
Naphthalene	446
tert-Butyl alcohol	1,420
Toluene	976
Total Xylenes	4,140
Total VOCs	38,223

PH-RW-A	
Date	12/16/2015
1,2,4-Trimethylbenzene	898
1,2-Dibromoethane	0.0082 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	329
Benzene	9,550
Ethylbenzene	588
Isopropylbenzene	60.1
Methyl-tert-butylether	10 U
Naphthalene	442
tert-Butyl alcohol	313
Toluene	155
Total Xylenes	1,260
Total VOCs	13,595

PH-PH-1	
Date	12/15/2015
1,2,4-Trimethylbenzene	497
1,2-Dibromoethane	0.0082 U
1,2-Dichloroethane	50 U
1,3,5-Trimethylbenzene	152
Benzene	15,500
Ethylbenzene	554
Isopropylbenzene	25 U
Methyl-tert-butylether	25 U
Naphthalene	182 J
tert-Butyl alcohol	500 U
Toluene	563
Total Xylenes	1,480
Total VOCs	18,928

PH-IW-10	
Date	12/15/2015
1,2,4-Trimethylbenzene	100 U
1,2-Dibromoethane	0.0081 U
1,2-Dichloroethane	100 U
1,3,5-Trimethylbenzene	50 U
Benzene	30,700
Ethylbenzene	104
Isopropylbenzene	50 U
Methyl-tert-butylether	50 U
Naphthalene	200 U
tert-Butyl alcohol	1000 U
Toluene	100 U
Total Xylenes	91.1 J
Total VOCs	30,895

PH-RW-W	
Date	12/15/2015
1,2,4-Trimethylbenzene	390
1,2-Dibromoethane	0.0081 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	108
Benzene	14,500
Ethylbenzene	590
Isopropylbenzene	22.2
Methyl-tert-butylether	10 U
Naphthalene	180
tert-Butyl alcohol	200 U
Toluene	459
Total Xylenes	1,060
Total VOCs	17,309

PH-IW-11	
Date	12/14/2015
1,2,4-Trimethylbenzene	50 U
1,2-Dibromoethane	0.0084 U
1,2-Dichloroethane	50 U
1,3,5-Trimethylbenzene	25 U
Benzene	16,700
Ethylbenzene	25 U
Isopropylbenzene	25 U
Methyl-tert-butylether	34.9 J
Naphthalene	100 U
tert-Butyl alcohol	500 U
Toluene	128
Total Xylenes	186
Total VOCs	17,049

PH-PH-20	
Date	12/17/2015
1,2,4-Trimethylbenzene	727
1,2-Dibromoethane	0.0085 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	238
Benzene	7,700
Ethylbenzene	847
Isopropylbenzene	46.9
Methyl-tert-butylether	10 U
Naphthalene	294
tert-Butyl alcohol	247
Toluene	328
Total Xylenes	2,050
Total VOCs	12,478

PH-RW-C	
Date	12/18/2015
1,2,4-Trimethylbenzene	575
1,2-Dibromoethane	0.0081 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	84.2
Benzene	7,110
Ethylbenzene	660
Isopropylbenzene	48.9
Methyl-tert-butylether	10 U
Naphthalene	384
tert-Butyl alcohol	236
Toluene	196
Total Xylenes	1,370
Total VOCs	10,664

DSCP-MW-32	
Date	12/15/2015
1,2,4-Trimethylbenzene	257
1,2-Dibromoethane	0.0084 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	93.6
Benzene	8,790
Ethylbenzene	296
Isopropylbenzene	73.7
Methyl-tert-butylether	10 U
Naphthalene	255
tert-Butyl alcohol	200 U
Toluene	93.1
Total Xylenes	369
Total VOCs	10,227

PH-PH-19	
Date	12/17/2015
1,2,4-Trimethylbenzene	449
1,2-Dibromoethane	0.0083 U
1,2-Dichloroethane	20 U
1,3,5-Trimethylbenzene	51.1
Benzene	10,300
Ethylbenzene	583
Isopropylbenzene	21.3
Methyl-tert-butylether	10 U
Naphthalene	120
tert-Butyl alcohol	200 U
Toluene	195
Total Xylenes	695
Total VOCs	12,414

Legend:

Total VOCs (Shallow Aquifer Wells)
- ≤ 1,000 µg/L
- ≥1000 & < 10,000 µg/L
- ≥ 10,000 µg/L

Total VOCs (Intermediate Aquifer Wells)
- ≤ 1,000 µg/L
- ≥ 1000 & < 10,000 µg/L
- ≥ 10,000 µg/L

Value — Exceeds Non-Residential Used Aquifer (TDS<2500 mg/L) Groundwater MSCs for VOCs

Value — Exceedance is due to an elevated detection limit

- Monitoring Well
- Recovery Well
- Manhole
- Sewer Line
- Interpreted Limits of the** "Hole/Breach"
- A A' Cross Section Lines and Label
- Pilot Test Treatment Area

PADEP Short List of Petroleum Products*	
VOCs	PADEP MSC
1,2,4-Trimethylbenzene	62 µg/L
1,2-Dibromoethane	0.05 µg/L
1,2-Dichloroethane	5 µg/L
1,3,5-Trimethylbenzene	53 µg/L
Benzene	5 µg/L
Ethylbenzene	700 µg/L
Isopropylbenzene	3500 µg/L
Methyl tert-butyl ether	20 µg/L
Naphthalene	100 µg/L
Toluene	1000 µg/L
Xylenes (total)	10000 µg/L

Notes:

1. VOCs are screened against Action Level of Non-Residential Used Aquifer (TDS <2500 mg/L) Groundwater MSCs for VOCs.
2. All units are in micrograms per liter (µg/L).
3. Results shown are for Total VOCs greater than or equal to 10,000 µg/L.
4. MSC - Medium-Specific Concentration
5. VOC - Volatile Organic Compound
6. TDS - Total Dissolved Solids
7. J - The analyte was positively identified; the quantitation is an estimation
8. D - The reported value is from a dilution
9. U - Undetected at the Limit of Detection

*For stored leaded gasoline, aviation gasoline, and jet fuel

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE

0 250 500 750 1,000

SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

FOURTH QUARTER OF 2015 PROGRESS REPORT

SITE TOTAL VOCs CONCENTRATION GREATER THAN 10,000 µg/L- SHALLOW AQUIFER GROUNDWATER

ARCADIS Design & Consultancy for natural and built assets

FIGURE **B-2**

CITY: SF DIV/GROUP: ENVIM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT #:
Shallow_D-size.mxd 8/15/2016 12:06:09 PM

SUNOCO PROPERTY

FORMER DSCP PROPERTY

SEPTA PROPERTY

STEEN PROPERTY

SIENA PLACE HOMES (FORMER PASSYUNK HOMES)

CSX Property

DSCP-MW-20D

DSCP-MW-20 4.14

DSCP-MW-46A 4.22

CSX-MW1

DSCP-MW-21A 2.76

DSCP-MW-19 3.45

CSX-MW5 2.87

CSX-MW6

CSX-DW-5

DSCP-MW-44A 1.64

DSCP-MW-17 1.95

DSCP-DW-6

DSCP-MW-2B 2.05

DSCP-MW-53 1.92

DSCP-MW-54 1.90

CSXMW-9 0.94

CSXMW-3A 4.16

DSCP-MW-1 1.31

DSCP-MW-16 1.45

DSCP-MW-24 1.46

DSCP-MW-13 1.83

DSCP-MW-12 1.82

CSX-MW4 0.56

DSCP-MW-23A 0.99

DSCP-MW-59 1.86

CSXMW-8 0.42

DSCP-DW-1

DSCP-IW-1

DSCP-MW-15 1.02

DSCP-MW-27A 1.60

DSCP-MW-1A 1.38

CSX-DW-4

CSXMW-7 0.35

CSX-MW2 0.53

DSCP-MW-2 0.85

DSCP-MW-3A 0.88

DSCP-MW-11 1.66

DSCP-MW-14 1.07

DSCP-RW-8 1.85

DSCP-MW-5 1.25

DSCP-MW-35A 1.25

DSCP-RW-10 1.35

DSCP-RW-9 1.25

DSCP-IW-3

DSCP-DW-13

DSCP-RW-2 1.10

DSCP-MW-4A 0.89

DSCP-MW-28 1.12

DSCP-IW-12

DSCP-MW-30 0.86

DSCP-MW-31 1.93

DSCP-PREPACK-01 0.94

DSCP-MW-32 1.82

DSCP-MW-34 1.91

SEPTA-SEPTAMW-1 1.36

SEPTA-SEPTAMW-3 0.56

PH-MW-55 0.65

PH-RW-A2 1.48

PH-PH-21 1.37

DSCP-RW-3 0.96

DSCP-PREPACK-02 0.90

DSCP-RW-5/MW-25 0.83

DSCP-MW-33 0.79

SEPTA-SEPTAMW-4 4.27

STEEN-IW-07

STEEN-MW-62

STEEN-DW-07

STEEN-PH-12

STEEN-MW-61

STEEN-DW-08

STEEN-MW-63

PH-PH-1 0.59

PH-RW-A 2.62

DSCP-MW-29 1.05

DSCP-MW-6 0.92

DSCP-RW-7 0.93

SEPTA-SEPTAMW-2 1.18

STEEN-IW-08

PH-RW-W2 3.84

PH-PH-2 0.67

PH-PH-20 0.64

DSCP-DW-12

DSCP-RW-6 0.84

DSCP-MW-36 0.99

DSCP-MW-10 1.97

STEEN-PH-10

PH-DW-10

PH-RW-W 2.27

PH-RW-B2 0.38

PH-RW-C 1.63

DSCP-RW-1A 0.93

DSCP-RW-4 1.20

DSCP-MW-9 1.18

STEEN-PH-11

STEEN-IW-09

STEEN-DW-09

PH-MWS-1 0.53

PH-RW-B 2.18

PH-RW-I2 1.49

PH-RW-CA 1.66

DSCP-RW-11 1.18

PH-RW-F 0.94

DSCP-MW-7 0.93

SSEPTA-PH-8 1.31

PH-IW-10

PH-RW-V2 1.18

PH-RW-I 4.00

PH-PH-19 0.76

PH-RW-D 1.29

PH-PH-18 0.82

PH-PH-17 0.83

PH-PH-4 0.98

EPH-MW-39 1.12

PH-MW-43 0.50

PH-RW-V 2.27

PH-PH-3 0.85

PH-PZ-4 0.98

PH-RW-E 0.80

PH-MW-60 1.03

PH-MW-42 0.67

STEEN-MW-64

PH-IW-11

PH-PH-22 0.56

PH-RW-U 2.83

PH-RW-T 4.99

PH-PH-13 0.70

PH-RW-S 1.84

PH-PH-16 1.38

PH-RW-O 2.28

PH-MWS-4 1.28

EPH-MW-5 1.00

EPH-PH-7 3.40

PH-DW-11

PH-RW-H 3.72

PH-RW-G 2.79

PH-RW-N 4.05

EPH-MW-48 1.02

PH-PH-14 0.88

PH-RW-M 2.41

PH-RW-P 2.50

PH-MWS-3 0.86

PH-MWS-2A 0.92

PH-MW-41 0.89

EPH-MW-49 0.77

PH-RW-Q 3.20

PH-MW-40 0.83

PH-MWS-13 -3.55

PH-MW-58 0.59

PH-PH-23 0.87

PH-PH-24 1.49

PH-MW-51 0.60

EPH-MW-50 0.58

PH-MW-37 5.43

PH-MW-56 0.25

EPH-MWS-11 0.55

EPH-MWS-10 2.50

PH-PH-6 10.11

PH-DW-2

PH-IW-2

PH-MWS-15 0.57

PH-DW-3

PH-IW-3

EPH-PH-5 0.41

PH-MW-57 -3.65

MH A

MH B

MH C

MH D

MH E

MH F

MH G

MH H

A

A'

B

B'

C

C'

D

D'

E

E'

F

F'

G

G'

H

H'

1.0

2.0

3.0

4.0

20

30

Legend:

- Groundwater Elevation Contour (Feet AMSL) (Dashed Where Inferred)
- 1.85 Groundwater Elevation (Feet AMSL)
- 4.27 Groundwater Elevation (Feet AMSL) Not used for Contouring due to Anomalous Values or Submerged Screens
- Monitoring Well
- Recovery Well
- Sewer Line
- Manhole
- Interpreted Limits of the** "Hole/Breach"
- A A' Cross Section Lines and Label
- Pilot Test Treatment Area

Notes:

1. CSXMW-3A, PH-RW-A, PH-RW-B, PH-PH-21, PH-PH-6, PH-RW-I, PH-RW-W2, PH-MWS-13, PH-MW-37, PH-RW-V, PH-RW-W, PH-MW-57, SEPTA-SEPTAMW-3 and SEPTA-SEPTAMW-4 water elevations not used for contouring due to anomalous values.
2. Water elevations for wells with submerged screens (DSCP-MW-5, DSCP-MW-11, DSCP-MW-14, DSCP-MW-34, DSCP-MW-59, DSCP-RW-5/MW-25, EPH-MWS-5, PH-MWS-2A, PH-MWS-4, and PH-RW-N) are excluded from potentiometric contouring.
3. CSX-MW1 was not surveyed and has been excluded from contouring.
4. AMSL - Above Mean Sea Level

* Wells in STEEN properties were not sampled during the first quarter of 2015 sampling event due to lack of property access

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE

0 250 500 750 1,000

SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

FOURTH QUARTER OF 2015 PROGRESS REPORT

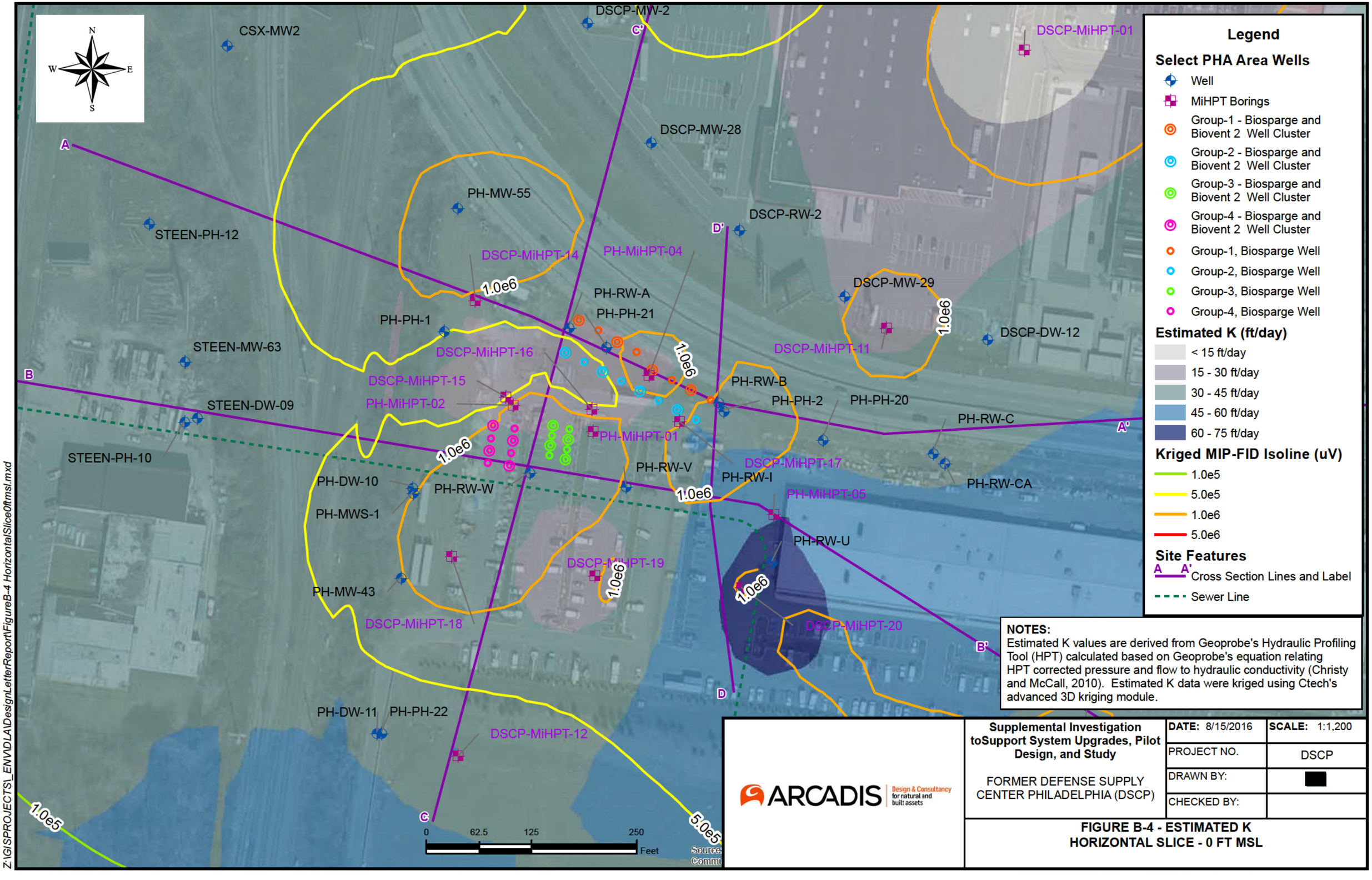
SHALLOW GROUNDWATER POTENTIOMETRIC CONTOURS - DECEMBER 07, 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE

B-3

CITY: SF_DIV/GROUP: ENV/IM DB: MESTIFAN OS LD: PIC: PM: TM: TR:



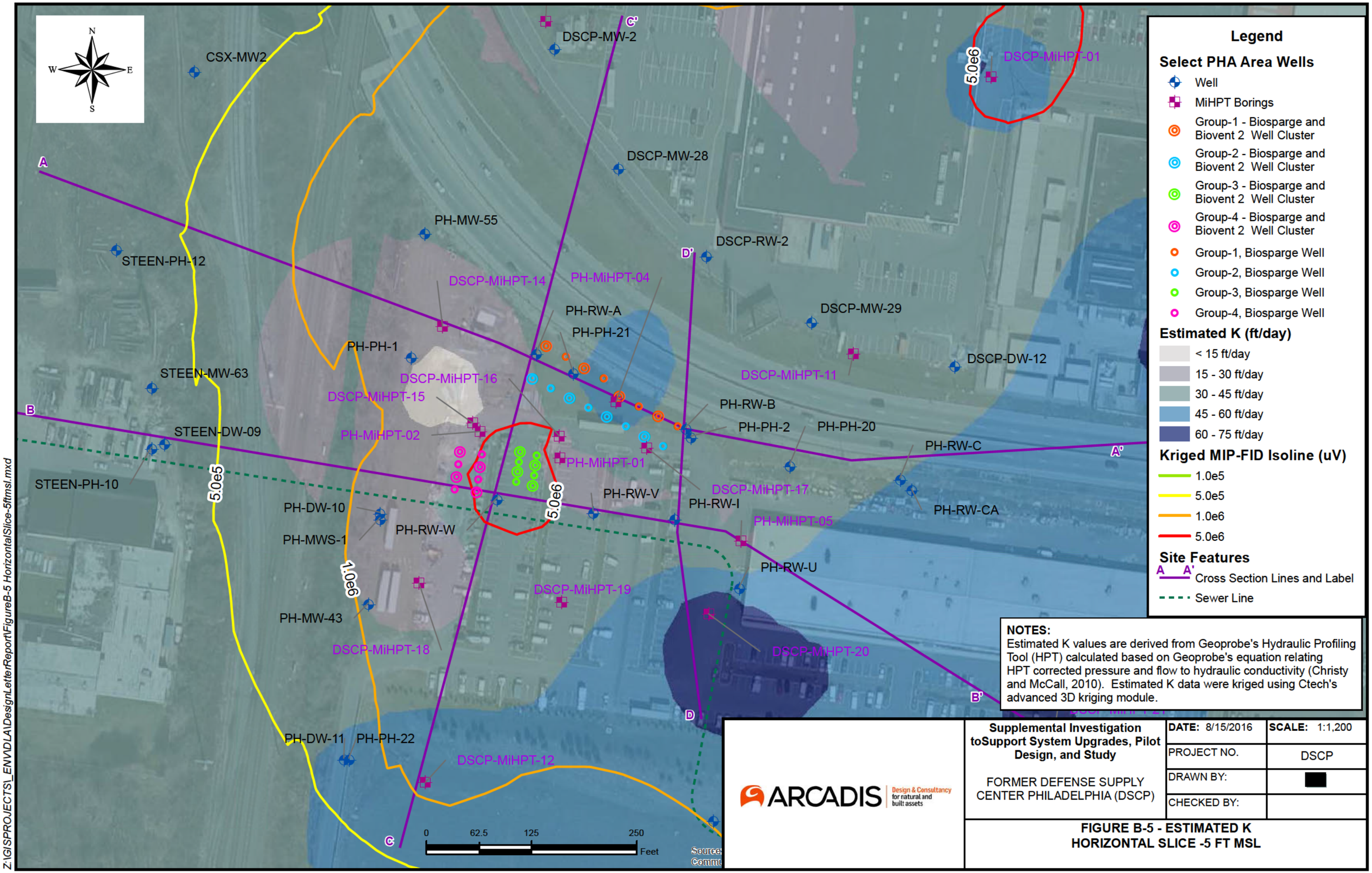
NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 8/15/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE B-4 - ESTIMATED K HORIZONTAL SLICE - 0 FT MSL

Z:\GIS\PROJECTS_ENVDLA\DesignLetterReport\FigureB-4 HorizontalSlice0ftmsl.mxd



NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 8/15/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE B-5 - ESTIMATED K HORIZONTAL SLICE -5 FT MSL

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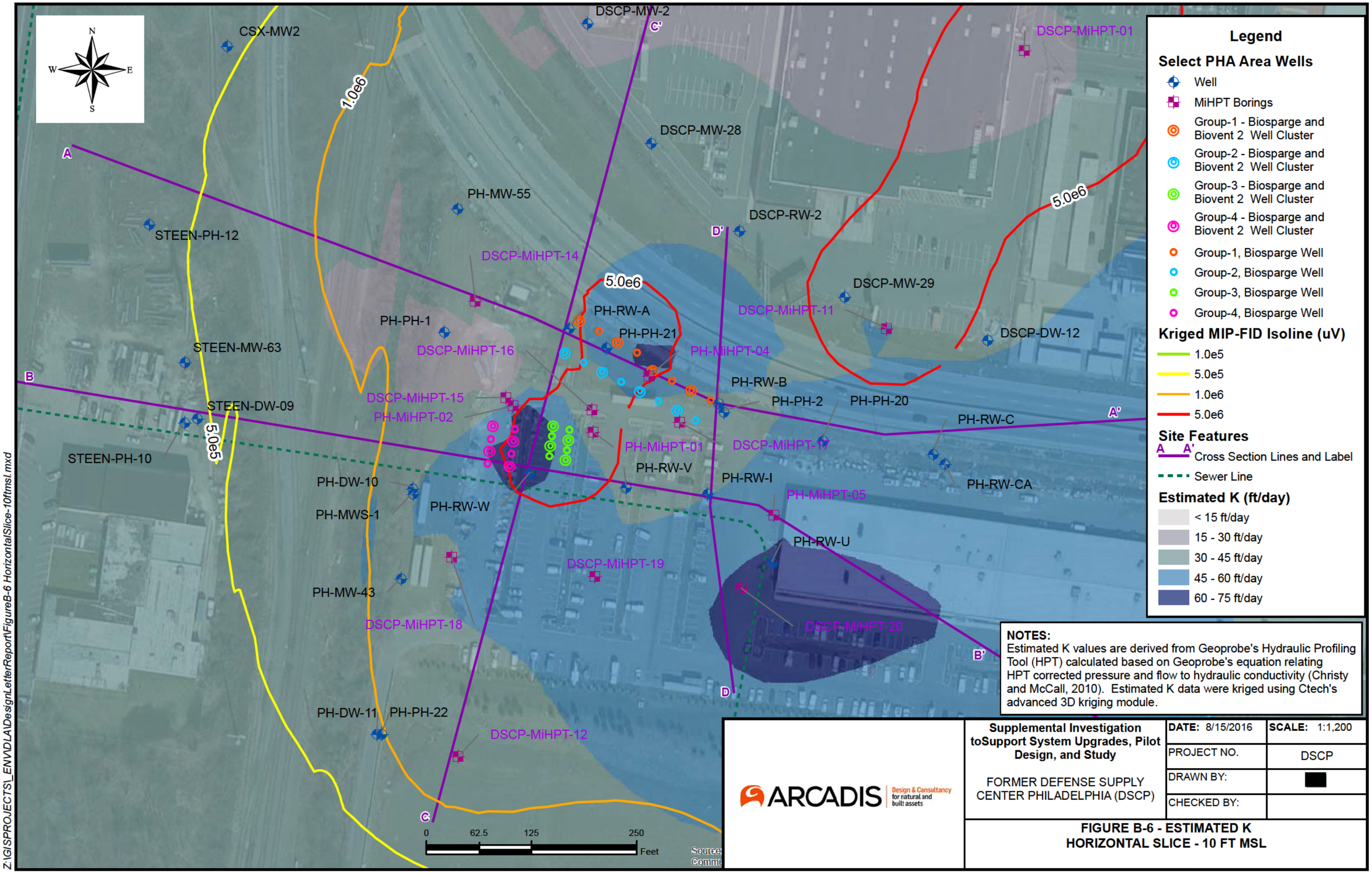

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 8/15/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

FIGURE B-6 - ESTIMATED K HORIZONTAL SLICE - 10 FT MSL

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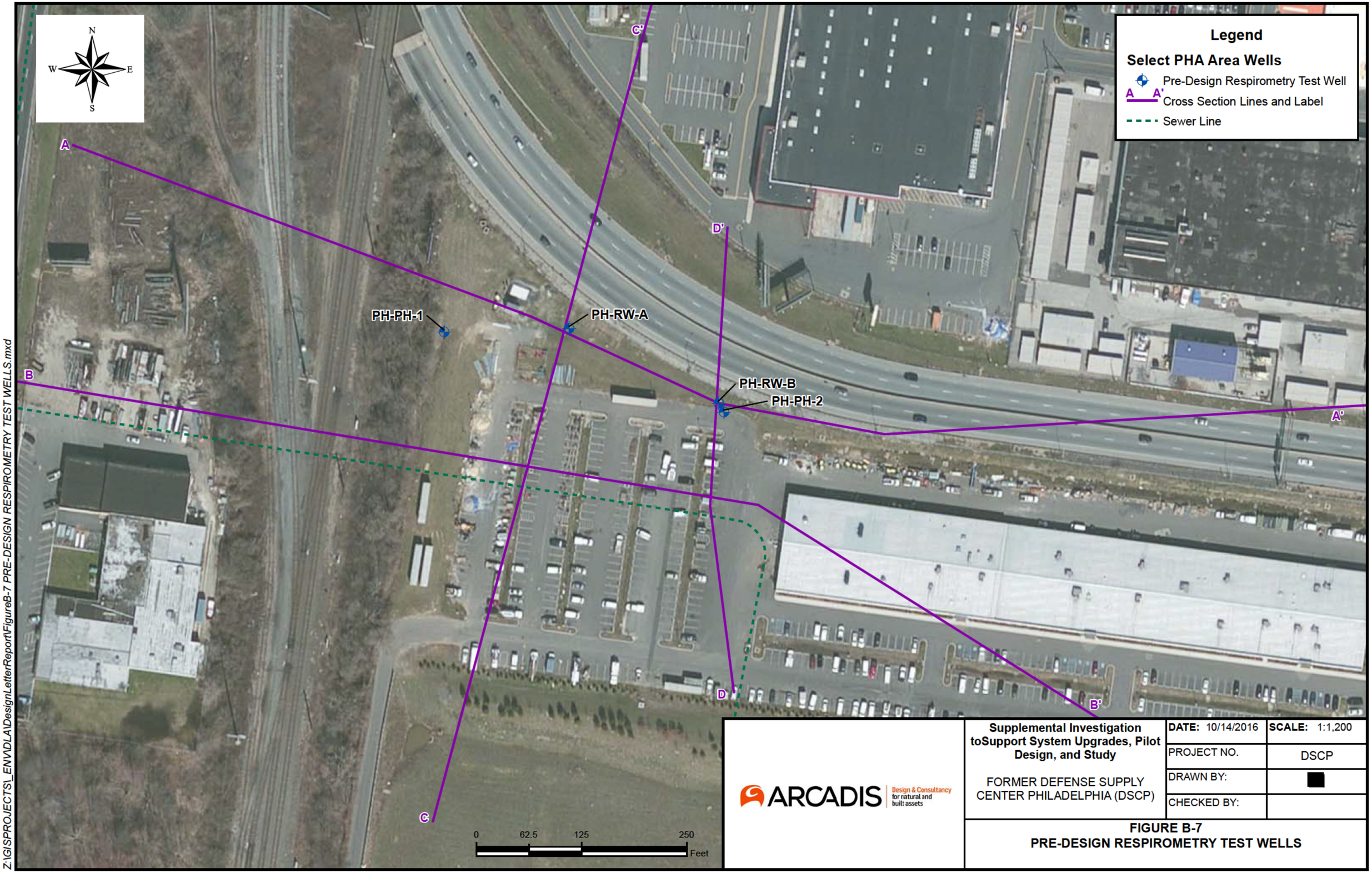


Z:\GIS\PROJECTS_ENVDLA\DesignLetterReport\FigureB-7 PRE-DESIGN RESPIROMETRY TEST WELLS.mxd

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	
	CHECKED BY:	

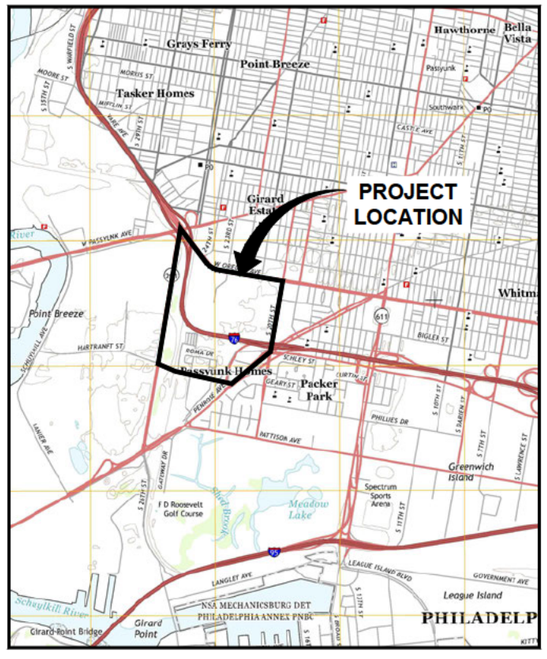
FIGURE B-7
PRE-DESIGN RESPIROMETRY TEST WELLS

Appendix C

Construction Drawings

CONSTRUCTION DRAWINGS

SYSTEM UPGRADES, PILOT DESIGN AND STUDY
FORMER DEFENSE SUPPLY CENTER (DSCP) - PHILADELPHIA
PHILADELPHIA, PENNSYLVANIA
CONTRACT NUMBER: W912BU-13-D-0002



REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: PHILADELPHIA, PA, DATED 2013.

LOCATION MAP

0 2000' 4000'
GRAPHIC SCALE

AREA LOCATION

PENNSYLVANIA

XREFS:
IMAGES: PROJECTNAME: ---
PA_Philadelphia_20130529_TM_geo.jpg
secondary_color.png

DATE ISSUED

NOVEMBER 18, 2016

2990 SOUTH 20th STREET
PHILADELPHIA, PA 19145

PREPARED FOR:
UNITED STATES ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

ARCADIS

ARCADIS U.S., INC.

INDEX TO DRAWINGS

	COVER PAGE
	GENERAL
G-1	CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2	CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3	MAJOR EQUIPMENT AND INSTRUMENT LIST
	CIVIL
C-1	SITE PLAN
C-2	PILOT TEST SYSTEM LAYOUT
C-3	TRENCHING DETAILS (1 OF 2)
C-4	TRENCHING DETAILS (2 OF 2)
C-5	PILOT TREATMENT SYSTEM ENCLOSURE
C-6	SYSTEM ENCLOSURE DETAILS
C-7	CONCRETE PAD AND MISCELLANEOUS DETAILS
	PID
PID-1	BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM
PID-2	BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM
PID-3	PIPING AND INSTRUMENTATION DIAGRAM LEGEND
	MECHANICAL
M-1	BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS
M-2	PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS
M-3	PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4	PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5	BIOSPARGE/BIOVENT BLOWER PACKAGE
	INSTRUMENTATION
I-ASL	PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT
I-ASB	PILOT TREATMENT SYSTEM CONTROL PANEL BILL OF MATERIALS
I-AS1	PILOT TREATMENT SYSTEM CONTROL PANEL POWER DISTRIBUTION WIRING DIAGRAM
I-AS2	PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 DISCRETE INPUTS
I-AS3	PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 RELAY OUTPUTS
I-AS4	PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 1 DISCRETE INPUTS
I-AS5	PILOT TREATMENT SYSTEM CONTROL PANEL SLOTS 2 AND 3 ANALOG INPUTS
	INSTRUMENTATION, CONTINUED
I-AS6	PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 4, ANALOG I/O
I-AS7	PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 1 OF 2)
I-AS8	PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 2 OF 2)
I-N0	NORTHERN SKIMMER SYSTEM PANEL LAYOUT
I-N1	NORTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-N2	NORTHER SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-N3	NORTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS
I-N4	NORTHERN SKIMMER SYSTEM- BLANK
I-N5	NORTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S0	SOUTHERN SKIMMER SYSTEM PANEL LAYOUT
I-S1	SOUTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-S2	SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-S3	SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS
I-S4	SOUTHERN SKIMMER SYSTEM- BLANK
I-S5	SOUTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S6	SOUTHERN SKIMMER SYSTEM- BLANK
I-S7	COMPRESSOR CONTROL ENCLOSURE (CCE) PANEL LAYOUT
I-S8	SOUTHERN SKIMMER SYSTEM MOTOR CONTROL PANEL WIRING DETAILS
	ELECTRICAL
E-1	ELECTRICAL SYMBOL LEGEND AND SPECIFICATIONS
E-2	ELECTRICAL SINGLE LINE DIAGRAM SOUTHERN SKIMMER SYSTEM
E-3	ELECTRICAL SINGLE LINE DIAGRAM NORTHERN SKIMMER SYSTEM
E-4	ELECTRICAL SINGLE LINE DIAGRAM PILOT TREATMENT SYSTEM
E-5	PILOT TREATMENT SYSTEM ELECTRICAL LAYOUT DIAGRAM
E-6	PILOT TREATMENT SYSTEM ENCLOSURE 480 VAC EQUIPMENT LAYOUT
E-7	PILOT TREATMENT SYSTEM ENCLOSURE 120 VAC EQUIPMENT LAYOUT
E-8	PILOT TREATMENT SYSTEM ENCLOSURE INSTRUMENTATION LAYOUT

1.0 INTRODUCTION

1.1 GENERAL

THE ENCLOSED DRAWINGS AND SPECIFICATIONS CONTAIN INFORMATION FOR THE CONSTRUCTION AND INSTALLATION OF A PILOT BIOSPARGE AND BIOVENT TREATMENT REMEDIATION SYSTEM TO BE INSTALLED AT THE FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP) SITE. THE FOLLOWING DRAWINGS DEPICTING THE REMEDIATION SYSTEM ARE REQUIRED FOR CONSTRUCTION AND INSTALLATION:

DRAWING NO. TITLE

G-1 ...	CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2 ...	CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3 ...	MAJOR EQUIPMENT AND INSTRUMENT LIST
C-1 ...	SITE PLAN
C-2 ...	PILOT TEST SYSTEM LAYOUT
C-3 ...	TRENCHING DETAILS (1 OF 2)
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PID-3...	PIPING AND INSTRUMENTATION DIAGRAM LEGEND
M-1...	BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DIAGRAM
M-2...	PERFORMANCE MONITORING WELL CONSTRUCTION DIAGRAM
M-3...	PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4...	PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5...	BIOSPARGE/BIOVENT BLOWER PACKAGE

1.2 DEFINITIONS

ENGINEER'S PROJECT MANAGER: MATTHEW LESLEY (ARCADIS)
ENGINEER: ARCADIS
OWNER: UNITED STATES DEFENCE LOGISTICS AGENCY
OWNER'S AGENT: UNITED STATES ARMY CORPS OF ENGINEERS
PROPERTY OWNER: CITY OF PHILADELPHIA HOUSING AUTHORTY

2.0 HEALTH AND SAFETY

1. THE CONTRACTOR (INCLUDING WORKERS AND SUBCONTRACTORS) SHALL PREPARE AN ACCIDENT PREVENTION PLAN (APP) AND APPROPRIATE ACTIVITY HAZARD ANALYSIS (AHA) AS REQUIRED BY THE ARMY CORPS SAFETY AND HEALTH MANUAL EM385 RIOR TO BEGINNING ANY WORK, AND SHALL ABIDE BY THE APP AND APPROPRIATE AHA DURING ALL SITE WORK. A COPY OF THE APP SHALL BE PROVIDED TO THE ENGINEER PRIOR TO BEGINNING ANY SITE WORK.

2. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL, AND OWNER-SPECIFIED HEALTH AND SAFETY REQUIREMENTS.

3. THE CONTRACTOR SHALL ESTABLISH AN EXCLUSION ZONE AROUND ALL WORK AREAS TO RESTRICT ACCESS AND PROVIDE APPROPRIATE PROTECTIONS DURING BOTH WORKING AND NON-WORKING HOURS.

4. DURING EXCAVATION WORK THE CONTRACTOR SHALL SURROUND THE WORK AREA WITH TEMPORARY CHAIN-LINK CONSTRUCTION FENCING TO RESTRICT ACCESS AND PROVIDE A SAFE WORK ENVIRONMENT. TEMPORARY FENCE SHALL BE INSTALLED AT A MINIMUM 10 FT SETBACK DISTANCE FROM EXCAVATIONS. THE CONTRACTOR SHALL USE TEMPORARY FENCE OR OTHER APPROVED SAFETY MARKERS SUCH AS BARRICADES, CONES, CAUTION TAPE AND ORANGE SNOW FENCE TO FURTHER DELINEATE, AND RESTRICT ACCESS TO THE WORK AREA AS APPROPRIATE DURING OTHER PHASES OF CONSTRUCTION. AT THE END OF EACH WORK DAY, ALL EXCAVATIONS SHALL EITHER BE BACKFILLED TO GRADE, OR SURROUNDED COMPLETELY BY TEMPORARY FENCING. DURING SPRING, SUMMER AND FALL EXCAVATIONS MAY ALSO BE COVERED BY STEEL ROAD PLATES (TRENCH PLATES) AFTER WORKING HOURS, ANCHORED TO THE GROUND CAPABLE OF SUPPORTING VEHICULAR TRAFFIC. IF TRENCH PLATES ARE USED, CONTRACTOR SHALL MAKE SURE THE TRENCH PLATES ARE CLEARLY MARKED AND VISIBLE. USE OF TRENCH PLATES DURING WINTERTIME SHALL ONLY BE PERMITTED AT THE APPROVAL OF THE ENGINEER AND OWNER DUE TO THE POTENTIAL IMPACT ON SNOW REMOVAL OPERATIONS.

5. IN ADDITION TO PROVIDING TEMPORARY FENCING SURROUNDING WORK AREA, CONTRACTOR WOULD ALSO NEED TO MAINTAIN A FENCED STAGING AREA FOR STAGING EQUIPMENT, ROLL-OFFS FOR HOLDING SOIL/DEBRIS FROM EXCAVATION, ETC. DURING THE ENTIRE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL CONTAIN LOOSE DEBRIS AND SECURE CONSTRUCTION MATERIALS ON A DAILY BASIS PRIOR TO DEPARTURE FROM THE SITE TO PROVIDE A CLEAN AND ORDERLY WORK AREA.

6. ALL EMPLOYEES OF THE CONTRACTOR AND THEIR SUBCONTRACTORS SHALL BE CURRENT WITH THEIR 40-HOUR HAZWOPER TRAINING AND 8-HOUR REFRESHER. PROOF OF SAID TRAINING DOCUMENTATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF WORK AND SHALL BE KEPT ONSITE DURING CONSTRUCTION.

7. CONTRACTOR SHALL MARK ALL POTENTIAL OVERHEAD AND/OR TRIP HAZARDS IN YELLOW.

8. CONTRACTOR SHALL MAKE SURE THAT ALL CONSTRUCTION EQUIPMENT AND FIELD PERSONNEL VEHICLES SHALL HAVE FIRE EXTINGUISHER IN THEM. THE FIRE EXTINGUISHERS SHALL BE FREELY ACCESSIBLE DURING ALL CONSTRUCTION ACTIVITIES.

3.0 SPECIFICATIONS

THE FOLLOWING SPECIFICATIONS OUTLINE THE REQUIREMENTS FOR CONSTRUCTION AND INSTALLATION OF THE PILOT REMEDIATION SYSTEM.

3.1 GENERAL

1. THE CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PENNDOT) PUBLICATION 408/2016 CONSTRUCTION SPECIFICATIONS, THE INTERNATIONAL BUILDING CODES, THE NATIONAL ELECTRIC CODE, AND ALL OTHER APPLICABLE FEDERAL, STATE AND LOCAL CODES.

2. ALL NECESSARY CONSTRUCTION PERMITS, APPROVALS AND INSPECTIONS SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR. PERMITS REQUIRED FOR CONSTRUCTION WILL INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING.

- BUILDING/CONSTRUCTION PERMIT
- ZONING PERMIT (IF DETERMINED TO BE NECESSARY BY PHILADELPHIA DEPARTMENT OF LICENSES AND INSPECTIONS)
- ELECTRICAL PERMIT
- WELL INSTALLATION PERMIT

3. A PRE-CONSTRUCTION MEETING BETWEEN OWNER, THE CONTRACTOR, AND ENGINEER WILL BE REQUIRED BEFORE ANY WORK BEGINS. THE MEETING WILL BE HELD AT THE SITE.

4. THE SELECTED CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER'S PROJECT MANAGER SHALL BE NOTIFIED OF ANY DISCREPANCY. ANY DEVIATIONS FROM DESIGN CONSTITUTE A STOP WORK. ENGINEER SHALL BE NOTIFIED, AND VERIFICATION OF ENGINEERING CALCULATIONS MUST BE COMPLETED PRIOR TO MAKING FIELD CHANGES. ALL CHANGES ARE TO BE DOCUMENTED VIA THE ENGINEER'S FORMAL SUBMITTAL PROCESS.

5. ALL MATERIALS USED FOR CONSTRUCTION OF THE SYSTEM SHALL BE NEW UNLESS OTHERWISE NOTED.

6. EQUIPMENT AND INSTRUMENTS THAT ARE SPECIFIED TO BE SUPPLIED BY THE ENGINEER/OWNER OR EXISTING ONSITE WILL BE PROVIDED BY THE ENGINEER/OWNER FOR INSTALLATION BY THE CONTRACTOR UNLESS OTHERWISE NOTED.

7. WHERE MATERIALS OR PRODUCTS CALLED FOR UNDER THIS CONTRACT ARE INSTALLED BEFORE THE INSTALLATION OR ERECTION OF ADEQUATE PROTECTIVE STRUCTURES, THE CONTRACTOR, WITHOUT ADDITIONAL COMPENSATION, SHALL PROVIDE APPROVED, EFFECTIVE AND DURABLE MEASURES TO PROTECT SUCH MATERIALS OR PRODUCTS AGAINST DAMAGE FROM THE ELEMENTS OR FROM ANY OTHER CAUSES.

8. ALL MACHINERY, EQUIPMENT, PIPING, ACCESSORIES, AND APPURTENANCES SHALL BE ADEQUATELY SUPPORTED AND SAFEGUARDED AGAINST ALL DAMAGE OR INJURY DURING PERFORMANCE OF WORK UNDER THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE OR INJURY RESULTING FROM HIS OPERATIONS AND SHALL REPAIR SUCH DAMAGE IMMEDIATELY AND TO THE SATISFACTION OF THE ENGINEER.

9. UNDER THE PUBLIC UTILITIES ACT NO. 187, THE CONTRACTOR SHALL COMPLY WITH THE ACT OF DECEMBER 10, 1974 (PUBLIC LAW 852, NO, 287), AS AMENDED, WHICH DEFINES THE PROCEDURES FOR NOTIFICATION TO PUBLIC UTILITIES PRIOR TO EXCAVATION, DRILLING OR DEMOLITION WORK USING POWER EQUIPMENT OR EXPLOSIVES. THE CONTRACTOR SHALL CONTACT CONTRACTOR SHALL CONTACT THE PENNSYLVANIA ONE-CALL SYSTEM AT 1-800-242-1776 TO LOCATE UTILITIES WITHIN THE WORK AREA AT LEAST THREE (3) BUT NOT MORE THAN TEN (10) DAYS BEFORE THE START OF EXCAVATION, DRILL OR SIMILAR INTRUSIVE ACTIVITIES. ONE-CALL TICKET INFORMATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.

10. THE CONTRACTOR SHALL ALSO CONTRACT A UTILITY LOCATION AND IDENTIFICATION SERVICE PROVIDER TO PERFORM A PRIVATE UTILITY LOCATION SURVEY OF THE ENTIRE WORK AREA PRIOR TO THE START OF INTRUSIVE WORK. A REPRESENTATIVE OF THE CONTRACTOR WHO IS FAMILIAR WITH THIS SCOPE OF WORK SHALL BE PRESENT ONSITE TO SUPERVISE DURING THE PRIVATE UTILITY LOCATION SURVEY. DETAILS OF THE UTILITY SURVEY SHALL BE PROVIDED TO AND REVIEWED WITH THE ENGINEER PRIOR TO THE START OF CONSTRUCTION TO DETERMINE WHETHER ANY ADJUSTMENTS TO TRENCHING ROUTES, WELL LOCATIONS OR SIMILAR ARE NECESSARY. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING ANY MARKS INDICATING BURIED INFRASTRUCTURE. IF MARKS FADE OR QUESTION ABOUT THE LOCATION OF BURIED INFRASTRUCTURE OCCURS, THE CONTRACTOR WILL BE RESPONSIBLE FOR PERFORMING ADDITIONAL PRIVATE UTILITY LOCATION SURVEY.

11. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO UNDERGROUND UTILITIES, PIPING AND ADJOINING STRUCTURES. IF SUBSURFACE WORK MUST TAKE PLACE WITHIN 30 INCHES OF A UTILITY LINE MARKING, THE UTILITY MUST BE EXPOSED (POTHOLED) BY SOFT DIG / CLEARANCE METHODS PRIOR TO STARTING SUBSURFACE INTRUSIVE WORK. NO MECHANIZED EQUIPMENT IS PERMITTED FOR THE EXPOSING OF THE UTILITY. WHEN TRENCHES MUST CROSS A UTILITY, THE UTILITY MUST BE EXPOSED 30 INCHES FROM THE OUTER EDGE IN A 360° DIRECTION. THE CONTRACTOR SHALL ENSURE ALL UNCOVERED UTILITIES ARE SUPPORTED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS AND SPECIFICATIONS.

12. THE CONTRACTOR SHALL WARRANTY ALL MATERIALS, CONSTRUCTION AND WORKMANSHIP FOR A PERIOD OF ONE YEAR. ALL DEFECTS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

13. THE CONTRACTOR SHALL MAKE SURE THAT THE WORK AREA IS CLEAN AND ORDERLY BOTH DURING CONSTRUCTION AND UPON COMPLETION PRIOR TO DEMOBILIZING FROM THE SITE. THE CONTRACTOR SHALL CONTAIN LOOSE DEBRIS AND STORE CONSTRUCTION MATERIALS ON A DAILY BASIS PRIOR TO DEPARTURE FROM THE SITE.

3.2 WELL INSTALLATION

1. ALL WELLS SHALL BE CONSTUCTED AS INDICATED ON THE CONTRACT DRAWINGS AND UTILIZING PVC PIPING - ASTM F 480, TYPE 1, GRADE 1, PVC 12454, NSF WC OR NSF PW, SCHEDULE [40], WITH FLUSH THREADED JOINT FITTINGS. THREADED JOINTS SHALL BE WRAPPED WITH FLUOROPOLYMER TAPE, AND PROVIDED WITH NITRILE O-RING GASKETS.

2. WELL SCREENS SHALL BE LOCATED AS INDICATED ON THE CONTRACT DRAWINGS. SLOT SIZE SHALL BE AS INDICATED. SLOTTED OPENINGS SHALL BE DISTRIBUTED UNIFORMLY AROUND THE CIRCUMFERENCE OF THE SCREEN. OPEN AREA SHALL APPROACH THE FORMATION'S NATURAL POROSITY.

3. PROVIDE FILTERPACK AND VERY FINE CHOKER SAND SEPARATION LAYER AS INDICATED ON THE CONTRACT DRAWINGS.

4. NEAT CEMENT GROUT - PROVIDE NEAT CEMENT GROUT IN ACCORDANCE WITH ASTM D 5092. CEMENT SHALL BE IN ACCORDANCE WITH ASTM C 150. QUICK SETTING ADMIXTURES SHALL NOT BE ALLOWED. DRILLING MUD OR CUTTINGS SHALL NOT BE USED AS A SEALING MATERIAL.

5. PROVIDE FLUSH THREADED SOLID PLUG AT THE BOTTOM OF THE WELL. PLUG SHALL BE THE SAME MATERIAL AS THE WELL CASING OR SCREEN TO WHICH IT IS ATTACHED. JOINTS SHALL BE WRAPPED WITH FLUOROPOLYMER TAPE AND PROVIDED WITH NITRILE O-RING GASKETS.

6. BOREHOLE SHALL BE ADVANCED USING CONVENTIONAL HOLLOW-STEM AUGER DRILLING METHODS. IF IT IS THE OPINION OF THE CONTRACTOR THAT AN ALTERNATE DRILLING METHOD IS REQUIRED, JUSTIFICATION FOR A BORING METHOD CHANGE SHALL BE SUBMITTED TO THE ENGINEER, AND APPROVAL FOR THE CHANGE GRANTED PRIOR TO DRILLING. DRILL CREW SHALL BE EXPERIENCED AND TRAINED IN DRILLING AND SAFETY REQUIREMENTS FOR CONTAMINATED SITES, AND LICENSED IN THE STATE OF PENNSYLVANIA.

7. IF DRILLING IS SEQUENCED TO COINCIDE WITH PIPING TRENCH EXCAVATION WORK THE CONTRACTOR MAY STOCKPILE SOIL CUTTINGS FROM THE BOREHOLES WITH SOIL EXCAVATED FROM THE PIPING TRENCHES AS DESCRIBED UNDER SECTION 3.3 BELOW. IF DRILLING ACTIVITES DO NOT COINICIDE WITH TRENCHING WORK, THEN THE SOIL CUTTINGS SHALL BE PLACED IN 55-GALLON DOT APPROVED HAZARDOUS DRUMS WHICH WILL BE STAGED ONSITE PROXIMAL TO THE WORK AREA. THE CONTRACTOR SHALL SCREEN SOIL CUTTINGS AND CORES FROM BOREHOLES FOR HYDROCARBON IMPACTS USING A HAND-HELD PHOTOIONIZATION DETECTOR (PID). IT IS EXPECTED THAT IMPACTED SOIL WILL BE ENCOUNTERED AT SOME DRILLING LOCATIONS. IF SOIL CUTTINGS ARE BEING STOCKPILED, AND SOILS ARE ENCOUNTERED EXHIBITING A PID READING OF GREATER THAN 50 PPM OR SIMILAR EVIDENCE OF IMPACTS SUCH AS STAINING OR ODORS, THE CONTRACTOR SHALL SEGREGATE THESE SOILS BY EITHER PLACING THEM IN SEPARATE STOCKPILES AND MANAGING AS DISCUSSED IN SECTION 3.3 BELOW, OR PLACING THEM IN 55-GALLON DOT APPROVED HAZARDOUS DRUMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORT AND DISPOSAL OF ALL SOIL (CLEAN OR IMPACTED), DEVELOPMENT/DECONTAMINATION WATER, AND OTHER CONSTRUCTION DEBRIS GENERATED DURING DRILLING, ALONG WITH ANY WASTE CHARACTERIZATION SAMPLING REQUIRED. THE CONTRACTOR SHALL ASSUME ALL SOIL IS NON-HAZARDOUS WHEN DEVLEOPING COSTING.

8. WELL CASINGS, SCREENS, PLUGS, AND CAPS SHALL BE CERTIFIED CLEAN BY THE MANUFACTURER UPON DELIVERY. THESE MATERIALS SHALL BE DELIVERED, STORED, AND HANDLED IN SUCH MANNER AS TO ENSURE THAT GREASE, OIL, OR OTHER CONTAMINANTS DO NOT CONTACT ANY PORTION OF THE WELL SCREEN AND CASING ASSEMBLY PRIOR TO INSTALLATION. IF DIRECTED BY THE ENGINEER, THE WELL SCREEN AND CASING ASSEMBLY SHALL BE CLEANED WITH HIGH PRESSURE WATER PRIOR TO INSTALLATION. CENTRALIZERS SHALL BE USED TO ENSURE THAT THE WELL SCREEN AND CASING ASSEMBLY IS INSTALLED CONCENTRICALLY IN THE BOREHOLE. WHEN THE ASSEMBLY HAS BEEN INSTALLED AT THE APPROPRIATE ELEVATION, IT SHALL BE ADEQUATELY SECURED TO PRECLUDE MOVEMENT DURING PLACEMENT OF THE FILTER PACKS AND ANNULAR SEALS. THE TOP OF THE WELL CASING SHALL BE CAPPED DURING FILTER PACK PLACEMENT.

9. FILTER PACK AND CHOKER SAND SEPARATION LAYER - FILTER PACK AND VERY FINE CHOKER SAND SEPARATION LAYER SHALL BE PLACED AS INDICATED ON THE APPROVED WELL CONSTRUCTION DRAWINGS TO FILL THE ENTIRE ANNULAR SPACE BETWEEN THE SCREEN AND CASING ASSEMBLY AND THE OUTSIDE WALL OF THE BOREHOLE. PLACE USING A TREMIE PIPE IN ACCORDANCE WITH EPA 600-4-89-034 AND ASTM D 5092. PLACEMENT BY GRAVITY OR FREE FALL METHODS IS NOT ALLOWED. CONTROL SPEED OF SAND PLACEMENT TO PREVENT BRIDGING AND TO ALLOW FOR SETTLEMENT. PRIOR TO COMMENCEMENT OF WORK, EQUIPMENT AND METHODS REQUIRED TO PLACE FILTERS SHALL BE APPROVED BY THE ENGINEER.

10. NEAT CEMENT GROUT - NEAT CEMENT GROUT SHALL BE PLACED IN THE ANNULAR SPACE ABOVE THE VERY FINE CHOKER SAND SEPARATION LAYER AS INDICATED ON THE WELL CONSTRUCTION DRAWINGS. GROUT SHALL BE PLACED AS A SLURRY THROUGH A TREMIE PIPE, AND INJECTED UNDER PRESSURE TO REDUCE CHANCE OF VOIDS. GROUT SHALL BE INJECTED IN ONE CONTINUOUS OPERATION TO A DEPTH OF 4 FEET BELOW GRADE. AFTER THE CEMENT GROUT HAS CURED FOR 24 HOURS THE REMAINING ANNULAR SPACE ABOVE THE GROUT SHALL BE FILLED WITH SAND TO GRADE. CEMENT GROUT SHALL CURE A MINIMUM OF 48 HOURS BEFORE BEGINNING WELL DEVELOPMENT OPERATIONS.

11. WELLS SHALL BE INSTALLED WITHIN 8-INCH DIAMETER, FLUSH-MOUNTED, H-20 TRAFFIC LOAD RATED VAULTS CONSTRUCTED TO THE SPECIFICATIONS SHOWN ON DRAWINGS M-1 AND M-2. FINAL WELLHEAD SURFACE COMPLETIONS FOR BIOVENT AND BIOSPARGE WELLS SHALL BE CONSTRUCTED AS SHOWN ON DRAWING M-1. IF DRILLING WORK IS SEQUENCED TO COINCIDE WITH PIPING TRENCH INSTALLATION THE CONTRACTOR MAY POSTPONE INSTALLING THE WELL VAULTS AND FINAL WELLHEAD SURFACE COMPLETIONS UNTIL AFTER SUBSURFACE CONVEYANCE PIPING RUNS ARE CONNECTED, PROVIDED THAT THE WELL LOCATIONS ARE SECURED WITHIN THE WORK AREA PERIMETER FENCE AND PROPERLY PROTECTED AGAINST ACCIDENTAL DAMAGE IN THE INTERIM.

12. CONTRACTOR SHALL DEVELOP BIOSPARGE WELLS, PERFORMANCE MONITORING WELLS AND ANY BIOVENTING WELLS WITH GREATER THAN 4 FEET OF STANDING WATER DEPTH. WELLS SHALL BE DEVELOPED BYBAILING, SURGING, AND PUMPING/OVERPUMPING/BACKWASHING METHODS. AIR SURGING AND JETTING ARE PROHIBITED. METHOD OF DEVELOPMENT SHALL BE APPROVED BY THE ENGINEER. WELL DEVELOPMENT SHALL NOT BEGIN UNTIL THE WELL INSTALLATION IS COMPLETE AND ACCEPTED BY THE ENGINEER. WELL DEVELOPMENT OPERATIONS SHALL BE CONDUCTED CONTINUOUSLY UNTIL DEVELOPMENT WATER FLOWS CLEAR AND FREE OF SEDIMENT WITH A TURBIDITY OF LESS THAN 50 NTU. WELL DEVELOPMENT SHALL CONTINUE FOR A MINIMUM OF AT LEAST 30 MINUTES AND A MAXIMUM OF 60 MINUTES. WATER FROM THE WELL DEVELOPMENT OPERATIONS SHALL BE DISPOSED OF BY THE CONTRACTOR AS DISCUSSED ABOVE.

13. A BOREHOLE LOG SHALL BE COMPLETED FOR EACH BORING DRILLED. BOREHOLE LOGS SHALL BE PREPARED BY THE CONTRACTOR DURING ALL WELL DRILLING AND INSTALLATION ACTIVITIES. INFORMATION PROVIDED ON THE LOGS SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

a. NAME OF THE PROJECT AND SITE.

b. BORING/WELL IDENTIFICATION NUMBER.

c. LOCATION OF BORING (COORDINATES, IF AVAILABLE).

d. MAKE AND MANUFACTURER'S MODEL DESIGNATION OF DRILLING EQUIPMENT AND NAME OF DRILLING FIRM.

e. DATE BORING WAS DRILLED.

f. REFERENCE DATA FOR ALL DEPTH MEASUREMENTS.

g. NAME OF DRILLER AND NAME AND SIGNATURE OF GEOLOGIST PREPARING LOG.

h. NOMINAL HOLE DIAMETER AND DEPTH AT WHICH HOLE DIAMETER CHANGES.

i. TOTAL DEPTH OF BORING.

j. METHOD OF DRILLING, INCLUDING SAMPLING METHODS AND SAMPLE DEPTHS, INCLUDING THOSE ATTEMPTED WITH NO RECOVERY. INDICATION OF PENETRATION RESISTANCE SUCH AS DRIVE HAMMER BLOWS GIVEN IN BLOWS PER 6 INCHES OF DRIVEN SAMPLE TUBES. INFORMATION SHALL INCLUDE HAMMER WEIGHT AND DROP DISTANCE. INFORMATION SUCH AS ROD SIZE, BIT TYPE, PUMP TYPE, ETC., SHALL BE RECORDED. A DESCRIPTION OF ANY TEMPORARY CASING USED, DRILL FLUIDS AND FLUID ADDITIVES USED, IF ANY, INCLUDING BRAND NAME AND AMOUNT USED, ALONG WITH THE REASON FOR AND START (BY DEPTH) OF ITS USE SHALL BE INCLUDED. IF MEASURED, MUD VISCOSITIES AND WEIGHT SHALL BE RECORDED.

k. DESCRIPTION OF THE MATERIAL OF WHICH EACH STRATUM IS COMPOSED, IN ACCORDANCE WITH ASTM D 2488, AND/OR STANDARD ROCK NOMENCLATURE, AS NECESSARY. SOIL PARAMETERS FOR LOGGING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, CLASSIFICATION, DEPOSITIONAL ENVIRONMENT AND FORMATION, IF KNOWN, UNIFIED SOIL CLASSIFICATION SYMBOL, SECONDARY COMPONENTS AND ESTIMATED PERCENTAGES, COLOR (USING FSUP SOIL COLOR CHART OR GSA RCC-001), PLASTICITY, CONSISTENCY (COHESIVE SOIL), DENSITY (NON-COHESIVE SOIL), MOISTURE CONTENT, STRUCTURE AND ORIENTATION, AND GRAIN ANGULARITY. ROCK CORE PARAMETERS FOR LOGGING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, ROCK TYPE, FORMATION, MODIFIER DENOTING VARIETY (SHALY, CALCAREOUS, SILICEOUS, ETC.), COLOR (USING GSA RCC-001), HARDNESS, DEGREE OF CEMENTATION, TEXTURE, CRYSTALLINE STRUCTURE AND ORIENTATION, DEGREE OF WEATHERING, SOLUTION OR VOID CONDITIONS, PRIMARY AND SECONDARY PERMEABILITY, AND LOST CORE. THE RESULTS OF ANY CHEMICAL FIELD SCREENING SHALL ALSO BE INCLUDED ON THE BORING LOG. CLASSIFICATION SHALL BE PREPARED IN THE FIELD AT THE TIME OF SAMPLING. THE RESULTS OF VISUAL OBSERVATION OF THE MATERIAL ENCOUNTERED, AND ANY UNUSUAL ODOR DETECTED SHALL ALSO BE DULY NOTED AND RECORDED. DEPTH OF ANY OBSERVED FRACTURES, WEATHERED ZONES, OR ANY ABNORMALITIES ENCOUNTERED. DEPTH TO WATER, AND ANY NON-AQUEOUS PHASE LIQUIDS (NAPLS) AND DATE MEASURED BEFORE, DURING, AND AFTER EACH DRILLING SHIFT, AND PRIOR TO WELL INSTALLATION.

14. A WELL DEVELOPMENT RECORD SHALL BE PREPARED FOR EACH WELL INSTALLED. INFORMATION PROVIDED ON THE WELL DEVELOPMENT RECORD SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

a. DATE, TIME AND ELEVATION OF WATER LEVEL IN THE WELL, BEFORE DEVELOPMENT.

b. DEPTH TO BOTTOM OF WELL, NAME OF PROJECT AND SITE, WELL IDENTIFICATION NUMBER, AND DATE OF DEVELOPMENT.

c. METHOD USED FOR DEVELOPMENT, TO INCLUDE SIZE, TYPE AND MAKE OF EQUIPMENT, BAILER, AND/OR PUMP USED DURING DEVELOPMENT.

d. VOLUME AND PHYSICAL CHARACTERISTICS OF WATER REMOVED, TO INCLUDE CHANGES DURING DEVELOPMENT IN CLARITY, COLOR, PARTICULATES AND ODOR.

e. VOLUME AND PHYSICAL CHARACTERISTICS OF SEDIMENT REMOVED, TO INCLUDE CHANGES DURING DEVELOPMENT IN COLOR, AND ODOR.

f. CLARITY OF WATER BEFORE, DURING, AND AFTER DEVELOPMENT. NEPHELOMETRIC TURBIDITY UNIT (NTU) MEASUREMENTS.

g. TOTAL DEPTH OF WELLHEAD AND THE STATIC WATER LEVEL AS PER ASTM D 4750 FROM TOP OF THE CASING, IMMEDIATELY AFTER PUMPING/DEVELOPMENT, AND 24 CONSECUTIVE HOURS AFTER DEVELOPMENT.

h. READINGS OF PH, SPECIFIC CONDUCTANCE, DO, ORP, AND TEMPERATURE TAKEN BEFORE, DURING, AND AFTER DEVELOPMENT.

i. NAME AND JOB TITLE OF INDIVIDUAL DEVELOPING WELL.

j. DESCRIPTION OF DEVELOPMENT WATER DISPOSAL.

15. ALL AUGERS, TOOLING AND OTHER DOWN-HOLE EQUIPMENT THAT HAS CONTACTED SUBSURFACE SOIL SHALL BE DECONTAMINATED BETWEEN DRILLING LOCATIONS BY HOT WATER PRESSURE WASHER (STEAM CLEANING). CONTRACTOR SHALL CONSTRUCT A TEMPORARY DECONTAMINATION PAD ONSITE FOR THIS PURPOSE. CONTRACTOR SHALL ASSUME THAT POTABLE WATER IS NOT AVAILABLE AT THE SITE AND SHALL PROVIDE A DECONTAMINATION WATER SOURCE. CONTRACTOR SHALL DISPOSE OF DECONTAMINATION WATER, RESIDUAL SOIL AND DECONTAMINATION PAD MATERIALS UPON COMPLETION OF WORK AS DESCRIBED ABOVE.

3.3 EXCAVATION/RESTORATION

1. WHERE PROCESS PIPING IS INSTALLED BELOW GROUND, THE PIPE SHALL BE BURIED IN A TRENCH EXCAVATED TO THE DIMENSIONS SHOWN ON DRAWINGS C-3 AND C-4. MINIMUM PIPING BURIAL DEPTH IS 21 INCHES MEASURED FROM GROUND SURFACE TO THE TOP OF THE PIPE UNLESS OTHERWISE STATED.

2. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO UNDERGROUND UTILITIES, PIPING, AND ADJOINING STRUCTURES DURING EXCAVATION WORK.

3. THE CONTRACTOR SHALL PLAN TO COMPLETE TRENCHING WORK IN SEVERAL SMALLER SECTIONS INSTEAD OF ONE LARGE OPEN EXCAVATION, IN ORDER TO REDUCE THE WORK AREA FOOTPRINT AND LIMIT DISRUPTION OF CURRENT SITE OPERATIONS TO THE EXTENT POSSIBLE.

4. EXCAVATIONS SHALL EITHER BE BACKFILLED TO GRADE AT THE END OF EACH WORK DAY PRIOR TO DEPARTING THE SITE, OR SURROUNDED COMPLETELY BY TEMPORARY CHAIN-LINK CONSTRUCTION FENCING OR COVERED BY TRENCH PLATES TO PREVENT ACCESS. ADDITIONAL DETAILS ON PROTECTION OF EXCAVATIONS ARE PROVIDED UNDER THE GENERAL SPECIFICATIONS ABOVE.

5. EXCAVATIONS THROUGH CONCRETE OR ASPHALT PAVEMENT SHALL BE SAWCUT TO PROVIDE A SQUARE VERTICAL JOINT FOR REPAVING.

6. FOLLOWING REMOVAL OF ASPHALT FROM THE PROPOSED TRENCH, THE CONTRACTOR SHALL SCAN THE ENTIRE PERIMETER OF THE TRENCH WITH A COMMERCIAL GRADE METAL DETECTOR. LOCATIONS OF METALLIC ANOMALIES ALONG THE TRENCH SHALL BE MARKED WITH ORANGE PAINT AND THEN HAND CLEARED DURING EXCAVATION.

7. EXCAVATED SOIL SHALL BE STOCKPILED WITHIN A BERMED AREA INSIDE THE FENCED WORK ZONE. SOIL STOCKPILES SHALL BE PLACED ON 10-MIL PLASTIC VISQUEEN AND COVERED WITH A MINIMUM OF 6-MIL PLASTIC VISQUEEN. EARTHEN MATERIALS SHALL NOT BE USED TO SECURE THE PLASTIC LINERS OR COVERS.

8. THE CONTRACTOR SHALL SCREEN EXCAVATED SOIL FOR HYDROCARBON IMPACTS USING A HAND-HELD PHOTOIONIZATION DETECTOR (PID).PETROLEUM HYDROCARBON IMPACTED SOIL IS NOT ANTICIPATED DUE TO THE SHALLOW DEPTH OF EXCAVATION; HOWEVER, IF SOIL IS ENCOUNTERED EXHIBITING A PID READING OF GREATER THAN 50 PPM OR SIMILAR EVIDENCE OF IMPACTS SUCH AS STAINING OR ODORS, IT SHALL BE SEGREGATED AND STOCKPILED IN AN AREA DESIGNATED BY THE ENGINEER. THE CONTRACTOR WILL THEN SAMPLE THE SOIL FOR PETROLEUM HYDROCARBON CONTENT AND WASTE CHARACTERIZATION PARAMETERS FOLLOWING CONSULTATION WITH THE ENGINEER.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE WASTE CHARACTERIZATION SAMPLING, TRANSPORTION AND DISPOSAL OF ALL SOIL (CLEAN OR IMPACTED), ASPHALT AND OTHER CONSTRUCTION DEBRIS GENERATED UNDER THIS SCOPE OF WORK. THE CONTRACTOR SHALL ASSUME ALL SOIL IS NON-HAZARDOUS WHEN DEVLEOPING COSTING. THE SITE OWNER SHALL BE RESPONSIBLE FOR SIGNING WASTE DISPOSAL MANIFESTS. CONTRACTOR SHALL ONLY CHARGE FOR DISPOSAL OF MATERIALS SENT TO OFFSITE DISPOSAL FACILITIES. CONTRACTOR SHALL BE REQUIRED TO SUBMIT WEIGH TICKETS FOR PAYMENT.

10. THE CONTRACTOR SHALL RESTORE ALL EXCAVATED AREAS TO MATCH EXISTING SURFACE COMPLETION. FOR COSTING PURPOSES CONTRACTOR SHALL ASSUME A TOTAL TRENCHING LENGTH OF 1,000 LF WITH 390 LF ACROSS ASPHALT PAVEMENT AND 610 LF ACROSS GRASS/UNPAVED SURFACE.

11. PIPING TRENCH RESTORATION DETAILS ARE PROVIDED ON DRAWINGS C-3 AND C-4. PIPING TRENCHES INSTALLED IN PAVED AREAS SHALL BE BACKFILLED WITH IMPORTED CLEAN PIPE BEDDING SAND FROM THE BOTTOM OF THE TRENCH TO THE BASE OF THE PAVEMENT FOUNDATION LAYER.

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No.	Date	Revisions	By	Ckd
2	05/09/2017	FOR BID	MB	MS
1	11/18/2016	FINAL	EM	CD

Professional Engineer's Name
Professional Engineer's No. PE

12. THE PAVEMENT FOUNDATION LAYER SHALL BE CONSTRUCTED OF PENNDOT NO. 2A OR NO. OGS COARSE AGGREGATE AS SPECIFIED IN PENNDOT PUBLICATION 408/2016 CONSTRUCTION SPECIFICATIONS. RECYCLED CONCRETE AGGREGATE (RCA) MAY ALSO BE USED PROVIDED IT MEETS THE GRAIN SIZE DISTRIBUTION AND SPECIFICATIONS FOR COARSE AGGREGATE PAVEMENT SUBBASE OUTLINED IN PENNDOT PUBLICATION 408/2016. AGGREGATE SHALL BE PLACED IN A SINGLE 8-INCH LIFT AND COMPACTED SO THAT THE FINAL COMPACTED THICKNESS IS 6-INCHES. THE AGGREGATE SHALL BE COMPACTED USING A VIBRATORY PLATE COMPACTOR UNTIL THE MATERIAL DOES NOT MOVE UNDER THE COMPACTION EQUIPMENT. A NON-WOVEN CLASS 1 TYPE GEOTEXTILE FABRIC SHALL BE INSTALLED BETWEEN THE SAND AND PAVEMENT FOUNDATION MATERIAL AS A SEPARATION LAYER TO PROVIDE SUPPORT DURING INSTALLATION AND COMPACTION.

13. PAVEMENT SHALL BE HOT MIX ASPHALT MEETING THE APPLICABLE DESIGN AND INSTALLATION SPECIFICATIONS OUTLINED IN PENNDOT PUBLICATION 408/2016. ASPHALT PAVEMENT WILL CONSIST OF 1.5 INCHES OF WEAR COURSE MATERIAL (SUPERPAVE MIXTURE 9.5MM) PLACED OVER 4 INCHES OF BINDER COURSE MATERIAL (SUPERPAVE MIX 25MM) AS SHOWN ON DRAWINGS C-3 AND C-4. THE ASPHALT MIX SHALL BE COMPACTED USING TANDEM ROLLERS UNTIL NO FURTHER COMPRESSION CAN BE OBTAINED AND ROLLING MARKS ARE ELIMINATED. IN AREAS TOO SMALL FOR THE ROLLER, A VIBRATING PLATE COMPACTOR SHALL BE USED TO ACHIEVE THOROUGH COMPACTION.

14. A BITUMINOUS TACK COAT OF EMULSIFIED ASPHALT (CLASS AT-E) SHALL BE APPLIED AT A RATE OF BETWEEN 0.02 - 0.07 GAL/YD2 TO THE PAVEMENT FOUNDATION LAYER PRIOR TO PLACING THE PAVEMENT BINDER COURSE, AND TO THE SURFACES OF ALL TRANSVERSE AND LONGITUDINAL JOINTS TO ENSURE PROPER BONDING BETWEEN SURFACES. TACK COAT SHALL BE APPLIED AS SPECIFIED IN PENNDOT PUBLICATION 408/2016.

14. THE CONTRACTOR SHALL RETURN TO THE SITE ONE WEEK AFTER ASPHALT PLACEMENT AND APPLY ASPHALT JOINT SEALER ALONG THE ENTIRE PERIMETER OF ALL NEWLY INSTALLED ASPHALT PAVEMENT AND TO ANY OTHER JOINTS WITHIN THE PAVEMENT AS SPECIFIED IN PENNDOT PUBLICATION 408/2016.

15. AS SHOWN ON DRAWINGS C-3 AND C-4, TRENCHES INSTALLED IN UNPAVED AREAS SHALL BE BACKFILLED WITH CLEAN PIPE BEDDING SAND TO A MINIMUM OF 4 INCHES ABOVE THE PIPING, FOLLOWED BY CLEAN NATIVE SOIL EXCAVATED FROM THE TRENCH. CONTRACTOR SHALL ASSUME FOR COSTING PURPOSES THAT SOIL EXCAVATED DURING TRENCHING IS SUITABLE FOR USE AS CLEAN BACKFILL (I.E., NO PETRLEUM HYDROCARBON IMPACTS, SUFFICIENT FINES TO ACHIEVE PROPER COMPACTION AND FREE OF ROCKS, ROOTS OR OTHER DEBRIS), BUT THIS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER DURING CONSTRUCTION. IF NATIVE SOIL IS DETERMINED TO BE UNSUITABLE FOR USE AS BACKFILL DURING CONSTRUCTION, CLEAN IMPORTED FILL OR PIPE BEDDING SAND WILL BE USED AS BACKFILL INSTEAD. SOIL SHALL BE PLACED AND COMPACTED IN 6-INCH LOOSE LIFTS DURING BACKFILLING USING A VIBRATORY PLATE COMPACTOR (**JUMPING JACK OR SIMILAR IMPACT COMPACTOR NOT PERMITTED**). TRENCHES SHALL BE RESTORED AT THE SURFACE WITH A MINIMUM 6-INCHES OF TOPSOIL.

16. TRENCHING INSTALLED IN UNPAVED AREAS AND ALL PORTIONS OF THE WORK AREA WHERE EXISTING VEGETATION WAS DISTURBED BY CONSTRUCTION ACTIVITES, SHALL BE HYDROSEEDED UPON COMPLETION USING A SEED MIX APPROPRIATE FOR THE LOCATION TO RESTORE THE EXISTING GRASS COVER. IF NOT PRESENT IN HYDOSEED MIX, CONTRACTOR SHALL APPLY STARTER FERTILIZER TO THE SOIL WHERE SEED WILL BE APPLIED OF THE COMPOSITION AND AT THE APPLICATION RATE RECOMMENDED BY THE GRASS SEED MANUFACTURER. CONTRACTOR SHALL APPLY STRAW MULCH OVER ALL SEEDED SURFACES FOLLOWING APPLICATION.

3.4 EROSION AND SEDIMENTATION CONTROLS

1. CONTRACTOR SHALL INSTALL MEASURES TO DIVERT STORMWATER SHEET FLOW FROM THE PARKING LOT AROUND THE WORK AREA AND AWAY FROM OPEN EXCAVATIONS (E.G. TEMPORARY BERMS/CURBING USING HAYBALES OR SIMILAR) WHERE NECESSARY DURING CONSTRUCTION.

2. CONTRACTOR SHALL INSTALL SEDIMENT FILTERS IN PARKING LOT STORM DRAINS WITHIN THE TRENCHING WORK AREA THAT RECEIVE SURFACE WATER RUNOFF FLOWS FROM THE WORK AREA.

3. CONTRACTOR SHALL CONTROL FUGITIVE DUST GENERATED DURING CONSTRUCTION AS NECESSARY BY APPLYING A LIGHT SPRAY OF WATER OR OTHER APPROVED DUST CONTROL MEASURES.

4. CONTRACTOR SHALL EMPLOY CONTROLS TO PREVENT CONSTRUCTION VEHICLES FROM TRACKING EXCAVATED SOIL OUT OF THE WORK AREA, AND SHALL DESIGN THE WORK AREA LAYOUT TO LIMIT THE POTENTIAL FOR TRAKCING OF SOIL OFFSITE. THE CONTRACTOR SHALL ALSO EMPLOY GOOD HOUSEKEEPING PRACTICES DURING CONSTRUCTION. RESIDUAL EXACATED SOIL SHALL BE CLEANED FROM PAVED SURFACES TO THE EXTENT PRACTICAL, TO PREVENT THIS MATERIAL FROM BECOMING ENTRAINED IN SURFACE WATER RUNOFF.

3.5 PROCESS PIPING

1. ALL UNDERGROUND PROCESS PIPING SHALL BE SCH. 40 PVC OR SDR-11 HIGH DENSITY POLYETHYLENE HDPE (UNLESS OTHERWISE INDICATED) AS SPECIFIED ON THE DRAWINGS.

2. ALL ABOVEGROUND COMPRESSED AIR PIPING SHALL BE GALVANIZED STEEL WITH THREADED FITTINGS, OR PRESSURE-RATED RUBBER AIR HOSE UNLESS OTHERWISE INDICATED. STEEL TO PVC TRANSITION FITTINGS SHALL BE USED WHERE INDICATED ON DRAWINGS M-1 AND M-4 AND COMPLETED BELOW GRADE.

3. HDPE PIPING JOINTS WILL BE FUSION WELDED.

4. FUSION WELDS OR SLIP WELDS SHALL MEET MANUFACTURER'S SPECIFICATIONS.

5. PVC PIPING JOINTS WILL BE GLUED USING LOW VOLATILE ORGANIC COMPOUND (VOC) MATERIALS.

6. INDIVIDUAL PIPING RUNS (HOME RUNS) SHALL BE INSTALLED TO EACH BIOVENTING AND BIOSPARGING WELL. PIPING SHALL CONNECT TO THE WELLHEADS AND REMEDIATION SYSTEM AS SHOWN ON DRAWINGS M-1, M-3, AND M-4.

7. ALL ABOVEGROUND PIPING SHALL BE PERMANENTLY LABELED WITH DIRECTIONAL FLOW ARROWS AND LINE CONTENTS AT 5' INTERVALS.

8. ALL 90° BENDS INSTALLED UNDERGROUND SHALL BE CONSTRUCTED USING LONG-SWEEP 90° ELBOWS.

9. WHEN CONNECTING TO OR BYPASSING EXISTING UNDERGROUND PIPING, THE CONTRACTOR SHALL FIRST VERIFY THE EXISTING PIPING PATH.

10. CONVEYANCE PIPING RUNS TO THE BIOSPARGE/BIOVENT WELLS SHALL BE PRESSURE TESTED BOTH UPON COMPLETION OF BELOW-GRADE PIPE INSTALLATION AND FINAL TRENCH RESTORATION. THOUGH NOT REQUIRED, IT IS ALSO RECOMMENDED THAT THE CONTRACTOR PRESSURE TEST PIPING AT VARIOUS POINTS DURING INSTALLATION IN ORDER TO SIMPLIFY THE PROCESS OF IDENTIFYING AND REPAIRING ANY LEAKS DISCOVERED. PRESSURE TESTING SHALL BE WITNESSED BY AN ENGINEER'S REPRESENTATIVE. CONTRACTOR SHALL KEEP A WRITEN RECORD OF PRESSURE TESTING RESULTS AND TAKE PHOTOS OF THE INITIAL AND FINAL PRESSURE READINGS ON EACH OF THE LINES AND PROVIDE THESE RECORDS TO THE ENGINEER TO DOCUMENT THE TESTING.

ALL LINES WILL BE PRESSURE TESTED AT A MINIMUM PRESSURE OF 15 PSI FOR A MINIMUM OF 15 MINUTES AFTER STABILIZATION. A TEST WILL BE CONSIDERED SUCCESSFUL IF PRESSURE LOSS IS LESS THAN 1 PSI OVER 15 MINUTE TEST DURATION.

NO TESTING WILL BE CONDUCTED THROUGH INSTRUMENTS OR EQUIPMENT. WHEN PRESSURE TESTING PVC PIPING ANY LENGTHS OF EXPOSED PIPING (I.E. NOT COVERED WITH SAND BACKFILL) SHALL BE COVERED WITH TARPS, BLANKETS, OR A SIMILAR PROTECTIVE BARRIER PRIOR TO PRESSURING THE LINE(S), AS A SAFETY PRECAUTION AGAINST FRAGMENTATION HAZARDS IN THE EVENT OF PIPE FAILURE. PVC PIPE IS NOT RATED FOR COMPRESSED AIR PRESSURE, AND IF STRUCK WITH SUFFICIENT FORCE WHILE UNDER PRESSURE IT CAN FRACTURE CREATING FLYING SHRAPNEL THAT COULD INJURE BYSTANDERS.

11. HYDROSTATIC PRESSURE TESTING CAN BE COMPLETED AS AN ALTERNATIVE TO TESTING WITH COMPRESSED AIR, PROVIDED CONTRACTOR DEVELOPS A TESTING PROCEDURE AND SUBMITS TO THE ENGINEER FOR REVIEW AND APPROVAL THE PRIOR TO THE START OF WORK. ALL WATER INTRODUCED INTO THE SYSTEM MUST BE EVACUATED ONCE PRESSURE TESTING IS COMPLETE.

12. ANY WATER THAT HAS ACCUMULATED IN THE BELOW-GRADE PIPING DURING INSTALLATION SHALL BE REMOVED UPON COMPLETION OF THE WORK AND PRESSURE TESTING.

13. AS SHOWN ON DRAWINGS C-3 AND C-4, ALL UNDERGROUND PIPING TRENCHES WILL INCLUDE TRACER TAPE/WIRE FOR UTILITY LOCATING.

3.6 ELECTRICAL

THE ELECTRICAL SCOPE OF WORK INCLUDES THE FOLLOWING:

1. INSTALLATION OF A PROGRAMMABLE LOGIC CONTROLLER (PLC) TO CONTROL SYSTEM OPERATIONS, INCLUDING CONNECTION TO THE MAIN PLC ON THE VES SYSTEM

2. INSTALLATION OF A LOCAL CONTROL PANEL (SYSTEM SHALL BE CONTROLLABLE FROM THE LOCAL CONTROL PANEL AS WELL AS THE MAIN SCADA SYSTEM).

3. BOTH THE SOUTH AND NORTH SKIMMER SYSTEM CONTROL PANELS SHALL BE UPGRADED AS PART OF THIS SCOPE OF WORK TO ALLOW COMMUNICATION WITH THE EXISTING SCADA SYSTEM.

4. THE EXISTING SCADA SYSTEM SHALL BE UPGRADED TO CONNECT TO THE SOUTH AND NORTH SIDE SKIMMING SYSTEMS AS WELL AS THE PROPOSED PILOT BIOSPARGE/BIOVENT SYSTEM.

5. AS PART OF THE ELECTRICAL UPGRADE SCOPE OF THIS DESIGN, THE SOUTH AND NORTH SKIMMER SYSTEMS, IN ADDITION TO THE NEW PLC FOR CONTROL OF THE PROPOSED PILOT BIOSPAGE/BIOVENT SYSTEM, WILL BE CONNECTED TO THE MAIN SCADA SYSTEM VIA ETHERNET RADIOS. THIS REQUIRES THE EXISTING CONTROL PANELS AT THE SKIMMER SYSTEMS TO BE UPGRADED TO INCLUDE A PLC AND RADIO LOCATED WITHIN THE PILOT SYSTEM ENCLOSURE. ADDITIONALLY, A RADIO WOULD NEED TO BE INSTALLED IN THE MAIN CONTROL PANEL (MCP) INSIDE OF THE VES CONTROL ROOM. THIS HARDWARE ALONG WITH THE NECESSARY ANTENNAS WILL ALLOW FOR THE THREE SYSTEMS TO COMMUNICATE WITH EACH OTHER. ONCE THE DATA IS ALL IN ONE LOCATION, PREVIOUS UPGRADES TO THE SCADA SYSTEM CAN BE UTILIZED TO IMPROVE REMOTE REPORTING OF DATA AND EVENTS. IT IS ANTICIPATED THAT THIS SCOPE OF WORK WILL ULTIMATELY LEAD TO LESS OPERATOR TIME ONSITE, ALLOW QUICKER REACTION TO CHANGES WHEN THE OPERATOR IS NOT ONSITE, AND NOT INCREASE THE OPERATOR'S WORK LOAD ONSITE WITH THE ADDITION OF THE PILOT BIOSPARGE/BIOVENT SYSTEM.

6. ELECTRICAL POWER FOR THE PILOT SYSTEM ENCLOSURE WILL BE INSTALLED AS SHOWN ON FIGURES E-2, E-3, AND E-4. THE ELECTRICAL DESIGN HAS DETERMINED THAT THE CURRENT DISTRIBUTION PROVIDED TO THE TRANSFORMER LOCATED ADJACENT TO THE SOUTH SIDE SKIMMING SYSTEM SHED SHOULD BE SUFFICIENT AT THE ANTICIPATED ELECTRICAL LOAD.

7. ADDITIONAL DETAILS FOUND ON ELECTRICAL DRAWINGS.

3.7 REMEDIATION SYSTEM CONSTRUCTION AND STARTUP

1. THE CONTRACTOR SHALL CONSTRUCT THE REMEDIATION PILOT SYSTEM EQUIPMENT ENCLOSURE ON SITE AT THE LOCATION SHOWN ON FIGURE C-2.

2. SYSTEM EQUIPMENT WILL BE INSTALLED WITHIN A SEA BOX CONTAINER PURCHASED BY THE CONTRACTOR. THE SYSTEM ENCLOSURE LAYOUT, INCLUDING LOCATIONS OF MAJOR EQUIPMENT, IS SHOWN ON DRAWING C-5. PROCESS AND INSTRUMENTATION DIAGRAMS FOR THE BIOSPARGING AND BIOVENTING SYSTEMS ARE PROVIDED ON DRAWINGS PID-1, PID-2 AND PID-3.

3. THE CONTRACTOR WILL ASSEMBLE THE SYSTEM USING COMBINATION OF EXSITING EQUIPMENT THAT WILL BE REPURPOSED FROM ANOTHER FORMER REMEDIATION SYSTEM STAGED AT THE SITE, AND EQUIPMENT PURCHASED NEW. A SYSTEM EQUIPMENT AND INSTRUMENTATION CONSTRUCTION LIST IS PROVIDED ON DRAWING G-3.

4. EXISTING EQUIPMENT WILL BE PROVIDED BY THE ENGINEER/OWNER'S AGENT AND AVAILABLE ONSITE PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PURCHASING ALL NEW EQUIPMENT AND MATERIALS REQUIRED TO CONSTRUCT THE SYSTEM.

5. CONTRACTOR TO SUPPLY AND INSTALL A FIRE EXTINGUISHER IN AN ALL WEATHER FIRE EXTINGUISHER CABINET AND IN ACCORDANCE WITH LOCAL FIRE CODES. CONTRACTOR TO SUPPLY A 20 POUND ABC FIRE EXTINGUISHER.

6. THE CONTRACTOR SHALL POUR A NEW CONCRETE PAD TO THE DIMENSIONS AND SPECIFICATIONS SHOWN ON DRAWINGS C-5 AND C-7 TO PROVIDE A LEVEL PLATFORM ON WHICH TO PLACE THE SYSTEM ENCLOSURE. THE REMEDIATION SYSTEM SHALL BE ANCHORED TO THE PAD AS SPECIFIED ON DRAWING C-7.

CONCRETE NOTES:

A. CONCRETE PAD SHALL HAVE THE FOLLOWING PROPERTIES
   1. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: 4,000 POUNDS PER SQUARE INCH (PSI).
   2. WATER / CEMENT RATIO MAXIMUM OF 0.50.
   3. 6% +/- 1% AIR ENTRAINMENT.

B. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "SPECIFICATIONS FOR STRUCTURAL CONCRETE" ACI 301.

C. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.

D. CALCIUM CHLORIDE SHALL NOT BE PERMITTED NOR SHALL ANY ADMIXTURE CONTAINING CHLORIDE BE PERMITTED THAT RESULTS IN A TOTAL CONCRETE MIX IN WHICH THE PRESENCE OF CHLORIDE IONS EXCEED 0.15 PERCENT BY WEIGHT OF CEMENT.

E. CONCRETE FINISHING

UNFORMED SURFACES: ACI 301, 5.3.4.2.C BROOM FINISH.

F. CURING MATERIALS

MEMBRANE CURING COMPOUND: ASTM C309, TYPE I-D, CLASS B, CLEAR WITH FUGITIVE DYE WHICH DISAPPEARS APPROXIMATELY 24 HOURS AFTER EXPOSURE TO SUNLIGHT.

G. FIELD QUALITY CONTROL

TESTS OF CONCRETE SLUMP AND STRENGTH WILL BE MADE AT THE DIRECTION OF THE ENGINEER.

7. THE CONTRACTOR SHALL INSTALL A 6-FOOT TALL CHAIN-LINK FENCE WITH PRIVACY SLATS AROUND THE REMEDIATION SYSTEM ENCLOSURE TO THE DIMENSIONS AND SPECIFICATIONS SHOWN ON DRAWING C-5. THE CONTRACTOR SHALL ASSUME THAT THE NEW FENCE WILL BE INSTALLED ON ONLY THREE SIDES OF THE SYSTEM COMPOUND AND WILL CONNECT TO AN EXISTING FENCE ON THE NORTH SIDE OF THE REMEDIATION SYSTEM. THE FENCE SHALL BE INSTALLED WITH 2 PAIRS OF 5-FOOT WIDE DOUBLE SWING GATES. FENCE PANEL SECTIONS SHALL BE A MAXIMUM OF 10 FEET LONG. FENCE POSTS SHALL BE SET AT A MINIMUM DEPTH OF 3 FEET BELOW GRADE IN CONCRETE FOOTERS. CONCRETE FOOTER DIAMETER WILL BE A MINIMUM OF 4 TIMES THE OUTER DIAMETER OF THE FENCE POST.

8. THE CONTRACTOR SHALL INSTALL BOTH FIXED AND REMOVABLE BOLLARD POSTS AT AND APPROXIMATE 4-FOOT SPACING AROUND PERIMETER OF THE NEW SYSTEM COMPOUND FENCE AS SHOWN ON DRAWING C-5.

9. UPON COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL TEST THE REMEDIATION SYSTEM EQUIPMENT TO CONFIRM THAT IT IS ALL WORKING PROPERLY. THE CONTRACTOR SHALL THEN PROVIDE A TECHNICIAN FAMILIAR WITH THE SYSTEM AND ITS OPERATION TO WORK WITH THE ENGINEER FOR A 2 DAY PERIOD OF SYSTEM STARTUP AND OPERATIONAL TESTING

3.8 AS-BUILT SURVEY/DOCUMENTATION

1. UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AS-BUILT RECORD DRAWINGS (RED LINES) SHOWING ACTUAL DETAILS, DIMENSIONS, SURVEYED LOCATIONS/ELEVATIONS AND OTHER PERTINENT FEATURES, AND IDENTIFY ANY DEVIATIONS FROM THE ORIGINAL DESIGN.

2. THE AS-BUILT DRAWINGS SHALL BE BASED UPON AN ACTUAL LAND SURVEY OF FINAL POST-CONSTRUCTION CONDITIONS COMPLETED BY A PENNSYLVANIA LICENSED SURVEYOR. THE SURVEY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING SITE FEATURES: ALL NEW AND WELLS WITHIN THE CONSTRUCTION AREA (INCLUDING GROUND SURFACE AND TOP OF CASING ELEVATIONS); BELOW-GRADE PIPING TRENCHES; REMEDIATION SYSTEM ENCLOSURE AND ENCLOSURE FENCE LOCATIONS; ELECTRICAL SERVICE LINE TO REMEDIATION SYSTEM ENCLOSURE. WELL TOP OF CASING AND GROUND SURFACE ELEVATIONS SHALL BE SURVEYED TO AN ACCURACY OF 0.01-FOOT. THE ENGINEER SHALL PROVIDE AN AUTOCAD FILE OF EXISTING SITE PLAN TO BE USED AS A BASEMAP FOR THE AS-BUILT SURVEY DRAWING.

4.0 CONSTRUCTION SCHEDULE

1. THE CONTRACTOR SHALL CONFIRM A CONSTRUCTION SCHEDULE WITH THE ENGINEER'S PROJECT MANAGER AT LEAST 14 DAYS PRIOR TO START OF WORK.

2. THE PROPOSED CONSTRUCTION SCHEDULE SHALL BE PRESENTED IN A TIMELINE FORMAT/GANTT CHART SHOWING ESTIMATED START DATE, DURATION, AND, COMPLETION TIMES FOR EACH ACTIVITY. ANY DEVIATION FROM THE ORIGINALLY PROPOSED SCHEDULE MUST BE COMMUNICATED TO THE ENGINEER'S PROJECT MANAGER WITHIN 24 HOURS.

5.0. SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE ENGINEER FOR REVIEW AND APPROVAL A MINIMUM OF 14 DAYS PRIOR TO THE START OF CONSTRUCTION.
   a. LIST OF PROPOSED MATERIALS AND SUBCONTRACTORS.
   b. SHOP DRAWINGS AND/OR SPECIFICATIONS FOR ANY PROPOSED EQUIPMENT/MATERIALS THAT VARY FROM THOSE IDENTIFIED IN THE SPECIFICATIONS.
   c. REQUIRED HAZWOPER TRAINING RECORDS FOR ALL CONTRACTOR AND SUBCONTRACTOR EMPLOYEES.
   d. CONSTRUCTION SCHEDULE.
   e. ACCIDENT PREVENTION PLAN AND ACTIVITY HAZARD ANALYSIS.

2. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE ENGINEER WITHIN 30 DAYS FROM COMPLETION OF WORK.
   a. AS BUILT RECORD DRAWINGS (RED LINES), INCLUDE ORIGINAL CADD FILES AND SURVEY DATA.
   b. MANUFACTURER DESCRIPTIONS, TECHNICAL SPECIFICATIONS, SHOP DRAWINGS, AND PRODUCT DATA FOR ANY EQUIPMENT/MATERIALS INSTALLED THAT DEVIATED FROM OR WERE NOT INCLUDED IN THE ORIGINAL SPECIFICATIONS.
   c. MANUFACTURER WARRANTIES.
   d. DATA FROM PRESSURE TESTING OF CONVEYANCE PIPING.
   e. SOIL BORING/WELL CONSTRUCTION LOGS.
   f. SUPPORTING DATA OR CERTIFICATIONS AS APPROPRIATE.

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IMAGES: secondary_color.png
PROJECTNAME: ---

No.	Date	Revisions	By	Ckd
2	05/09/2017	FOR BID	MB	MS
1	11/18/2016	FINAL	EM	CD

Professional Engineer's Name
Professional Engineer's No.
State | Date Signed | Project Mgr.
Designed by | Drawn by | Checked by

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THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

G-2

BIOVENTING SYSTEM

TUTHILL PNEUMAX COMPETITOR SL 3006-22L2, 2 LOBE MODEL WITH 7.5 HP MOTOR

RATED FOR 4.2 PSIG @ 313 SCFM

EXISTING ONSITE EQUIPMENT TO BE REPURPOSED

ITEM ITEM DESCRIPTION

1. VI-101 - VACUUM GAUGE (0-30 IHG), QTY. 1
2. PDI-101 - DIFFERENTIAL PRESSURE INDICATOR, DWYER INSTRUMENTS # 2020 (0-20 IWC). TO BE REUSED ON NEW INLET AIR FILTER, QTY. 1
3. 7 1/2 HP TEFC MOTOR, MARATHON ELECTRIC #213TTFC4026
4. BLOWER, TUTHILL PNEUMATICS SL-3006-22L2
5. PNEUMAX 300 SOUND-DEADENING ENCLOSURE, TUTHILL PNEUMATICS, INCLUDES
   a. DISCHARGE SILENCER (S-102)
   b. CHECK VALVE (CV-101)
   c. EXISTING VACUUM RELIEF VALVE - TO BE REMOVED OR DISABLED
6. TISH-101 - NEMA 4 TEMPERATURE SWITCH, ASHCROFT #T424-TS-040-75/205° F (75 - 205 F), WITH 1/2" THERMOWELL, KOENIG-PRETEMPCO #KP140051A, QTY. 1
7. PI-102 - BLOWER EFFLUENT PRESSURE GAUGE (0-15 PSI), QTY. 1
8. TI-102 - BLOWER EFFLUENT TEMPERATURE GAUGE, NOSHOK #30.110.025.0-250° F, QTY. 1
9. 2" BRASS BLEED AIR VALVE, APOLLO #64-108-01, QTY. 1
10. ROTAMETER FLOW METERS, KING INSTRUMENTS (4 - 48 SCFM) 7510-1-3-7A07, BRASS FITTINGS, QTY. 16
11. PI-102 & PI-115 - PRESSURE GAUGE, ASHCROFT (0-15 PSI), ¼" ID, QTY. 17

NEW EQUIPMENT TO BE PROCURED

ITEM ITEM DESCRIPTION

1. F-101 - 4" INLET AIR FILTER, QTY. 1
   a. MANUFACTURER: SOLBERG
   b. MODEL #: CSL-235P-400
   c. MAX FLOW RATE: 520 SCFM
   d. STYLE: MPT
   e. TEMP RATE: -15 TO 220 F
   f. MEDIA: POLYESTER
2. NEW SHEAVING AND BELT FOR SL-3006-22L2 BLOWER
   a. MANUFACTURER: TUTHILL
   b. PART #S
   i. 23252-3 - 3" 3V SHEAVE, QTY. 1
   ii. 23252-13 - 6" 3V SHEAVE, QTY. 1
   iii. 23301-3 - JA 0.875 BUSHING, QTY. 1
   iv. 23532-7 - SH 1.375 BUSHING, QTY. 1
   v. 28210-13 - 3VX500 BELT, QTY. 2
3. PIT-101 - PRESSURE TRANSMITTER, QTY. 1
   a. MANUFACTURER: OMEGA
   b. MODEL #: PX171-015GI
   c. PRESSURE RANGE: 15 PSIG
   d. CONNECTOR: MINI-DIN
   e. OUTPUT: 4 - 20 MA
4. PRV-101 - 2" PRESSURE RELIEF VALVE, QTY. 1
   a. MANUFACTURER: KUNKLE
   b. MODEL #: 0337-H01ANE0007
   c. CONNECTION: 2"
   d. SET PRESSURE: 7 PSI
   e. MATERIAL: BRONZE
   f. VALVE: NON-CODE AIR/GAS
   g. SPRING: SST TYPE 17-7
5. FI-101 & FI-102 - FLOW METER FOR 4" PIPE (IN-LINE FLOW SENSOR), QTY. 2
   a. MANUFACTURER: DWYER INSTRUMENTATION
   b. MODEL #: DS-300 SERIES
   c. PART NUMBER: DS-300-4"
   d. DIFFERENTIAL PRESSURE RANGE: 0.28 - 34" WC
   e. TEMPERATURE: 0 TO 200F
6. PDI-102 & PDI-103 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 2
   a. MANUFACTURER: DWYER
   b. MODEL#: 2002
   c. DIFFERENTIAL PRESSURE RANGE: 0 - 2" WC
   d. CONNECTIONS: 1/8" FNPT
   e. MAX PRESSURE RATING: 35 PSI
   f. OTHER: BRASS BALL VALVES ON TUBING CONNECTIONS TO FLOW METER
7. PDIT-101 - DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER, QTY. 1
   a. MANUFACTURER: ASHCROFT
   b. MODEL #: IX3F0242STP2IW
   c. DIFFERENTIAL PRESSURE RANGE: 0 - 2" WC
   d. 4 - 20 MA OUTPUT SIGNAL
8. PI-103, PI-104, PI-105 & PI-106 - PRESSURE GAUGE (0 - 15 PSI), QTY. 4
   a. MANUFACTURER: ASHCROFT
   b. RANGE: 0-15 PSI
   c. CONNECTIONS: ¼" ID NPT
9. 2" INLINE BLEED AIR SILENCER, QTY. 1
   a. MANUFACTURER: UNIVERSAL
   b. MODEL #: US-2
10. SV-110, 120, 130 & 140 - 2" SOLENOID VALVE, QTY. 4
    a. MANUFACTURER: VALWORX
    b. MODEL #: 568016A, 115V AC
    c. NORMALLY CLOSED
    d. MATERIAL: BRASS
11. 4" BRASS BALL VALVE, QTY. 1
12. 2" BRASS BALL VALVE, QTY. 5
13. 1" BRASS BALL VALVE, QTY. 16
14. 1/4" BALL VALVE, BRASS, FOR VACUUM AND PRESSURE GAUGE ISOLATION VALVES AND SAMPLE PORTS. QTY. 38
15. 2" BRASS GATE VALVE, QTY. 1
16. 1" BRASS GATE VALVE, QTY. 16
17. 4" BY 2" GCSP REDUCER, QTY. 6
18. 2" BY 1" GCSP REDUCER, QTY. 32
19. 1" BY 1/4" CCSP REDUCER, QTY. 16

BIOSPARGING SYSTEM

TUTHILL PNEUMAX COMPETITOR SL 3003-22L2, 2 LOBE MODEL
RATED FOR 120 SCFM @ 12 PSIG WITH UPGRADE TO 10 HP MOTOR

EXISTING ONSITE EQUIPMENT TO BE REPURPOSED

ITEM ITEM DESCRIPTION

1. VI-201 - VACUUM GAUGE (0-30 IHG), QTY. 1
2. BLOWER, TUTHILL COMPETITOR SL 3003-22L2, 2 LOBE MODEL
3. INLET AIR FILTER, SOLBERG MANUFACTURING - ASSEMBLY MODEL # CSL-851-250HC, REPLACEMENT ELEMENT # 851, QTY. 1
4. PNEUMAX 300 SOUND-DEADENING ENCLOSURE, TUTHILL PNEUMATICS, INCLUDES
   a. DISCHARGE SILENCER (S-202)
   b. CHECK VALVE (CV-201)
   c. EXISTING PRESSURE RELIEF VALVE TO BE REPLACE (SEE BELOW)
5. TI-202 - TEMPERATURE GAUGE, NOSHOK #30.110.025.0-250° F, QTY. 1
6. PI-201 - PRESSURE GAUGE (0-15 PSI), QTY. 1
7. TISH-203 - NEMA 4 TEMPERATURE SWITCH, ASHCROFT # T424-TS-040-75/205° F, INCLUDES 1/2" THERMOWELL, KOENIG-PRETEMPCO #KP140051A, QTY. 1
8. 2" BLEED AIR VALVE ASSEMBLY (GASHO #US-2), INCLUDES:
   a. 2" BRASS BALL VALVE, APOLLO #64-108-01
   b. 2" INLINE SILENCER, UNIVERSAL US-2
9. 1" BRASS BALL VALVE - QTY. 10

NEW EQUIPMENT TO BE PROCURED

ITEM ITEM DESCRIPTION

1. PDI-201 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR - QTY. 1
   a. MANUFACTURER: DWYER INSTRUMENTS
   b. MODEL #: 2020
   c. CONNECTIONS: 1/8" FNPT
   d. RANGE: 0-20 PSIG
   e. MAX TEMPERATURE: 140 F
   f. OTHER: BRASS BALL VALVES ON TUBE CONNECTIONS TO LINE
2. 10 HP BLOWER MOTOR
   a. MANUFACTURER: BALDOR
   b. MODEL #: IDM3774T
   c. POWER: 460 V, 3-PHASE, 60 HZ
   d. FRAME: 215T
   e. SPEED 1,800 RPM
   f. INVERTER DUTY
3. NEW SHEAVING AND BELT FOR SL-3006-22L2 BLOWER
   a. MANUFACTURER: TUTHILL
   b. PART #S
   i. 23532-3 - 0.875" SH BUSHING, QTY. 1
   ii. 23128-6 - 1.375" SDS BUSHING, QTY. 1
   iii. 28210-45 - 3VX487 BELT , QTY. 3
   iv. 23106-4 - 3.5 OD 3V SHEAVE (QD), QTY. 1
   v. 23106-11 - 5.3 OD 3V SHEAVE (QD), QTY. 1
4. PIT-201 - PRESSURE TRANSMITTER, QTY. 1
   a. MANUFACTURER: OMEGA
   b. MODEL #: PX171-015GI
   c. PRESSURE RANGE: 15 PSIG
   d. CONNECTOR: MINI-DIN
   e. OUTPUT: 4 - 20 MA
5. PRV-201 - PRESSURE RELIEF VALVE, QTY. 1
   a. MANUFACTURER: KUNKLE
   b. MODEL #: 337-H01ANM0012
   c. CONNECTION: 2"
   d. SET PRESSURE: 12 PSI
   e. MATERIAL: BRONZE
   f. VALVE: NON-CODE AIR/GAS
   g. SPRING: SST TYPE 17-7
6. HEAT EXCHANGER WITH CONDENSATE DRAIN, QTY. 1
   a. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.
   b. MODEL #: ACA-3361-3-G-T
   c. MATERIALS: STANDARD WITH GALVANIZED CABINET AND HERESITE COATED CORE AND FAN
   d. MOTOR: 60 HZ, 230/460 V, 3 PHASE, 1 HP
   e. OTHER: ½" FNPT 316 STAINLESS STEEL BALL VALVE ON CONDENSATE DRAIN
7. FI-201 & FI-202 - FLOW METER FOR 2" PIPE (IN-LINE FLOW SENSOR), QTY. 2
   a. MANUFACTURER: DWYER INSTRUMENTATION
   b. MODEL #: DS-300 SERIES
   c. PART NUMBER: DS-300-2"
   d. DIFFERENITAL PRESSURE RANGE: 0.75 - 75" WC
   e. TEMPERATURE: 0 TO 200F
8. PDI-202 & PDI-203 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 2
   a. MANUFACTURER: DWYER
   b. MODEL#: 2002
   c. DIFFERENTIAL PRESSURE RANGE: 0 - 4" WC
   d. CONNECTIONS: 1/8" FNPT
   e. MAX PRESSURE RATING: 35 PSI
   f. OTHER: BRASS BALL VALVES ON TUBING CONNECTIONS TO FLOW METER
9. PDIT-201 - DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER, QTY. 1
   a. MANUFACTURER: ASHCROFT
   b. MODEL #: IX3F0242STP5IW
   c. DIFFERENTIAL PRESSURE RANGE: 0 - 5" WC
   d. 4 - 20 MA OUTPUT SIGNAL
10. TI-203 - TEMPERATURE GAUGE (0 - 250 F), QTY. MANUFACTURER: PYROMATION
    e. MODEL #: SERIES 440
    f. SHEATH: 1/4 INCH
    g. THERMOWELL: 3/4 INCH
    h. MATERIAL: 316 SS
    i. ELEMENT CONNECTION: 3 WIRE
    j. TEMP: 0-250 F
11. PI-202, 203, 204, 205, 206 & 215 - PRESSURE GAUGE, 0-20 PSI, QTY. 37
    a. MANUFACTURER: ASHCROFT
    b. MODEL #: 30ZZ91
    c. CONNECTION: ¼" NPT
    d. GAUGE TYPE: PROCESS
    e. DIAL SIZE: 4-1/2"
    f. MATERIAL: 316 SS
    g. RANGE: 0-30 PSI
12. 2" SOLENOID VALVE, QTY. 4
    a. MANUFACTURER: VALWORX
    b. MODEL #: 568016A, 115V AC
    c. NORMALLY CLOSED
    a. MATERIAL: BRASS
13. ROTAMETER FLOW METERS , KING INSTRUMENTS (0 - 14 SCFM) - QTY. 32
    a. MANUFACTURER: KING INSTRUMENTS
    b. MODEL #: 7510-2-3-7A-03
    c. CONNECTION: ¾" FNPT
    d. FLOW RATE: 0-14 SCFM
    e. MATERIAL: BRASS
14. 2" BRASS BALL VALVE, QTY. 5
15. 1" BRASS BALL VALVE, QTY. 22
16. 1/4"BRASS BALL VALVE, QTY. 73
17. 1" BRASS GATE VALVE, QTY. 33
18. 2" BY 1" GCSP REDUCER, QTY. 32
19. 1" BY 1/4" GCSP REDUCER, QTY. 32

REMEDIATION EQUIPMENT ENCLOSURE

NEW EQUIPMENT TO BE PROCURED

ALL EQUIPMENT INSTALLED AND WIRED PER N.E.C. NEMA 4 NON-HAZARDOUS LOCATION AND UL

ITEM ITEM DESCRIPTION

1. SYSTEM ENCLOSURE
   a. MANUFACTURER: SEABOX
   b. MODEL: SB862.0
   i. DIMENSIONS: 20' LONG BY 8' WIDE BY 8' HIGH
   ii. DOUBLE DOORS BOTH ENDS (TYPE 2) DRY FREIGHT ISO CARGO CONTAINER OR APPROVED EQUIVALENT.
   c. CONTRACTOR TO FIELD-INSTALL R15 INSULATION COVERED BY TWO 5/8" LAYERS OF TYPE X GYPSUM BOARD ON INTERIOR WALLS AND CEILING OF CONTAINER
   d. CONTRACTOR TO FIELD-INSTALL ALL VENTS AND OTHER PENETRATIONS IN SYSTEM ENCLOSURE WALL
2. 50" WET-LOCATION FLUORESCENT CEILING LIGHT FIXTURES, QTY. 2
   a. MCMASTER-CARR 1616K22 OR APPROVED EQUIVALENT
3. GFCI ELECTRICAL OUTLET BOX (SEE ELECTRICAL DRAWINGS FOR DETAILS), QTY. 1.
4. NEMA 4X STEEL CONTROL PANEL MOUNTED ON INSIDE OF ENCLOSURE, WIRED AND TESTED (SEE ELECTRICAL DRAWINGS FOR DETAILS), QTY. 2
5. SYSTEM WIRED AND INSTALLED FOR ELECTRICALLY UNCLASSIFIED ENVIRONMENT
6. PASSIVE VENT LOUVERS INSTALLED IN CONTAINER DOORS, QTY. 2
   a. MANUFACTURER: MCMASTER-CARR
   b. MODEL #: 2100K252
   c. TYPE: FIXED BLADE
   d. DIMENSIONS: 24" WIDE X 24" HIGH OPENING
   e. MATERIAL: EXTRUDED ALUMINUM
7. POWERED VENT FAN WITH OPERATION CONTROLLED BY THERMOSTAT MOUNTED INSIDE SEABOX
   a. DIRECT-DRIVE DUST-RESISTANT WALL EXHAUST FAN, QTY. 1
   i. MANUFACTURER: MCMASTER-CARR
   ii. PART #: 2187K32
   iii. TYPE: 120 VAC
   iv. DIMENSION: 16" DIAMETER BLADES
   v. WALL COLLAR REQUIRED TO MOUNT
   b. THERMOSTAT, QTY. 1
   i. MANUFACTURER: MCMASTER-CARR
   ii. PART #: 17395K93
   iii. 120 V LINE VOLTAGE
8. ELECTRIC HEATER CONTROLLED BY THERMOSTAT)
   a. ELECTRICAL HEATER, QTY. 1
   i. MANUFACTURER: MCMASTER-CARR
   ii. PART #: 2022K55
   iii. POWER: 480 V AC, 3 PHASE, 5 KW
   iv. OUTPUT: 17100 BTU/HOUR
   v. CEILING-MOUNTED
   b. THERMOSTAT, QTY. 1
   i. MANUFACTURER: MCMASTER-CARR
   ii. SPDT HEATER-MOUNT THERMOSTAT
   iii. PART #: 2022K41

MISCELLANEOUS EQUIPMENT

EXISTING EQUIPMENT

ITEM ITEM DESCRIPTION

1. TEMPORARY FENCE PANEL, QTY. 11

NEW EQUIPMENT TO BE PROCURED

ITEM ITEM DESCRIPTION

1. 1" SDR-11 HDPE TO GALVANIZED STEEL TRANSITION FITTING FOR BIOSPARGE SUBSURFACE CONVEYANCE PIPING STUB-UPS AT MANIFOLD, QTY. 32
   a. MANUFACTURER: CONTINENTAL (AVAILABLE FROM - HDPE SUPPLY), OR APPROVED EQUIVALENT
   b. PART #: C4949-00 1914-00
   c. SIZE # 1" BY 1"
   d. 1" BUTT FUSION X 1" MNPT THREAD
2. 1" SCH 40 PVC TO SDR-11 HDPE TRANSITION FITTING FOR SUBSURFACE CONVEYANCE PIPING CONNECTIONS TO BIOSPARGE WELLHEADS, QTY. 32
   a. MANUFACTURER: POLY-CAM
   b. MODEL #: SERIES 737 ID CONTROLLED PVC/HDPE TRANSITION FITTING
   c. SIZE: 1" NOMINAL

NOTES

1. SEE ELECTRICAL AND INSTRUMENTATION DRAWINGS FOR EQUIPMENT LIST/ SPECIFICATIONS FOR ELECTRICAL AND CONTROL WIRING AND INSTALLATION.

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IMAGES:
PROJECTNAME: ---

No.	Date	Revisions	By	Ckd
2	05/09/2017	FOR BID	MB	MS
1	11/18/2016	FINAL	EM	CD

Professional Engineer's Name
Professional Engineer's No.
State: PA | Date Signed | Project Mgr.: ML
Designed by | Drawn by | Checked by

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ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

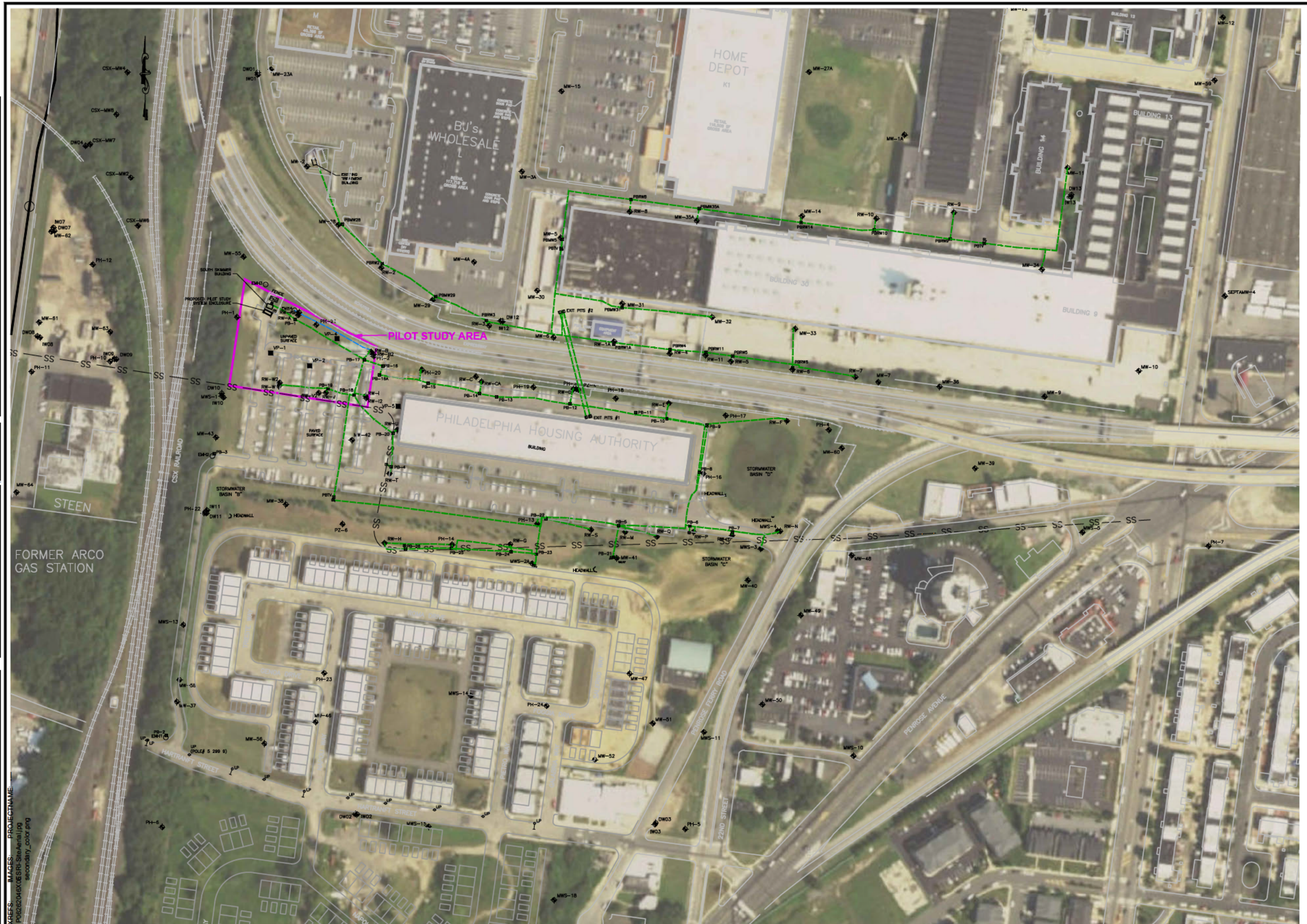
MAJOR EQUIPMENT AND INSTRUMENT LIST

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

G-3



LEGEND:

- FENCE
- UTILITY POLE
- LIGHT POLE
- SHALLOW OR INTERMEDIATE WELL
- DEEP WELL
- VAPOR POINTS
- PB–10 ELECTRICAL PULL BOX
- WELL VAULT
- TERMINATION VAULT
- REMEDIATION SYSTEM TRENCH ROUTE
- ABANDONED ELECTRICAL CONDUIT
- ELECTRIC/COMMUNICATIONS LINE
- SS SEWER LINE (LOCATION APPROXIMATE)
- SD STORM DRAIN LINE (LOCATION APPROXIMATE)
- ELECTRICAL TRANSFORMER
- EMH4 ELECTRICAL MANHOLE

NOTES:

CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO–LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC, DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."
2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.
5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100–3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 10, 2007. DWG: SK041007.
6) UTILITY PLAN, SIENA PLACE, 3100–3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.
7) PIPING TRENCH SURVEY, DENNIS W. SKLAR, INC.–PROFESSIONAL LAND SURVEYING, BENSALEM, PA, JUNE 6, 2010.
8) AERIAL PHOTO SOURCED FROM ESRI ARCMAP.

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SCALE: 1" = 120'

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No.	Date	Revisions	By	Ckd
2	05/09/2017	FOR BID	MB	MS
1	11/18/2016	FINAL	EM	CD

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Professional Engineer's Name: [redacted]
Professional Engineer's No.: PE077587
State: PA | Date Signed: | Project Mgr.: ML
Designed by: | Drawn by: | Checked by:

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SITE PLAN

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016

ARCADIS
824 MARKET STREET
SUITE 820
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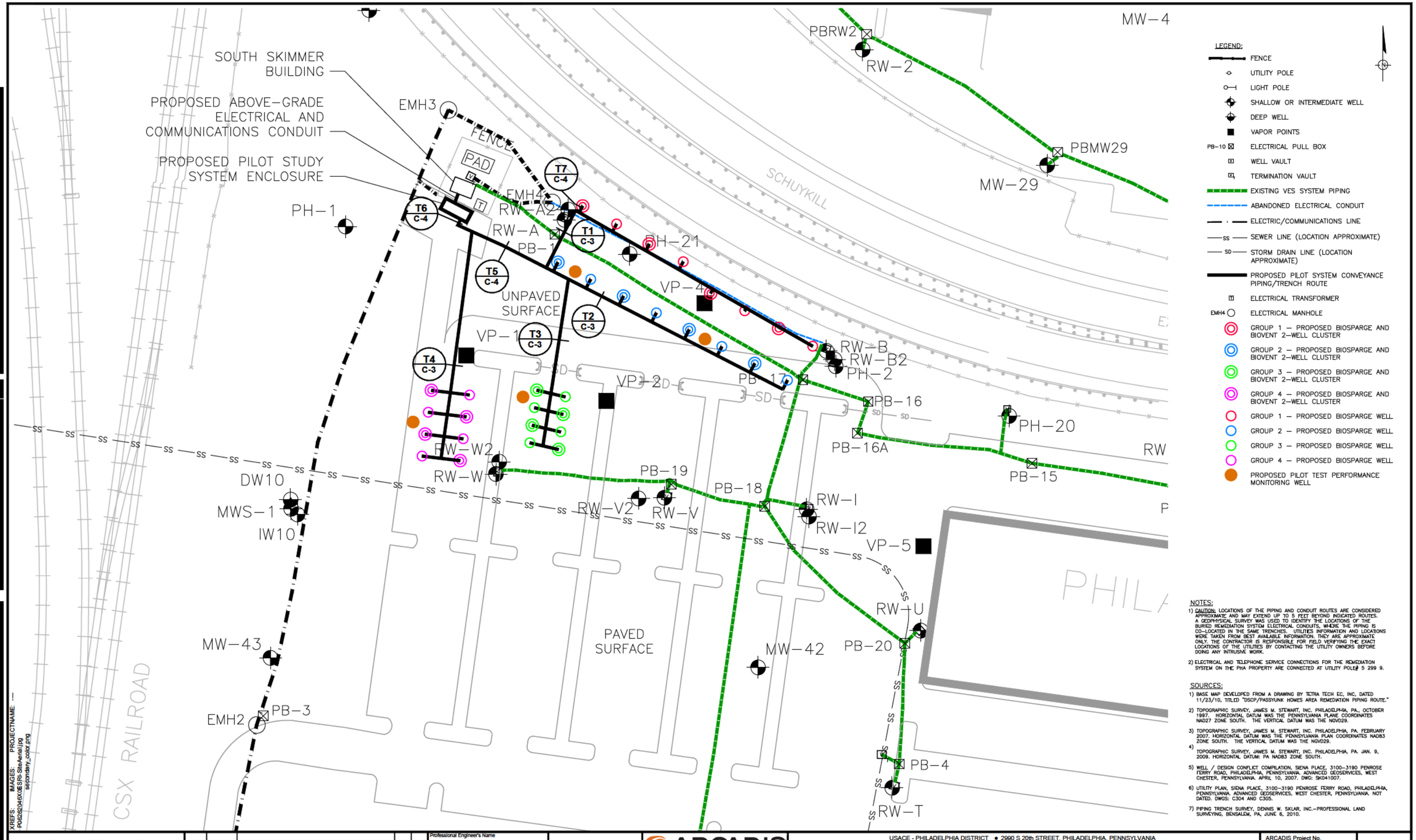
C-1



LEGEND:

- FENCE
- UTILITY POLE
- LIGHT POLE
- SHALLOW OR INTERMEDIATE WELL
- DEEP WELL
- VAPOR POINTS
- PB-10 ELECTRICAL PULL BOX
- WELL VAULT
- TERMINATION VAULT
- EXISTING VES SYSTEM PIPING
- ABANDONED ELECTRICAL CONDUIT
- ELECTRIC/COMMUNICATIONS LINE
- SS SEWER LINE (LOCATION APPROXIMATE)
- SD STORM DRAIN LINE (LOCATION APPROXIMATE)
- PROPOSED PILOT SYSTEM CONVEYANCE PIPING/TRENCH ROUTE
- ELECTRICAL TRANSFORMER
- EMH4 ELECTRICAL MANHOLE
- GROUP 1 – PROPOSED BIOSPARGE AND BIOVENT 2-WELL CLUSTER
- GROUP 2 – PROPOSED BIOSPARGE AND BIOVENT 2-WELL CLUSTER
- GROUP 3 – PROPOSED BIOSPARGE AND BIOVENT 2-WELL CLUSTER
- GROUP 4 – PROPOSED BIOSPARGE AND BIOVENT 2-WELL CLUSTER
- GROUP 1 – PROPOSED BIOSPARGE WELL
- GROUP 2 – PROPOSED BIOSPARGE WELL
- GROUP 3 – PROPOSED BIOSPARGE WELL
- GROUP 4 – PROPOSED BIOSPARGE WELL
- PROPOSED PILOT TEST PERFORMANCE MONITORING WELL

NOTES:

1) CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

2) ELECTRICAL AND TELEPHONE SERVICE CONNECTIONS FOR THE REMEDIATION SYSTEM ON THE PHA PROPERTY ARE CONNECTED AT UTILITY POLE# 5 299 9.

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC, DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."

2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.

3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.

4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.

5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 10, 2007. DWG: SK041007.

6) UTILITY PLAN, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.

7) PIPING TRENCH SURVEY, DENNIS W. SKLAR, INC.-PROFESSIONAL LAND SURVEYING, BENSALEM, PA, JUNE 6, 2010.

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0 30 60
SCALE: 1" = 30'

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1	11/18/2016	FINAL	EM	CD

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Professional Engineer's Name

Professional Engineer's No.
PE077587

State	Date Signed	Project Mgr.
PA		ML

Designed by | Drawn by | Checked by

ARCADIS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2960 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TEST SYSTEM LAYOUT

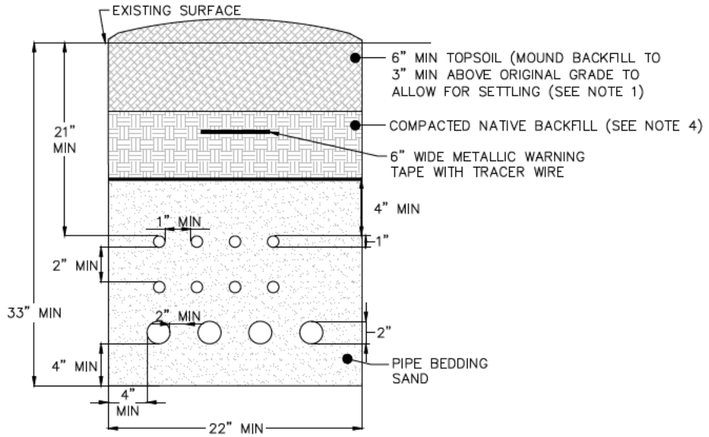
PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
NOVEMBER 18, 2016

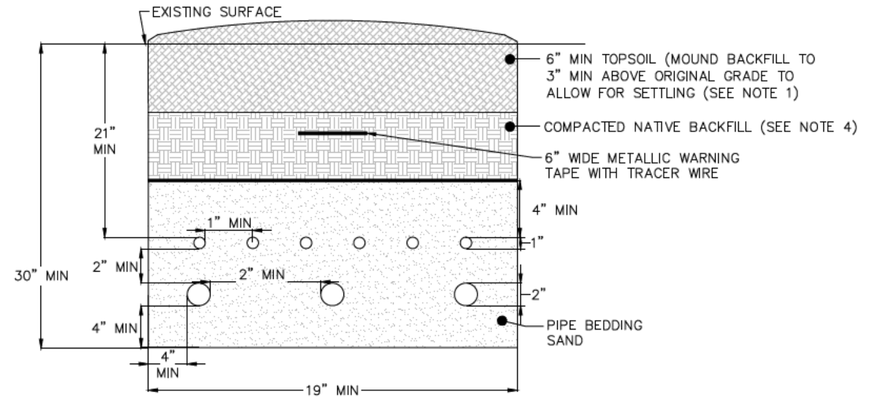
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-2



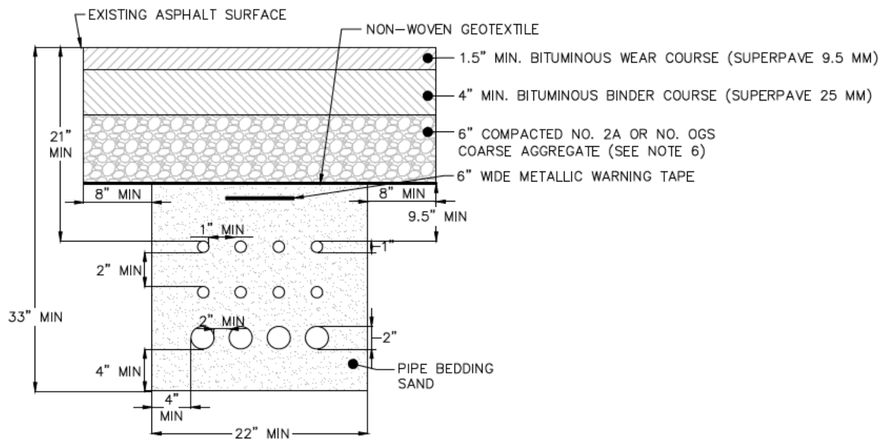
T1 CROSS SECTION - UNPAVED SURFACE (T1 / C-3)

NOT TO SCALE



T2 CROSS SECTION - UNPAVED SURFACE (T2 / C-3)

NOT TO SCALE



T3, T4 CROSS SECTIONS - ASPHALT SURFACE (T3 / C-3) (T4 / C-3)

NOT TO SCALE

TABLE 1: PIPE RUN DETAILS				
TYPE	CONSTRUCTION	DIAMETER	DESCRIPTION	ASSOCIATED WELL TYPE
BIOSPARGING	SRD 11 HDPE	1"	COMPRESSED AIR DELIVERY LINE FROM ENCLOSURE TO BIOSPARGING WELL	BS
BIOVENTING	SCH 40 PVC	2"	COMPRESSED AIR DELIVERY LINE FROM ENCLOSURE TO BIOVENTING WELL	BV

TRENCH LOCATION	GROUP(S)	NO. OF PIPES	MIN. WIDTH (INCHES)	MIN. DEPTH (INCHES)
T1	1	12	22	33
T2	2	9	19	30
T3	3	12	22	33
T4	4	12	22	33
T5	1,2,3	36	31	37
T6	1,2,3,4	48	39	37

NOTES:

1. ONSITE TRENCHES WILL BE RESTORED TO MATCH EXISTING SURFACE COMPLETION. AREAS OF EXISTING ASPHALT SURFACE COMPLETION SHALL BE RESTORED TO THE MINIMUM SPECIFICATIONS SHOWN HERE AND AS DESCRIBED IN DRAWINGS G–1 AND G–2. CONTRACTOR TO RESEED IN VEGETATED AREAS WITH APPROPRIATE SEED MIX TO MATCH PRE–EXISTING GRASS COVER.
2. ARRANGEMENT OF PIPES SHOWN IN TRENCH CROSS SECTIONS IS FOR DEMONSTRATIVE PURPOSES ONLY AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND APPROVAL OF THE ENGINEER.
3. TRENCH BACKFILL AND PAVEMENT SUB–BASE MATERIAL SHALL BE PLACED AND COMPACTED IN 6" LIFTS OR AS SPECIFIED IN DRAWINGS G–1 AND G–2. DO NOT COMPACT TOPSOIL.
4. FOR TRENCHES IN UNPAVED AREAS, NATIVE EXCAVATION SPOIL WILL BE INSTALLED AS TRENCH BACKFILL FROM THE TOP OF THE PIPE BEDDING SAND TO A COMPACTED DEPTH OF 6" BELOW GRADE. IF NATIVE EXCAVATION SPOIL IS NOT SUITABLE FOR REUSE AS TRENCH BACKFILL (AS DEFINED IN DRAWINGS G–1 AND G–2), THEN USE SAND PIPE BEDDING INSTEAD.
5. ALL TRENCHES WILL BE EXCAVATED TO DEPTHS SHOWN ON THE CROSS–SECTIONS. NO TRENCHES WILL BE EXCAVATED TO GREATER DEPTH WITHOUT APPROVAL FROM THE ENGINEER. TRENCHES WILL NOT EXCEED 48" IN DEPTH WITHOUT ENGINEERING APPROVAL AND APPROPRIATE SAFETY MEASURES IN PLACE (E.G. TRENCH BOX).
6. RECYCLED CONCRETE AGGREGATE (RCA) MEETING REQUIRED SPECIFICATIONS IS AN ACCEPTABLE ALTERNATIVE FOR COARSE AGGREGATE (SEE DRAWINGS G–1 AND G–2).

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Professional Engineer's Name

Professional Engineer's No. PE077587

State: PA | Date Signed | Project Mgr.: ML

Designed by | Drawn by | Checked by

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

TRENCHING DETAILS (1 of 2)

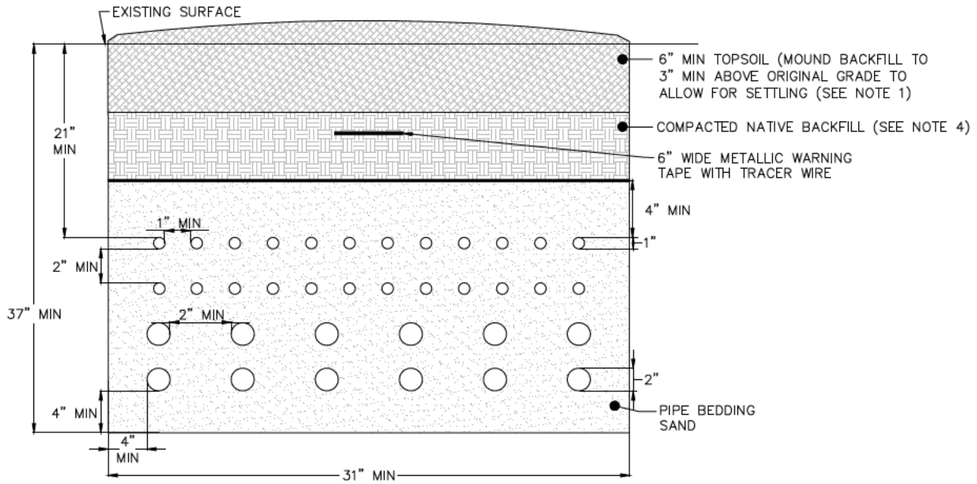
PROCESS

ARCADIS Project No. 06262046.0005.00004

Date NOVEMBER 18, 2016

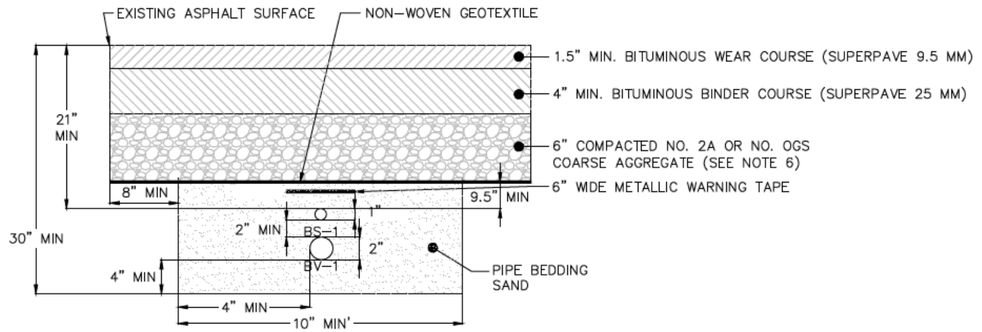
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-3



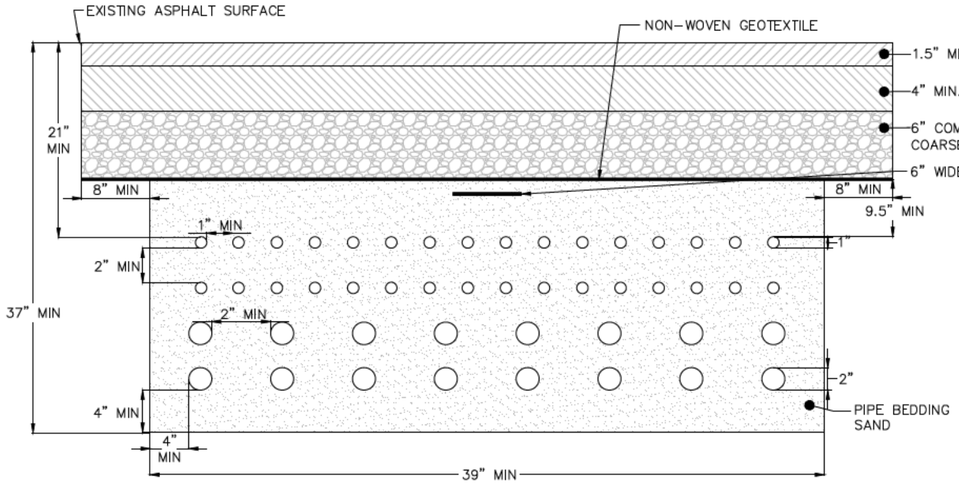
T5 CROSS SECTION - UNPAVED SURFACE (T5 C-4)

NOT TO SCALE



T7 TYPICAL CROSS SECTION - TO WELL CLUSTER (T7 C-4)

NOT TO SCALE



T6 CROSS SECTION - ASPHALT SURFACE (T6 C-4)

NOT TO SCALE

TABLE 1: PIPE RUN DETAILS				
TYPE	CONSTRUCTION	DIAMETER	DESCRIPTION	ASSOCIATED WELL TYPE
BIOSPARGING	SRD 11 HDPE	1"	COMPRESSED AIR DELIVERY LINE FROM ENCLOSURE TO BIOSPARGING WELL	BS
BIOVENTING	SCH 40 PVC	2"	COMPRESSED AIR DELIVERY LINE FROM ENCLOSURE TO BIOVENTING WELL	BV

TRENCH LOCATION	GROUP(S)	NO. OF PIPES	MIN. WIDTH (INCHES)	MIN. DEPTH (INCHES)
T1	1	12	22	33
T2	2	9	19	30
T3	3	12	22	33
T4	4	12	22	33
T5	1,2,3	36	31	37
T6	1,2,3,4	48	39	37

NOTES:

1. ONSITE TRENCHES WILL BE RESTORED TO MATCH EXISTING SURFACE COMPLETION. AREAS OF EXISTING ASPHALT SURFACE COMPLETION SHALL BE RESTORED TO THE MINIMUM SPECIFICATIONS SHOWN HERE AND AS DESCRIBED IN DRAWINGS G-1 AND G-2. CONTRACTOR TO RESEED IN VEGETATED AREAS WITH APPROPRIATE SEED MIX TO MATCH PRE-EXISTING GRASS COVER.
2. ARRANGEMENT OF PIPES SHOWN IN TRENCH CROSS SECTIONS IS FOR DEMONSTRATIVE PURPOSES ONLY AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND APPROVAL OF THE ENGINEER.
3. TRENCH BACKFILL AND PAVEMENT SUB-BASE MATERIAL SHALL BE PLACED AND COMPACTED IN 6" LIFTS OR AS SPECIFIED IN DRAWINGS G-1 AND G-2. DO NOT COMPACT TOPSOIL.
4. FOR TRENCHES IN UNPAVED AREAS, NATIVE EXCAVATION SPOIL WILL BE INSTALLED AS TRENCH BACKFILL FROM THE TOP OF THE PIPE BEDDING SAND TO A COMPACTED DEPTH OF 6" BELOW GRADE. IF NATIVE EXCAVATION SPOIL IS NOT SUITABLE FOR REUSE AS TRENCH BACKFILL (AS DEFINED IN DRAWINGS G-1 AND G-2), THEN USE SAND PIPE BEDDING INSTEAD.
5. ALL TRENCHES WILL BE EXCAVATED TO DEPTHS SHOWN ON THE CROSS-SECTIONS. NO TRENCHES WILL BE EXCAVATED TO GREATER DEPTH WITHOUT APPROVAL FROM THE ENGINEER. TRENCHES WILL NOT EXCEED 48" IN DEPTH WITHOUT ENGINEERING APPROVAL AND APPROPRIATE SAFETY MEASURES IN PLACE (E.G. TRENCH BOX).
6. RECYCLED CONCRETE AGGREGATE (RCA) MEETING REQUIRED SPECIFICATIONS IS AN ACCEPTABLE ALTERNATIVE FOR COARSE AGGREGATE (SEE DRAWINGS G-1 AND G-2).

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1	11/18/2016	FINAL	EM	CD

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Professional Engineer's Name

Professional Engineer's No. PE077587

State PA | Date Signed | Project Mgr. ML

Designed by | Drawn by | Checked by

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

TRENCHING DETAILS (2 of 2)

PROCESS

ARCADIS Project No. 06262046.0005.00004

Date NOVEMBER 18, 2016

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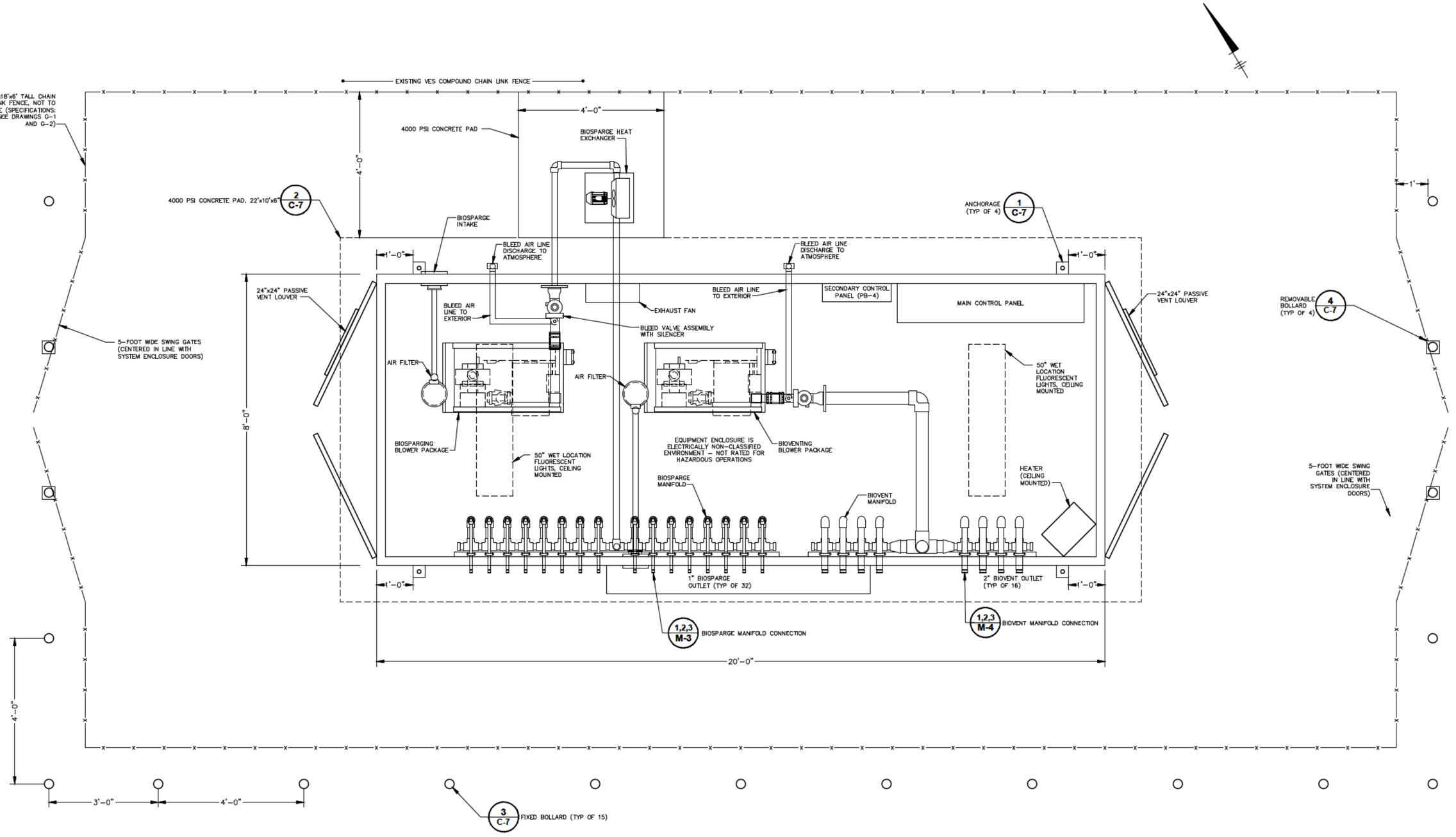
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-4



NOTE:

FENCE AND BOLLARDS NOT TO SCALE. SEE DRAWINGS G-1 AND G-2 FOR SPECIFICATIONS.

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Professional Engineer's Name

Professional Engineer's No.
PE077587

State	Date Signed	Project Mgr.
PA		ML
Designed by	Drawn by	Checked by

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USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM ENCLOSURE

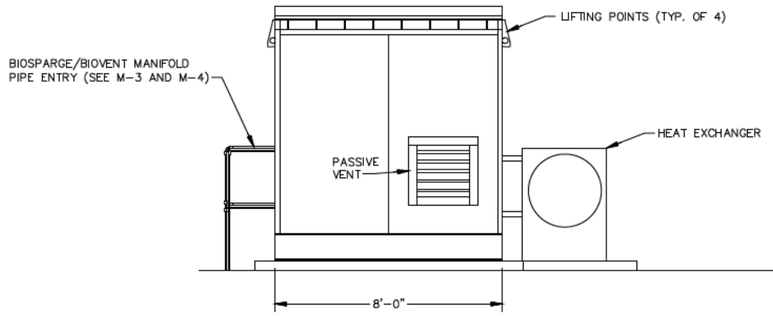
CONSTRUCTION

ARCADIS Project No.
06262046.0005.00004

Date
NOVEMBER 18, 2016

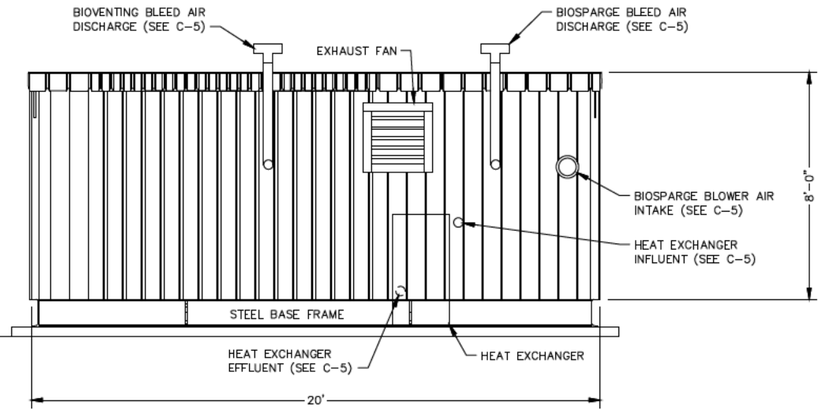
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-5



RIGHT VIEW - NORTHWEST

0 2' 5'
SCALE: 3/8"=1'-0"



REAR VIEW - SOUTHWEST

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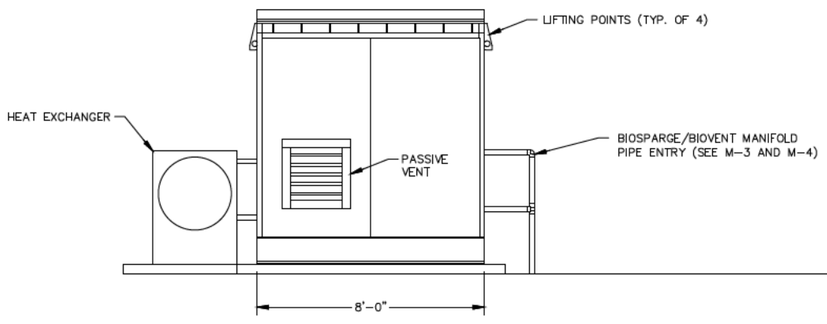

LEFT VIEW - SOUTHEAST

0 2' 5'
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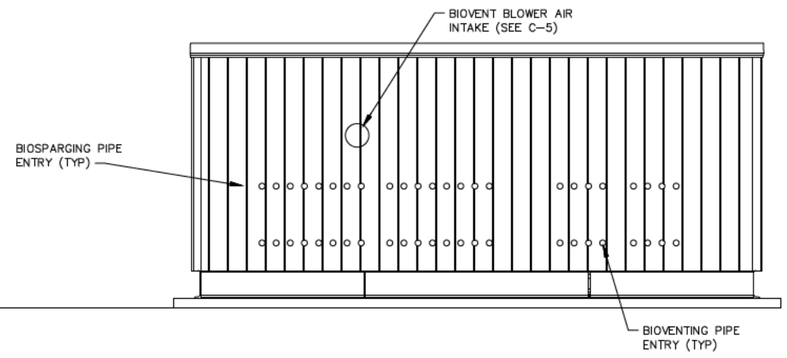

FRONT VIEW - NORTHEAST

0 2' 5'
SCALE: 3/8"=1'-0"

NOTES

1. SYSTEM ENCLOSURE SHOWN IS SEA BOX SB862.0, DOUBLE DOORS BOTH ENDS (TYPE 2), 20'x8' DRY FREIGHT ISO CARGO CONTAINER.

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Professional Engineer's Name [redacted]
Professional Engineer's No. PE077587
State PA | Date Signed | Project Mgr. ML
Designed by | Drawn by | Checked by

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

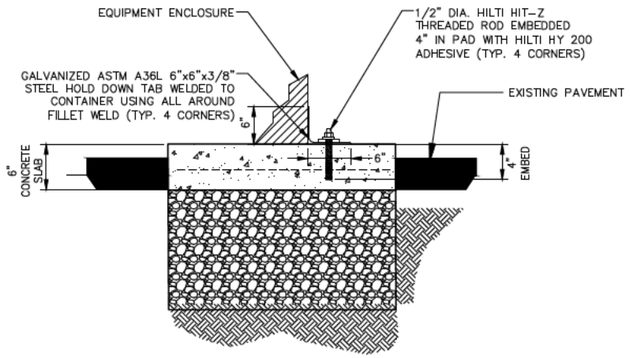
SYSTEM ENCLOSURE DETAILS

CONSTRUCTION

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016

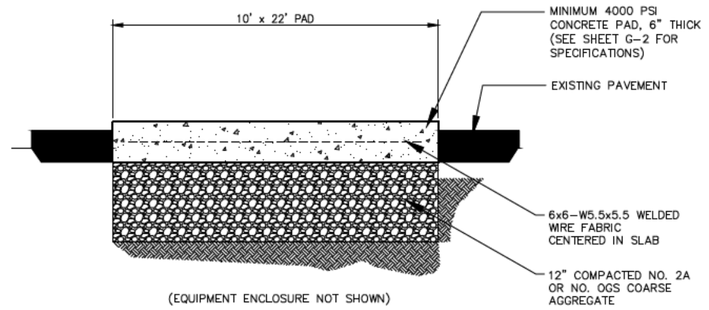
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-6



REMEDIATION SYSTEM ENCLOSURE ANCHORAGE DETAIL (1 / C-7)

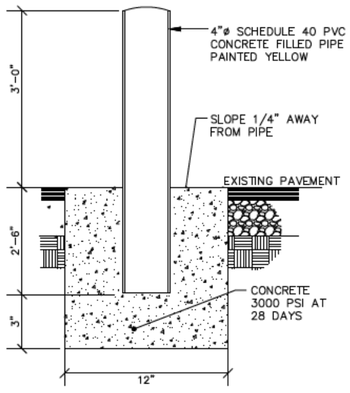
NOT TO SCALE



NOTE: PAD SHALL BE PLACED LEVEL AND MAXIMUM 1" ABOVE SURROUNDING PAVEMENT ELEVATION.

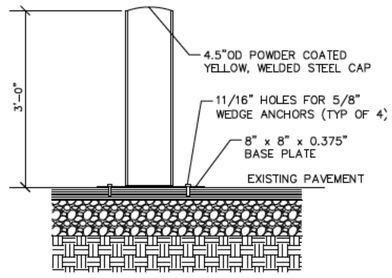
CROSS-SECTION CONCRETE PAD DETAIL (2 / C-7)

NOT TO SCALE



FIXED BOLLARD DETAIL (3 / C-7)

NOT TO SCALE



REMOVABLE BOLLARD DETAIL (4 / C-7)

NOT TO SCALE

CITY: Milwaukee WI DIV/GROUP: ENV DB: [redacted] LD: [redacted] PIC: [redacted] PM: [redacted] TM: LYRON=*OFF=*REF*
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Professional Engineer's Name: [redacted]
Professional Engineer's No.: PE077587
State: PA | Date Signed: | Project Mgr.: ML
Designed by: [redacted] | Drawn by: [redacted] | Checked by: [redacted]

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ARCADIS U.S., INC.

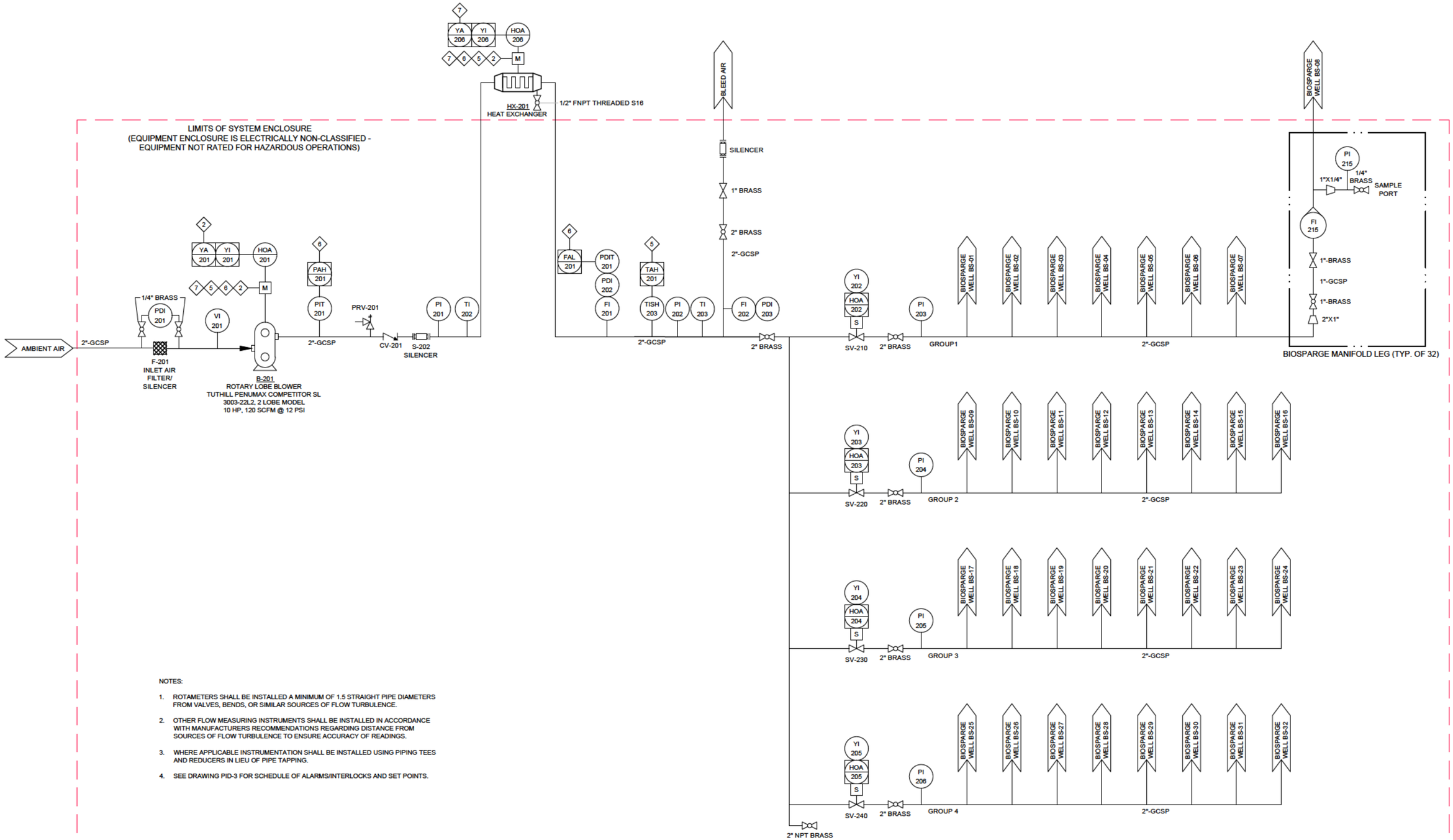
USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

CONCRETE PAD AND MISCELLANEOUS DETAILS

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-7



NOTES:

1. ROTAMETERS SHALL BE INSTALLED A MINIMUM OF 1.5 STRAIGHT PIPE DIAMETERS FROM VALVES, BENDS, OR SIMILAR SOURCES OF FLOW TURBULENCE.
2. OTHER FLOW MEASURING INSTRUMENTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS REGARDING DISTANCE FROM SOURCES OF FLOW TURBULENCE TO ENSURE ACCURACY OF READINGS.
3. WHERE APPLICABLE INSTRUMENTATION SHALL BE INSTALLED USING PIPING TEES AND REDUCERS IN LIEU OF PIPE TAPPING.
4. SEE DRAWING PID-3 FOR SCHEDULE OF ALARMS/INTERLOCKS AND SET POINTS.

PIC: [redacted] PM: [redacted] LD: [redacted] CHK: [redacted]
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Professional Engineer's Name: [redacted]
Professional Engineer's No.: PE077587
State: PA | Date Signed | Project Mgr.: ML
Designed by: [redacted] | Drawn by: [redacted] | Checked by: [redacted]

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

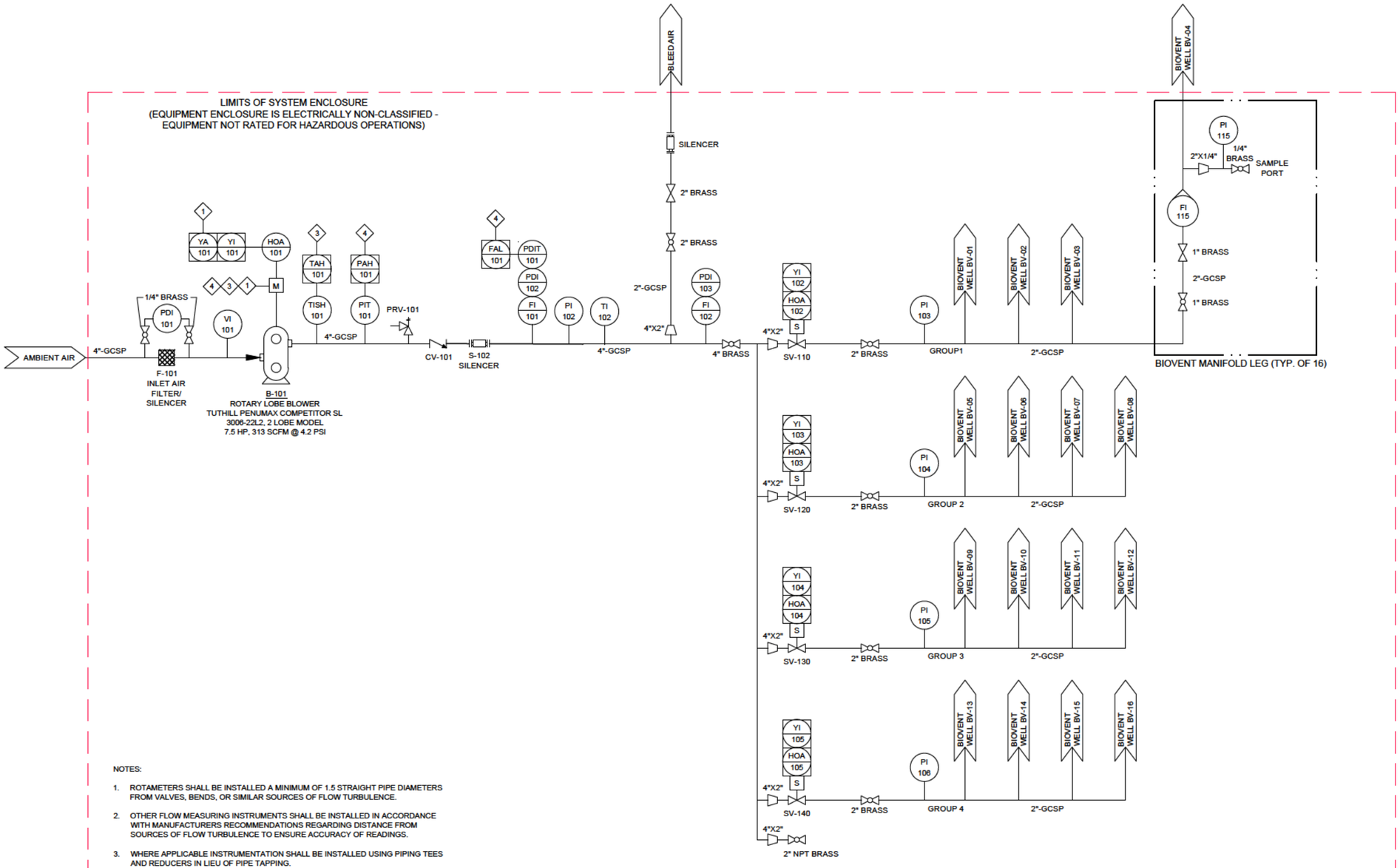
BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM

PROCESS

ARCADIS Project No.
06262046.0005.00004
Date
NOVEMBER 18, 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

PID-1



NOTES:

1. ROTAMETERS SHALL BE INSTALLED A MINIMUM OF 1.5 STRAIGHT PIPE DIAMETERS FROM VALVES, BENDS, OR SIMILAR SOURCES OF FLOW TURBULENCE.
2. OTHER FLOW MEASURING INSTRUMENTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS REGARDING DISTANCE FROM SOURCES OF FLOW TURBULENCE TO ENSURE ACCURACY OF READINGS.
3. WHERE APPLICABLE INSTRUMENTATION SHALL BE INSTALLED USING PIPING TEES AND REDUCERS IN LIEU OF PIPE TAPPING.
4. SEE DRAWING PID-3 FOR SCHEDULE OF ALARMS/INTERLOCKS AND SET POINTS.

ACAD MENU FILE: [redacted] DWG/DGN FILE: [redacted] LD: [redacted] PIC: [redacted] PM: [redacted] TM: LYRON="OFF="REF"
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LEGEND:

- PROCESS PIPING
- SKID MOUNTED EQUIPMENT
- INSTRUMENT SIGNAL
- TRUE UNION BALL VALVE
- GATE VALVE
- CHECK VALVE
- SOLENOID VALVE (NORMALLY CLOSED) (S)
- PRESSURE RELIEF VALVE
- REDUCER
- FLANGED CONNECTION
- SILENCER
- AIR FILTER
- HEAT EXCHANGER (M)
- BLOWER (M)
- ROTAMETER (FI X)

PIPELINE DESIGNATION:

6"-S04P

- LINE TYPE
- MATERIAL
- SIZE

TYPE:

D = DUCT
H = HOSE
C = DOUBLE WALL CONTAINMENT PIPE
P = PIPE
T = TUBE

MATERIAL:

BRZ - BRASS/BRONZE
CIR - CAST IRON
CST - CARBON STEEL
CPR - COPPER
CVC - CHLORINATED POLYVINYL CHLORIDE
DIR - DUCTILE IRON
FRP - FIBERGLASS
GCS - GALVANIZED CARBON STEEL
LCS - LINED CARBON STEEL
PET - POLYETHYLENE
POP - POLYPROPYLENE
PVC - POLYVINYL CHLORIDE
RUB - RUBBER
S04 - 304 STAINLESS STEEL
S4L - 304L STAINLESS STEEL
S16 - 316 STAINLESS STEEL
S6L - 316L STAINLESS STEEL
TEF - TEFLON
VIT - VITON
TYG - TYGON

ABBREVIATIONS:

%	PERCENT
AC	AIR COMPRESSOR
AD	AIR DRYER
AR	AIR RECEIVER TANK
CFM	CUBIC FEET PER MINUTE
E	ELECTRIC ACTUATOR
F	MULTIMEDIA FILTER
FAH	FLOW ALARM HIGH
FAL	FLOW ALARM LOW
FC	FLOW CONTROL
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIC	FLOW INDICATING CONTROL
FIR	FLOW INDICATE RECORDER
FIT	FLOW INDICATING TRANSMITTER
FM	FLOW METER
FQ	FLOW TOTALIZER
FQI	FLOW QUANTITY INDICATOR
FQIR	FLOW QUANTITY INDICATOR RECORDER
FQR	FLOW QUANTITY RECORDER
FQS	FLOW QUANTITY SWITCH
FT	FLOW TRANSMITTER
FV	FLOW VALVE
GAL	GALLON(S)
GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
HAZ	HAZARDOUS
HDPE	HIGH DENSITY POLYETHYLENE
HIM	HUMAN INTERFACE MACHINE
HOA	HAND/OFF/AUTO
HR	HOUR
HS	HAND SWITCH
INCH H2O	INCHES WATER COLUMN
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH HIGH
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW LOW
LB	POUND(S)
LC	LEVEL CONTROLLER
LE	LEVEL ELEMENT
LG	LEVEL GAUGE
LI	LEVEL INDICATOR
LIC	LEVEL INDICATING CONTROL
LIR	LEVEL INDICATE RECORDER
LIT	LEVEL INDICATING TRANSMITTER
LPGAC	LIQUID PHASE GRANULAR ACTIVATED CARBON
[redacted]	LEVEL SWITCH
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LT	LEVEL TRANSMITTER
M	MOTOR
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NPT	NATIONAL PIPE THREAD
PAH	PRESSURE ALARM HIGH
PAHH	PRESSURE ALARM HIGH HIGH
PAL	PRESSURE ALARM LOW
PDAH	PRESSURE DIFFERENTIAL ALARM HIGH
PDAHH	PRESSURE DIFFERENTIAL ALARM HIGH HIGH
PDE	PRESSURE DIFFERENTIAL ELEMENT
PDI	PRESSURE DIFFERENTIAL INDICATOR
PDIR	PRESSURE DIFFERENTIAL INDICATE RECORDER
PDIT	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER
PDITSH	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER SWITCH HIGH
PDSH	PRESSURE DIFFERENTIAL SWITCH HIGH
PE	PRESSURE ELEMENT
PI	PRESSURE INDICATOR
PIR	PRESSURE INDICATE RECORDER
PISH	PRESSURE INDICATING S ITCH HIGH
PISL	PRESSURE INDICATING S ITCH LOW
PIT	PRESSURE INDICATING TRANSMITTER
PRV	PRESSURE RELIEF VALVE
PSIG	PRESSURE PER SQUARE INCH GAUGE
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
SC	SPEED CONTROL
SI	SPEED INDICATOR
SIC	SPEED INDICATING CONTROL
ST	SPEED TRANSMITTER
T	TANK
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH HIGH
TAL	TEMPERATURE ALARM LOW
TC	TEMPERATURE CONTROL
TET	TEMPERATURE ELEMENT TRANSMITTER
TI	TEMPERATURE INDICATOR
TIR	TEMPERATURE INDICATE RECORDER
TISH	TEMPERATURE INDICATE SWITCH HIGH
TOC	TOP OF CASING
TSH	TEMPERATURE SWITCH HIGH
TW	THERMAL WELL
TYP	TYPICAL
V	VALVE
VFD	VARIABLE FREQUENCY DRIVE
VPGAC	VAPOR PHASE GRANULAR ACTIVATED CARBON
YA	STATUS ALARM
YI	STATUS INDICATOR
ZA	POSITION INDICATING ALARM
ZAC	POSITION ALARM VALVE FAILED TO CLOSE
ZAO	POSITION ALARM VALVE FAILED TO OPEN
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPENED

Schedule of Alarms/Interlocks

Alarm	Description	Interlock	
Shut Down	Notification of system shutdown not associated with the other alarm conditions	--	
E-Stop	System emergency stop button depressed	--	
Power Failure	System power failure	--	
B-101 OLD	Biovent blower (B-101) motor overload	1	Disable B-101
B-201 OLD	Biovent blower (B-101) motor overload	2	Disable B-201 and Heat Exchanger (HX-201)
TAH-101	Biovent blower (B-101) high effluent temperature	3	Disable B-101
PAH-101	Biovent blower (B-101) high effluent pressure	4	Disable B-101
FAL-101	Biovent blower (B-101) low flow or differential pressure indicator transmitter PDIT-101 failure		
TAH-201	Biosparge heat exchanger (HX-201) high effluent temperature	5	Disable B-201 and HX-201
PAH-201	Biosparge blower (B-201) high effluent pressure	6	Disable B-201 and HX-201
FAL-201	Biosparge blower (B-201) low flow or differential pressure indicator transmitter PDIT-201 failure		
HX Fail	Heat Exchanger HX-201 failure	7	Disable B-201

* PLC sends out email/text notification for all alarms

Process Safety Devices/Controls and Set Points

Process Safety Device/Control	Set Point
Control panel emergency stop	--
Biovent blower motor overload	--
Biovent blower (B-101) high effluent temperature switch/alarm (TISH-101/TAH-101)	130 F
Biovent blower (B-101) high effluent pressure switch/alarm (PIT-101/PAH-101)	7.5 psi
Biovent blower (B-101) low flow alarm (FAL-101)	10 cfm*
Biovent blower pressure relief valve (PRV-101)	7 psi
Biosparge heat exchanger high effluent temperature switch/alarm (TISH-203/TAH-201)	130 F
Biosparge blower (B-201) high effluent pressure switch/alarm (PIT-201/PAH-201)	12.5 psi
Biosparge blower (B-201) low flow alarm (FAL-201)	5 cfm*
Biosparge blower pressure relief valve (PRV-201)	12 psi

* 5 minute delay on low flow alarm upon blower startup.

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D =	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = PULSE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VACUUM, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED	DRIVE, ACTUATOR, FINAL CONTROL ELEMENT	

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS			
SHARED DISPLAY, SHARED CONTROL			
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.			
PROGRAMMABLE LOGIC CONTROLLER FUNCTION			

LEGENDS NOTES:

1. ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: PD = DIFFERENTIAL PRESSURE FQ = TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: PH
3. MEANING OF A "USER'S CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
4. UNCLASSIFIED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT, THE MEANING SHALL BE SPECIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
5. THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

GENERAL NOTES:

1. ALL ANALOG SETPOINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE SCREEN.
2. ALARMS THAT SHUT DOWN EXTRACTION WELLS AND TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
3. THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
4. WHERE APPLICABLE, TEES AND REDUCERS SHALL BE INSTALL IN LIEU OF PIPE TAPPING.

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FORMER DSCP SYSTEM UPGRADES

PIPING AND INSTRUMENTATION DIAGRAM LEGEND

PROCESS

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Date NOVEMBER 18, 2016

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SUITE 820
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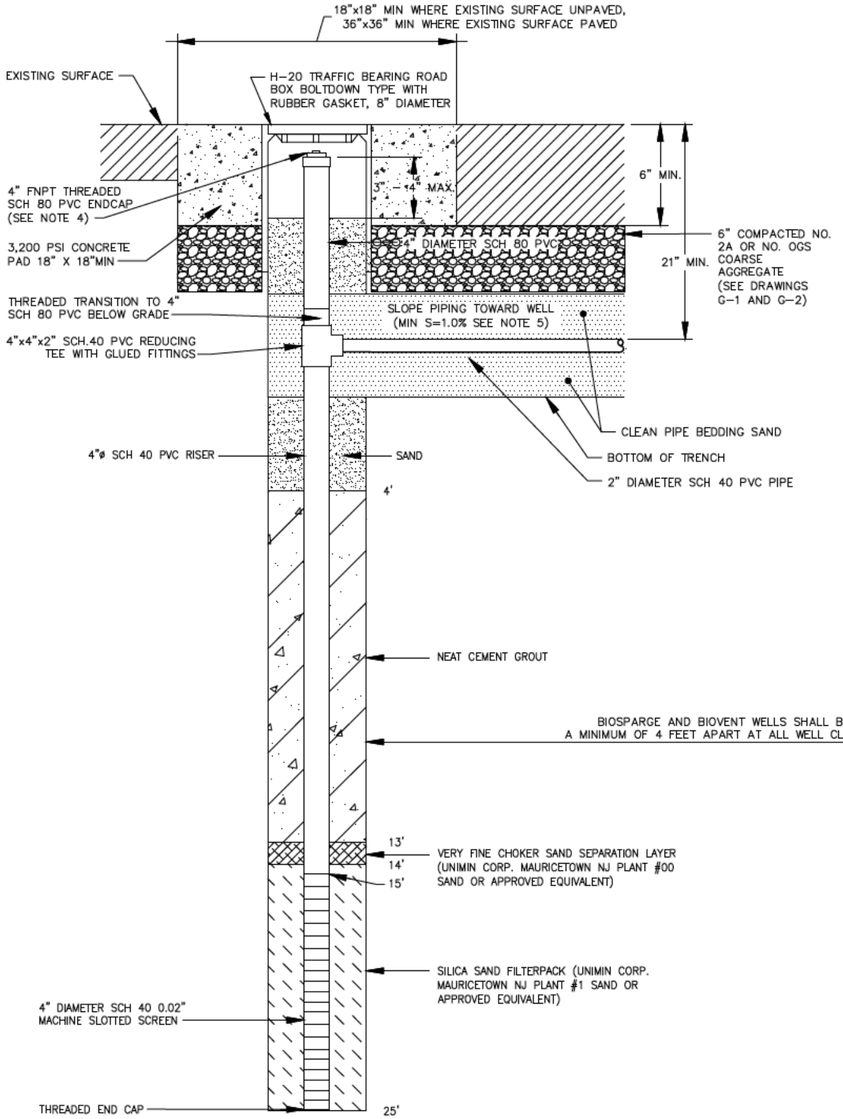
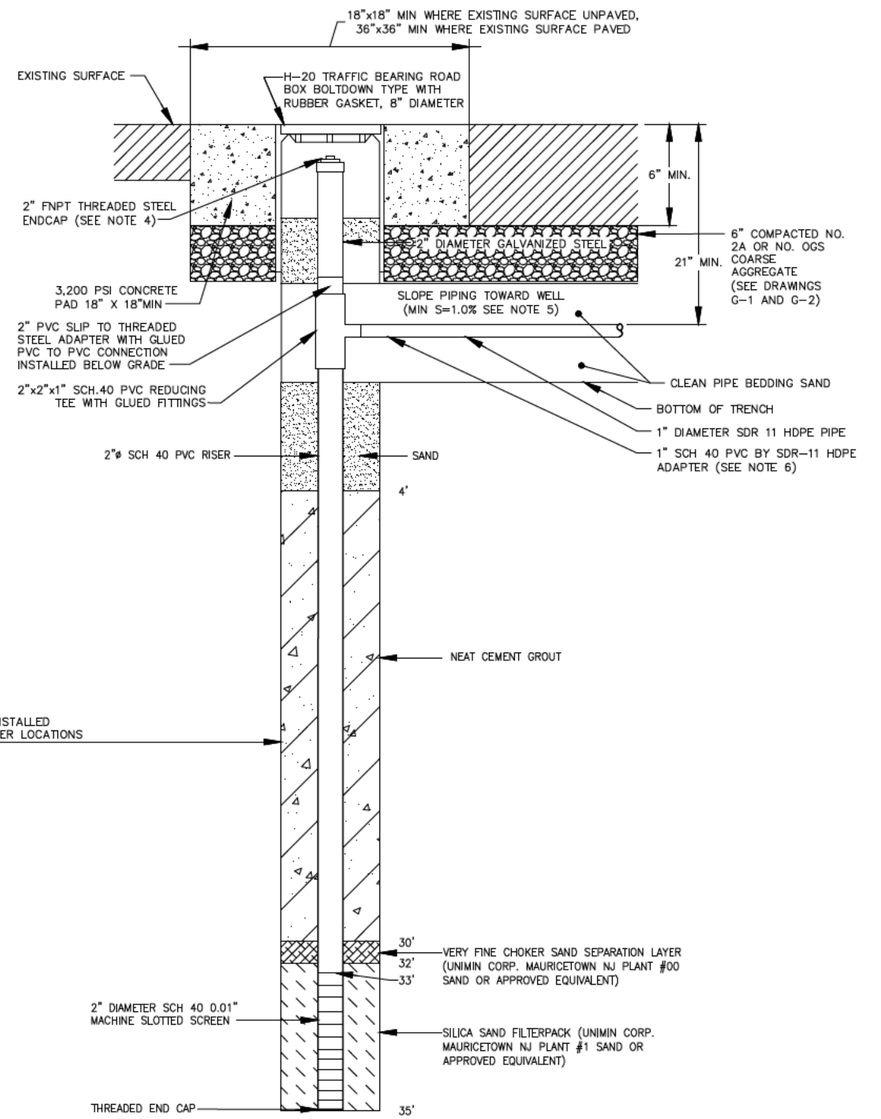
TEL. 302.658.1718

PID-3



BIOVENT WELL CONSTRUCTION/SURFACE COMPLETION DETAIL (1 / M-1)

NOT TO SCALE



BIOSPARGE WELL CONSTRUCTION/SURFACE COMPLETION DETAIL (2 / M-1)

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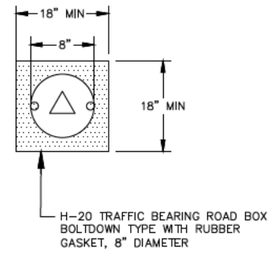
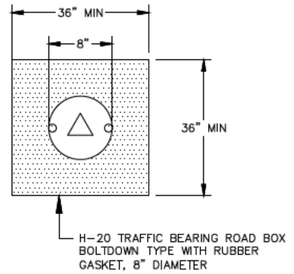


WELLHEAD MONUMENT DETAIL - UNPAVED SURFACE (TYP.)

NOT TO SCALE



WELLHEAD MONUMENT DETAIL - PAVEMENT SURFACE (TYP.)

NOT TO SCALE

NOTES:

1. DETAILS ARE APPROXIMATE AND NOT TO SCALE. REFER TO TRENCH CROSS SECTION DETAILS FOR TRENCH BACKFILL DESIGN SPECIFICATIONS.
2. PVC – POLYVINYL CHLORIDE
   BLS – BELOW LAND SURFACE
   HPDE – HIGH DENSITY POLYETHYLENE
3. WELL CONSTRUCTION DEPTHS ARE APROXIMATE. SEE DRAWINGS G-1 AND G-2 FOR DETAILS. FINAL DEPTHS TO BE DETERMINED BASED ON ACTUAL SURFACE LITHOLOGY ENCOUNTERED IN THE FIELD DURING INSTALLATION.
4. THREADED STEEL/PVC CAPS ON BIOSPARGE/BIOVENT WELLS SHALL BE EQUIPPED WITH A THREADED BRASS BALL VALVE WITH 1/8" NIPPLE FITTING FOR MEASURING OF WELLHEAD PRESSURE READINGS.
5. SUBSURFACE PIPING WILL BE SLOPED TOWARD INDIVIDUAL BIOSPARGE AND BIOVENT WELLS AND AWAY FROM MANIFOLD.
6. SCH 40 PVC TO SDR-11 HDPE ADAPTER FITTING WITH GLUED PVC TO PVC CONNECTION AS SPECIFIED ON DRAWING G-3.

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Designed by	Drawn by	Checked by

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BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS

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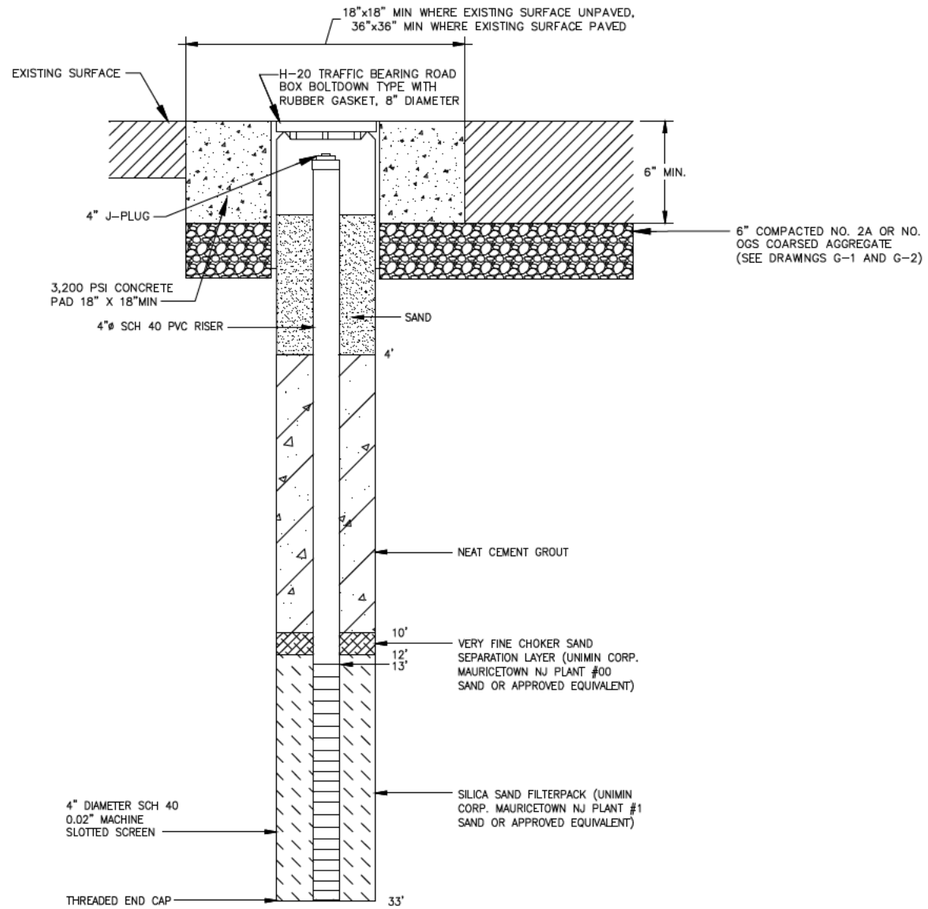

PERFORMANCE MONITORING WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

NOT TO SCALE

1 / M-2

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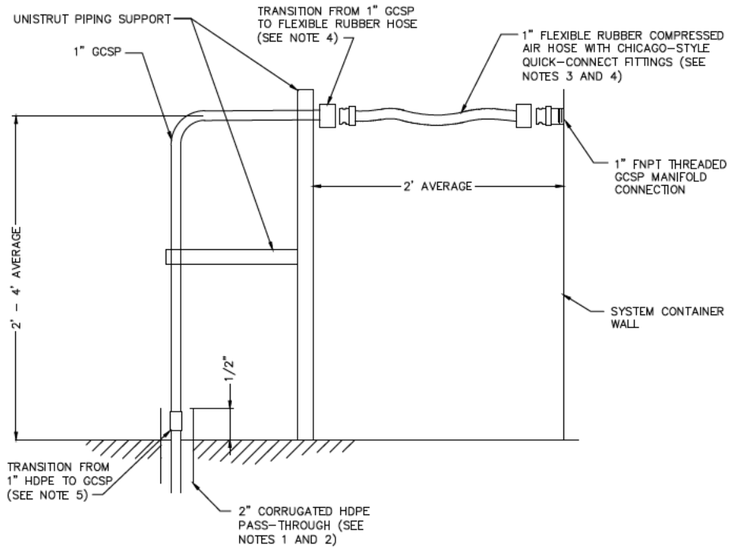
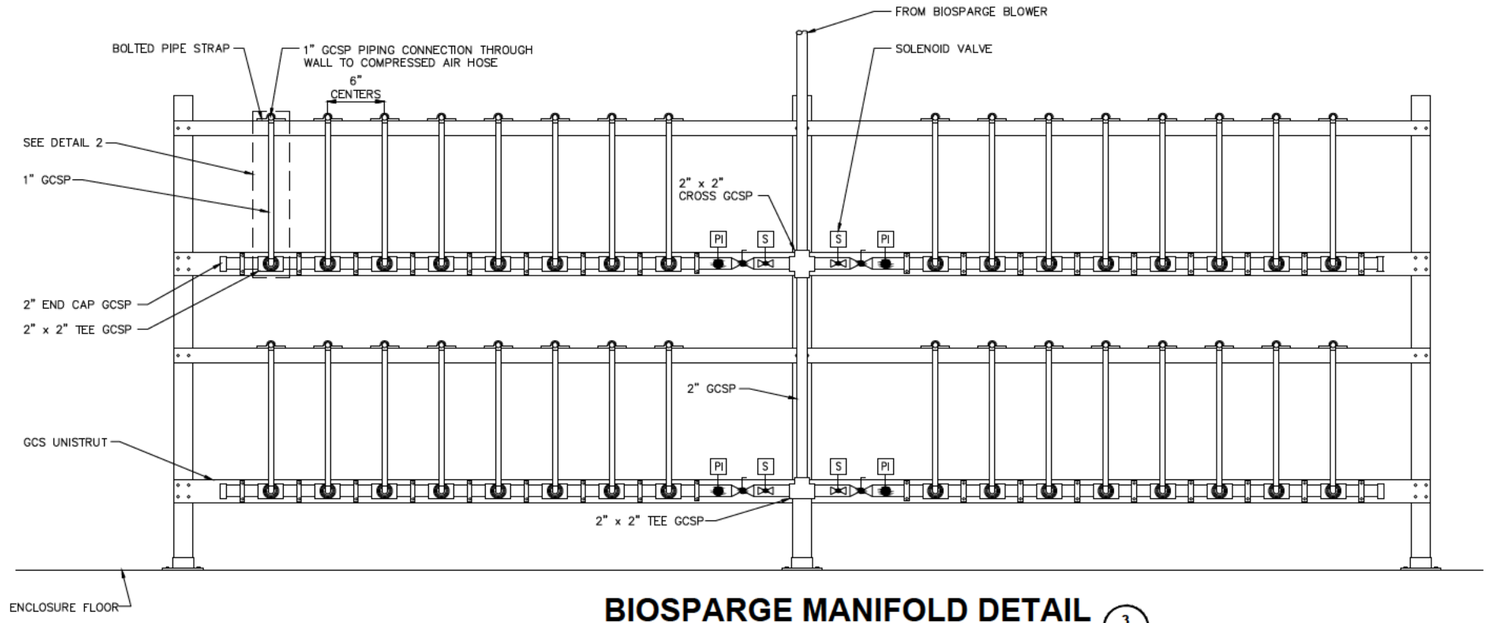


BIOSPARGE MANIFOLD PIPING CONNECTION DETAIL

1 / M-3

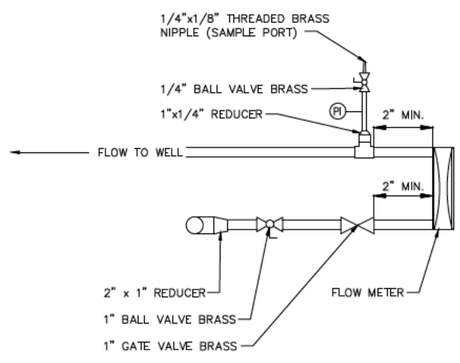
NOT TO SCALE



BIOSPARGE MANIFOLD DETAIL

3 / M-3

NOT TO SCALE



BIOSPARGE MANIFOLD VALVING/INSTRUMENTATION (TYP. OF 32)

2 / M-3

NOT TO SCALE

NOTES:

1. PROVIDE CORRUGATED HDPE PIPE SLEEVES AT ALL SLAB/ASPHALT PENETRATIONS. SLEEVES SHALL BE 1" LARGER THAN DIAMETER OF INNER PIPE AND SHALL EXTEND 1/2" ABOVE AND 3" BELOW SLAB/ASPHALT.
2. GAP BETWEEN SLEEVES AND INNER PIPE SHALL BE SEALED UPON COMPLETION.
3. FLEXIBLE COMPRESSED AIR HOSES TO BE ANCHORED TO UNISTRUT SUPPORT AND/OR SYSTEM CONTAINER WALL BY WHIP-CHECKS.
4. FLEXIBLE RUBBER HOSE SHALL BE 200 PSI PRESSURE AND 200F TEMPERATURE RATED, UV RESISTANT, AND WITH CHICAGO-STYLE QUICK-CONNECT FITTINGS.
5. TRANSITION FROM SDR-11 HDPE TO GALVANIZED STEEL WITH MNPT THREADED END CONNECTION AS SPECIFIED ON DRAWING C-3.
6. GCSP - GALVANIZED CARBON STEEL PIPE
   S - SOLENOID VALVE
   PI - PRESSURE INDICATOR

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1	11/18/2016	FINAL	EM	CD

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Professional Engineer's Name: [redacted]
Professional Engineer's No.: PE077587
State: PA
Date Signed:
Project Mgr.: ML
Designed by: [redacted]
Drawn by: [redacted]
Checked by: [redacted]

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS

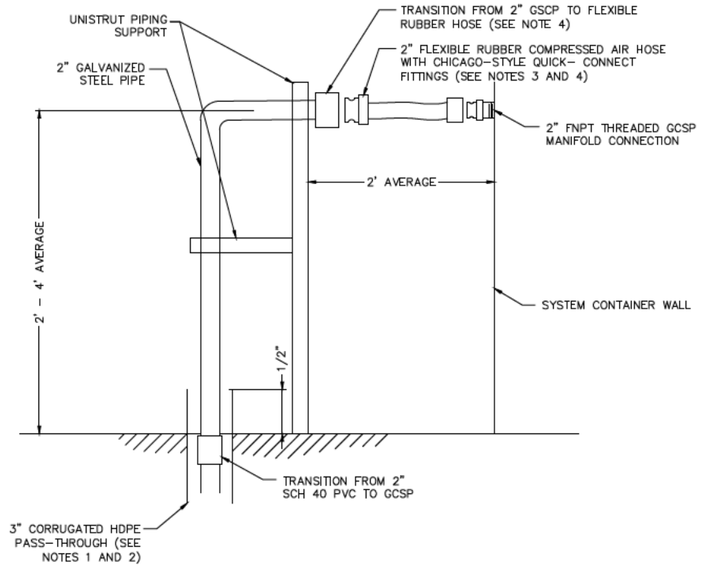
PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
NOVEMBER 18, 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

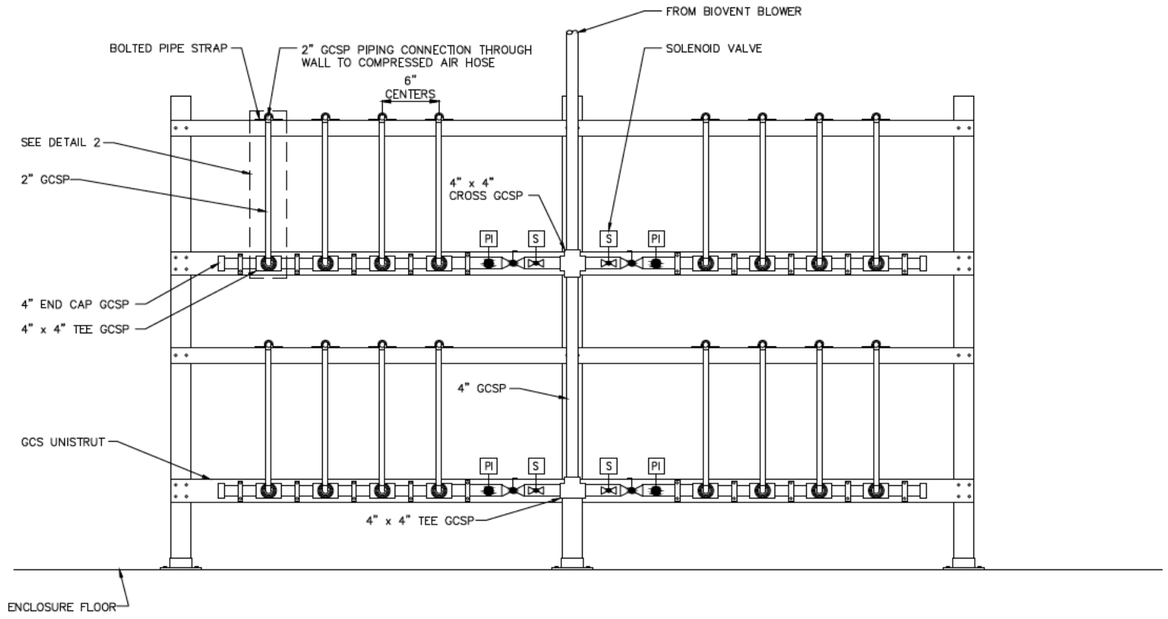
M-3



BIOVENT MANIFOLD PIPING CONNECTION DETAIL

1 / M-4

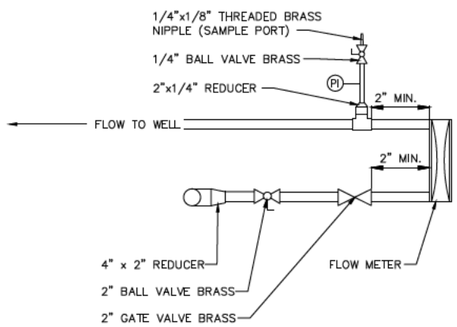
NOT TO SCALE



BIOVENT MANIFOLD DETAIL

3 / M-4

NOT TO SCALE



BIOVENT MANIFOLD INSTRUMENTATION (TYP. OF 16)

2 / M-4

NOT TO SCALE

NOTES:

1. PROVIDE CORRUGATED HDPE PIPE SLEEVES AT ALL SLAB/ASPHALT PENETRATIONS. SLEEVES SHALL BE 1" LARGER THAN DIAMETER OF INNER PIPE AND SHALL EXTEND 1/2" ABOVE AND 3" BELOW SLAB/ASPHALT.
2. GAP BETWEEN SLEEVES AND INNER PIPE SHALL BE SEALED UPON COMPLETION.
3. FLEXIBLE COMPRESSED AIR HOSES TO BE ANCHORED TO UNISTRUT SUPPORT AND/OR SYSTEM CONTAINER WALL BY WHIP-CHECKS.
4. FLEXIBLE RUBBER HOSE SHALL BE 200 PSI PRESSURE AND 200F TEMPERATURE RATED, UV RESISTANT, AND WITH CHICAGO-STYLE QUICK-CONNECT FITTINGS.
5. TRANSITION BELOW GRADE FROM PVC TO HDPE USING 2" SCH 40 PVC SLIP TO GCSP THREADED ADAPTER FITTING.
6. GCSP – GALVANIZED CARBON STEEL PIPE
   S – SOLENOID VALVE
   PI – PRESSURE INDICATOR

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Professional Engineer's Name: [redacted]
Professional Engineer's No.: PE077587
State: PA | Date Signed: | Project Mgr.: ML
Designed by: [redacted] | Drawn by: [redacted] | Checked by: [redacted]

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ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM BIOVENT MANIFOLD DETAILS

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

M-4

CTX: M:\Navy\ce_WI_DIV\GROUP_ENV_DR [redacted] LD [redacted] PIC [redacted] PM [redacted] TM: LYRON=*;OFF=*REF*
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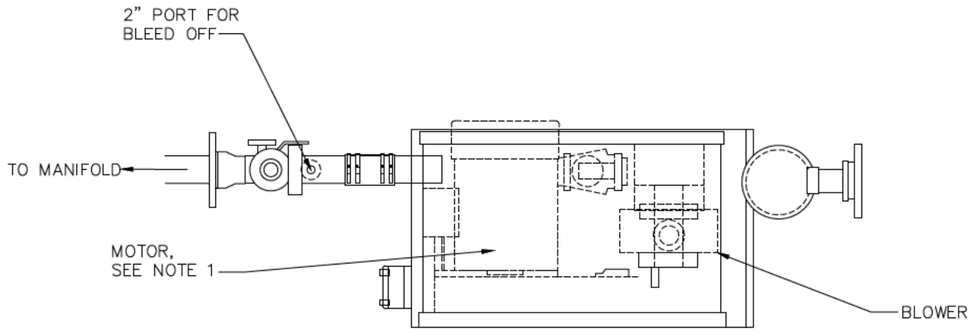
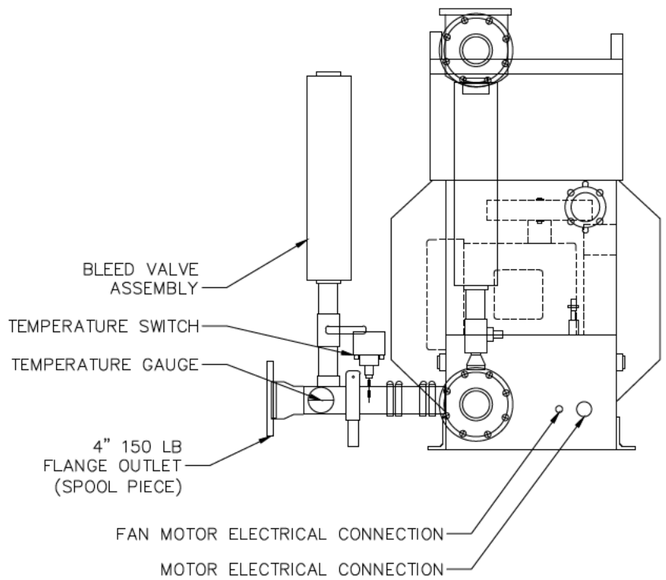


LIMITS OF BLOWER PACKAGE - TOP VIEW

NOT TO SCALE

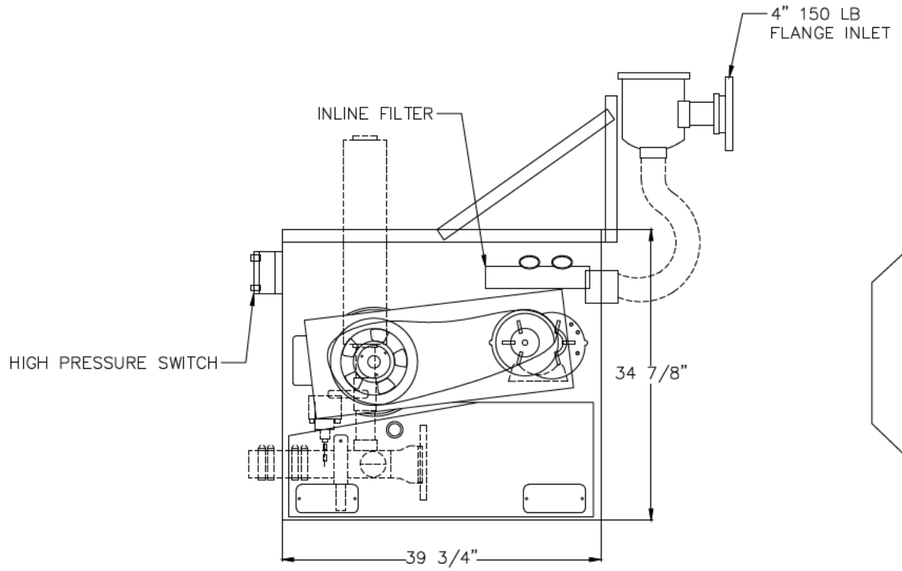
NOTES

1. 7.5 HP MOTOR TO BE UPGRADED TO 10 HP MOTOR FOR BIOSPARGE BY CONTRACTOR. 7.5 HP MOTOR FOR BIOVENT.
2. SEE DRAWING G–3 FOR MAJOR EQUIPMENT LIST.



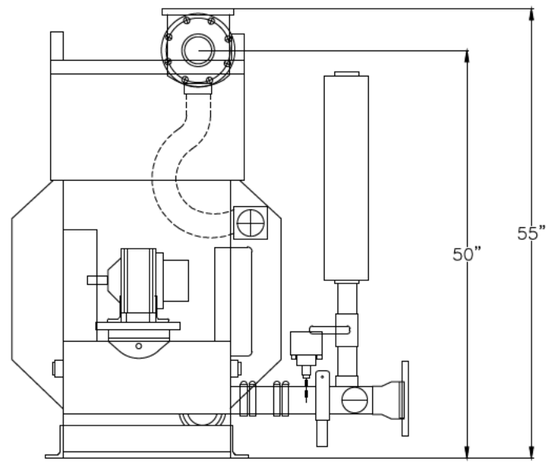
LEFT SIDE VIEW

NOT TO SCALE



FRONT VIEW

NOT TO SCALE



RIGHT SIDE VIEW

NOT TO SCALE

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Professional Engineer's Name [redacted]
Professional Engineer's No. PE077587
State PA | Date Signed | Project Mgr. ML
Designed by [redacted] | Drawn by [redacted] | Checked by [redacted]

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

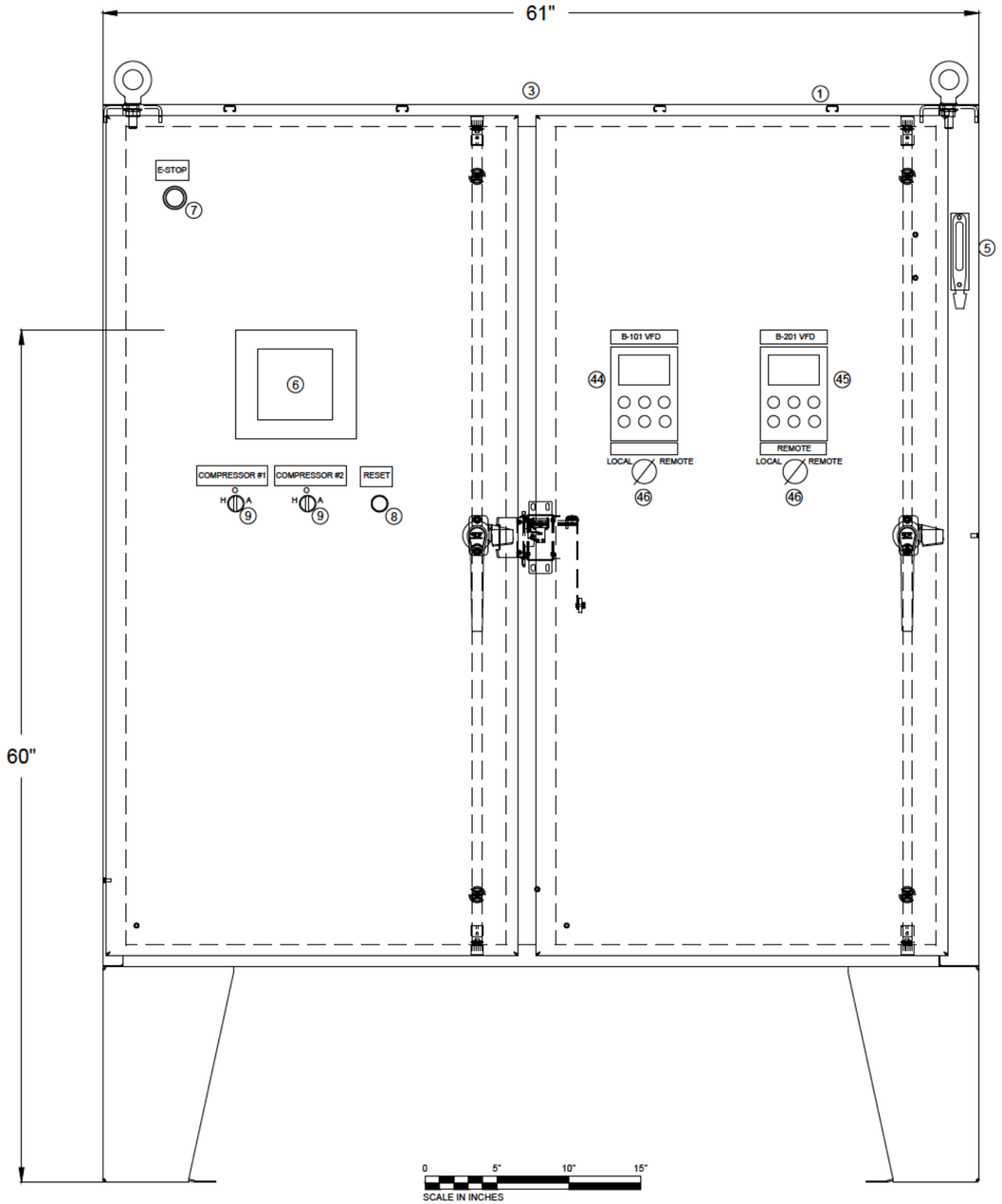
BIOSPARGE/BIOVENT BLOWER PACKAGE

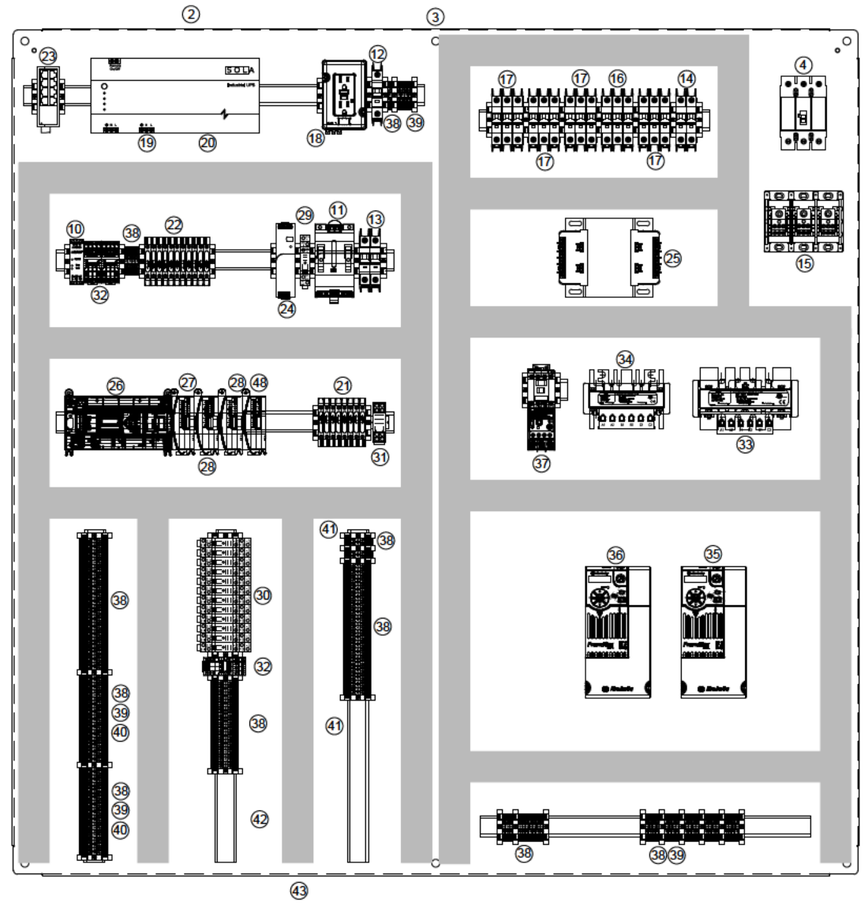
PROCESS

ARCADIS Project No. 06262046.0005.00004
Date NOVEMBER 18, 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

M-5





CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: [redacted] PM: [redacted] TM: LYR:ON=*OFF=*REF*
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2	8/5/2016	DRAFT FOR REVIEW	KE	DL
1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's Name: DAVE OBERLE
Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-ASL

TAG	QTY		DESCRIPTION	MANUFACTURER	CATALOG #
1	1		2 DOOR STEEL ENCLOSURE FOR FLANGE DISCONNECT 60X61X18	SCE	60XEL6118LP
2	1		BACK PANEL FOR ENCLOSURE	SCE	60P60
3	1		BARRIER PLATE FOR ENCLOSRE		
4	1		AB MOLDED CASE CIRCUIT BREAKER (T/M), 25 KA, 100 A	AB	140G-G2C3-D10
5	1		AB FLEX CABLE OPERATOR (NON METALIC HANDLE)	AB	140G-GFCX04
6	1		10" C-MORE HMI PANEL	C-MORE	EA9-10CL
7	1		RED MUSHROOM HEAD E-STOP (NC) TWIST RELEASE	AB	800FP-MT44PX01S
8	1		BLACK, 22 MM, MOMENTARY PUSH BUTTON	AB	800FP-F2PX10
9	2		BLACK, 22 MM, 3 POSITION MAINTAINED SELECTOR SWITCH (2 NO)	AB	800FP-SM32PX20
10	1		DUAL CHANNEL, 24 VDC SAFETY RELAY AUTO/MANUAL RESET	AB	440R-N23117
11	1		SURGE AND FILTER PROTECTION DEVICE (10A)	AB	4983-DC120-10
12	1		MINIATURE CIRCUIT BREAKER, 1 P, 8 A	AB	1489-M1C080
13	2		MINATURE CIRCUIT BREAKER 1 P, 5 A	AB	1489-M1C050
14	1		MINATURE CIRCUIT BREAKER 2 P, 3 A	AB	1489-M2D030
15	1		POWER DISTRIBUTION BLOCK, 3P (1:6)	AB	TBD
16	1		MINATURE CIRCUIT BREAKER 3 P, 20 A	AB	1489-M3D200
17	4		MINATURE CIRCUIT BREAKER 3 P, 15 A	AB	1489-M3D150
18	1		DIN RAIL MOUNTED GFCI RECEPTACLE	AB	1492-REC15G
19	1		UL UNINTERUPTABLE POWER SUPPLY (520 VA)	SOLA	S1K520
20	1		UL UNINTERUPTABLE POWER SUPPLY MOUNTING BRACKET	SOLA	S1K-PMBRK
21	8		5X20 MM 120 VAC FUSE HOLDER WITH INDICATOR	AB	1492-WFB4250
	8		5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
22	11		5x20 MM 24 VDC FUSE HOLDER WITH INDICATOR	AB	1492-WFB424
	1		5X20 MM TIME DELAY CERAMIC FUSES (5 A)	BUSSMAN	S505-5-R
	10		5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
23	1		8 PORT INDUSTRIAL ETHERNET SWITCH	N-TRON	108TX
24	1		24 VDC POWER SUPPLY (120 W)	AB	1606-XLE120E
25	1		480 X 240/120 VAC CONTROL TRANSFORMER, 1 KVA	HAMMOND	PH1000MQMJ
26	1		MICROLOGIX 1400 PLC	AB	1766-L32BWA
27	1		16 POINT, 24 VDC DISCRETE INPUT MODULE	AB	1762-IQ16
28	2		4 CHANNEL ANALOG INPUT MODULE	AB	1762-IF4
29	1		GENERAL PURPOSE SPDT RELAYS (120 VAC COIL), 16 A	AB	700-HK36A1
30	12		GENERAL PURPOSE SPDT RELAYS (24 VDC COIL), 16 A	AB	700-HK36A24
	13		5 PIN RELAY SOCKETS	AB	700-HN221
31	1		4PDT GENERAL PURPOSE RELAYS (120 VAC COIL), 7 A	AB	700-HC24A1
32	3		4PDT GENERAL PURPOSE RELAYS (24 VDC COIL), 7 A	AB	700-HC24A24
	4		14 PIN RELAY SOCKET	AB	700-HN104
33	1		3% LINE REACTOR FOR 10 HP MOTOR	AB	1321-3R18-B
34	1		3% LINE REACTOR FOR 7.5 HP MOTOR	AB	1321-3R12-B
35	1		10 HP VFD WITH ETHERNET	AB	25B-D017N114
36	1		7.5 HP VFD WITH EHTERNET	AB	25B-D013N114
37	1		NEMA NON-REVERSING E-COMBO STARTER, 3 HP, 480 VAC, 120 VAC C	AB	309-AOD-EEE
38	TBD		IEC TERMINAL BLOCK (30 A)	AB	1492-J3
39	TBD		IEC GROUND TERMINAL BLOCK	AB	1492-J3G
40	TBD		IEC PLUG IN DEVICE TERMINAL BLOCK	AB	1492-J3P
	TBD		FUSE PLUG WITH BLOWN FUSE INDICATION (10-36 V)	AB	1492-FPK224
	TBD		5X20 MM TIME DELAY CERAMIC FUSES (500 MA)	AB	S505-500-R
41	TBD		END ANCHORS	TBD	
42	TBD		DIN RAIL	TBD	
43	TBD		WIRING DUCT	TBD	
44	1		AB HIM MODULE	AB	22-HIM-C2S
45	1		AB HIM MODULE	AB	22-HIM-C2S
46	2		BLACK 22MM 2 POSITION MAINTAINED	AB	FP-SM22PX20
48	1		4 CH ANALOG MODULE (2 IN / 2 OUT)	AB	1762-IF2OF2

LEGEND

- DENOTES TERMINAL BLOCK CONNECTION
- DASHED LINES DENOTES WIRING TO FIELD DEVICES
- DASHED WITH PATTERN DENOTES DEVICES IN REMOTE LOCATIONS

LINE NUMBER DESCRIPTION

0000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); WIRE NUMBER (ALWAYS 1 DIGIT); LINE NUMBER (ALWAYS 2 DIGITS)

TB TERMINAL BLOCK

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: M.LESLEY PM: M.LESLEY TM: LYRON="OFF=*REF*
\\arcadis-us.com\offdata\Milwaukee-WIEIC_DWG\PROJECTS\DSCP\DWG\CADA\I-AS PANELS.dwg LAYOUT: I-ASB SAVED: 12/5/2016 12:05 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: — PLOTTED: 12/5/2016 12:07 PM BY: ERICKSON, KEVIN
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No.	Date	Revisions	By	Ckd
3	5/12/2016	FOR BID	MK	DL
2	8/5/2015	DRAFT FOR REVIEW	KE	DL
1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's Name: DAVE OBERLE
Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL BILL OF MATERIALS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date: APRIL 2016

ARCADIS
824 MARKET STREET
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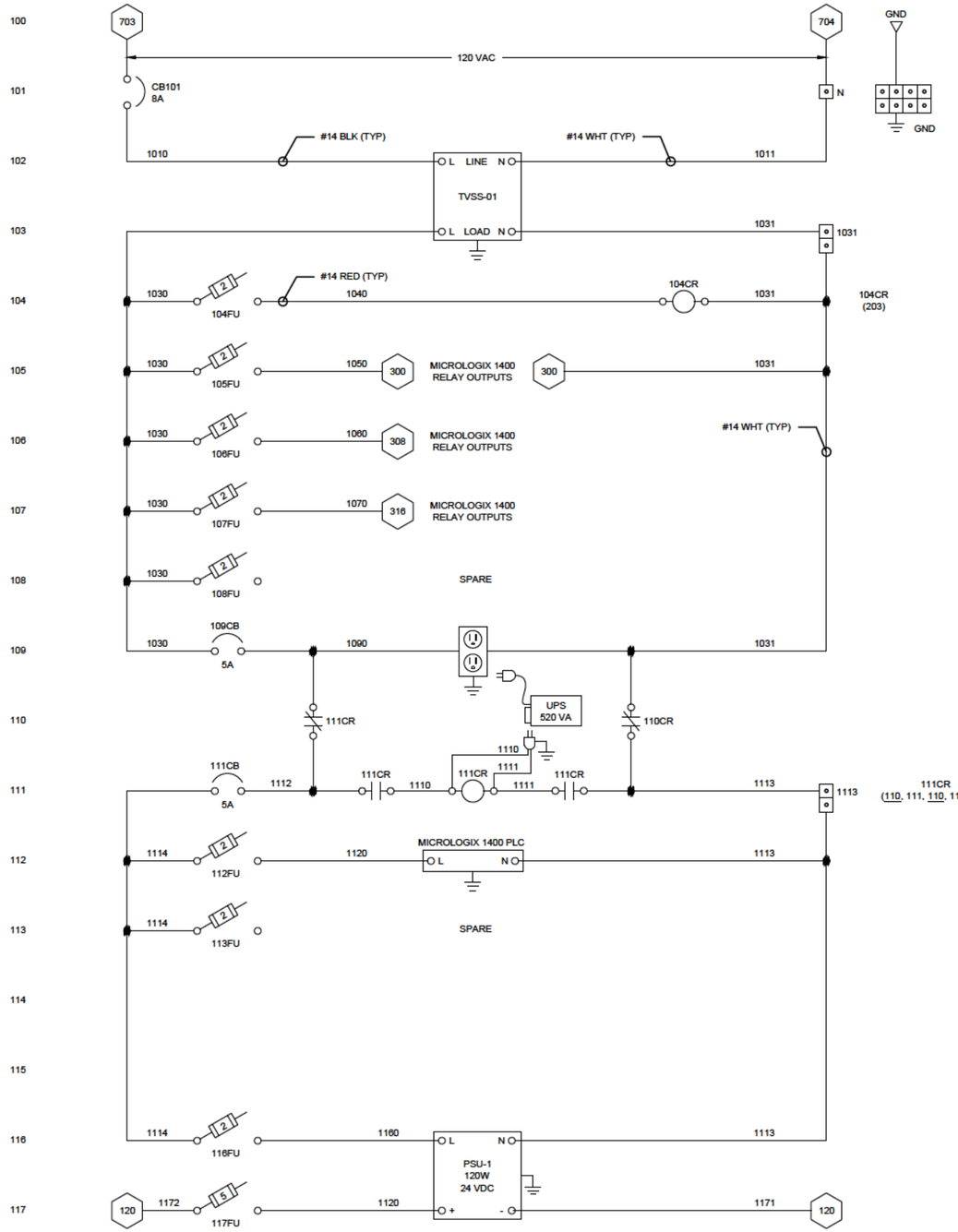

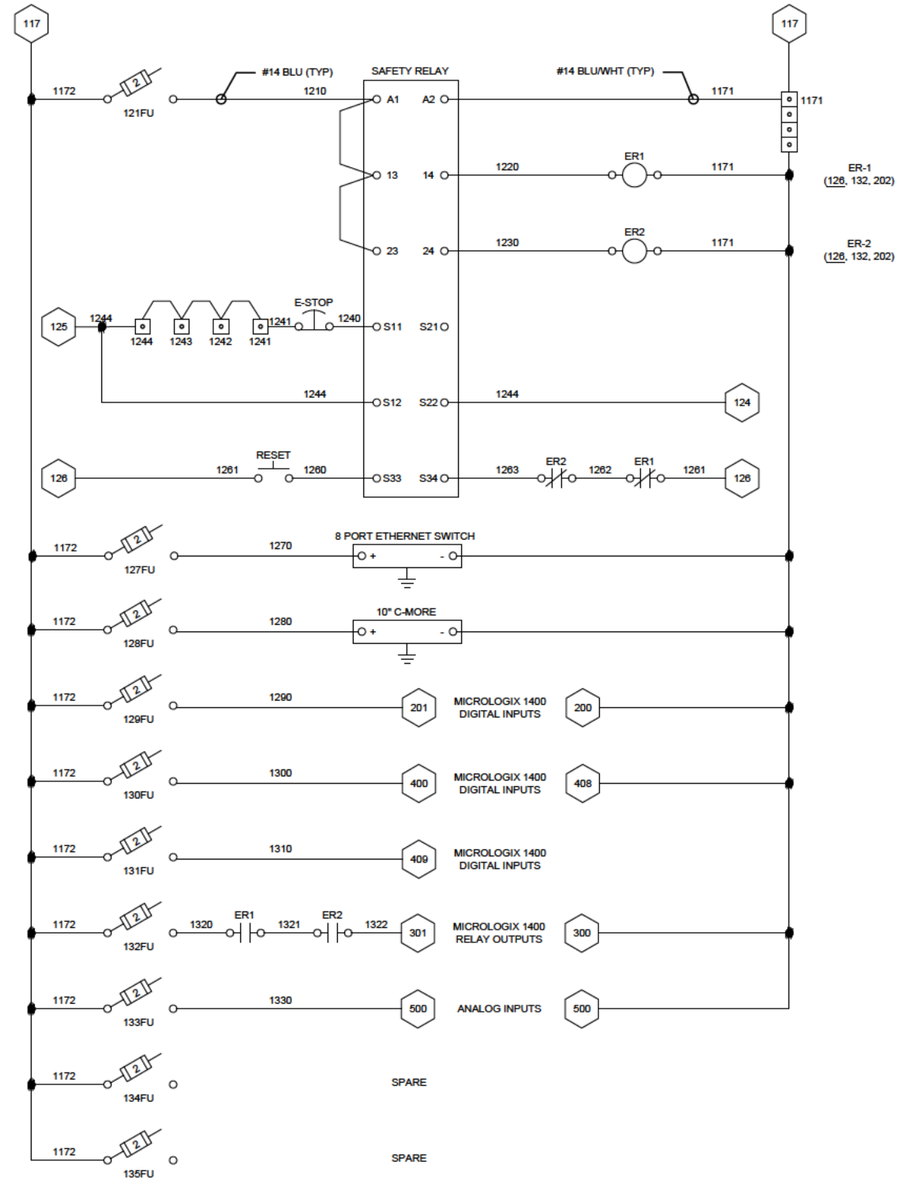

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3	8/12/2016	FOR BID	MK	DL
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1	4/29/2016	DRAFT	KE	DL

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USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL POWER DISTRIBUTION WIRING DIAGRAM

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
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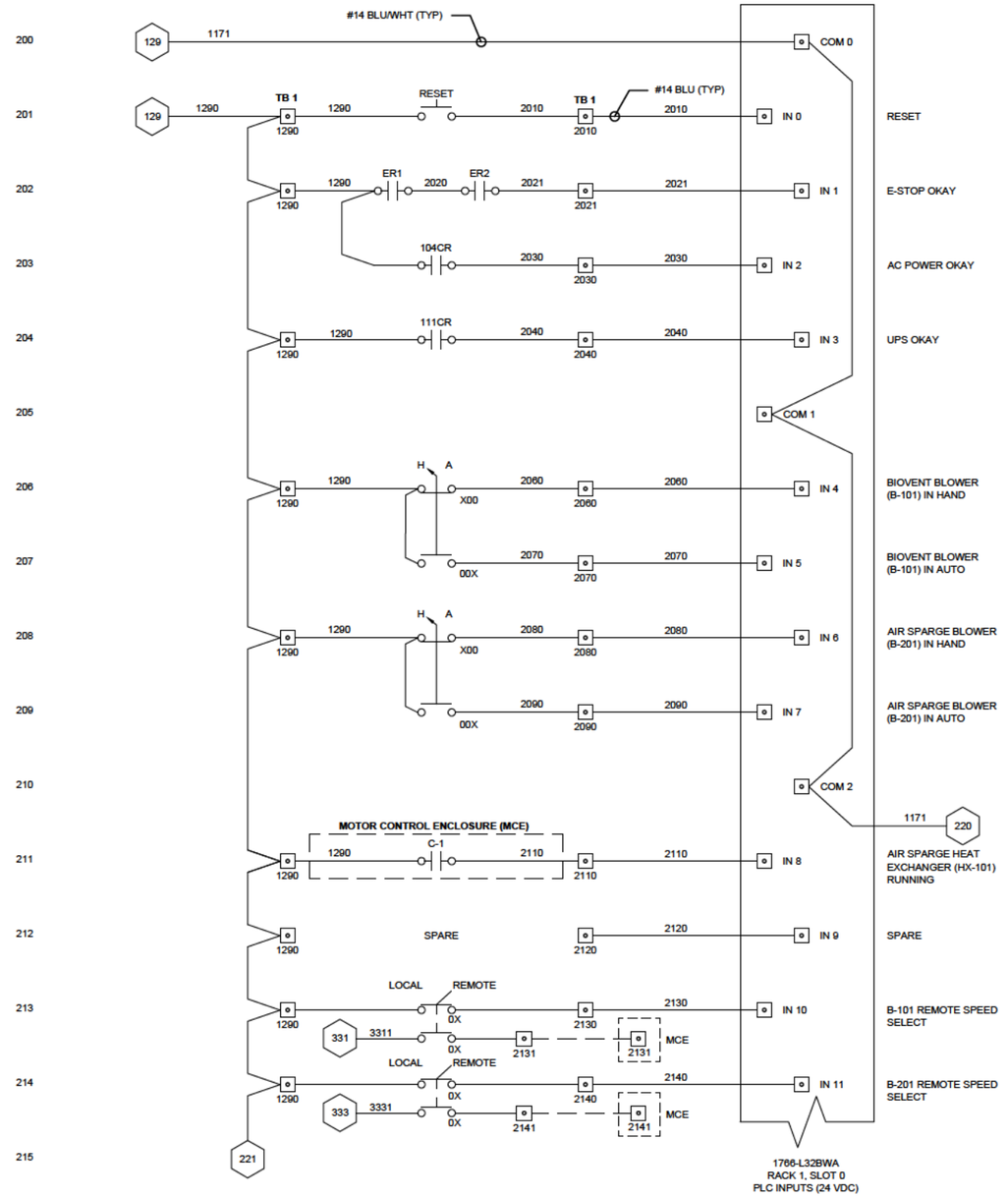

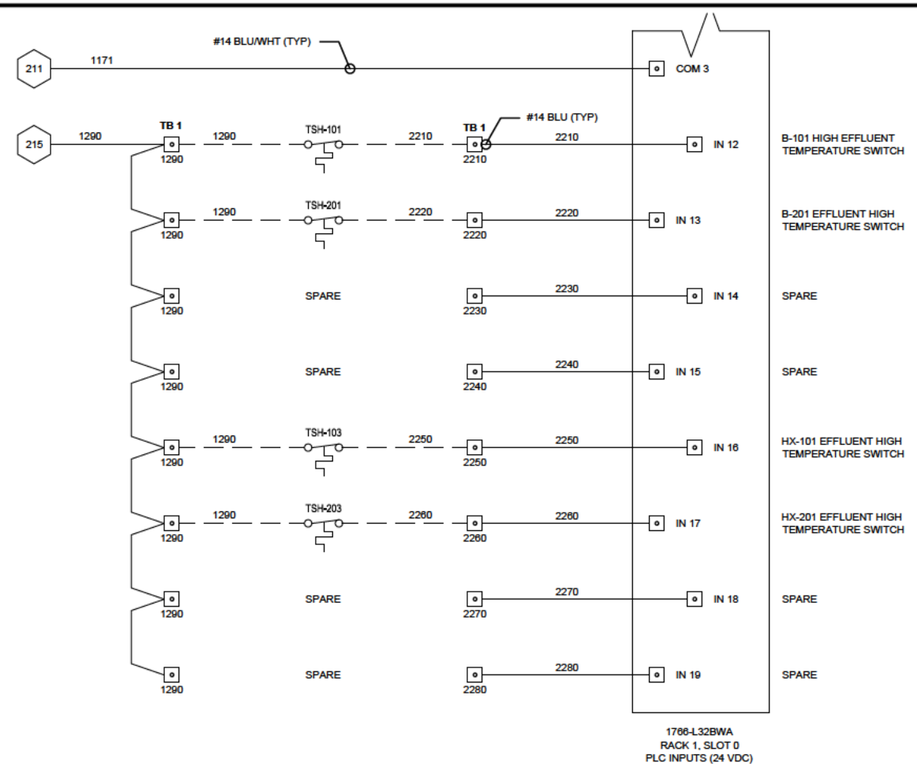

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ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 DISCRETE INPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

ARCADIS
824 MARKET STREET
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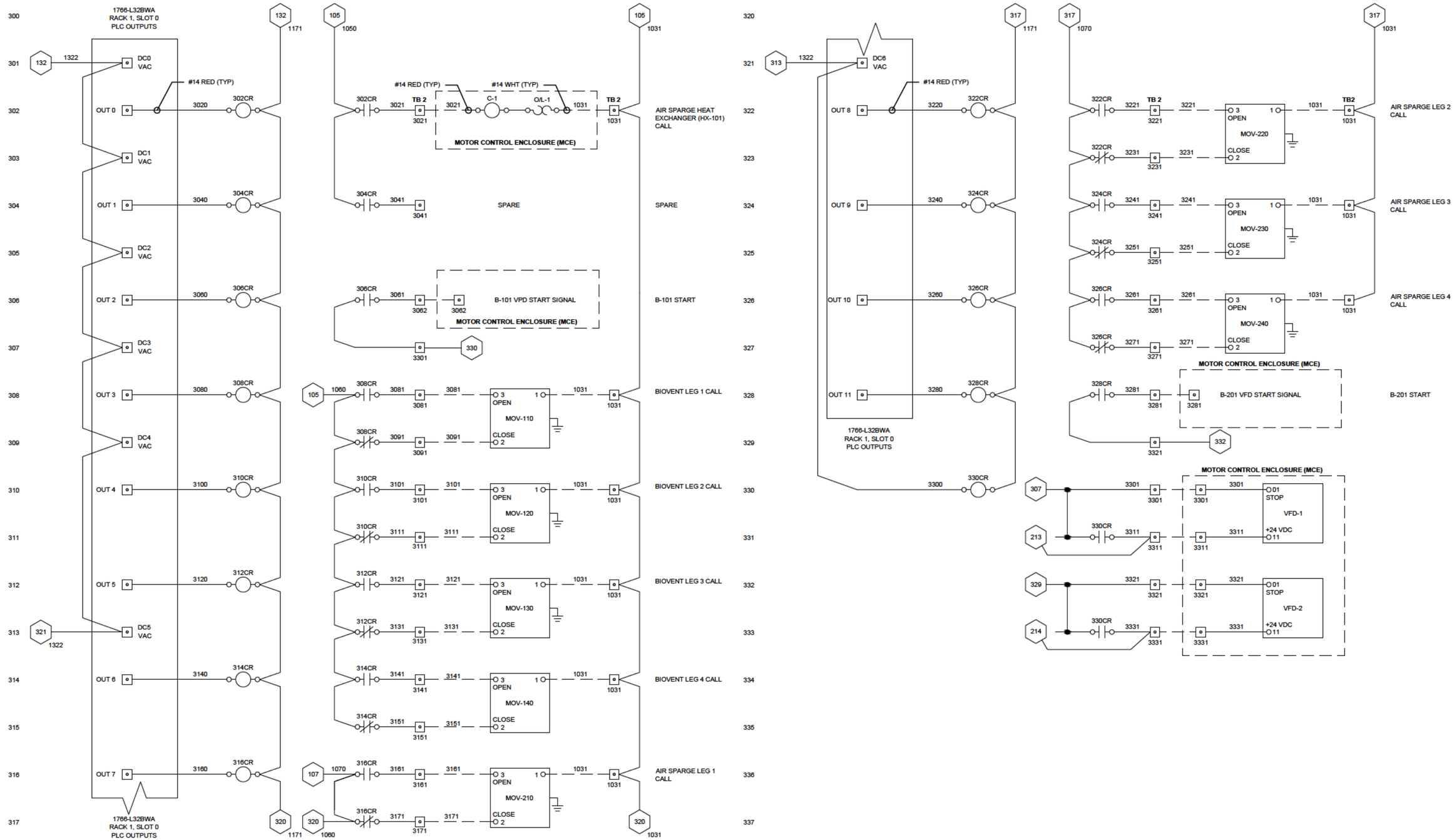

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ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

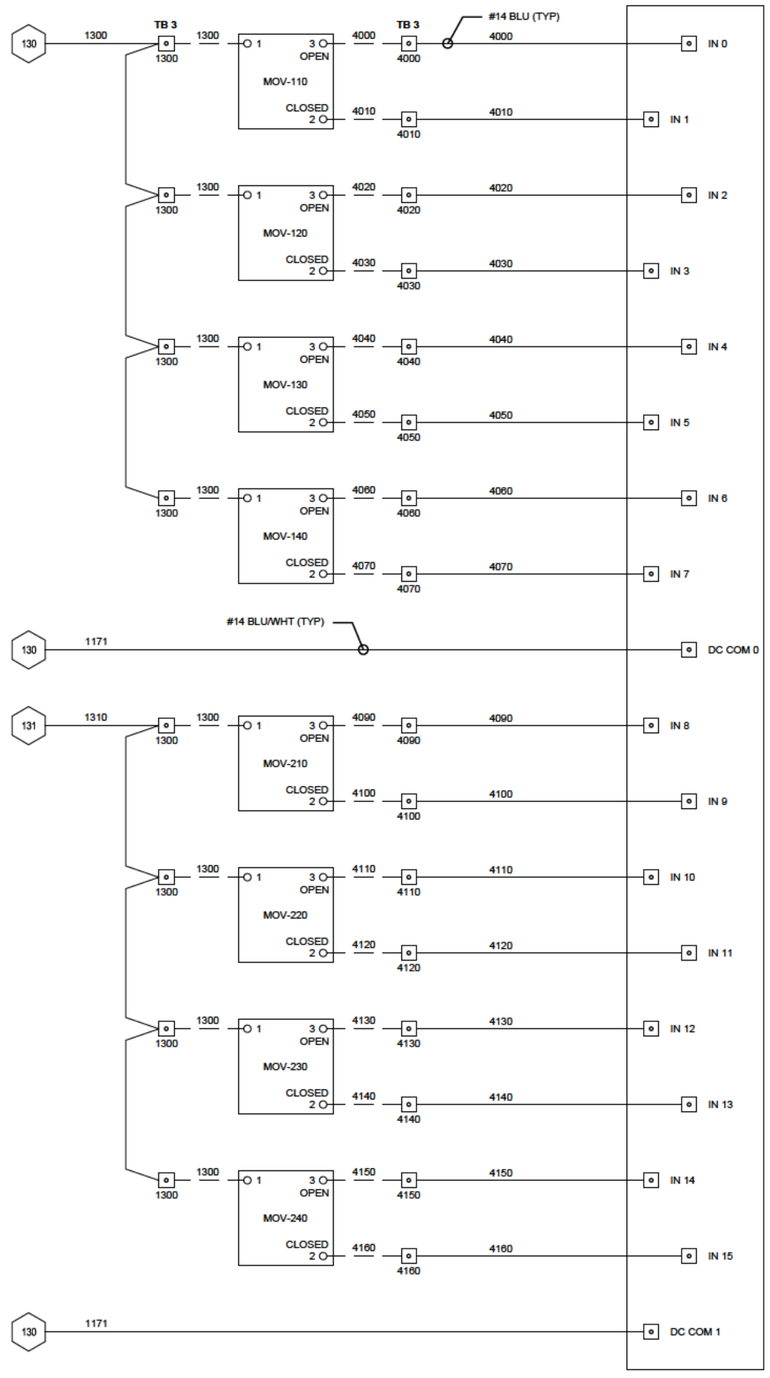
PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 RELAY OUTPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-AS3



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E0262046X05

No.	Date	Revisions	By	Ckd
3	8/12/2016	FOR BID	MK	DL
2	8/5/2016	DRAFT FOR REVIEW	KE	DL
1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's Name		
DAVE OBERLE		
Professional Engineer's No.		
State	Date Signed	Project Mgr.
PA		ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT ● 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 1 DISCRETE INPUTS

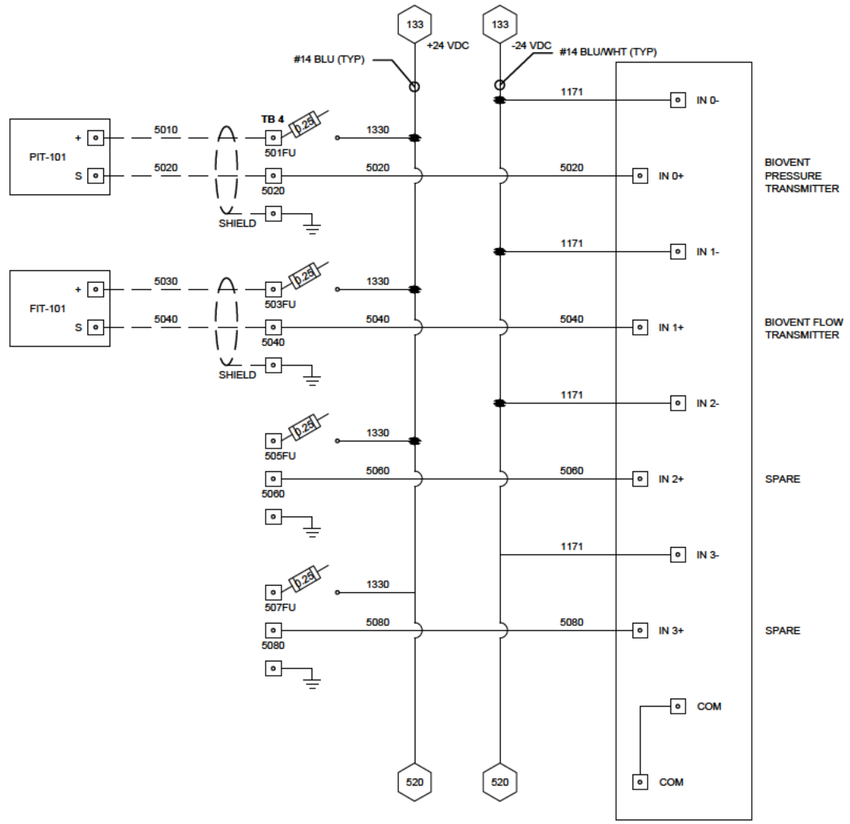
ELECTRICAL

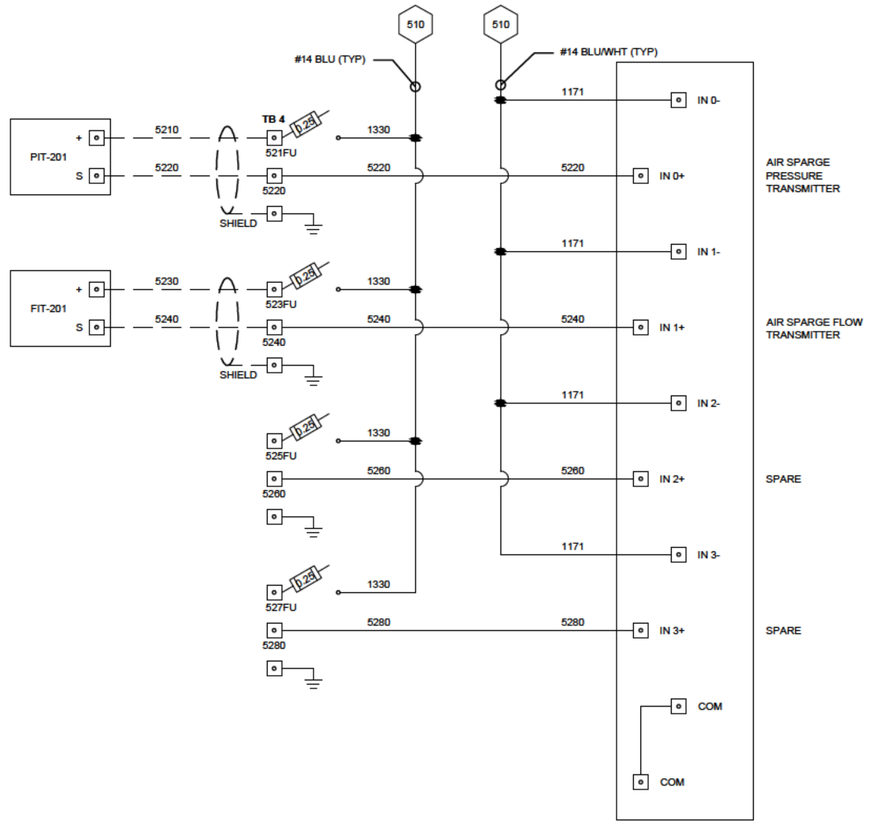
ARCADIS Project No. 06262046.0005.00004

Date APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-AS4





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1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's Name: DAVE OBERLE
Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL SLOTS 2 AND 3 ANALOG INPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

ARCADIS
824 MARKET STREET
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TEL. 302.658.1718

I-AS5

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XREFS: IMAGES: PROJECTNAME: ---
E0626046X05

BELDEN 9954
SHIELDED CABLE,
4 COND, 16 GA. (TYP.)

TB6

(MCE)
VFD1
SPEED
(4-20mA)

+ 15
- 14

6011 — b.25 — 601FU — 6010 — IN 0 +

6020 — 6020 — I: 1/0 IN 0 -

GND — 6020

SHIELD

VFD1 SPEED
B-101

(MCE)
VFD2
SPEED
(4-20mA)

+ 15
- 14

6031 — b.25 — 603FU — 6030 — IN 1 +

I: 1/1

6040 — 6040 — IN 1 -

6040

SHIELD

VFD2 SPEED
B-201

V OUT 0

0: 1/0

(MCE)
VFD1
SPEED
SP REF
(4-20mA)

+ 13

6061 — b.25 — 606FU — 6060 — 1 OUT 0

VFD1 SPEED
REF

V OUT 1

0: 1/0

(MCE)
VPD 2
SPEED
SP REF
(4-20mA)

+ 13

6081 — b.25 — 608FU — 6080 — 1 OUT 0

VPD 2 SPEED
REF

JUMPER

JUMPER

COM

1762-IF20F2
2 ANALOG INPUTS
2 ANALOG OUTPUTS
RACK 1, SLOT 4

KEEP FACTORY DEFAULT

ANALOG INPUT SWITCH

ON 1 2

VOLTAGE (ON)

CURRENT (ON)

FACTORY DEFAULT

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Professional Engineer's Name: DAVE OBERLE
Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 4, ANALOG I/O

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
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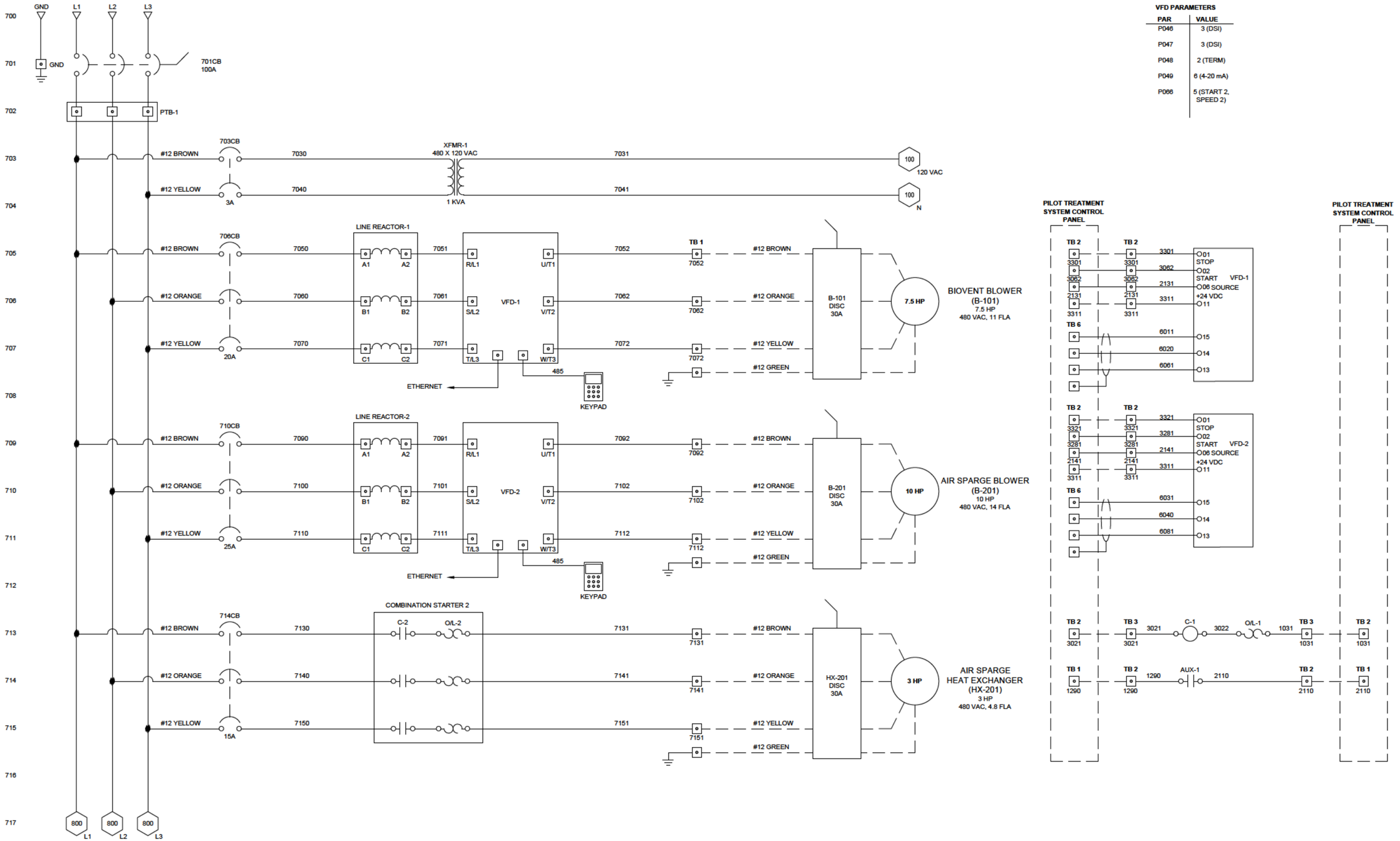
TEL. 302.658.1718

I-AS6



VFD PARAMETERS

PAR	VALUE
P046	3 (DSI)
P047	3 (DSI)
P048	2 (TERM)
P049	6 (4-20 mA)
P066	5 (START 2, SPEED 2)

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: [redacted] PM: [redacted] TM: LYR:ON=*;OFF=*REF*
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ARCADIS U.S., INC.

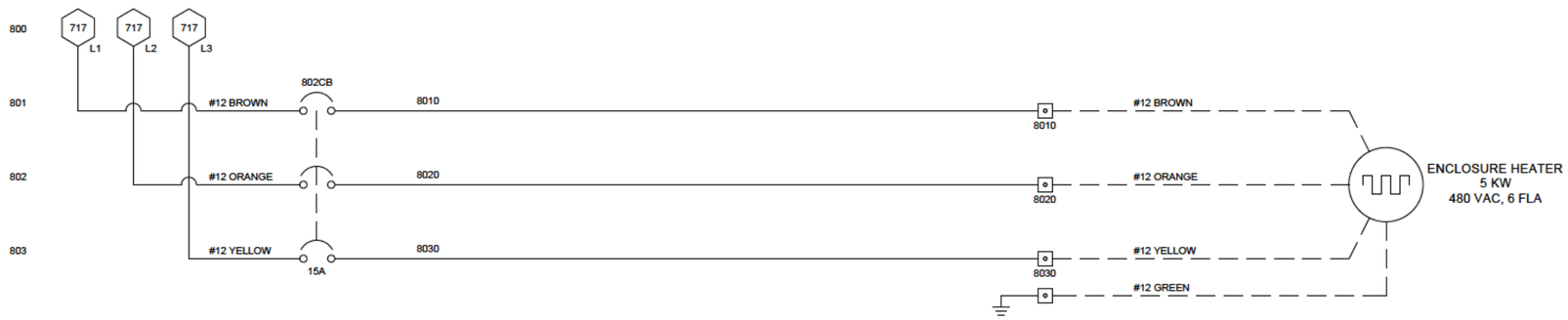
USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 1 OF 2)

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-AS7



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Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

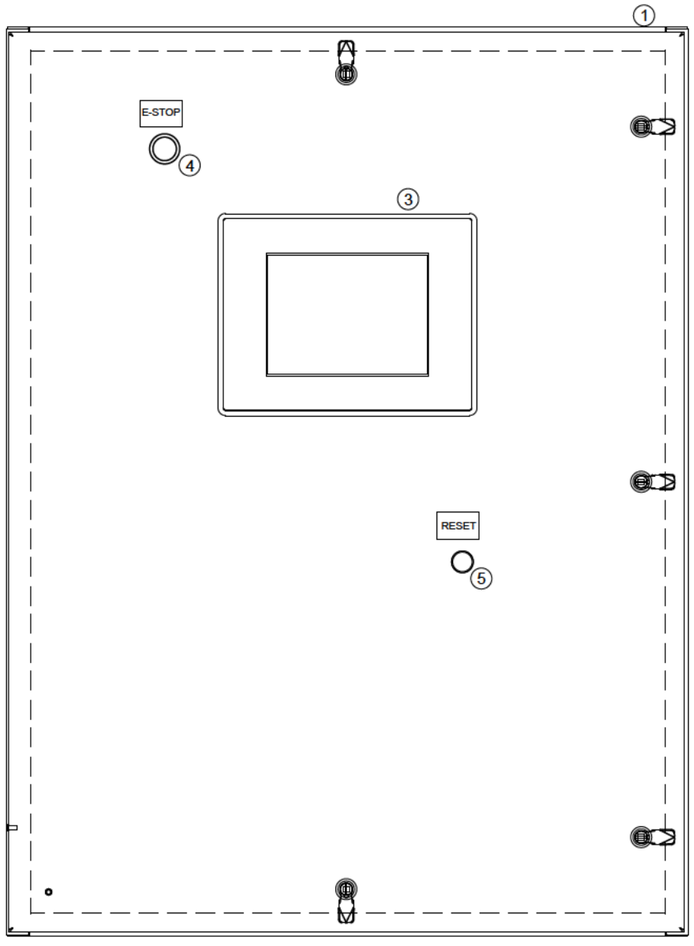
PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 2 OF 2)

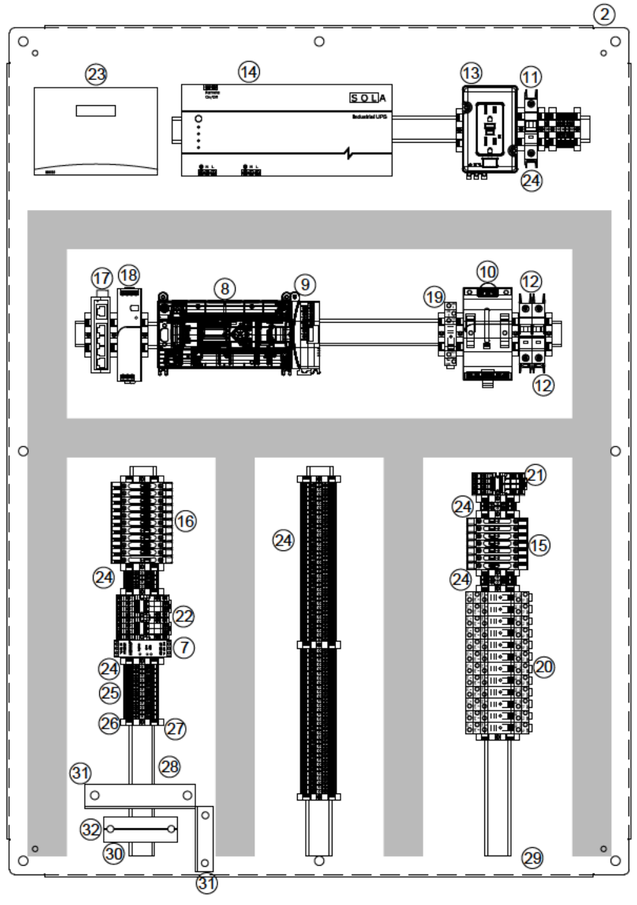
ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date: APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-AS8





TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG #
1	1	STEEL ENCLOSURE 48X36X12	SCE	48EL3612LP
2	1	BACK PANEL FOR ENCLOSURE	SCE	48P36
3	1	6" C-MORE HMI PANEL	C-MORE	EA9-10CL
4	1	RED MUSHROOM HEAD E-STOP (NC) TWIST RELEASE	AB	800FP-MT44PX01S
5	1	BLACK, 22 MM, MOMENTARY PUSH BUTTON	AB	800FP-F2PX10
7	1	DUAL CHANNEL, 24 VDC SAFETY RELAY AUTO/MANUAL RESET	AB	440R-N23117
8	1	MICROLOGIX 1400 PLC	AB	1766-L32BWA
9	1	4 CHANNEL ANALOG INPUT MODULE	AB	1762-F4
10	1	SURGE AND FILTER PROTECTION DEVICE (10A)	AB	4983-DC120-10
11	1	MINIATURE CIRCUIT BREAKER, 1 P, 8 A	AB	1489-M1C080
12	2	MINATURE CIRCUIT BREAKER 1 P, 5 A	AB	1489-M1C050
13	1	DIN RAIL MOUNTED GFCI RECEPTACLE	AB	1492-REC15G
14	1	UL UNINTERUPTABLE POWER SUPPLY (520 VA)	SOLA	S1K520
	1	UL UNINTERUPTABLE POWER SUPPLY MOUNTING BRACKET	SOLA	S1K-PMBRK
15	7	5X20 MM 120 VAC FUSE HOLDER WITH INDICATOR	AB	1492-WFB4250
	7	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
16	11	5x20 MM 24 VDC FUSE HOLDER WITH INDICATOR	AB	1492-WFB424
	1	5X20 MM TIME DELAY CERAMIC FUSES (5 A)	BUSSMAN	S505-5-R
	10	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
17	1	5 PORT INDUSTRIAL ETHERNET SWITCH	N-TRON	105TX
18	1	24 VDC POWER SUPPLY (120 W)	AB	1606-XLE120E
19	1	GENERAL PURPOSE SPDT RELAYS (120 VAC COIL), 16 A	AB	700-HK36A1
20	16	GENERAL PURPOSE SPDT RELAYS (24 VDC COIL), 16 A	AB	700-HK36A24
	17	5 PIN RELAY SOCKETS	AB	700-HN221
21	1	4PDT GENERAL PURPOSE RELAYS (120 VAC COIL), 7 A	AB	700-HC24A1
22	2	4PDT GENERAL PURPOSE RELAYS (24 VDC COIL), 7 A	AB	700-HC24A24
	3	14 PIN RELAY SOCKET	AB	700-HN104
23	1	ETHERNET RADIO	SCHNIEDER	JR900
24	TBD	IEC TERMINAL BLOCK (30 A)	AB	1492-J3
25	TBD	IEC GROUND TERMINAL BLOCK	AB	1492-J3G
26	TBD	IEC PLUG IN DEVICE TERMINAL BLOCK	AB	1492-J3P
	TBD	FUSE PLUG WITH BLOWN FUSE INDICATION (10-36 V)	AB	1492-FPK224
	TBD	5X20 MM TIME DELAY CERAMIC FUSES (500 MA)	AB	S505-500-R
27	TBD	END ANCHORS	TBD	
28	TBD	DIN RAIL	TBD	
29	TBD	WIRING DUCT	TBD	
30	1	ANALOG IS BARRIER	WEIDMULLER	9918010000
31	1	SAFETY BARRIER	WEIDMULLER	9916290000
32	2	DIGITAL IS BARRIER		

LEGEND

- DENOTES TERMINAL BLOCK CONNECTION
- DASHED LINES DENOTES WIRING TO FIELD DEVICES
- DASHED WITH PATTERN DENOTES DEVICES IN REMOTE LOCATIONS

LINE NUMBER DESCRIPTION

0000
- WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS)
- LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000
- WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS)
- WIRE NUMBER (ALWAYS 1 DIGIT)
- LINE NUMBER (ALWAYS 2 DIGITS)

TB TERMINAL BLOCK

0 4" 8" 12"
SCALE IN INCHES

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: PM: TM: LYR:ON=*OFF=*REF*
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ED0262046X05

No.	Date	Revisions	By	Ckd
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1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM PANEL LAYOUT

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016
ARCADIS 824 MARKET STREET SUITE 820 WILMINGTON, DE 19801 TEL. 302.658.1718

I-N0

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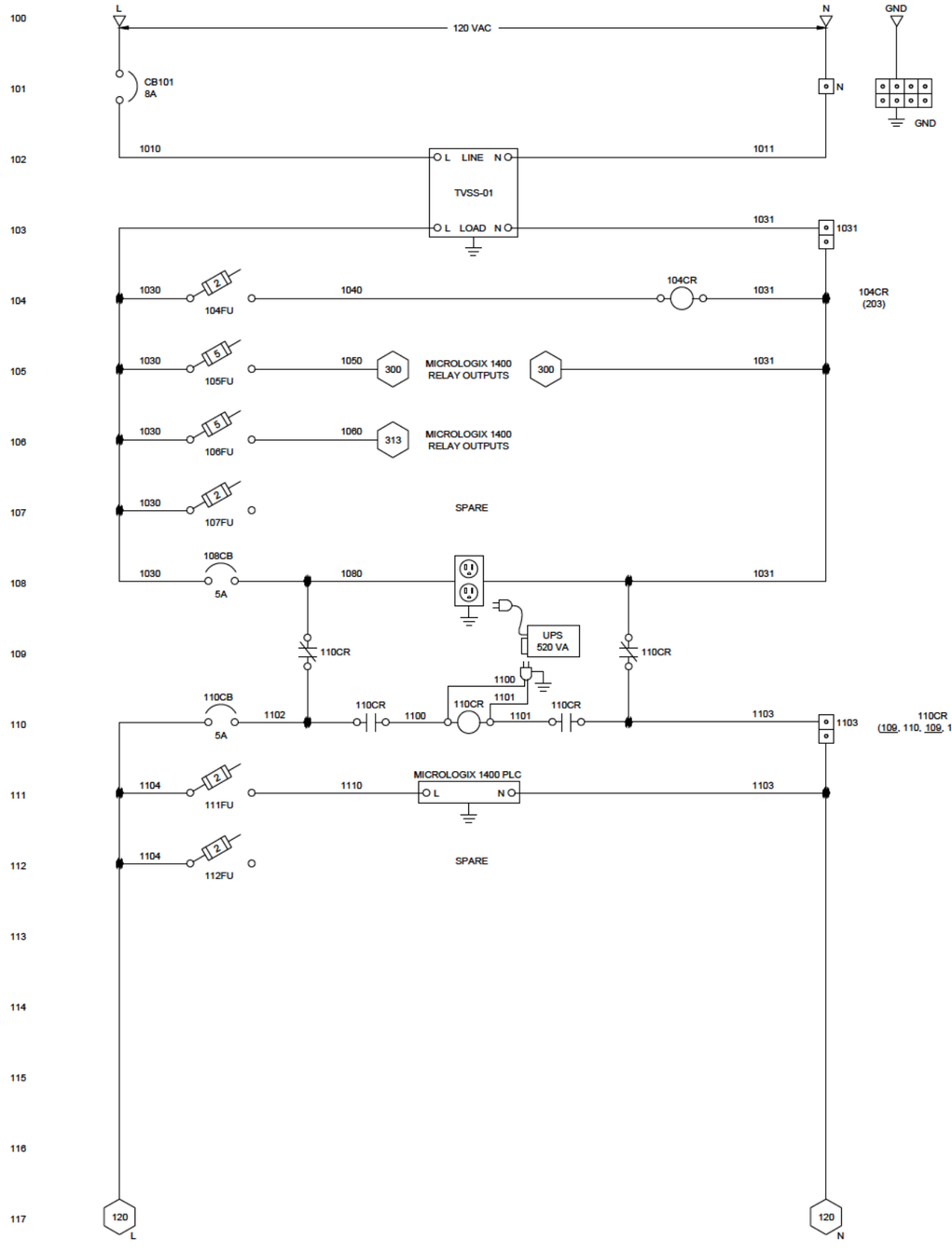

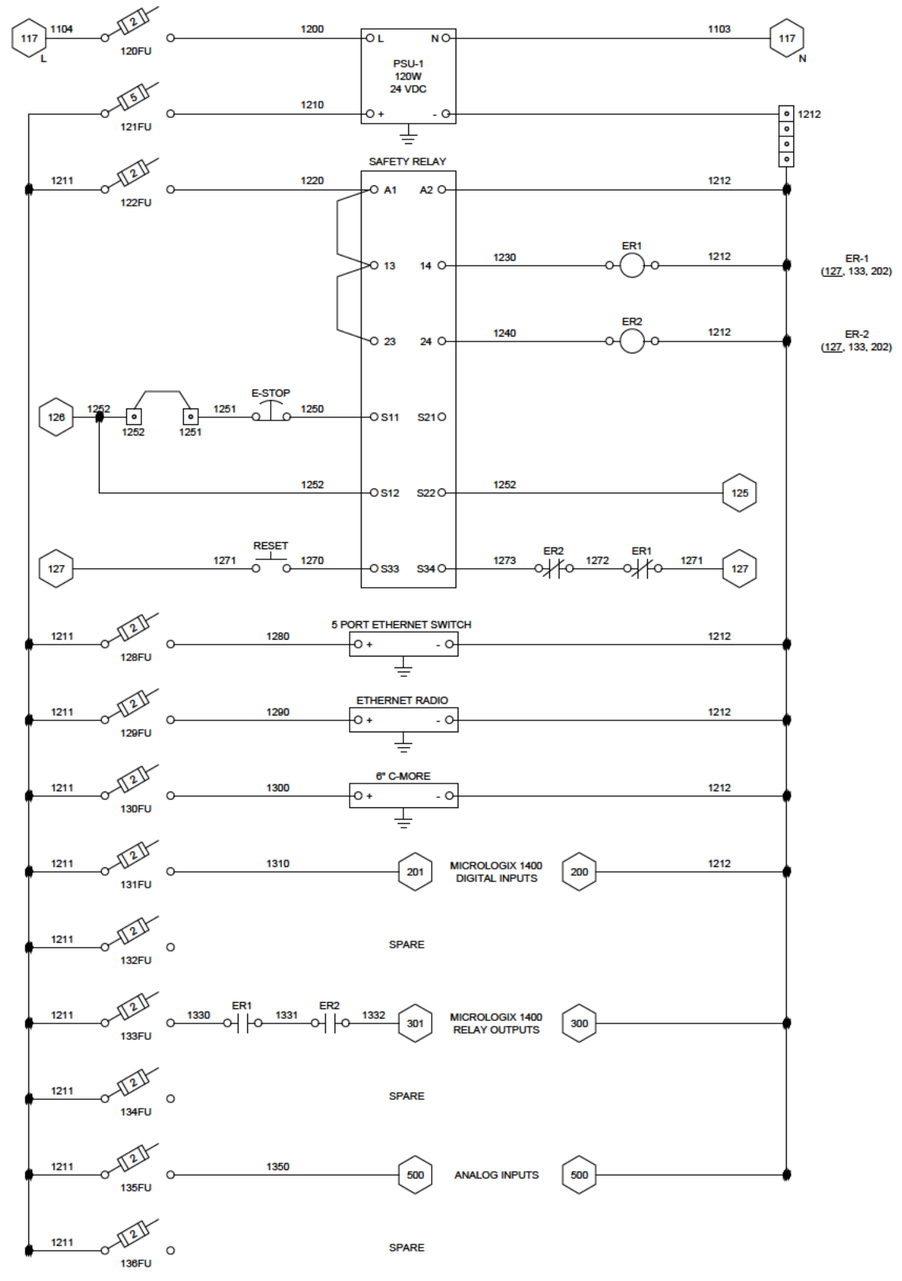

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Professional Engineer's No.:

State	Date Signed	Project Mgr.
PA		ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM POWER DISTRIBUTION

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
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WILMINGTON, DE 19801
TEL. 302.658.1718

I-N1

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: [redacted] PM: [redacted] TM: LYR:ON=*;OFF=*REF*
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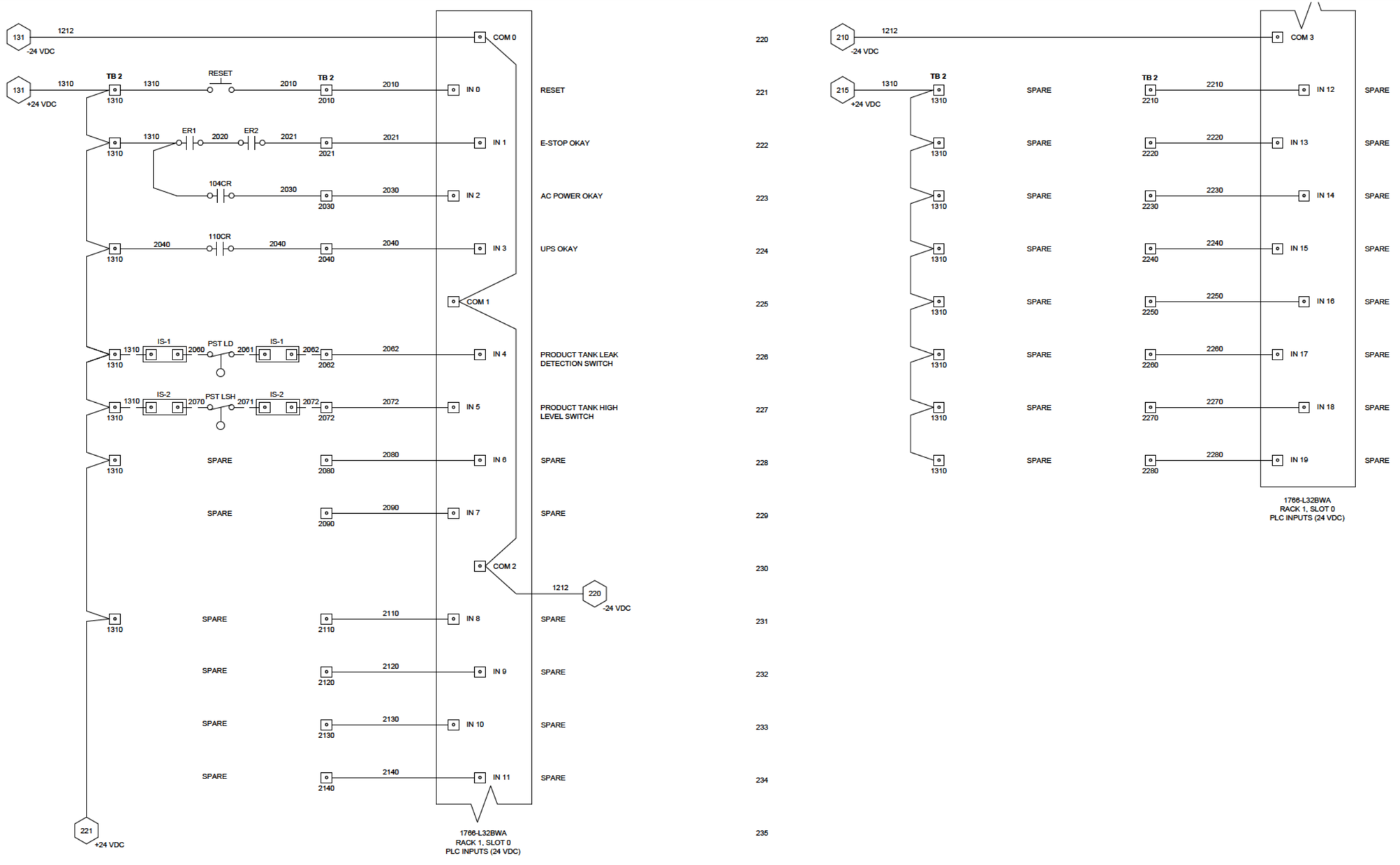

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Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM
MICROLOGIX 1400 24 VDC DISCRETE INPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004

Date APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-N2

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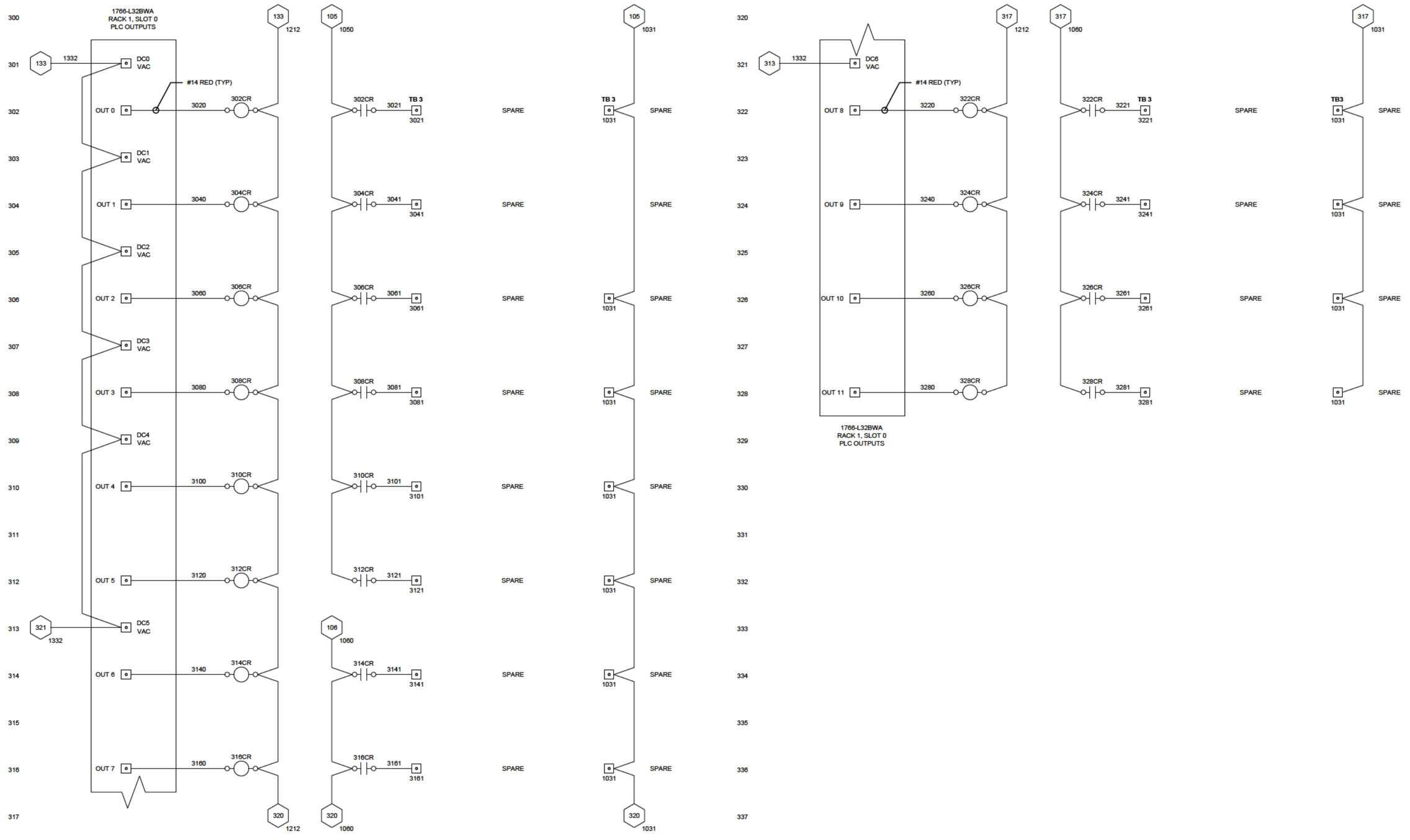

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Professional Engineer's Name: DAVE OBERLE		
Professional Engineer's No.		
State: PA	Date Signed	Project Mgr.: ML
Designed by: DL	Drawn by: KE	Checked by: DL

ARCADIS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM
MICROLOGIX 1400 RELAY OUTPUTS

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-N3

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XREFS: IMAGES: PROJECTNAME: ---
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No.	Date	Revisions	By	Ckd
3	8/12/2016	FOR BID	MK	DL
2	8/5/2016	DRAFT FOR REVIEW	KE	DL
1	4/29/2016	DRAFT	KE	DL

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FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
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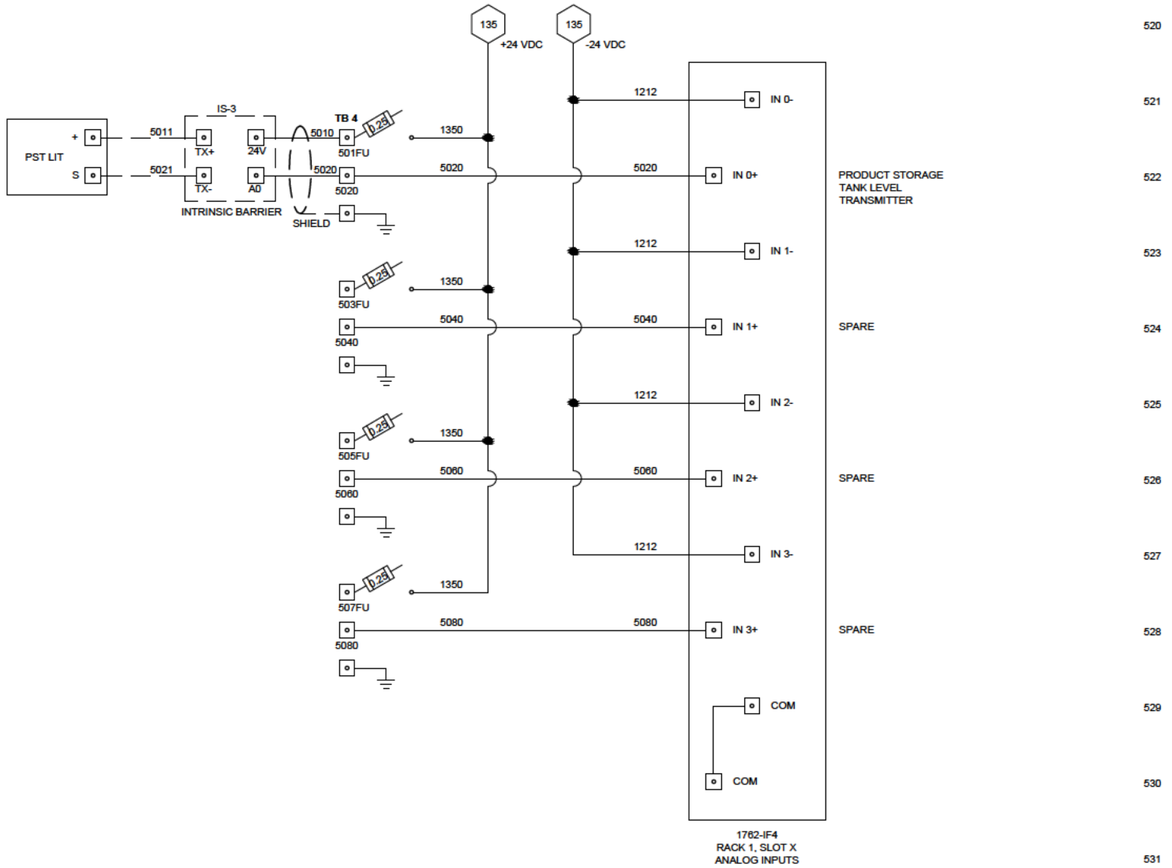
I-N4



PRODUCT STORAGE TANK LEVEL TRANSMITTER

SPARE

SPARE

SPARE

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USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
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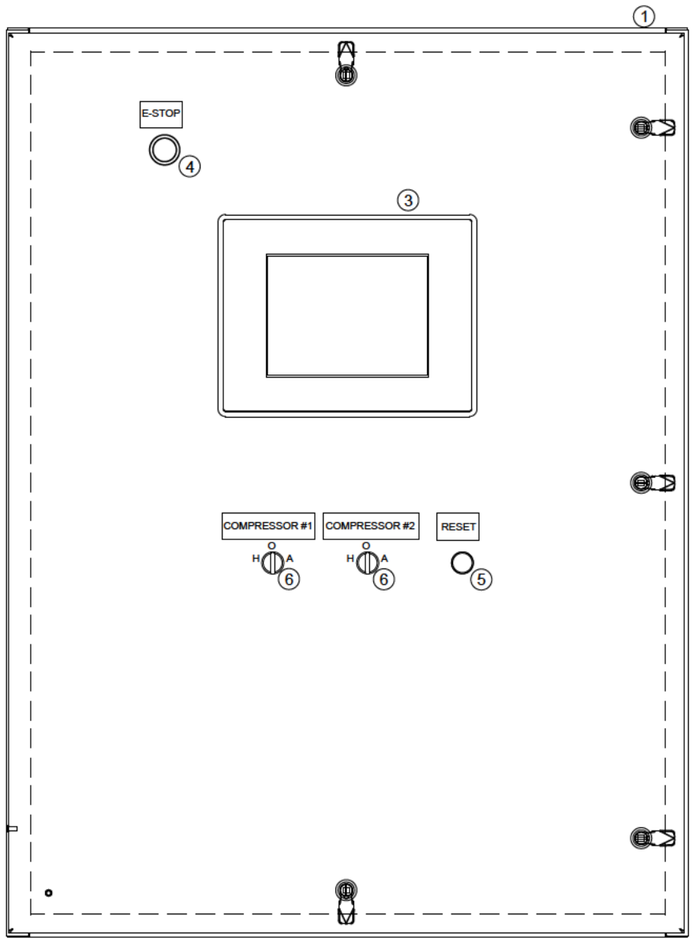
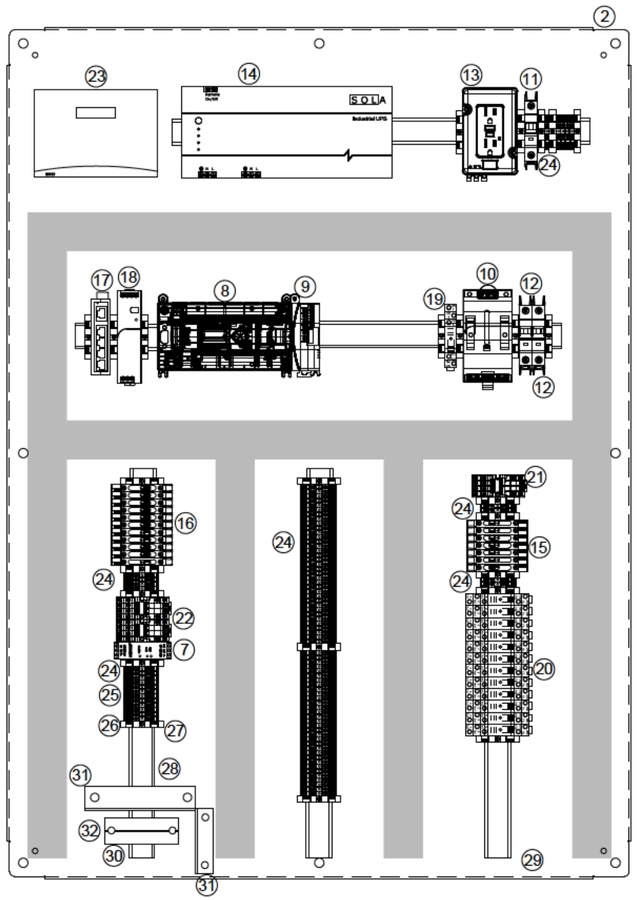
I-N5





TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG #
1	1	STEEL ENCLOSURE 48X36X12	SCE	48EL3612LP
2	1	BACK PANEL FOR ENCLOSURE	SCE	48P36
3	1	6" C-MORE HMI PANEL	C-MORE	EA9-10CL
4	1	RED MUSHROOM HEAD E-STOP (NC) TWIST RELEASE	A8	800FP-MT44PX01S
6	2	BLACK, 22 MM, 3 POSITION MAINTAINED SELECTOR SWITCH (2 NO)	A8	800FP-SM32PX20
5	1	BLACK, 22 MM, MOMENTARY PUSH BUTTON	A8	800FP-F2PX10
7	1	DUAL CHANNEL, 24 VDC SAFETY RELAY AUTO/MANUAL RESET	A8	440R-N23117
8	1	MICROLOGIX 1400 PLC	A8	1766-L32BWA
9	1	4 CHANNEL ANALOG INPUT MODULE	A8	1762-IF4
10	1	SURGE AND FILTER PROTECTION DEVICE (10A)	A8	4983-DC120-10
11	1	MINIATURE CIRCUIT BREAKER, 1 P, 6 A	A8	1489-M1C060
12	2	MINATURE CIRCUIT BREAKER 1 P, 5 A	A8	1489-M1C050
13	1	DIN RAIL MOUNTED GFCI RECEPTACLE	A8	1492-REC15G
14	1	UL UNINTERUPTABLE POWER SUPPLY (520 VA)	SOLA	S1K520
	1	UL UNINTERUPTABLE POWER SUPPLY MOUNTING BRACKET	SOLA	S1K-PMBRK
15	7	5X20 MM 120 VAC FUSE HOLDER WITH INDICATOR	A8	1492-WFB4250
	7	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
16	11	5x20 MM 24 VDC FUSE HOLDER WITH INDICATOR	A8	1492-WFB424
	1	5X20 MM TIME DELAY CERAMIC FUSES (5 A)	BUSSMAN	S505-5-R
	10	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
17	1	5 PORT INDUSTRIAL ETHERNET SWITCH	N-TRON	105TX
18	1	24 VDC POWER SUPPLY (120 W)	A8	1606-XLE120E
19	1	GENERAL PURPOSE SPDT RELAYS (120 VAC COIL), 16 A	A8	700-HK36A1
20	16	GENERAL PURPOSE SPDT RELAYS (24 VDC COIL), 16 A	A8	700-HK36A24
	17	5 PIN RELAY SOCKETS	A8	700-HN221
21	1	4PDT GENERAL PURPOSE RELAYS (120 VAC COIL), 7 A	A8	700-HC24A1
22	2	4PDT GENERAL PURPOSE RELAYS (24 VDC COIL), 7 A	A8	700-HC24A24
	3	14 PIN RELAY SOCKET	A8	700-HN104
23	1	ETHERNET RADIO	SCHNIEDER	JR900
24	TBD	IEC TERMINAL BLOCK (30 A)	A8	1492-J3
25	TBD	IEC GROUND TERMINAL BLOCK	A8	1492-J3G
26	TBD	IEC PLUG IN DEVICE TERMINAL BLOCK	A8	1492-J3P
	TBD	FUSE PLUG WITH BLOWN FUSE INDICATION (10-36 V)	A8	1492-FPK224
	TBD	5X20 MM TIME DELAY CERAMIC FUSES (500 MA)	A8	S505-500-R
27	TBD	END ANCHORS	TBD	
28	TBD	DIN RAIL	TBD	
29	TBD	WIRING DUCT	TBD	
30	1	ANALOG INPUT IS BARRIER	A8	9918010000
31	1	SAFETY BARRIER		
32	2	DIGITAL INPUT IS BARRIER (# CH)	WEIDMULLER	9916290000

LEGEND

- DENOTES TERMINAL BLOCK CONNECTION
- DASHED LINES DENOTES WIRING TO FIELD DEVICES
- DASHED WITH PATTERN DENOTES DEVICES IN REMOTE LOCATIONS

LINE NUMBER DESCRIPTION

0000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); WIRE NUMBER (ALWAYS 1 DIGIT); LINE NUMBER (ALWAYS 2 DIGITS)

TB TERMINAL BLOCK

0 4" 8" 12"
SCALE IN INCHES

CITY: WILMINGTON, DE DV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: [redacted] PM: [redacted] TM: LYR:ON=*;OFF=*REF*
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PA		ML
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DL	KE	DL

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USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM PANEL LAYOUT

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

ARCADIS
824 MARKET STREET
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WILMINGTON, DE 19801
TEL. 302.658.1718

I-S0

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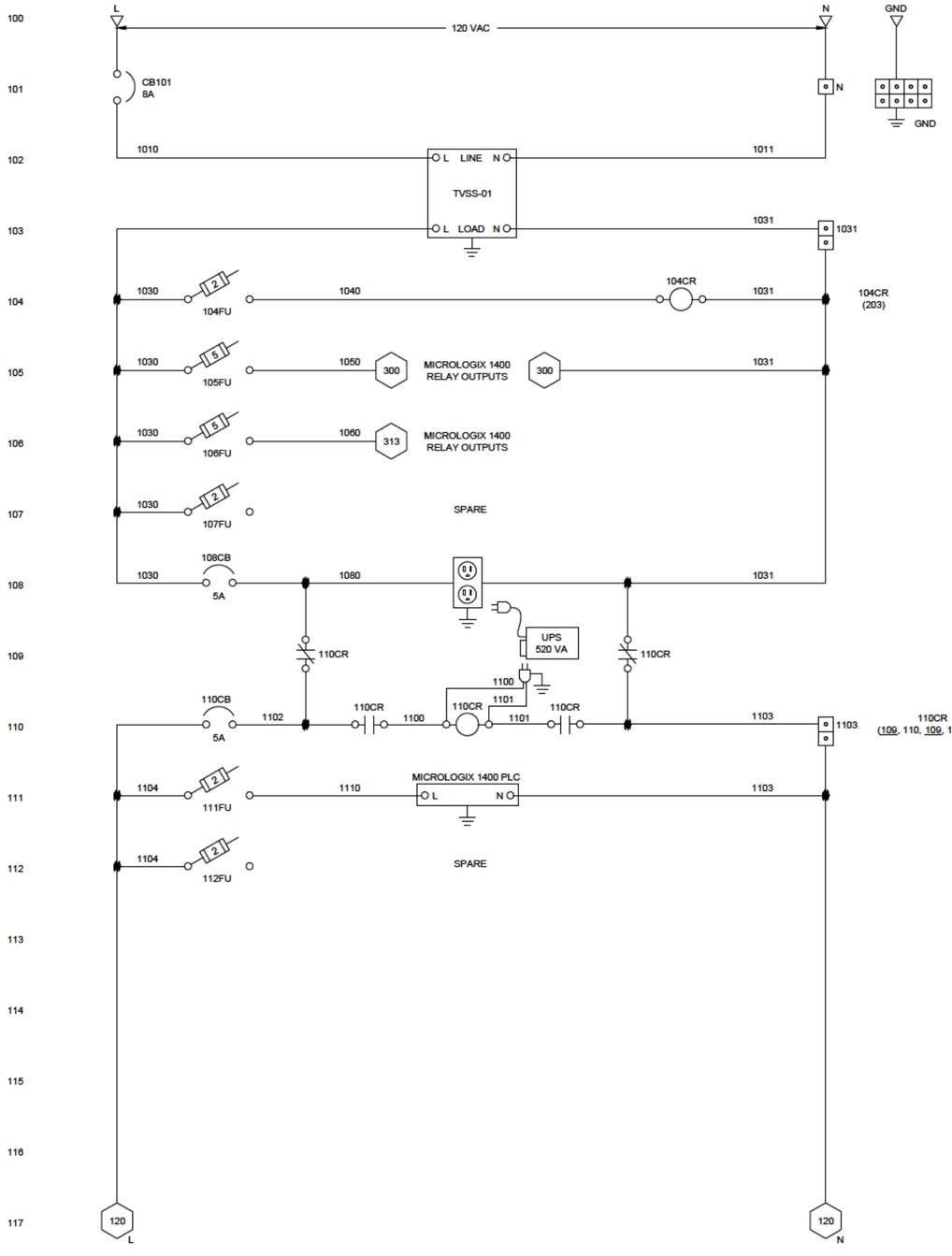

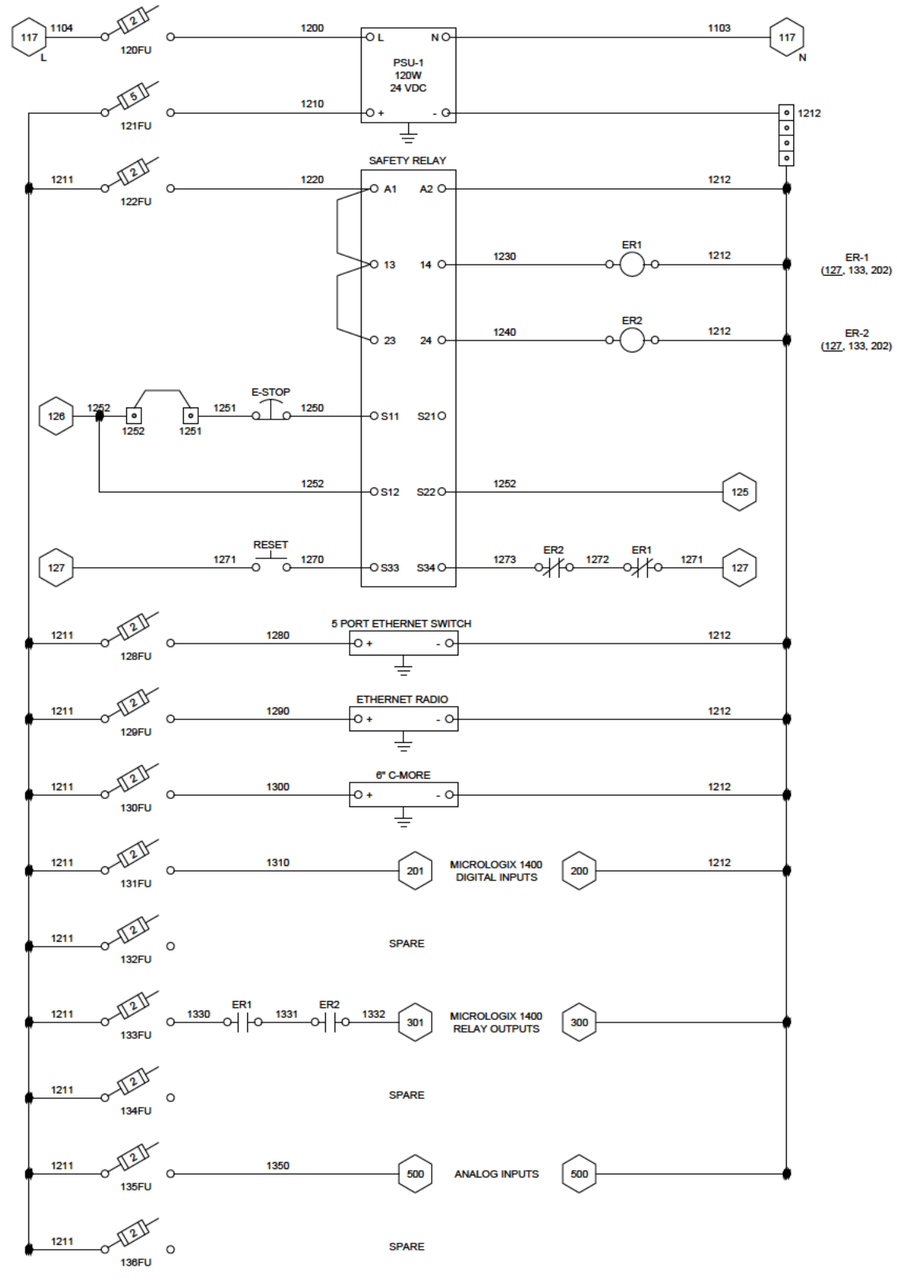

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USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM POWER DISTRIBUTION

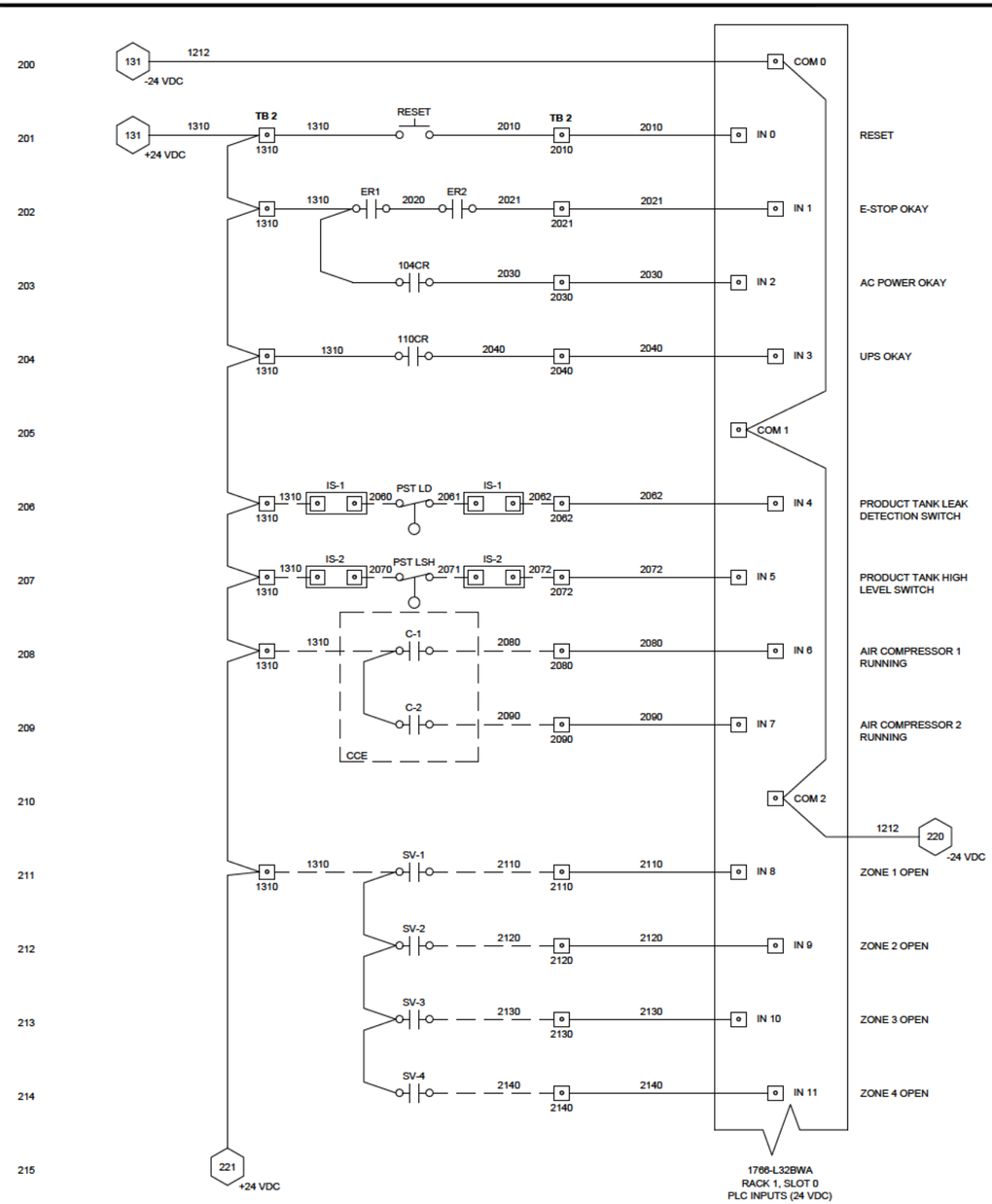
ELECTRICAL

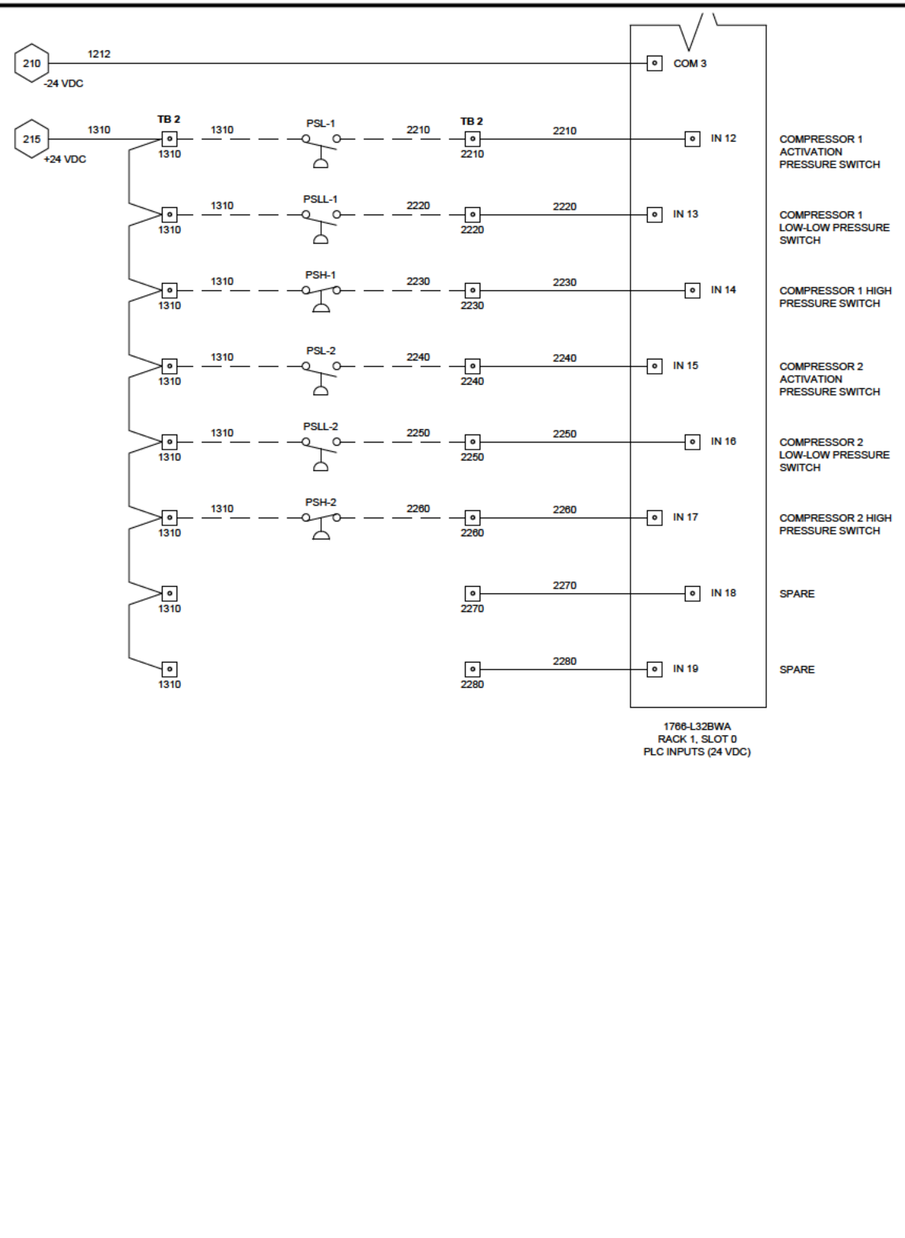
ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S1





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FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM
MICROLOGIX 1400 24 VDC DISCRETE INPUTS

ELECTRICAL

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Date APRIL 2016

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SUITE 820
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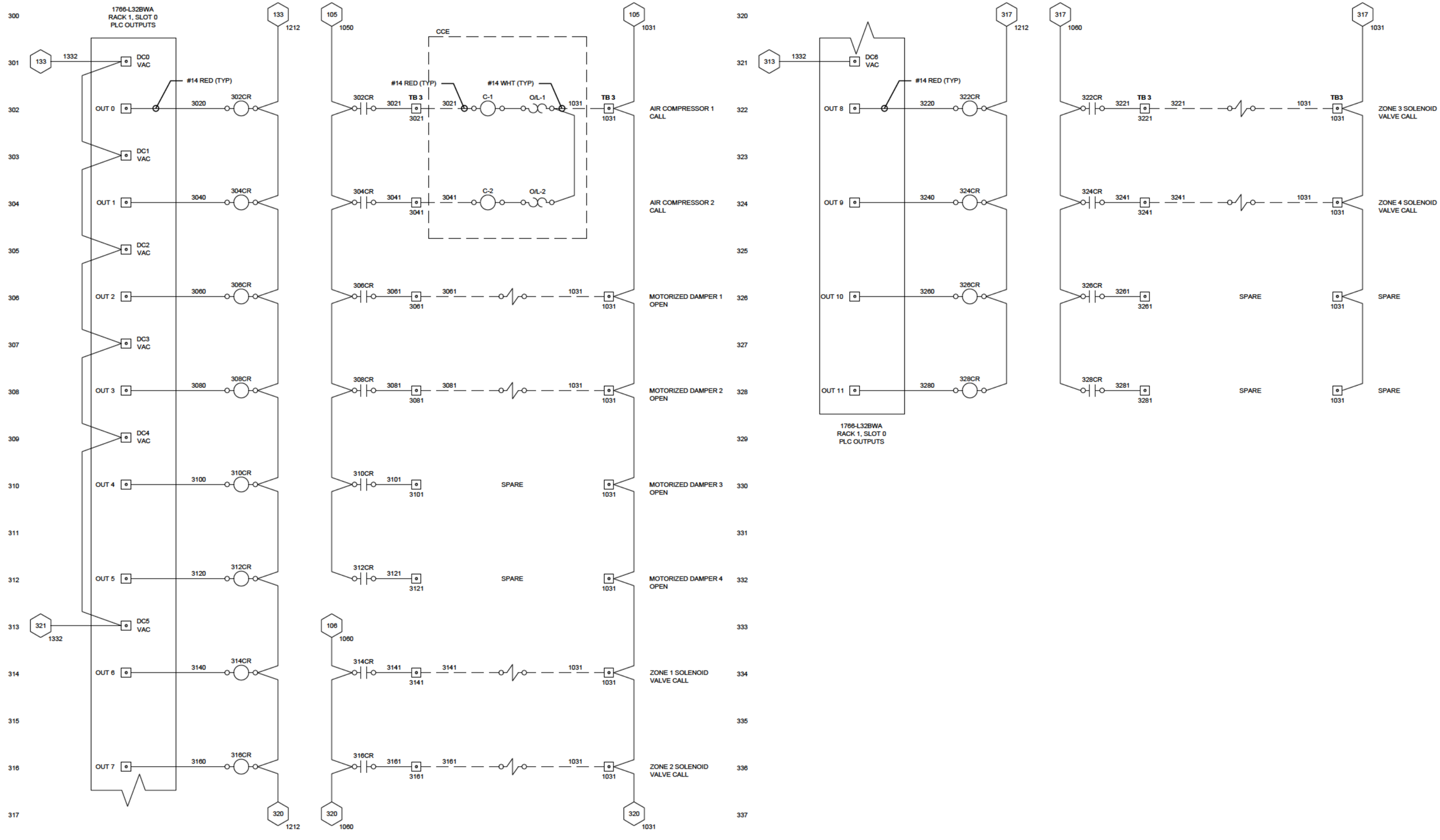
I-S2



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FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM
MICROLOGIX 1400 RELAY OUTPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
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SOUTHERN SKIMMER SYSTEM

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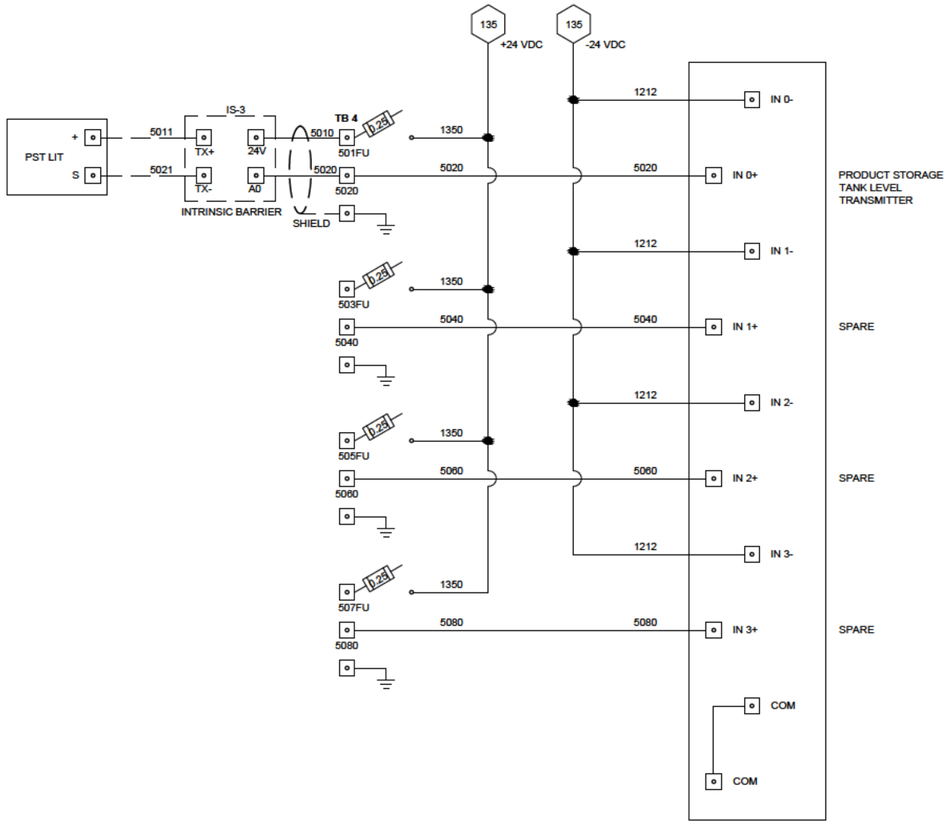

PRODUCT STORAGE TANK LEVEL TRANSMITTER

SPARE

SPARE

SPARE

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FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
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I-S5

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FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM

ELECTRICAL

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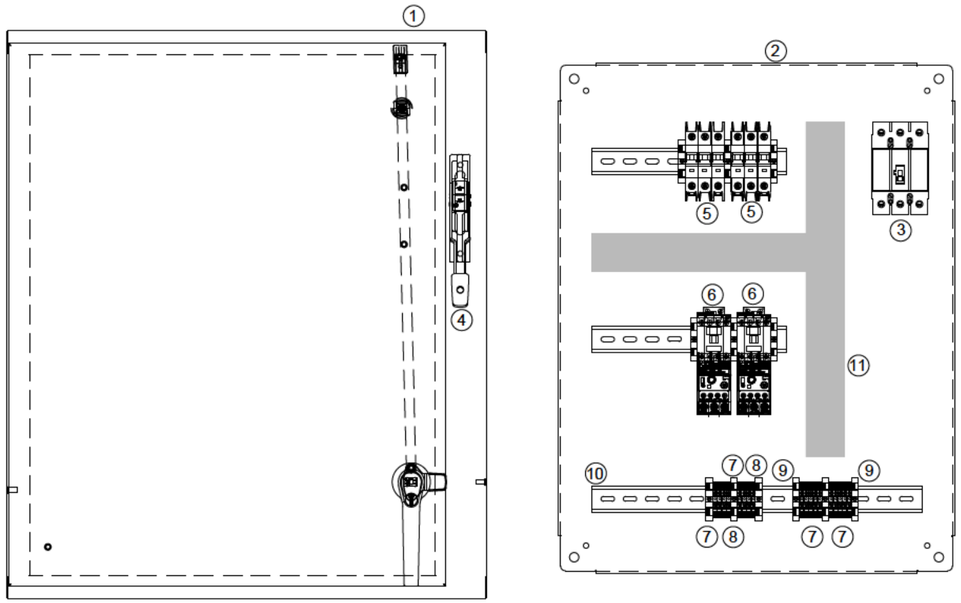
I-S6



TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG#
1	1	STEEL DISCONNECT ENCLOSURE 30X25X10	SCE	30XEL2510LP
2	1	BACK PANEL FOR ENCLOSURE	SCE	30P24
3	1	AB MOLDED CASE CIRCUIT BREAKER (T/M), 25 KA, 30 A	AB	140G-G2C3-C30
4	1	AB FLEX CABLE OPERATOR (NON METALIC HANDLE)	AB	140G-GFCX04
5	2	MINIATURE CIRCUIT BREAKER 1P, 15A	AB	1489-M3C150
6	2	NEMA NON-REVERSING E-COMBO STARTER, 7.5 HP, 480 VAC, 120 VAC COIL	AB	509-AOD-EEE
7	TBD	IEC TERMINAL BLOCK (30 A)	AB	1492-J3
8	TBD	IEC GROUND TERMINAL BLOCK	AB	1492-J3G
9	TBD	END ANCHOR	TBD	
10	TBD	DIN RAIL	TBD	
11	TBD	WIRING DUCT	TBD	

0 4" 8" 12"
SCALE IN INCHES

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: M.SHATTUCK PIC: PM: TM: LYR:ON=*OFF=*REF*
G:\EIC_DWG\PROJECTS\DSCP\DWG\CAD\SKIMMER PANELS - SOUTH.dwg LAYOUT: I-S7 SAVED: 8/12/2016 9:55 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 8/12/2016 10:03 AM BY: ALLEN, JONATHAN V.
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No.	Date	Revisions	By	Ckd
3	8/12/2016	FOR BID	MK	DL
2	8/5/2016	DRAFT FOR REVIEW	KE	DL
1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's Name: DAVE OBERLE
Professional Engineer's No.:
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

COMPRESSOR CONTROL ENCLOSURE (CCE) PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S7

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ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM
MOTOR CONTROL PANEL WIRING DETAILS

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

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I-S8

ELECTRICAL SYMBOL LEGEND

SINGLE LINE DIAGRAM

SERVICE CONNECTION

CIRCUIT BREAKER

DISCONNECT SWITCH

MOTOR

COMBINATION MOTOR STARTER WITH MOTOR CIRCUIT PROTECTOR AND OVERLOADS

METER

GROUND ROD

FUSE

DRY TYPE TRANSFORMER

PANEL

UNIT HEATER

THERMOSTAT

VFD — VARIABLE FREQUENCY DRIVE

HTC — HEAT TRACE CONTROLLER (THERMOSTAT MOUNTED TO PIPING).

SPD — SURGE PROTECTION DEVICE

RECEPTACLES

POWER RECEPTACLE WITH DISCONNECTING MEANS

POWER RECEPTACLE

LIGHTS

$3 — THREE WAY LIGHT SWITCH

ELECTRICAL SPECIFICATIONS:

GENERAL

1. ALL ELECTRICAL EQUIPMENT SHALL BE U.L. LISTED AND LABELED.
2. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND HIS PROPOSAL SHALL INCLUDE ALL CONTINGENCIES NECESSARY FOR THE COMPLETION OF HIS WORK REGARDING SUCH EXISTING CONDITIONS.
3. ALL ELECTRICAL WORK SHALL BE COMPLETED IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS INCLUDING THE MOST RECENT EDITION OF THE NATIONAL ELECTRIC CODE (NEC) AND OSHA REQUIREMENTS, ALL AS INTERPRETED BY THOSE HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION REQUIRED WITH THE LOCAL FIRE DEPARTMENT. ANY DRAWINGS REQUIRED FOR PERMITS OTHER THAN THOSE PRESENTED HEREIN WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REVIEWED BY THE ENGINEER PRIOR TO USE.
4. THERE SHALL BE NO SUBSTITUTIONS UNLESS THE CONTRACTOR HAS OBTAINED WRITTEN APPROVAL FROM THE ENGINEER AFTER HAVING SUBMITTED AN ALTERNATIVE PROPOSAL COMPLETE WITH A DESCRIPTION OF DEVIATION FROM THE SPECIFICATIONS AND A STATEMENT OF BENEFITS TO BE DERIVED SHOULD SUCH A PROPOSED SUBSTITUTE BE ACCEPTED.
5. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO SHOW THE APPROXIMATE LOCATIONS OF OUTLETS, CONDUIT, JUNCTION BOXES, EQUIPMENT, ETC. DIMENSIONS PRESENTED ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS AND ALL DIMENSIONS, WHETHER SHOWN ON THE DRAWINGS OR SCALED, SHALL BE VERIFIED IN THE FIELD .
6. ELECTRICAL PANEL BUILDER(S) SHALL PROVIDE DETAILED SHOP DRAWINGS OF PANEL FOR ENGINEER APPROVAL PRIOR TO CONSTRUCTION.
7. UNLESS OTHERWISE NOTED, CONDUIT USE SHALL BE AS FOLLOWS:
   - 7.1. CONDUIT ABOVE GRADE AND EXPOSED TO THE ELEMENTS SHALL BE RIGID GALVANIZED STEEL (RGS).
   - 7.2. FINAL CONNECTION TO MOVING EQUIPMENT (i.e. MOTORS, TRANSFORMERS, FREE STANDING EQUIPMENT, ETC.) SHALL BE BY LIQUID TIGHT FLEXIBLE METALLIC CONDUIT.
   - 7.3. INTERIOR LIGHTING CIRCUITS ABOVE 8'-0" AFF SHALL BE MC CABLE WITH A DEDICATED GROUNDING CONDUCTOR.
   - 7.4. DIRECT BURIED CONDUIT BELOW GRADE SHALL BE SCHEDULE 40 PVC. RIGID METAL CONDUIT (RGS) SHALL BE USED ABOVE GRADE. PROVIDE SEAL OFF FITTINGS FOR ALL CONDUITS ENTERING AND EXITING CLASSIFIED AREAS.
8. INSTALL PULL BOXES, JUNCTION BOXES, SPLICE BOXES AND FITTINGS WHERE SHOWN AND AT OTHER LOCATIONS AS NECESSARY. PULL AND JUNCTION BOX MATERIAL SHALL MATCH THE CONDUIT SYSTEM ATTACHED .
9. ALL 120 VOLT, SINGLE PHASE 20 AMPERE RECEPTACLE OUTLETS USED BY THE WORKMEN SHALL BE GROUND FAULT CIRCUIT INTERRUPTER (GFCI) TYPE. ALL RECEPTACLES INSTALLED OUTDOORS SHALL BE WEATHER RESISTANT, GFCI TYPE RECEPTACLES, PER NEC 406.9.

RIGID METAL CONDUIT (RGS)

1. GALVANIZED STEEL, HOT-DIPPED ZINC, ANSI STANDARD C80.1 AND C80.4.
2. MANUFACTURER SHALL BE ALLIED TUBE & CONDUIT CORPORATION, TRIANGLE WIRE AND CABLE INC., OR EQUAL.

NONMETALLIC CONDUIT (PVC)

1. NONMETALLIC RIGID CONDUIT AND FITTINGS SHALL BE SCHEDULE 80, POLYVINYL CHLORIDE AND SHALL BE RESISTANT TO CORROSION.
2. CONDUIT AND FITTINGS SHALL BE IN ACCORDANCE WITH NEMA STANDARD TC-2 AND TC-3, LATEST REVISION.
3. MANUFACTURER SHALL BE CARLON ELECTRIC CONDUIT CO., TRIANGLE PWC CO., OR EQUAL.

LIQUID TIGHT FLEXIBLE METALLIC CONDUIT (LFMC)

1. FLEXIBLE CONDUIT SHALL BE AN INTERLINKED GALVANIZED STEEL CORE WITH A SMOOTH LIQUID TIGHT PVC COVER.
2. FITTINGS SHALL BE NEMA-3R RATED AND MATCH CONDUIT TYPE INSTALLED.
3. MANUFACTURER'S SHALL BE ANACONDA, LIQUATITE OR EQUAL.

JUNCTION BOXES

IN INDOOR, DRY LOCATIONS, JUNCTION BOXES AND FITTINGS SHALL BE OF GALVANIZED STEEL OR COPPER FREE ALUMINUM. IN EXTERIOR LOCATIONS, JUNCTION BOXES SHALL BE NEMA 4X STAINLESS STEEL.

WIRES AND CABLES

1. GENERAL
   - A. ALL CONDUCTORS, UNLESS OTHERWISE NOTED, SHALL BE STRANDED COPPER, CONSTRUCTED OF SOFT DRAWN OR ANNEALED COPPER.
   - B. CONDUCTORS INSULATION SHALL BE COLOR CODED. COLOR OF INSULATION SHALL BE ONE COLOR THROUGHOUT THE ENTIRE RUN.
   - C. 277/480 VAC, THREE PHASE, 4 WIRE
     PHASE A - BROWN
     PHASE B - ORANGE
     PHASE C - YELLOW
     NEUTRAL - GRAY
     GROUND - GREEN
   - D. 120/208 VAC, THREE PHASE, 4 WIRE
     PHASE A - BLACK
     PHASE B - RED
     PHASE C - BLUE
     NEUTRAL - WHITE
     GROUND - GREEN
2. LOW VOLTAGE CONDUCTORS
   - A. ALL CONDUCTORS FOR POWER, LIGHTING AND 120 VAC CONTROL SHALL BE RATED FOR A MINIMUM OF 600 VAC.
   - B. CONDUCTORS SHALL BE CONSTRUCTED OF UNCOATED CLASS C COPPER CONCENTRIC-LAY-STRANDED WIRES.
3. INSTRUMENTATION CABLES

   TWISTED PAIR, WITH QUANTITY OF PAIRS AS SHOWN ON DRAWINGS, OF NO. 18 AWG TINNED COATED CLASS C COPPER CONCENTRIC LAY STRANDED WIRES WITH AN ALUMINUM POLYESTER SHIELD AND COPPER DRAIN. RATED FOR 600V AND COLOR CODED WITH PVC OUTER JACKET.
4. VARIABLE FREQUENCY DRIVE (VFD) CABLES

   SHALL HAVE A MINIMUM OF 45 MILS OF CROSS LINKED POLYETHYLENE INSULATION.
5. CONNECTORS
   - A. PIGTAIL SPLICING #10 AND SMALLER, USE TAPERED SPRING WIRE NUTS. MANUFACTURER SHALL BE IDEAL WING NUT, BUCHANAN B-CAP, T&B PIGGIES, OR EQUAL.
   - B. FOR TERMINATION OF #14 CONTROL WIRES TO TERMINALS, USE INSULATED COMPRESSION SPADE TYPE CONNECTORS. MANUFACTURER SHALL BE BURNDY HYDENT, T&B STA-KON, OR EQUAL.
   - C. SPLICES AND TERMINALS FOR #6 AND LARGER SHALL BE COPPER COMPRESSION TYPE. MANUFACTURER SHALL BE BURNDY HYDENT OR HYLUG, T&B, STA-CON, OR EQUAL.
   - D. FIXTURE CONNECTIONS MANUFACTURER SHALL BE T&B STA-KON SERIES PT-66M, IDEAL CRIMP SLEEVE NO. 410 WITH LONG BARREL, OR EQUAL.

GROUNDING

1. GROUNDING OF ELECTRICAL SYSTEMS AND EQUIPMENT SHALL, AT A MINIMUM, MEET THE REQUIREMENTS OF NEC ARTICLE 250 OR SHALL EXCEED ARTICLE 250 AS HEREIN SPECIFIED.
2. ALL CONDUITS SHALL HAVE AN INTERNAL GROUNDING CONDUCTOR. THIS GROUNDING CONDUCTOR SHALL BE PROVIDED ALTHOUGH IT MAY NOT BE SHOWN OR SCHEDULED ON THE PLANS.
3. GROUNDING ELECTRODE CONDUCTORS SHALL BE A MINIMUM OF NO. 6 AWG BARE STRANDED COPPER.
4. GROUND RODS SHALL BE 3/4" DIAMETER, 10 FEET LONG, STEEL CORE WITH COPPER MOLTEN WELDED OR ELECTROLYTICALLY BONDED TO EXTERIOR.
5. ALL CONNECTIONS SHALL BE MADE WITH COMPRESSION OR CADWELD CONNECTORS.

ENCLOSURES

1. ENCLOSURES SHALL BE NEMA 12 FOR DRY, INDOOR LOCATIONS UNLESS OTHERWISE NOTED.
2. WET LOCATIONS OR OUTDOORS, ENCLOSURES SHALL BE NEMA 4X STAINLESS STEEL.
3. ENCLOSURES SHALL HAVE A NAMEPLATE ON THE EXTERIOR IDENTIFYING THE APPLICATION OR FUNCTION OF THE EQUIPMENT ENCLOSED. COORDINATE NAMING IN THE FIELD.

WIRING DEVICES

1. RECEPTACLES MARKED AS GFCI SHALL BE OF THE GROUND FAULT CIRCUIT INTERRUPTER TYPE. MANUFACTURER SHALL BE GE TYPE TGTR 20, OR EQUAL.
2. RECEPTACLES USED IN CLASS 1, DIVISION 2 AREAS SHALL BE CROUSE-HINDS CAT. NO. ENR 21201 WITH EDS BACKBOX AND ENP5201 PLUG.
3. SWITCHES
   - A. LIGHTING SWITCHES SHALL BE RATED 20 AMPERES AT 120 VAC, TOGGLE OPERATED, PLASTIC ENCLOSED, SINGLE POLE, THREE-WAY OR FOUR-WAY AS SHOWN OR REQUIRED. MANUFACTURER SHALL BE P&S SERIES 20AC1 SPECIFICATION GRADE, OR EQUAL.
   - B. SWITCHES SHALL HAVE SILVER ALLOY CONTACTS AND PROVISIONS FOR SIDE AND BACK WIRING.
   - C. EACH SWITCH SHALL BE SUITED FOR FULL-RATED CAPACITY ON TUNGSTEN FILAMENT AND FLOURSCENT LAMP LOADS.
4. FACEPLATE AND COVERS
   - A. FINISHED AREAS SHALL HAVE STAINLESS STEEL TYPE 302 ALLOY COVERS.
   - B. WET AND CORROSIVE AREAS SHALL BE WEATHERPROOF COVERS WITH GASKETS.

VARIABLE FREQUENCY DRIVE (VFD)

1. PROVIDE VFD AS SHOWN TO OPERATE SPECIFIED LOAD. VFD MANUFACTURER SHALL BE ALLEN BRADLEY, SQUARE D, OR EQUAL.
2. PROVIDE 3 PERCENT LINE REACTOR INTEGRAL TO CONTROLLER TO REDUCE SURGE CURRENTS AND POWER LINE DISTURBANCES, AND ELIMINATE NUISANCE TRIPPING OF CONTROLLER.

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USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

ELECTRICAL SYMBOL LEGEND AND SPECIFICATIONS

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

ARCADIS
824 MARKET STREET
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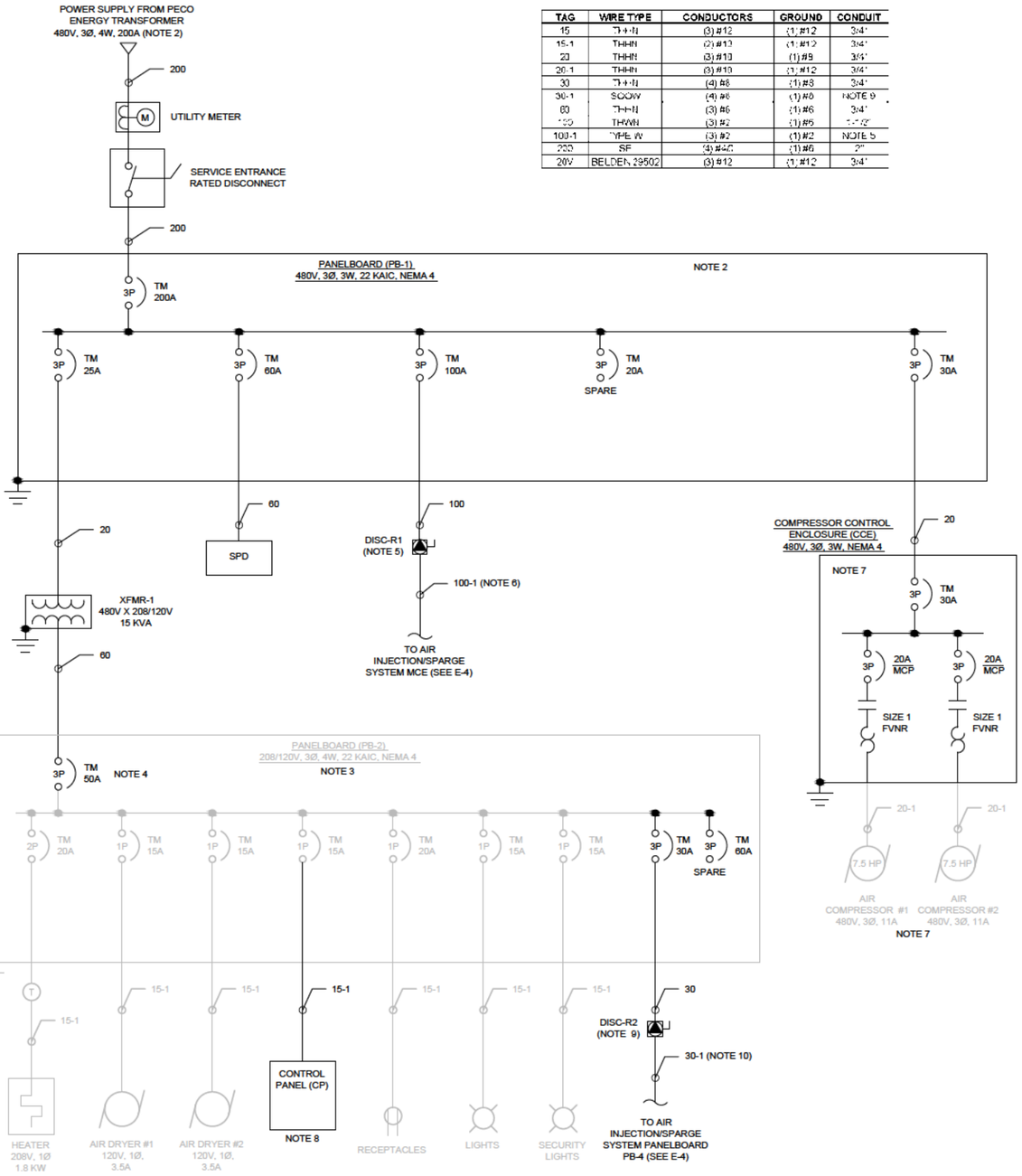
E-1



TAG	WIRE TYPE	CONDUCTORS	GROUND	CONDUIT
15	THHN	(3) #12	(1) #12	3/4"
15-1	THHN	(2) #12	(1) #12	3/4"
20	THHN	(3) #10	(1) #9	3/4"
20-1	THHN	(3) #10	(1) #12	3/4"
30	THHN	(4) #8	(1) #8	3/4"
30-1	SOOW	(4) #8	(1) #8	NOTE 9
60	THHN	(3) #6	(1) #6	3/4"
100	THWN	(3) #2	(1) #6	1-1/2"
100-1	THHN	(3) #2	(1) #2	NOTE 5
200	SE	(3) #4/0	(1) #6	2"
20V	BELDEN 29502	(3) #12	(1) #12	3/4"

PB-1 | LOCATION: SOUTHERN SKIMMER SYSTEM BUILDING | NOTES | CABINET MOUNTING | SURFACE
VOLTS: 480V | PHASE: 3 | WIRE: 3 | ENCLOSURE: NEMA 4 | 200A MAIN CIRCUIT BREAKER | RATING: 22 KAIC
FEED: BOTTOM FROM SERVICE DISCONNECT

LOAD SERVED	LOAD (KVA) A	B	C	BREAKER AMP	POLE	CKT	PH	CKT	BREAKER POLE	AMP	LOAD (KVA) A	B	C	LOAD SERVED
XFMR-1 15 KVA TRANSFORMER	5.00					1		2						
		5.00		25	3	3		4	3	60				SURGE PROTECTION DEVICE
			5.00			5		6						
AIR INJECTION/SPARGE SYSTEM	9.48					7		8			6.10			
		9.48		100	3	9		10	3	30		6.10		COMPRESSOR CONTROL ENCLOSURE
			9.48			11		12					6.10	
SPARE						13		14						
				20	3	15		16						SPACE
						17		18						
SPACE						19		20						
						21		22						SPACE
						23		24						
SPACE						25		26						
						27		28						SPACE
						29		30						
SUB-TOTAL CONNECTED KVA:	14.48										6.10			20.58
		14.48										6.10		20.58
			14.48										6.10	20.58
											TOTAL CONNECTED KVA:			61.74

PB-2 | LOCATION: SOUTHERN SKIMMER SYSTEM BUILDING | NOTES | CABINET MOUNTING | SURFACE
VOLTS: 208/120V | PHASE: 3 | WIRE: 4 | ENCLOSURE: NEMA 4 | 50A MAIN CIRCUIT BREAKER | RATING: 22 KAIC
FEED: BOTTOM FROM 15KVA TRANSFORMER (XFMR-1)

LOAD SERVED	LOAD (KVA) A	B	C	BREAKER AMP	POLE	CKT	PH	CKT	BREAKER AMP	POLE	LOAD (KVA) A	B	C	LOAD SERVED
AIR SPARGE INJECTION SYSTEM	1.17			30	3	1		2	20	1	1.50			RECEPTACLES
		1.50				3		4	20	2		0.90		HEATER
			0.50			5		6					0.90	
SPARE				60	3	7		8	15	1	0.50			AIR DRYER #1
						9		10	15	1		0.50		BUILDING LIGHTS
						11		12	15	1			0.50	SECURITY LIGHTS
CONTROL PANEL	1.00			20	1	13		14						SPACE
AIR DRYER #2		0.50		15	1	15		16						SPACE
SPACE						17		18						SPACE
SPACE						19		20						SPACE
SPACE						21		22						SPACE
SPACE						23		24						SPACE
SPACE						25		26						SPACE
SPACE						27		28						SPACE
SPACE						29		30						SPACE
SUB-TOTAL CONNECTED KVA:	2.17										2.00			4.17
		2.00										1.40		3.40
			0.50										1.40	1.90
											TOTAL CONNECTED KVA:			9.47

NOTES:

1. EXISTING EQUIPMENT SHOWN IN GRAY FOR CLARITY.
2. CHANGE EXISTING 200 AMP, 3 PHASE, 208 VAC POWER DROP FROM PECO ENERGY TO A 200 AMP, 3 PHASE, 480 VAC SERVICE. EXISTING CONDUIT AND WIRE FEEDING THE MAIN BREAKER PANEL SHALL BE REUSED FOR THE NEW SERVICE.
3. EXISTING 208/120 VAC PANELBOARD (PB-2) SHALL BE REUSED. A 15 KVA 480 X 208/120 VAC TRANSFORMER SHALL BE INSTALLED TO PROVIDE POWER TO THIS PANELBOARD FROM THE NEW 480 VAC PANELBOARD (PB-1).
4. REPLACE EXISTING 200 A MAIN CIRCUIT BREAKER IN PB-2 WITH A 50 AMP MAIN CIRCUIT BREAKER.
5. INSTALL A NEMA 4X RECEPTACLE WITH DISCONNECTING MEANS (HUBBELL MODEL HBL4100MI7W OR APPROVED EQUAL) ON THE EXTERIOR OF THE SOUTH SKIMMER BUILDING AND A RECEPTACLE (HUBBELL MODEL HBL4100R7W OR APPROVED EQUAL) ON THE EXTERIOR OF THE PILOT TREATMENT SYSTEM BUILDING.
6. SOW CABLE WITH THE APPROPRIATE PLUGS (HUBBELL MODEL HBL4100P7W OR APPROVED EQUAL) SHALL BE RUN BETWEEN THE BUILDINGS. TO PROVIDE 480 VAC POWER TO THE NEW AIR INJECITON/SPARGE SYSTEM.
7. INSTALL A NEW MOTOR CONTROL ENCLOSURE FOR THE STARTERS FOR BOTH EXISTING COMPRESSORS. UNIT MOUNTED STARTERS SHALL BE REMOVED FROM THE COMPRESSORS.
8. REMOVE ALL EXISTING CONTROL PANELS FROM THE BUILDING. A NEW CONTROL PANEL FOR THE SKIMMER SYSTEM SHALL BE INSTALLED USING THE SAME CIRCUIT.
9. INSTALL A NEMA 4X RECEPTACLE WITH DISCONNECTING MEANS (HUBBELL MODEL HBL530MI9W OR APPROVED EQUAL) ON THE EXTERIOR OF THE SOUTH SKIMMER BUILDING AND A RECEPTACLE (HUBBELL MODEL HBL530R9W OR APPROVED EQUAL) ON THE EXTERIOR OF THE PILOT TREATMENT SYSTEM BUILDING.
10. SOW CABLE WITH THE APPROPRIATE PLUGS (HUBBELL MODEL HBL4100P7W OR APPROVED EQUAL) SHALL BE RUN BETWEEN THE BUILDINGS. TO PROVIDE 208/120 VAC POWER TO THE NEW AIR INJECTION/SPARGE SYSTEM.

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FORMER DSCP SYSTEM UPGRADES

ELECTRICAL SINGLE LINE DIAGRAM SOUTHERN SKIMMER SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
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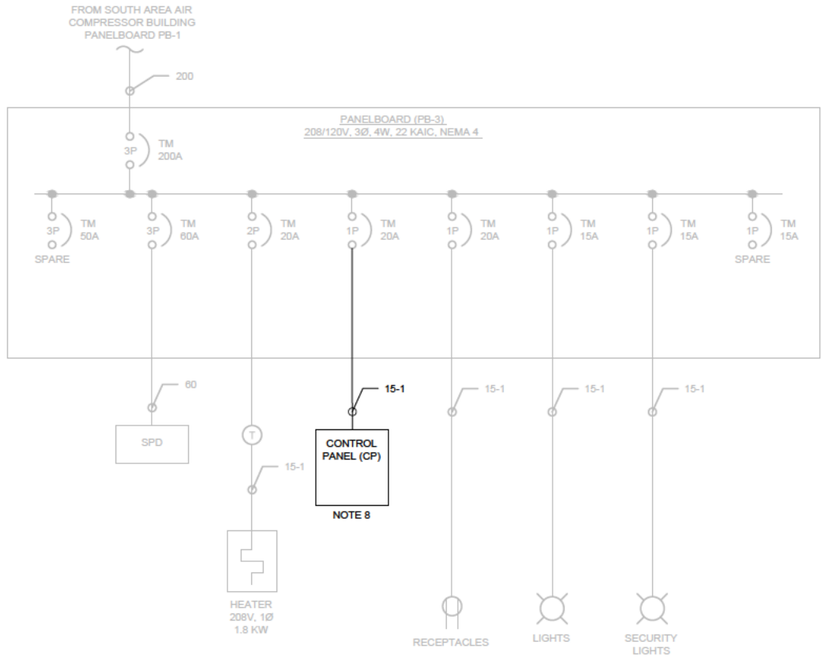
E-2



	PB-3	LOCATION:	NORTHERN SKIMMER SYSTEM BUILDING			NOTES		CABINET MOUNTING:	SURFACE
VOLTS:	208/120V	PHASE:	3	WIRE:	4	ENCLOSURE:	NEMA 4	200A MAIN CIRCUIT BREAKER	RATING:	22 KAC
FEED:	BOTTOM FROM MCC IN MAIN TREATMENT BUILDING									

LOAD SERVED	LOAD (KVA) A	LOAD (KVA) B	LOAD (KVA) C	BREAKER AMP	BREAKER POLE	CKT	PH	CKT	BREAKER AMP	BREAKER POLE	LOAD (KVA) A	LOAD (KVA) B	LOAD (KVA) C	LOAD SERVED
SPARE				50	3	1		2	20	1	1.50			RECEPTACLES
						3		4	20	2		0.50		HEATER
						5		6					0.90	
SURGE PROTECTION DEVICE				60	3	7		8	15	1				SPARE
						9		10	15	1		0.50		BUILDING LIGHTS
						11		12	15	1			0.50	SECURITY LIGHTS
CONTROL PANEL	1.00			20	1	13		14						SPACE
SPACE						15		16						SPACE
SPACE						17		18						SPACE
SPACE						19		20						SPACE
SPACE						21		22						SPACE
SPACE						23		24						SPACE
SPACE						25		26						SPACE
SPACE						27		28						SPACE
SPACE						29		30						SPACE
SUB-TOTAL CONNECTED KVA:	1.00	0.00	0.00								1.50	1.40	1.40	2.9 1.4 1.4
TOTAL CONNECTED KVA:														5.3

TAG	WIRE TYPE	CONDUCTORS	GROUND	CONDUIT
15	THHN	(3) #12	(1) #12	3/4"
15-1	THHN	(2) #12	(1) #12	3/4"
20	THHN	(3) #10	(1) #8	3/4"
20-1	THHN	(3) #10	(1) #12	3/4"
30	THHN	(4) #8	(1) #8	3/4"
30-1	SOOW	(4) #8	(1) #8	NOTE 9
50	THHN	(3) #6	(1) #6	3/4"
100	THWN	(3) #2	(1) #6	1-1/2"
100-1	TYPE W	(3) #2	(1) #2	NOTE 5
200	SE	(4) #4/0	(1) #6	2"
20V	BELDEN 89502	(3) #12	(1) #12	3/4"

NOTES:

1. EXISTING EQUIPMENT SHOWN IN GRAY FOR CLARITY.
2. CHANGE EXISTING 200 AMP, 3 PHASE, 208 VAC POWER DROP FROM PECO ENERGY TO A 200 AMP, 3 PHASE, 480 VAC SERVICE. EXISTING CONDUIT AND WIRE FEEDING THE MAIN BREAKER PANEL SHALL BE REUSED FOR THE NEW SERVICE.
3. EXISTING 208/120 VAC PANELBOARD (PB-2) SHALL BE REUSED. A 15 KVA 480 X 208/120 VAC TRANSFORMER SHALL BE INSTALLED TO PROVIDE POWER TO THIS PANELBOARD FROM THE NEW 480 VAC PANELBOARD (PB-1).
4. REPLACE EXISTING 200 A MAIN CIRCUIT BREAKER IN PB-2 WITH A 50 AMP MAIN CIRCUIT BREAKER.
5. INSTALL A NEMA 4X RECEPTACLE WITH DISCONNECTING MEANS (HUBBELL MODEL HBL4100MI7W OR APPROVED EQUAL) ON THE EXTERIOR OF THE SOUTH SKIMMER BUILDING AND A RECEPTACLE (HUBBELL MODEL HBL4100R7W OR APPROVED EQUAL) ON THE EXTERIOR OF THE NEW AIR INJECTION/SPARGE SYSTEM BUILDING.
6. SOW CABLE WITH THE APPROPRIATE PLUGS (HUBBELL MODEL HBL4100P7W OR APPROVED EQUAL) SHALL BE RUN BETWEEN THE BUILDINGS. TO PROVIDE 480 VAC POWER TO THE NEW AIR INJECITON/SPARGE SYSTEM.
7. INSTALL A NEW MOTOR CONTROL ENCLOSURE FOR THE STARTERS FOR BOTH EXISTING COMPRESSORS. UNIT MOUNTED STARTERS SHALL BE REMOVED FROM THE COMPRESSORS.
8. REMOVE ALL EXISTING CONTROL PANELS FROM THE BUILDING. A NEW CONTROL PANEL FOR THE SKIMMER SYSTEM SHALL BE INSTALLED USING THE SAME CIRCUIT.
9. INSTALL A NEMA 4X RECEPTACLE WITH DISCONNECTING MEANS (HUBBELL MODEL HBL530MI9W OR APPROVED EQUAL) ON THE EXTERIOR OF THE SOUTH SKIMMER BUILDING AND A RECEPTACLE (HUBBELL MODEL HBL530R9W OR APPROVED EQUAL) ON THE EXTERIOR OF THE NEW AIR INJECTION/SPARGE SYSTEM BUILDING.
10. SOW CABLE WITH THE APPROPRIATE PLUGS (HUBBELL MODEL HBL4100P7W OR APPROVED EQUAL) SHALL BE RUN BETWEEN THE BUILDINGS. TO PROVIDE 208/120 VAC POWER TO THE NEW AIR INJECTION/SPARGE SYSTEM.

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2	8/5/2016	DRAFT FOR REVIEW	KE	DL
1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's No.: PE076383
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

ELECTRICAL SINGLE LINE DIAGRAM NORTHERN SKIMMER SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

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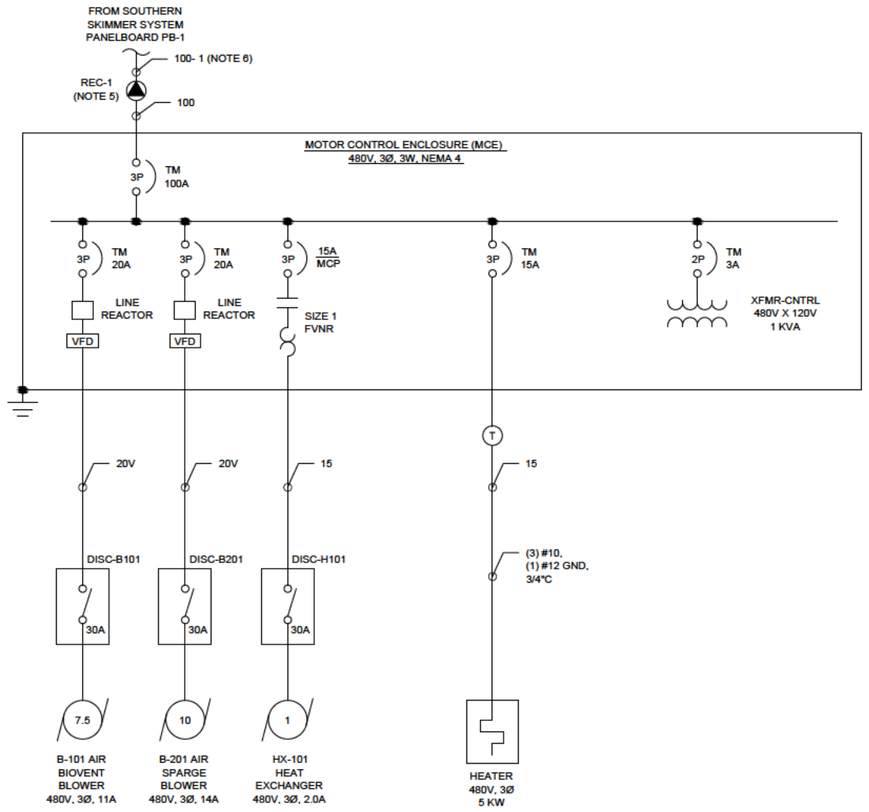

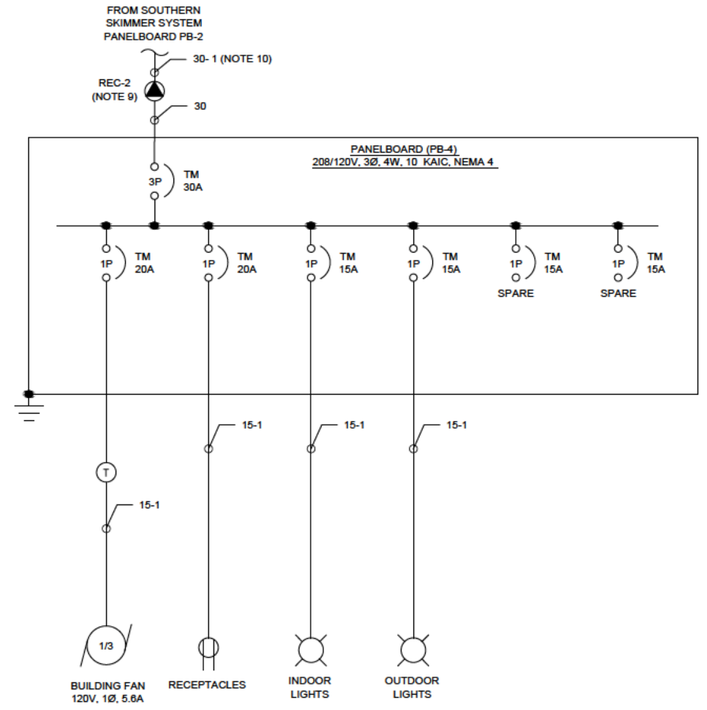

NOTES:

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TAG	WIRE TYPE	CONDUCTORS	GROUND	CONDUIT
15	THHN	(3) #12	(1) #12	3/4"
15-1	THHN	(2) #12	(1) #12	3/4"
20	THHN	(3) #10	(1) #8	3/4"
20-1	THHN	(3) #10	(1) #12	3/4"
30	THHN	(4) #8	(1) #8	3/4"
30-1	SOOW	(4) #8	(1) #8	NOTE 9
60	THHN	(3) #6	(1) #6	3/4"
100	THWN	(3) #2	(1) #6	1-1/2"
100-1	TYPE W	(3) #2	(1) #2	NOTE 9
200	SE	(4) #4/0	(1) #6	2"
20V	BELDEN 39502	(3) #12	(1) #12	3/4"

AIR INJECTION/SPARGE SYSTEM MCE

DEVICE	VOLTAGE	PHASE	HP	DUTY FACTOR	BREAKER SIZE (AMPS)	CONNECT LOAD - 480V (AMPS)**	DEMAND LOAD - 480V (AMPS)**	kVA	
BIOVENT BLOWER (B-101)	480	3	7.50	100.0%	20	11.00	11.00	9.15	
AIR SPARGE BLOWER (B-201)	480	3	7.50	100.0%	25	14.00	14.00	11.64	
HEAT EXCHANGER (HX-101)	480	3	1.00	100.0%	15	2.00	2.00	1.66	
5 KW HEATER	480	3	--	100.0%	15	6.01	6.01	5.00	
CONTROL TRANSFORMER	480	3	--	100.0%	3	1.20	1.20	1.00	
				SUBTOTALS:		34	34	28.45	
						TOTAL ELECTRICAL LOAD:		34.22	CONNECTED AMPS
**VALUES TAKEN FROM 2011 NEC								34.22	DEMAND
MAIN BREAKER INFORMATION								50	MINIMUM BREAKER SIZE
								100	MAIN

PB-4	LOCATION: MAIN ELECTRICAL ROOM SPARGE SYSTEM			NOTES:	CABINET MOUNTING: SURFACE
VOLTS: 208/120V	PHASE: 3	WIRE: 4	ENCLOSURE: NEMA 4	30A MAIN CIRCUIT BREAKER	RATING: 10 KAIC
FEED: BOTTOM FROM PANELBOARD (PB-2)					

LOAD SERVED	LOAD (KVA) A	B	C	BREAKER AMP	POLE	CKT		CKT	BREAKER AMP	POLE	LOAD (KVA) A	B	C	LOAD SERVED
BUILDING FAN	0.67			20	2	1		2	15	1	0.50			OUTDOOR LIGHTS
RECEPTACLES		1.50		20	1	3		4	15	1				SPARE
INDOOR LIGHTS			0.00	15	1	5		6	15	1				SPARE
SPACE						7		8						SPACE
SPACE						9		10						SPACE
SPACE						11		12						SPACE
MAIN				30	3	13		14						SPACE
						15		16						SPACE
						17		18						SPACE
SUB-TOTAL CONNECTED KVA	0.67										0.50			1.17
		1.50										0.00		1.50
			0.00										0.00	0.50
TOTAL CONNECTED KVA														3.17

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Professional Engineer's No.: PE076383
State: PA | Date Signed: | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

ELECTRICAL SINGLE LINE DIAGRAM PILOT TREATMENT SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

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824 MARKET STREET
SUITE 820
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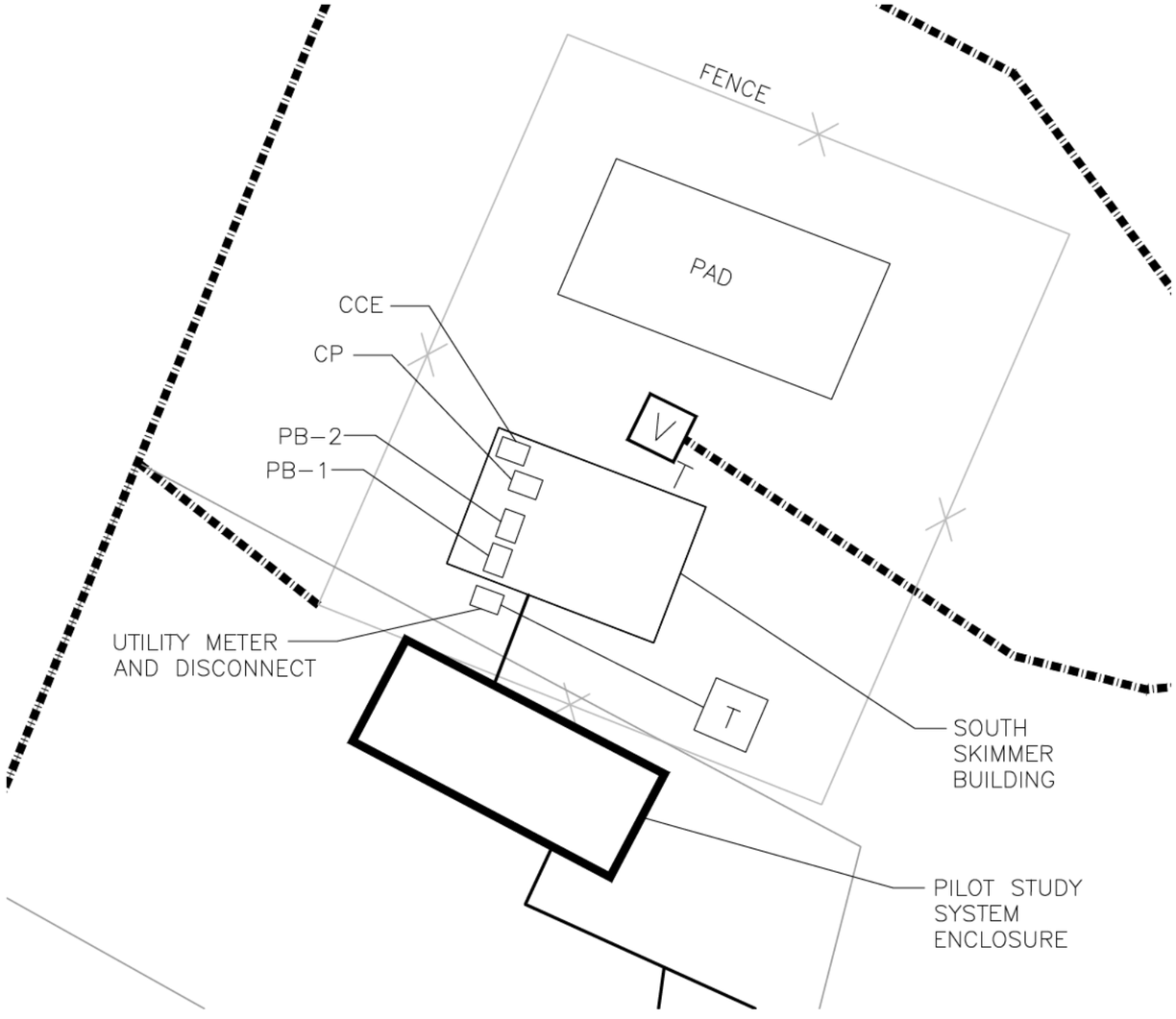

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USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM ELECTRICAL LAYOUT DIAGRAM

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
APRIL 2016

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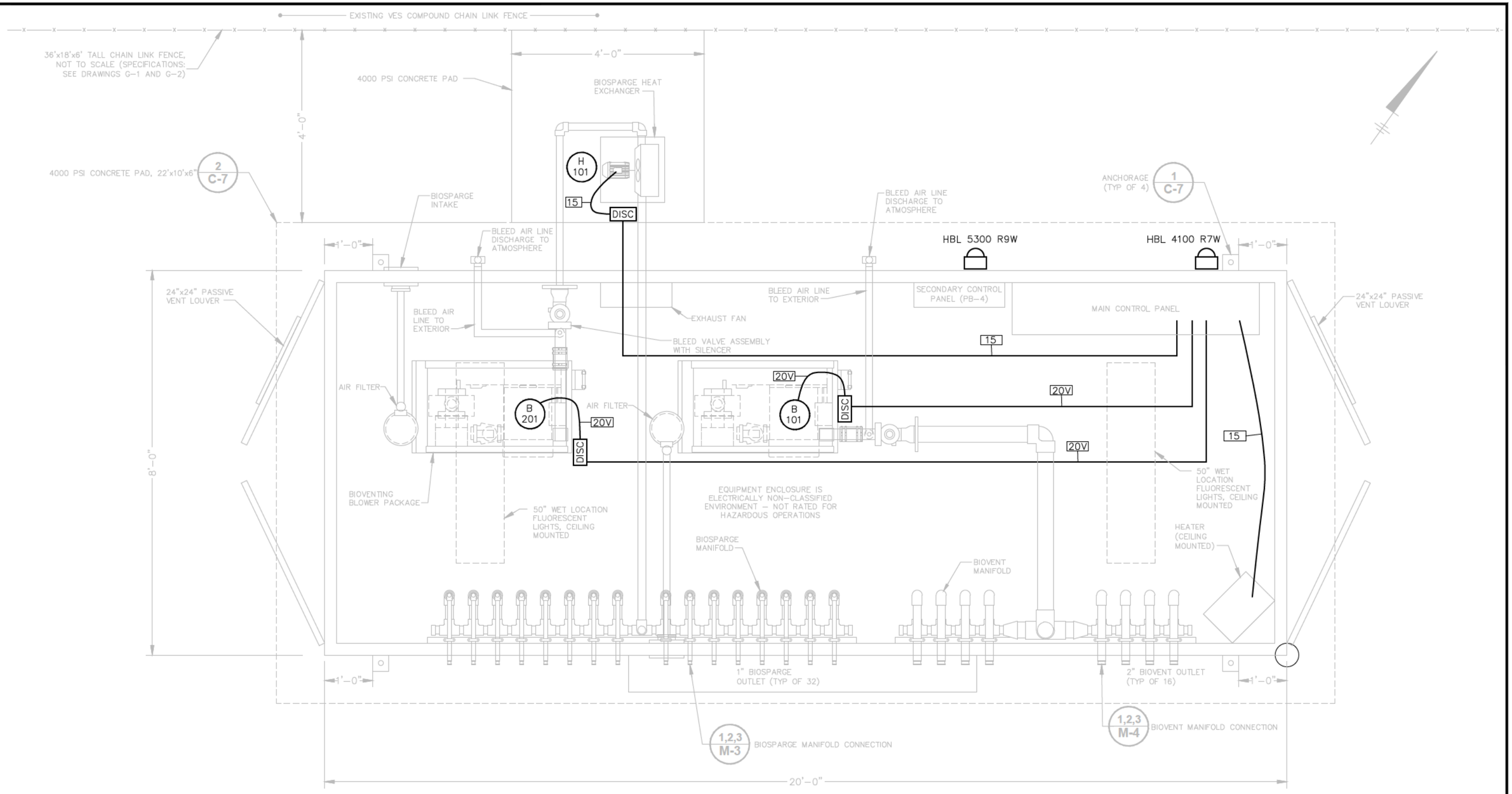

CONDUIT AND CONDUCTOR SCHEDULE				
CONDUIT	SIZE	CONDUCTOR SIZE & TYPE	ORIGINATION	TERMINATION SERVICE
15	3/4"	(3) #12 THWN + (1) #12	CP	HX-101 480 VAC
20V	3/4"	BELDEN 29502	CP	B-101 480 VAC
20V	3/4"	BELDEN 29502	CP	B-201 480 VAC
30	3/4"	(4) #8 THWN + (1) #8 GND	PB-2	PB-4 208 VAC
100	1 1/2"	(3) #3 THWN + (1) #8 GND	PB-1	CP 120 VAC

NOTE:

FENCE AND BOLLARDS NOT TO SCALE. SEE DRAWING G-1 FOR SPECIFICATIONS.

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1	4/29/2016	DRAFT	KE	DL

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Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA		ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM ENCLOSURE 480 VAC EQUIPMENT LAYOUT

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004

Date APRIL 2016

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824 MARKET STREET
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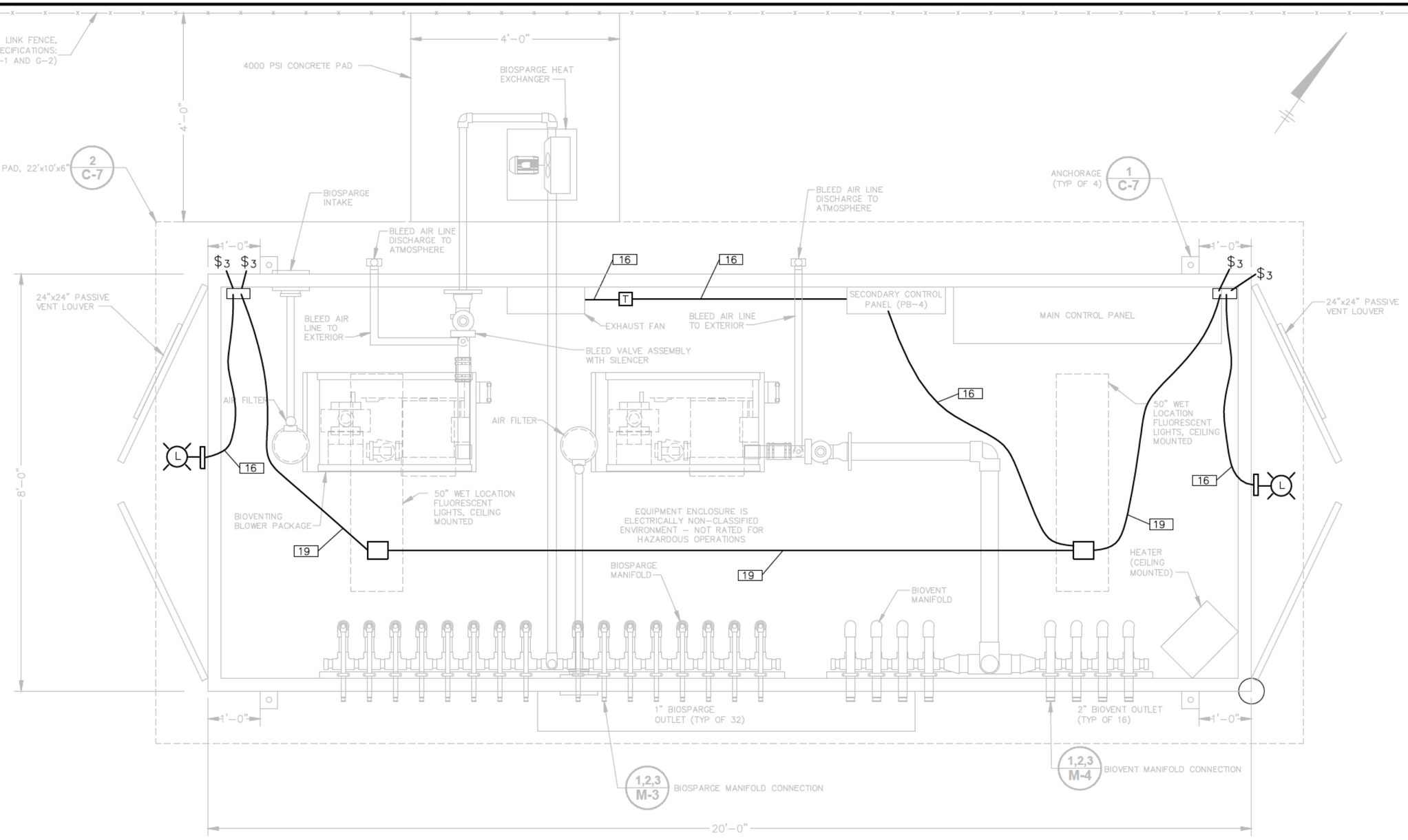

CONDUIT AND CONDUCTOR SCHEDULE		
CONDUIT #	SIZE	CONDUCTOR SIZE & TYPE
16	3/4"	(2) #12 THWN + (1) #14 GND
17	3/4"	(6) #12 THWN + (1) #14 GND
18	3/4"	(7) #12 THWN + (1) #14 GND
19	3/4"	(8) #12 THWN + (1) #14 GND

NOTE:

FENCE AND BOLLARDS NOT TO SCALE. SEE DRAWING G-1 FOR SPECIFICATIONS.

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FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM ENCLOSURE 120 VAC EQUIPMENT LAYOUT

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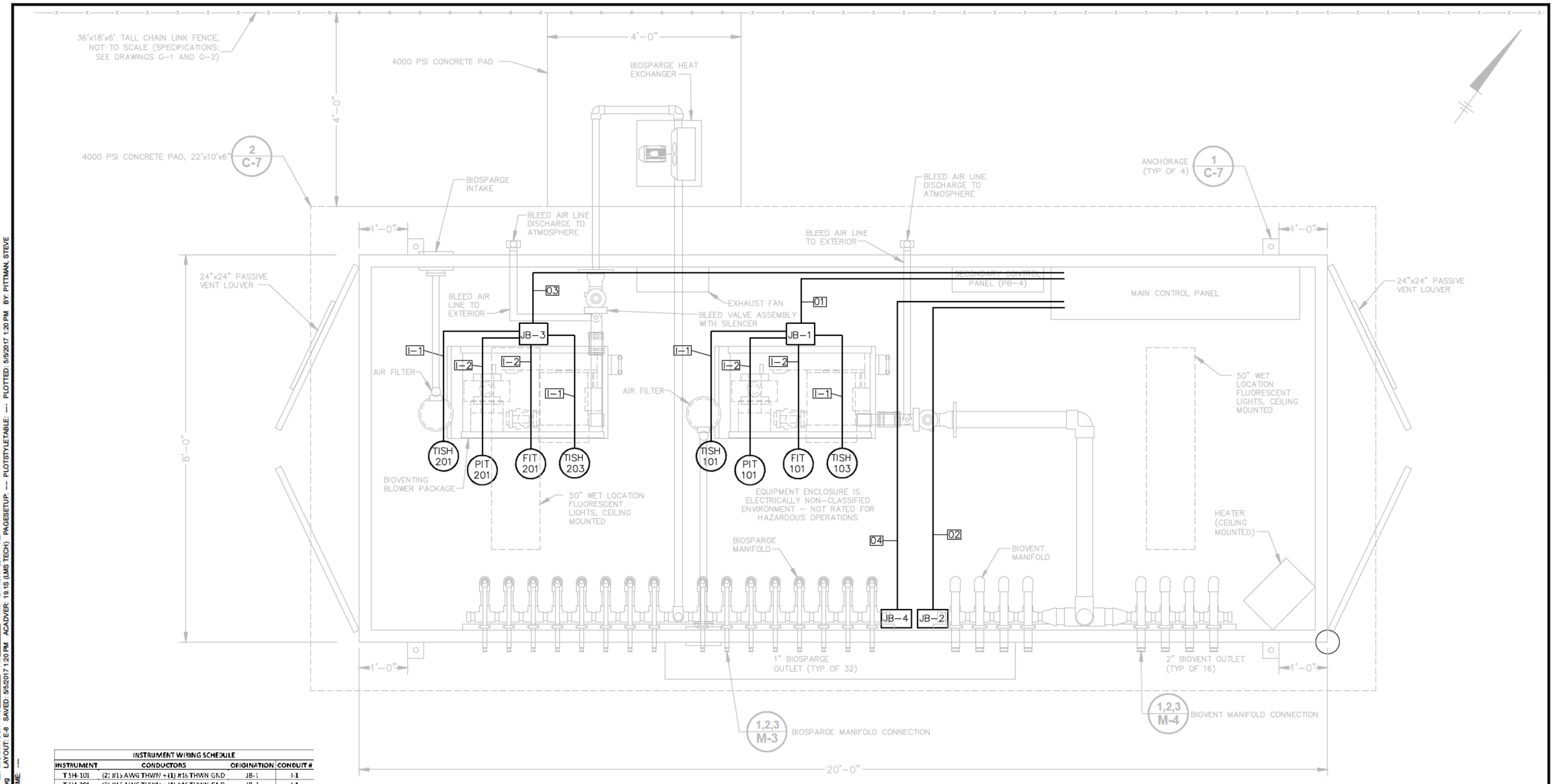

INSTRUMENT WIRING SCHEDULE			
INSTRUMENT	CONDUCTORS	ORIGINATION	CONDUIT #
T SH-101	(2) #16 AWG THWN + (1) #16 THWN GND	JB-1	I-1
T SH-201	(2) #16 AWG THWN + (1) #16 THWN GND	JB-3	I-1
PIT-101	BELDEN 1120A	JB-1	I-2
PIT-201	BELDEN 1120A	JB-3	I-2
FIT-101	BELDEN 1120A	JB-1	I-2
FIT-201	BELDEN 1120A	JB-3	I-2
SV-1XX	(3) #14 AWG THWN + (1) #14 THWN GND	JB-2	I-3
SV-2XX	(3) #14 AWG THWN + (1) #14 THWN GND	JB-4	I-3
T SH-103	(2) #16 AWG THWN + (1) #16 THWN GND	JB-1	I-1
T SH-203	(2) #16 AWG THWN + (1) #16 THWN GND	JB-3	I-1

NOTES:
1. EACH SOLENOID VALVE SHALL HAVE (1) - 3 CONDUIT RUN FROM JB-2
2. EACH SOLENOID VALVE SHALL HAVE (1) - 3 CONDUIT RUN FROM JB-4
3. CONDUIT ROUTING AND SUPPORT STRUCTURES SHALL BE DETERMINED IN THE FIELD

CONDUIT AND CONDUCTOR SCHEDULE					
CONDUIT #	SIZE	CONDUCTOR SIZE & TYPE	ORIGINATION	TERMINATION	SERVICE
1	3/4"	(4) #16 THWN + (2) BELDEN 1120A + (1) #14 GND	CP	JB-1	24 VDC
02	3/4"	(4) #16 THWN + (2) BELDEN 1120A + (1) #14 GND	CP	JB-2	24 VDC
03	3/4"	(12) #14 THWN + (1) #14 GND	CP	JB-3	120 VAC
04	3/4"	(12) #14 THWN + (1) #14 GND	CP	JB-4	120 VAC

NOTE:
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FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM ENCLOSURE INSTRUMENTATION LAYOUT

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date APRIL 2016

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824 MARKET STREET
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E-8

Appendix D

Supporting Calculations

Appendix D-Supporting Calculations
Table D-1a
SVE Design Tool ROI/ERs V1.0

Job No:	No	Date	Revision	By	Ckd
Client: USACE	1	8/15/2016		[redacted]	
Site Name: Former DSCP Philadelphia Site					
Site Location: Philadelphia, PA					
Description: This calculation develops a graphical output of required flow, required airflow, and anticipated well-screen entrance velocity as a function of target treatment ROI, and desired pore volume exchange rate. Although developed for use with SVE, calculations apply for air extraction or injection applications in the vadose zone.					

Calculation Approach and Methodology: Use information developed/derived from pilot testing along with the anticipated physical dimensions of the treatment zone to develop inputs for use in the two governing equations. The mass flow function will be used in order to estimate the flow rate required to achieve the desired exchange rate (ER, also referred to as the pore volume exchange rate). The anticipated flow rate is then input into the pressure drop function to determine what the expected vacuum requirement will need to be in order to induce/achieve the flow and ER expectations. The governing equations are then used to model a range of potential scenarios using a fixed value for pneumatic conductivity, and a variety of ERs and target treatment ROIs. Calculated results are then graphically displayed for subsequent well field design and optimization considerations.

Radial Flow Design Functions:

The soil vapor extraction method relies on two principal design functions. The first relates the mass air flow required to achieve the design exchange rate (ER) as a function of the soil pore volume between the well radius and the variable, outer radius, b. The second function calculates the pressure drop required to drive air flow at the design ER, over the soil volume which lies between the outer radius, b, and the well bore radius, a.

The Mass Flow Function (Q_m):

$$Q_m = \frac{ER \cdot \pi \cdot (b^2 - a^2) \cdot h \cdot \eta \cdot \rho_{air}}{1440 \cdot 60}$$

The mass flow function was developed to express the air flow (Q_m) required through a target soil volume, as a function of the outer radius, b, of the target volume, and the selected exchange rate, ER.

The Pressure Drop Function

$$\Delta P = \frac{Q}{K_{air} \cdot 2 \cdot \pi \cdot h} \cdot \ln\left(\frac{b}{a}\right) \cdot 2490^{-1}$$

The pressure drop function was designed to express pressure drop required to drive the target exchange rate, ER, through the target soil treatment volume, as a function of the radial distance from the well bore (r = a) to the outer radius (r = b), where the pressure is assumed to be 1 atmosphere. The equation is the radial form of the Darcian flow equation, with the function Q_m (as defined above) inserted instead of simply Q. The equation yields pressure drop in cgs units (dynes/cm^2), so a conversion to inches of H_2O is accomplished through division by 2490 dynes/cm^2 per inch H_2O.

Variable Definition:

Q_m = Mass Flow Rate (g/sec)
Q = Volumetric Flow Rate (scfm)
ER = Exchange Rate, Pore Volumes Removed per Day
b = Design Radius of Influence (cm)
a = Extraction Well Borehole Radius (cm)
h = Vadose Zone Thickness, Exposed Screen (cm)
η = Soil Porosity
ρ_{air} = Air Density (g/cm^3) at Standard Conditions
ΔP = Pressure Differential Between a and b (in H_2O)
K_a = Volume Based Pneumatic Conductivity (cm/sec)
K_{air} = Mass Based Pneumatic Conductivity (sec), obtained from Pneumatic Conductivity Design Tool

Design Considerations:

Vapor Extraction Well Radius

The effective radius of the soil vapor extraction well must be estimated for design calculations. This is an important determination, because the rate of pressure drop increases rapidly as the well radius decreases. If the well pack is very porous relative to the formation, the effective well radius equals the borehole radius; When the well packing is near the formation permeability, the effective well radius equals the well screen radius.

Exchange Rate

The exchange rate determines the air flow which must be applied to any soil volume, to achieve design goals. Bioventing exchange rates may be set as low as 1 pore volume per 10 days of treatment (ER = 0.1). Highly aggressive soil vapor extraction systems may operate at exchange rates of 10 or more (ER >10), although in these cases a large pressure drop through the treatment volume is required, and vacuum lift of the groundwater surface adds a design problem to be overcome. Typical vapor extraction systems achieve 1 to 2 pore volume exchanges per day.

Calculations:

Enter Data into **BLUE** Fields
Tool Computes Values for **GREEN** Fields
GRAY Fields indicate A Value that is Linked to Another Location

User Inputs:

Test Well ID: SVE-01

a =	0.50	(ft.)
h =	8.8	(ft.)
η =	0.3	
ρ_{air} =	1.21E-03	(g/cm^3)
K_{air} =	2.80E-07	(sec)

Open Screen Area (see Table 1 pg. 4): 8.3%
Well Casing Radius: 0.17 (ft.)

Intermediate Outputs:

a =	15.2	(cm)
h =	268.2	(cm)
K_a =	2.74E-04	(cm/sec)

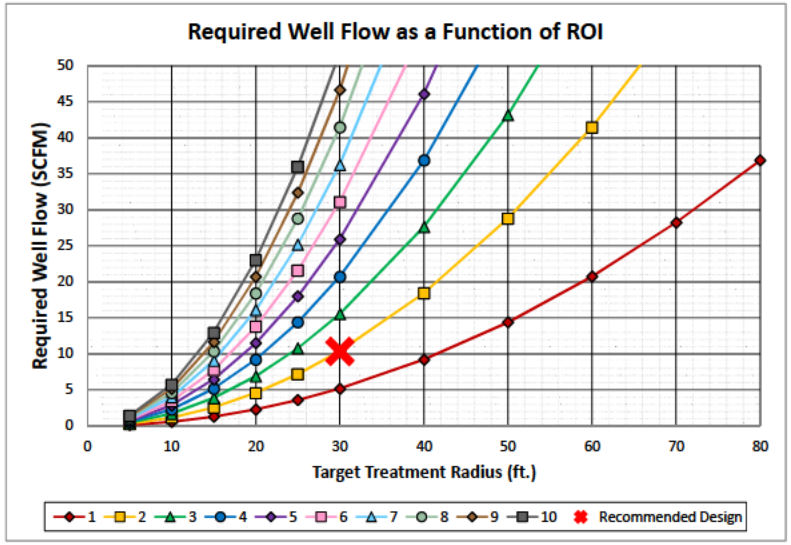
Effective Open Screen Area: 0.76 (ft^2)

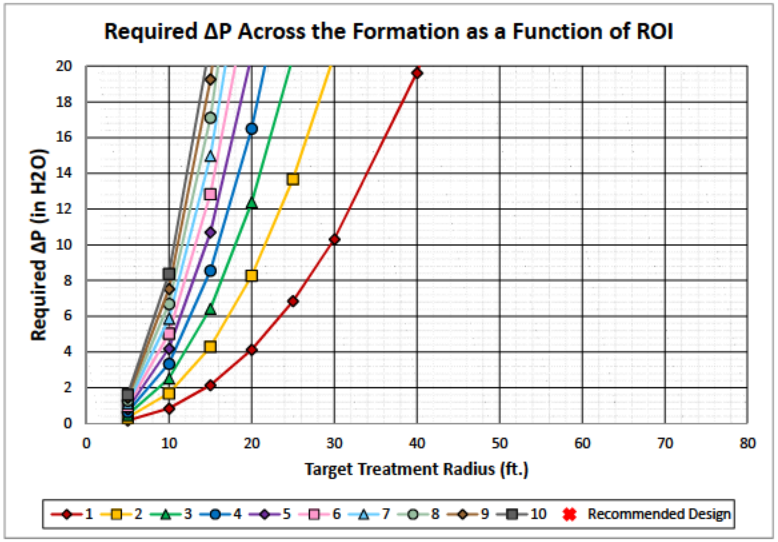
Appendix D-Supporting Calculations
Table D-1a
SVE Design Tool ROI/ERs V1.0

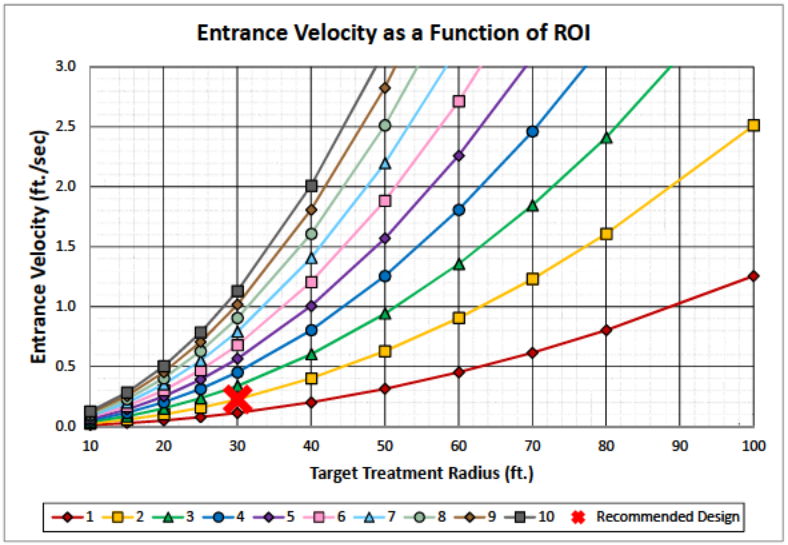
		Exchange Rate														
		1			2			3			4			5		
Test Well	ROI (b) ft.	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)
SVE-01	5	0	0	0.00	0	0	0.01	0	0	0.01	1	1	0.01	1	1	0.02
	10	1	1	0.01	1	2	0.03	2	3	0.04	2	3	0.05	3	4	0.06
	15	1	2	0.03	3	4	0.06	4	6	0.08	5	9	0.11	6	11	0.14
	20	2	4	0.05	5	8	0.10	7	12	0.15	9	17	0.20	12	21	0.25
	25	4	7	0.08	7	14	0.16	11	21	0.24	14	27	0.31	18	34	0.39
	30	5	10	0.11	10	21	0.23	16	31	0.34	21	41	0.45	26	52	0.56
	40	9	20	0.20	18	39	0.40	28	59	0.60	37	78	0.80	46	98	1.00
	50	14	32	0.31	29	64	0.63	43	97	0.94	58	129	1.26	72	161	1.57
	60	21	48	0.45	41	96	0.90	62	145	1.36	83	193	1.81	104	241	2.26
	70	28	68	0.62	56	136	1.23	85	203	1.85	113	271	2.46	141	339	3.08
	80	37	91	0.80	74	182	1.61	111	273	2.41	148	364	3.21	184	455	4.02
	100	58	148	1.26	115	297	2.51	173	445	3.77	231	593	5.02	288	742	6.28

		Exchange Rate														
		6			7			8			9			10		
Test Well	ROI (b) ft.	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)	Flow (Q) scfm	App. Vac. (ΔP) in H_2O	Ent. Vel (ft./sec)
SVE-01	5	1	1	0.02	1	1	0.02	1	1	0.02	1	1	0.03	1	2	0.03
	10	3	5	0.08	4	6	0.09	5	7	0.10	5	8	0.11	6	8	0.13
	15	8	13	0.17	9	15	0.20	10	17	0.23	12	19	0.25	13	21	0.28
	20	14	25	0.30	16	29	0.35	18	33	0.40	21	37	0.45	23	41	0.50
	25	22	41	0.47	25	48	0.55	29	55	0.63	32	62	0.71	36	68	0.78
	30	31	62	0.68	36	72	0.79	41	82	0.90	47	93	1.02	52	103	1.13
	40	55	118	1.21	65	137	1.41	74	157	1.61	83	177	1.81	92	196	2.01
	50	86	193	1.88	101	226	2.20	115	258	2.51	130	290	2.83	144	322	3.14
	60	124	289	2.71	145	338	3.16	166	386	3.62	187	434	4.07	207	482	4.52
	70	169	407	3.69	198	474	4.31	226	542	4.92	254	610	5.54	282	678	6.15
	80	221	546	4.82	258	636	5.63	295	727	6.43	332	818	7.23	369	909	8.04
	100	346	890	7.53	403	1038	8.79	461	1186	10.05	519	1335	11.30	576	1483	12.56

NOTES:
App. Vac. = Applied Well Head Vacuum
Ent. Vel. = Entrance Velocity
RED Values Exceed Recommended Value (Entrance Velocity <3.0 ft./sec, Applied Well Head Vacuum < half the exposed screen "h")







Recommended Design Criteria:

User Inputs:

ER =	2	(PV/day)
ROI (b) =	30	(ft.)

Intermediate Outputs:

ROI (b) =	914.4	(cm)
Flow Rate (Q_m):	5.9	(g/sec)

Final Design Criteria:

Flow Rate (Q):	**10.4**	(scfm)
App. Vac. (ΔP):	**20.62**	(in H_2O)
Entrance Velocity:	**0.23**	(ft./sec)

(Also See X on Graphs)

Table 1: Open Screen Areas

Slot Size	Stainless Steel		Polyvinylchloride (PVC)			
	Wire Wrapped		Wire wrapped		Mill Slotted	
	2-inch	4-inch	2-inch	4-inch	2-inch	4-inch
	Open Area (%)					
6	9.10%	NA	4.70%	NA	2.00%	NA
7	NA	8.20%	NA	4.10%	NA	2.90%
10	14.10%	11.30%	7.70%	6.70%	2.80%	4.10%
12	16.60%	13.40%	NA	12.50%	NA	4.50%
15	19.80%	NA	NA	17.70%	4.50%	NA
20	24.80%	20.60%	14.30%	22.20%	5.80%	5.80%
30	33.00%	28.40%	19.90%	26.30%	8.30%	7.70%

Johnson Screens: SS V-wire (model W60 304/316 stainless); PVC Vee-wire; PVC Slotted (sch. 40 pvc slotted @ 3/16 inch) Calculated flow capacity, per foot of screen (cfm/ft.), assuming entrance velocity of 5 ft./sec

Job No:	No	Date	Revision	By	Ckd
Client: USACE	1	8/10/2016		[redacted]	
Site Name: Former DSCP Philadelphia Site					
Site Location: Philadelphia, PA					
Description: The purpose of this design tool is to calculate pneumatic conductivity from pilot-test data. The calculation tool was developed for SVE vacuum applications, but also applies for air injection applications.					

converted to mass flow units (g/sec), assuming an air density of 1.25 g/L. Pneumatic Conductivity is calculated from pressure drops between several observation points at different radial distances from an extraction well at a known flow rate.

$$K_{air} = \frac{Q}{2 \cdot \pi \cdot D.\Delta P} \cdot \ln\left(\frac{a}{b}\right)$$

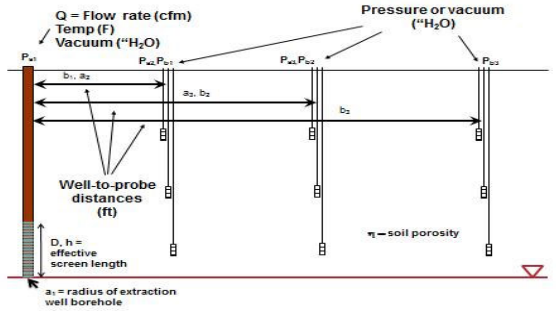
Variable Definition:

a = Inner Vacuum Measurement Point
b= Outer Vacuum Measurement Point
Q_v = Volumetric Flow Rate (ft^3/min)
Q_M = Mass Flow Rate (g/sec))
r = Effective Extraction Well Radius (ft)
a = Distance from Extraction Well to Inner Vacuum Measurement Point (ft)
b= Distance from Extraction Well to Outer Vacuum Measurement Point (ft)
D= Vadose Zone Thickness (ft)
P_a= Vacuum at Inner Measurment Point ("H_20)
P_b = Vacuum at Outer Measurement Point("H_20)
Δ P = Pressure Differential between a and b (g/cm*sec^2)
K_{air} = Mass-Based Pneumatic Conductivity (sec)
K_a = Volume-Based Pneumatic Conductivity (cm/sec)

Calculations

Enter Data into BLUE Fields
Tool Computes Values for GREEN Fields
GRAY Fields indicate A Value that is Linked to Another Location

SVE Pilot Data Collection



(a)	(b)	Q_v (ft^3/min)	Q_M (g/sec)	r (ft)	a (ft)	b (ft)	D (ft)	P_a (" H_20)	P_b ("H_20)	ΔP= Pa - Pb (g/cm*sec^2))	K_{air} (sec)	K_a (cm/sec)
RW-A2	RW-A	10	5.90	0.5	0.5	7.5	8.82	43	1.48	1.03E+05	-9.15E-08	-8.96E-05
RW-A2	PH-1	10	5.90	0.5	0.5	154	8.82	43	0.67	1.05E+05	-1.90E-07	-1.86E-04
RW-A2	PH-21	10	5.90	0.5	0.5	50.8	8.82	43	0.42	1.06E+05	-1.52E-07	-1.49E-04
RW-A2	VP-1	10	5.90	0.5	0.5	122	8.82	43	0.91	1.05E+05	-1.83E-07	-1.79E-04
RW-A2	VP-2	10	5.90	0.5	0.5	187	8.82	43	0.93	1.05E+05	-1.97E-07	-1.94E-04
										Average	-7.99E-05	-1.60E-04

Appendix D- Supporting Calculations
Table D-1b
PNEUMATIC CONDUCTIVITY DESIGN TOOL

(a)	(b)	Q_v (ft^3/min)	Q_M (g/sec)	r (ft)	a (ft)	b (ft)	D (ft)	P_a (" H_20)	P_b ("H_20)	ΔP= Pa - Pb (g/cm*sec^2))	K_{air} (sec)	K_a (cm/sec)
RW-W2	RW-W	10.5	6.19	0.5	0.5	8.3	6.68	23.75	2.64	5.25E+04	-2.59E-07	-2.54E-04
RW-W2	RW-V2	10.5	6.19	0.5	0.5	109.5	6.68	23.75	1.11	5.64E+04	-4.63E-07	-4.54E-04
RW-W2	VP-1	10.5	6.19	0.5	0.5	79.5	6.68	23.75	1.21	5.61E+04	-4.37E-07	-4.28E-04
RW-W2	VP-2	10.5	6.19	0.5	0.5	85	6.68	23.75	1.21	5.61E+04	-4.43E-07	-4.34E-04
										Average	-4.00E-07	-3.92E-04

Minimum Pneumatic Conductivity	#######
Maximum Pneumatic Conductivity	#######
Average Pneumatic Conductivity	#######

Biosparging Pilot System Lineloss Calcs

Client:	USACE		prepared by: [redacted]	checked by:	revised:
Site Name:	Former DSCP Philadelphia Site	RED = User Edit	prep. date: 08/10/16	chk date:	rev. date:
Site Location:	Philadelphia, PA				

References:

[1] Civil Engineering Reference Manual (CERM) 10th Edition, Lindeberg.
[2] Engineering Tool Box.com
[3] http://www.harvel.com/pipepvc-sch40-80-dim.asp
[4] Crane Valves (1988). Flow of Fluids through Valves, Fittings, and Pipe - Technical Paper 410; Crane Valves; Signal Hill, California; 1988

Equipment Information:

Blower Make and Model: Tuthill Competitor SL-3003-22L2; 10 HP motor
Power Type:
Power Requirements:

General Notes
10 HP motor, 2950 rpm, 12 psi pressure, 125 scfm airflow

Assumptions:

Description	Variable	Value	Unit	Notes
See "Quick Ref - compressible flow" tab for additional assumptions				
Target System Parameters				
Target ROI	ROI	13	ft	
Target Flow Rate per well	Q_{WELL}	9.5	acfm	Flow thorugh conveyance pipe (15 scfm)
# of Operational Wells	#	8	---	
Total System Flow Rate	Q_{TOTAL}	77	acfm	Flow through manifold only, do not include bleed air!
Target Pressure at Wellhead	P_{WELL}	191	in w.c	
Blower Discharge Pressure	P_{BLOWER}	24.4	in Hg	
Blower Discharge Pressure	P_{BLOWER}	331.108	in w.c	Starting Pressure
Well Furthest from Compund		300	ft	From pilot system layout figure

Blower Through Manifold

Sum of Straight Pipe Lengths

Description	L	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
Inlet to Blower							
Blower to Manifold	L_1	20	ft	2 in	8.07531 "w.c./100 ft	1.615062 " w.c.	
Manifold Length	L_2	10	ft	2 in	8.07531 "w.c./100 ft	0.807531 " w.c.	
	SUM	30	ft		**SUM**	**2.42259 " w.c.**	

Sum of Fittings (Equivalent Length Method) [2] & [3]See Ref tab

Quantity	Description	L_e	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
6	90o Elbow, standard sharp inside radius	8.6	51.6	ft	2 in	8.07531 "w.c./100 ft	4.16686 " w.c.	
6	Union	0.45	2.7	ft	2 in	8.07531 "w.c./100 ft	0.218033 " w.c.	
1	Inlet Air Filter/Silencer				2 in		2.5 " w.c.	
1	Check Valve	19	19	ft	2 in	8.07531 "w.c./100 ft	1.534309 " w.c.	
1	Heat Exchanger				2		6 " w.c.	
1	Tee Flow - Run	4.3	4.3	ft	2 in	8.07531 "w.c./100 ft	0.347238 " w.c.	
1	Ball valve (full open)	2.89	2.89	ft	2 in	8.07531 "w.c./100 ft	0.233376 " w.c.	
1	Tee Flow - Branch	12	12	ft	2 in	8.07531 "w.c./100 ft	0.969037 " w.c.	Eqn in Col H mod to
1	Tee Flow - Branch	12	12	ft	2 in	6.34076 "w.c./100 ft	0.760892 " w.c.	reduce flow along
1	Tee Flow - Branch	12	12	ft	2 in	4.79631 "w.c./100 ft	0.575558 " w.c.	manifold assuming
1	Tee Flow - Branch	12	12	ft	2 in	3.44761 "w.c./100 ft	0.413713 " w.c.	equal distribution
1	Tee Flow - Branch	12	12	ft	2 in	2.30157 "w.c./100 ft	0.276188 " w.c.	to legs
1	Tee Flow - Branch	12	12	ft	2 in	1.36701 "w.c./100 ft	0.164041 " w.c.	
1	Tee Flow - Branch	12	12	ft	2 in	0.65598 "w.c./100 ft	0.078717 " w.c.	
1	Tee Flow - Branch	12	12	ft	2 in	0.18696 "w.c./100 ft	0.022435 " w.c.	
	SUM	176.49	ft		**SUM**	**18.2604 " w.c.**	

Treatment Compound Instrumentation + Pipe to Wellhead

Sum of Straight Pipe Lengths

Description	L	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
Subgrade Conveyance	L_1	300	ft	1 in	4.42835 "w.c./100 ft	13.28505 " w.c.	
	SUM	300	ft		**SUM**	**13.2851 " w.c.**	

Sum of Fittings (Equivalent Length Method) [2] & [3]See Ref tab

Quantity	Description	L_e	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
1	Reducer (2/1)	1	1	ft	1 in	4.42835 "w.c./100 ft	0.044284 " w.c.	
1	Open Gatevalve	0.6	0.6	ft	1 in	4.42835 "w.c./100 ft	0.02657 " w.c.	
1	Ball valve (full open)	1.58	1.58	ft	1 in	4.42835 "w.c./100 ft	0.069968 " w.c.	
1	Rotameter			ft	1 in		9.5 " w.c.	
4	Union	0.29	1.16	ft	1 in	4.42835 "w.c./100 ft	0.051369 " w.c.	
4	90o Elbow, standard sharp inside radius	5.3	21.2	ft	1 in	4.42835 "w.c./100 ft	0.938811 " w.c.	
4	90o Elbow, long sweep radius	2.5	10	ft	1 in	4.42835 "w.c./100 ft	0.442835 " w.c.	
	SUM	35.54	ft		**SUM**	**11.0738 " w.c.**		
					TOTAL Pressure Losses	**45.0 " w.c.**	**1.63 psi**	
					Wellhead Pressure (with losses)	**286.07 " w.c.**	**10.33 psi**	

Biosparging Pilot System Lineloss Calcs - Scenario 1

Client: USACE
Site Name: Former DSCP Philadelphia Site
Site Location: Philadelphia, PA

RED = User Edit

prepared by:	checked by:	revised:
prep. date: 08/10/16	chk date:	rev. date:

References:

[1] Civil Engineering Reference Manual (CERM) 10th Edition, Lindeberg.
[2] Engineering Tool Box.com
[3] http://www.harvel.com/pipepvc-sch40-80-dim.asp
[4] Crane Valves (1988). Flow of Fluids through Valves, Fittings, and Pipe - Technical Paper 410; Crane Valves; Signal Hill, California; 1988

Equipment Information:

Blower Make and Model: Tuthill Competitor SL-3006-22L2; 7.5 HP motor
Power Type:
Power Requirements:

General Notes
Scenario 1 - 7.5 HP motor, 3530 rpm, 4.2 psi pressure, 313 scfm airflow distributed to all 16 active bioventing wells

Assumptions:

Description	Variable	Value	Unit	Notes
See "Quick Ref - compressible flow" tab for additional assumptions				
Target System Parameters				
Target ROI	ROI	30	ft	
Target Flow Rate per well	Q_{WELL}	18	acfm	Flow thorugh conveyance pipe (20 scfm)
# of Operational Wells	#	16	—	
Total System Flow Rate	Q_{TOTAL}	301	acfm	Flow through manifold only, do not include bleed air!
Target Pressure at Wellhead	P_{WELL}	45	in w.c	
Blower Discharge Pressure	P_{BLOWER}	8.5	in Hg	
Blower Discharge Pressure	P_{BLOWER}	115.345	in w.c	Starting Pressure
Well Furthest from Compund		300	ft	From pilot system layout figure

Blower Through Manifold

Sum of Straight Pipe Lengths

Description	L	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
Inlet to Blower							
Blower to Manifold	L_1	20	ft	4 in	3.82416 "w.c./100 ft	0.764832 " w.c.	
Manifold Length	L_2	10	ft	4 in	3.82416 "w.c./100 ft	0.382416 " w.c.	
	SUM	30	ft		SUM	1.14725 " w.c.	

Sum of Fittings (Equivalent Length Method) [2] & [3]See Ref tab

Quantity	Description	L_e	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
6	90o Elbow, standard sharp inside radius	13.1	78.6	ft	4 in	3.82416 "w.c./100 ft	3.005789 " w.c.	
4	Union	0.65	2.6	ft	4 in	3.82416 "w.c./100 ft	0.099428 " w.c.	
1	Inlet Air Filter/Silencer				4 in		2.5 " w.c.	
1	Reducer (2/1)	4	4	ft	4 in	3.82416 "w.c./100 ft	0.152966 " w.c.	
1	Expansion (1/2)	6	6	ft	4 in	3.82416 "w.c./100 ft	0.22945 " w.c.	
1	Check Valve	38	38	ft	4 in	3.82416 "w.c./100 ft	1.453181 " w.c.	
1	Silencer				4 in		1.5 " w.c.	
1	Tee Flow - Run	8.3	8.3	ft	4 in	3.82416 "w.c./100 ft	0.317405 " w.c.	Eqn in Col H mod to reduce flow along manifold assuming equal distribution to legs
1	Tee Flow - Run	8.3	8.3	ft	4 in	2.28683 "w.c./100 ft	0.189806 " w.c.	
1	Tee Flow - Run	8.3	8.3	ft	4 in	1.10791 "w.c./100 ft	0.091957 " w.c.	
1	Tee Flow - Run	8.3	8.3	ft	4 in	0.32098 "w.c./100 ft	0.026641 " w.c.	
4	Tee Flow - Branch	22	88	ft	4 in	0.32098 "w.c./100 ft	0.28246 " w.c.	
4	Reducer (2/1)	4	16	ft	2 in	7.74602 "w.c./100 ft	1.239364 " w.c.	
4	Ball valve (full open)	5.47	21.88	ft	2 in	7.74602 "w.c./100 ft	1.69483 " w.c.	
4	Tee Flow - Run	8.3	33.2	ft	2 in	4.60074 "w.c./100 ft	1.527444 " w.c.	
4	Tee Flow - Run	8.3	33.2	ft	2 in	2.20772 "w.c./100 ft	0.732962 " w.c.	
4	Tee Flow - Run	8.3	33.2	ft	2 in	0.62923 "w.c./100 ft	0.208904 " w.c.	
4	Tee Flow - Branch	22	88	ft	2 in	0.62923 "w.c./100 ft	0.553721 " w.c.	
	SUM	475.88	ft		SUM	15.8063 " w.c.		

Treatment Compound Instrumentation + Pipe to Wellhead

Sum of Straight Pipe Lengths

Description	L	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
Subgrade Conveyance	L_1	300	ft	2 in	0.58088 "w.c./100 ft	1.742639 " w.c.	
	SUM	300	ft		SUM	1.74264 " w.c.	

Sum of Fittings (Equivalent Length Method) [2] & [3]See Ref tab

Quantity	Description	L_e	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
1	Open Gatevalve	1.5	1.5	ft	2 in	0.58088 "w.c./100 ft	0.008713 " w.c.	
1	Ball valve (full open)	2.89	2.89	ft	2 in	0.58088 "w.c./100 ft	0.016787 " w.c.	
4	Union	0.45	1.8	ft	2 in	0.58088 "w.c./100 ft	0.010456 " w.c.	
4	90o Elbow, standard sharp inside radius	8.6	34.4	ft	2 in	0.58088 "w.c./100 ft	0.199823 " w.c.	
1	Rotameter			ft	2 in		9.5 " w.c.	
4	90o Elbow, long sweep radius	5.7	22.8	ft	2 in	0.58088 "w.c./100 ft	0.132441 " w.c.	
	SUM	63.39	ft		SUM	9.86822 " w.c.		

TOTAL Pressure Losses	28.6 " w.c.	1.03 psi
Wellhead Pressure (with losses)	86.781 " w.c.	3.13 psi

Bioventing Pilot System Lineloss Calcs - Scenario 2

Client: USACE
Site Name: Former DSCP Philadelphia Site
Site Location: Philadelphia, PA

RED = User Edit

prepared by:	checked by:	revised:
prep. date: 08/10/16	chk date:	rev. date:

References:

[1] Civil Engineering Reference Manual (CERM) 10th Edition, Lindeberg.
[2] Engineering Tool Box.com
[3] http://www.harvel.com/pipepvc-sch40-80-dim.asp
[4] Crane Valves (1988). Flow of Fluids through Valves, Fittings, and Pipe - Technical Paper 410; Crane Valves; Signal Hill, California; 1988

Equipment Information:

Blower Make and Model: Tuthill Competitor SL-3006-22L2; 7.5 HP motor
Power Type:
Power Requirements:

General Notes
Scenario 2 - 7.5 HP motor, 3530 rpm, 4.2 psi pressure, 313 scfm airflow distributed to 8 active bioventing wells (2 cycle groups)

Assumptions:

Description	Variable	Value	Unit	Notes
See "Quick Ref - compressible flow" tab for additional assumptions				
Target System Parameters				
Target ROI	ROI	30	ft	
Target Flow Rate per well	Q_{WELL}	37	acfm	Flow thorugh conveyance pipe (40 scfm)
# of Operational Wells	#	8	—	
Total System Flow Rate	Q_{TOTAL}	301	acfm	Flow through manifold only, do not include bleed air!
Target Pressure at Wellhead	P_{WELL}	45	in w.c	
Blower Discharge Pressure	P_{BLOWER}	8.5	in Hg	
Blower Discharge Pressure	P_{BLOWER}	115.345	in w.c	Starting Pressure
Well Furthest from Compund		300	ft	From pilot system layout figure

Blower Through Manifold

Sum of Straight Pipe Lengths

Description	L	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
Inlet to Blower							
Blower to Manifold	L_1	20	ft	4 in	3.82416 "w.c./100 ft	0.764832 " w.c.	
Manifold Length	L_2	10	ft	4 in	3.82416 "w.c./100 ft	0.382416 " w.c.	
	SUM	30	ft		SUM	1.14725 " w.c.	

Sum of Fittings (Equivalent Length Method) [2] & [3]See Ref tab

Quantity	Description	L_e	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
6	90o Elbow, standard sharp inside radius	13.1	78.6	ft	4 in	3.82416 "w.c./100 ft	3.005789 " w.c.	
4	Union	0.65	2.6	ft	4 in	3.82416 "w.c./100 ft	0.099428 " w.c.	
1	Inlet Air Filter/Silencer				4 in		2.5 " w.c.	
1	Reducer (2/1)	4	4	ft	4 in	3.82416 "w.c./100 ft	0.152966 " w.c.	
1	Expansion (1/2)	6	6	ft	4 in	3.82416 "w.c./100 ft	0.22945 " w.c.	
1	Check Valve	38	38	ft	4 in	3.82416 "w.c./100 ft	1.453181 " w.c.	
1	Silencer				4 in		1.5 " w.c.	
1	Tee Flow - Run	8.3	8.3	ft	4 in	3.82416 "w.c./100 ft	0.317405 " w.c.	
1	Tee Flow - Run	8.3	8.3	ft	4 in	1.10791 "w.c./100 ft	0.091957 " w.c.	
2	Tee Flow - Branch	22	44	ft	4 in	1.10791 "w.c./100 ft	0.487481 " w.c.	
2	Reducer (2/1)	4	8	ft	2 in	27.17778 "w.c./100 ft	2.174223 " w.c.	
2	Ball valve (full open)	5.47	10.94	ft	2 in	27.17778 "w.c./100 ft	2.973249 " w.c.	
4	Tee Flow - Run	8.3	33.2	ft	2 in	16.14219 "w.c./100 ft	5.359207 " w.c.	
4	Tee Flow - Run	8.3	33.2	ft	2 in	7.74602 "w.c./100 ft	2.57168 " w.c.	
4	Tee Flow - Run	8.3	33.2	ft	2 in	2.20772 "w.c./100 ft	0.732962 " w.c.	
4	Tee Flow - Branch	22	88	ft	2 in	2.20772 "w.c./100 ft	1.942792 " w.c.	
	SUM	396.34	ft		SUM	25.5918 " w.c.		

Treatment Compound Instrumentation + Pipe to Wellhead

Sum of Straight Pipe Lengths

Description	L	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
Subgrade Conveyance	L_1	300	ft	2 in	2.14175 "w.c./100 ft	6.425263 " w.c.	
	SUM	300	ft		SUM	6.42526 " w.c.	

Sum of Fittings (Equivalent Length Method) [2] & [3]See Ref tab

Quantity	Description	L_e	Value	Unit	Pipe Size	Friction Factor [4]	Frictional Loss	Notes
1	Open Gatevalve	1.5	1.5	ft	2 in	2.14175 "w.c./100 ft	0.032126 " w.c.	
1	Ball valve (full open)	2.89	2.89	ft	2 in	2.14175 "w.c./100 ft	0.061897 " w.c.	
4	Union	0.45	1.8	ft	2 in	2.14175 "w.c./100 ft	0.038552 " w.c.	
4	90o Elbow, standard sharp inside radius	8.6	34.4	ft	2 in	2.14175 "w.c./100 ft	0.736764 " w.c.	
1	Rotameter			ft	2 in		9.5 " w.c.	
4	90o Elbow, long sweep radius	5.7	22.8	ft	2 in	2.14175 "w.c./100 ft	0.48832 " w.c.	
	SUM	63.39	ft		SUM	10.8577 " w.c.		
					TOTAL Pressure Losses	44.0 " w.c.	1.59 psi	
					Wellhead Pressure (with losses)	71.323 " w.c.	2.57 psi	

Appendix D- Supporting Calculations
Table D-3

Estimated Aquifer Sparging Design Injection Pressures Calculations

Client: USACE
Site: Former DSCP Philadelphia Site
Analysis by/Date: [redacted] 8/10/16

Assumptions

No pilot test available, no flow or pressure data. Required pressure estimates appear below.

Number of sparge wells	32 wells
Borehole diameter	7 inches
Casing diameter	2 inch
Screen type	0.01 machine slotted
Screen length	2 ft
Geology	Sequences of silty & clayey sand, and cemented sand & gravel
DTW high	19.5 feet bgs
DTW low	21 feet bgs

	AS
Depth to water (average)	20.25 feet
Depth to top of screen	33 feet
Total Depth	35 feet

Min Injection Pressure

Min injection pressure

= 0.43 * (hydrostatic head) + air pressure for well annulus packing material (0.1 psi) + air entry pressure for the formation (conservative for sands and clays 1 psi)

	High Groundwater
• High Groundwater Min Injection Pressure =	6.91 psi
• Average Groundwater Min Injection Pressure =	Average Groundwater 6.58 psi
• Low Groundwater Min Injection Pressure =	Low Groundwater 6.26 psi
Max Pressure @ 7.5 HP	7.4 psi

Max injection pressure

$P_{soil\ column} = (depth_{top\ well\ screen}) \times (G_s) \times (1\text{-}n) \times (\rho_{H2O})$

$P_{H2O\ column} = (depth_{top\ well\ screen} - DTW) * (n) * (\rho_{H2O})$

G_s= Specific gravity of soil = 2.7*(specific gravity of water @ 20 degrees Celsius, 0.99)	2.673	
n = Porosity	25%	0.25
Depth to top of well screen	33 ft	
ρ_{H2O} = density of water	62.4	lbs/ft^3
DTW = Depth to water table	20.25 ft	
conversion factor	144	psi/psf

	AS
• $P_{Soil\ Column}$	28.667925 psi
• $P_{H2O\ Column}$	1.38 psi
Estimated Overburden Fracture Pressure	30.05 psi
Estimated Max Design Injection Pressure	24.04 psi

References:

USACE 2008. Engineering Design, In-Situ Air Sparging, EM 1110-1-4005, January 31, 2008.

Estimated Hydrocarbon Mass Biodegradation Rate from Bioventing Application

Site: Former DSCP Site, Philadelphia, PA
Analysis by/date: [redacted] & Matt Swensson / 8/10/16

This spreadsheet calculates the estimated hydrocarbon mass biodegradation rate from bioventing using oxygen utilization rates obtained from in-situ respiration field testing and other assumptions. The spreadsheet follows the procedure outlined in Volume II of the 1995 EPA Bioventing Principles and Practice Manual. Hydrocarbon biodegradation rates are calculated using the following equation.

$$\text{Hydrocarbon Biodegradation Rate (lb/day)} = -k_B = \frac{-ko\theta_a\rho_{O2}C(0.01)}{\rho_k}$$

Inputs and assumptions:

θ_a	0.3 m3/cm3	page 28 in EPA reference	
ρ_{O2}	1378 mg/L	O2 density at standard pressure, 10°C	
C	0.33 benzene	mass ratio of hydrocarbons to O2 [0.29-0.33]	
ρ_K	1.86 g/cm3	116 lb/ft3	soil bulk density [0.4-2.1]
Avg smear zone thickness	2 ft	Assumed based on subsurface lithology, MIP data and water table elevation data for pilot test area	
Bioventing pilot treatment area	36,000 ft2	Estimated based on pilot system layout and assumed 30 ft bioventing ROI	

Mass Degredation Calculations:

Soil Volume	72000 ft3	
Soil Mass	8,352,891 lb	3,788,788 kg

O2 Util Rates (%O2/day)		**Biodeg Rates (mg hydrocarbon/kg soil-day)**		**Estimated Hydrocarbon Degredation Rate in BV Area (lb/day)**		
Min	17.42	Min	17.42	Min	6.60E+07 mg/day	145.5 lb/day
Max	300.70	Max	220.55	Max	8.36E+08 mg/day	1842.2 lb/day
Avg	102.33	Avg	75.05	Avg	2.84E+08 mg/day	626.9 lb/day

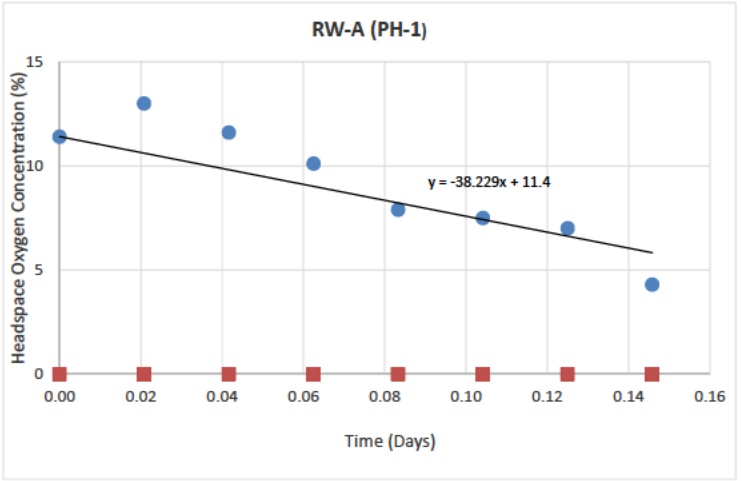
Notes:
Injection well indicates well into which atmospheric air was injected prior to start of the respiration test.

Appendix D- Supporting Calculations
Table D-4

4/12/12 13:00 BV system OFF, PH-1 Injection Well

Observation Well RW-A

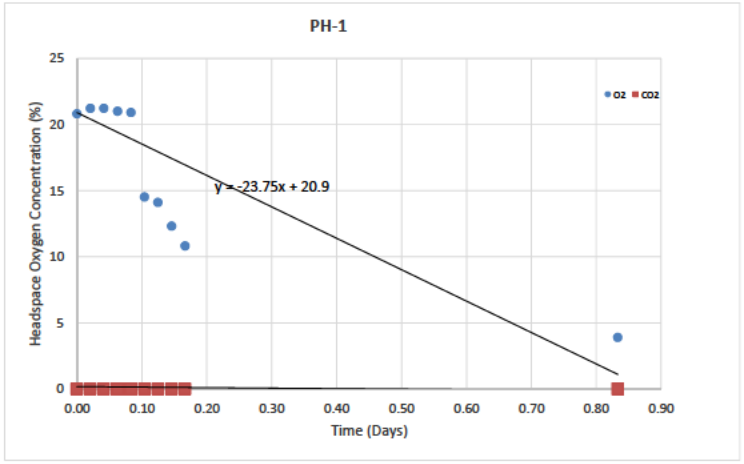
Date & Time	Time (day)	O2 (%)	CO2 (ppm)	CO2 (%)	VOC (ppm)	
4/12/12 13:00	0.00	11.4	3.8	0.00038	346	
4/12/12 13:30	0.02	13	3.2	0.00032	367	
4/12/12 14:00	0.04	11.6	3.7	0.00037	330	
4/12/12 14:30	0.06	10.1	4.7	0.00047	359	
4/12/12 15:00	0.08	7.9	5.5	0.00055	355	
4/12/12 15:30	0.10	7.5	6	0.0006	374	
4/12/12 16:00	0.13	7	6.4	0.00064	363	
4/12/12 16:30	0.15	4.3	7.7	0.00077	404	
	O2 Util Rate (%/day)					Biodeg. Rate (mg/kg-d)
y = -38.229x + 11.4	38.23					28.04



4/12/12 13:00 BV system OFF, PH-1 Injection Well

Injection Well PH-1

Date & Time	Time (day)	O2 (%)	CO2 (ppm)	CO2 (%)	VOC (ppm)	
4/12/12 13:00	0.00	20.8	0	0	0	
4/12/12 13:30	0.02	21.2	0	0	0	
4/12/12 14:00	0.04	21.2	0	0	0	
4/12/12 14:30	0.06	21	0	0	0	
4/12/12 15:00	0.08	20.9	0.1	0.00001	50.5	
4/12/12 15:30	0.10	14.5	1.3	0.00013	271	
4/12/12 16:00	0.13	14.1	1.2	0.00012	290	
4/12/12 16:30	0.15	12.3	1.6	0.00016	326	
4/12/12 17:00	0.17	10.8	1.7	0.00017	387	
4/13/12 9:00	0.83	3.9	4.4	0.00044	622	
	O2 Util Rate (%/day)					Biodeg. Rate (mg/kg-d)
y = -23.75x + 20.9	23.75					17.42

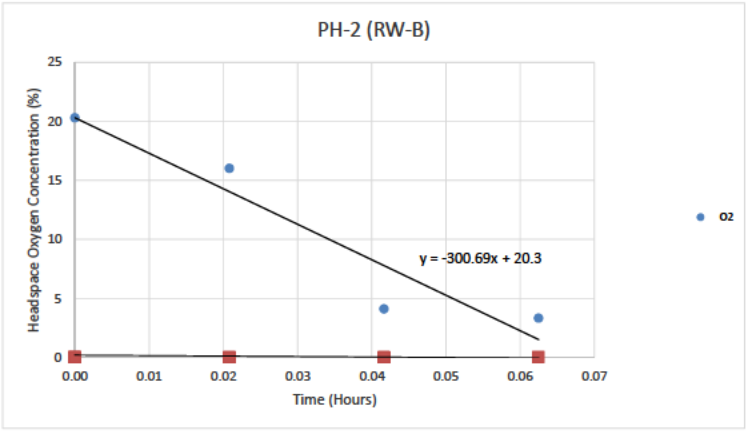


Appendix D- Supporting Calculations
Table D-4

4/20/12 13:30 BV system OFF, RW-B injection well

Observation Well PH-2

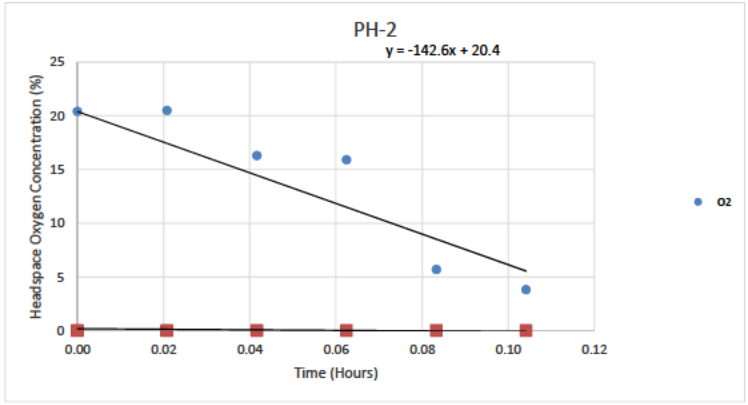
Date & Time	Time (day)	O2 (%)	CO2 (ppm)	CO2 (%)	VOC (ppm)	
4/20/12 13:00	0.00	6.8	6.7	0.00067	258	
4/20/12 13:30	0.00	20.3	0	0	406	
4/20/12 14:00	0.02	16	1.3	0.00013	604	
4/20/12 14:30	0.04	4.1	8.3	0.00083	402	
4/20/2012 15:00	0.06	3.3	8.8	0.00088	394	
	O2 Util Rate (%/day)					Biodeg. Rate (mg/kg-d)
y = -300.69x + 20.3	300.70					220.55



4/26/12 13:00 BV system OFF, PH-2 injection well

Injection Well PH-2

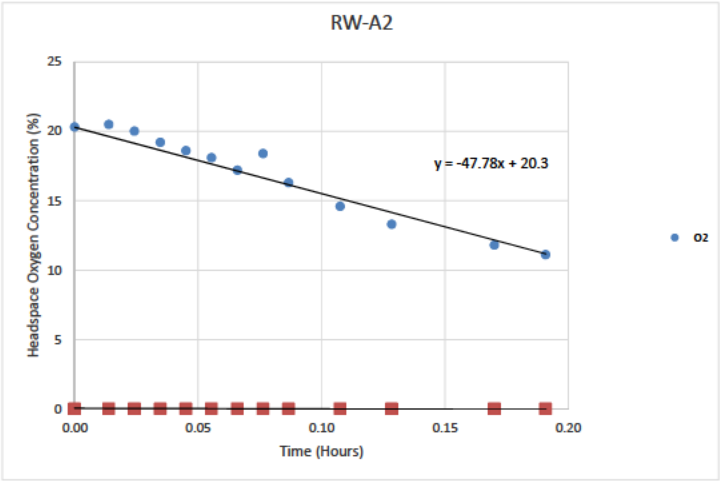
Date & Time	Time (day)	O2 (%)	CO2 (ppm)	CO2 (%)	VOC (ppm)	
4/26/12 9:00	0.00	1.1	1.1	0.00011	642	
4/26/12 13:00	0.00	20.4	0.1	0.00001	641	
4/26/12 13:30	0.02	20.5	0.1	0.00001	487	
4/26/12 14:00	0.04	16.3	1.2	0.00012	564	
4/26/12 14:30	0.06	15.9	1.5	0.00015	465	
4/26/12 15:00	0.08	5.7	6	0.0006	702	
4/26/2012 15:30	0.10	3.8	7.2	0.00072	712	
	O2 Util Rate (%/day)					Biodeg. Rate (mg/kg-d)
y = -142.6x + 20.4	142.60					104.59



Appendix D- Supporting Calculations
Table D-4

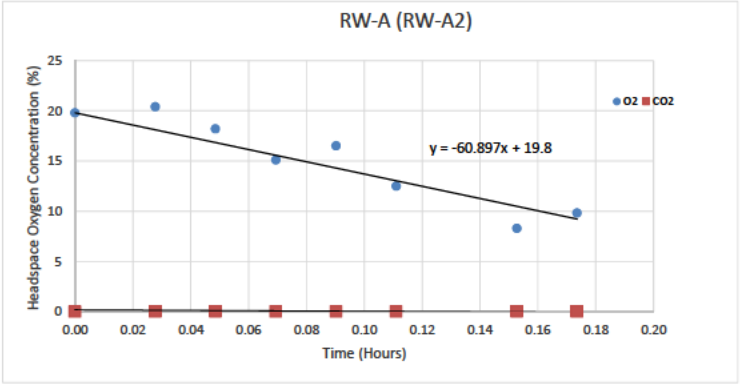
5/27/16 7:20 BV system OFF, RW-A2 injection well

Injection Well RW-A2						
	Time	O2	CO2	CO2	VOC	
Date & Time	(day)	(%)	(ppm)	(%)	(ppm)	
5/27/16 7:20	0.00	20.3	0.2	0.00002	306	
5/27/16 7:40	0.01	20.5	0.1	0.00001	139	
5/27/16 7:55	0.02	20	0.3	0.00003	144	
5/27/16 8:10	0.03	19.2	0.6	0.00006	116	
5/27/16 8:25	0.05	18.6	0.8	0.00008	171	
5/27/16 8:40	0.06	18.1	1.1	0.00011	241	
5/27/16 8:55	0.07	17.2	1.2	0.00012	154	
5/27/16 9:10	0.08	18.4	0.7	0.00007	176	
5/27/16 9:25	0.09	16.3	1.2	0.00012	101	
5/27/16 9:55	0.11	14.6	1.5	0.00015	107	
5/27/16 10:25	0.13	13.3	2.2	0.00022	160	
5/27/16 11:25	0.17	11.8	2.5	0.00025	175	
5/27/16 11:55	0.19	11.1	2.8	0.00028	168	
	O2 Util Rate (%/day)					Biodeg. Rate (mg/kg-d)
y = -47.78x + 20.3	47.78					35.04



5/27/16 7:20 BV system OFF, RW-A2 injection well

Observation Well RW-A						
	Time	O2	CO2	CO2	VOC	
Date & Time	(day)	(%)	(ppm)	(%)	(ppm)	
5/27/16 7:25	0.00	19.8	0.4	0.00004	321	
5/27/16 8:00	0.03	20.4	0.1	0.00001	90.1	
5/27/16 8:30	0.05	18.2	1.7	0.00017	611	
5/27/16 9:00	0.07	15.1	3.3	0.00033	730.8	
5/27/16 9:30	0.09	16.5	1.8	0.00018	711	
5/27/16 10:00	0.11	12.5	4	0.0004	553	
5/27/16 11:00	0.15	8.3	6.1	0.00061	243	
5/27/16 11:30	0.17	9.8	5	0.0005	555	
	O2 Util Rate (%/day)					Biodeg. Rate (mg/kg-d)
y = -60.897x + 19.8	60.90					44.67

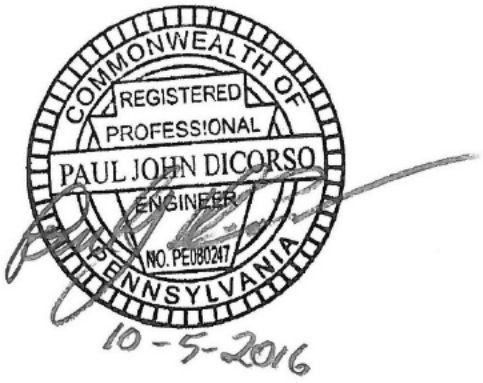


ARCADIS Design & Consultancy for natural and built assets

USACE PHILADELPHIA DISTRICT

FORMER DSCP SYSTEM UPGRADES

CARGO BOX EQUIPMENT ENCLOSURE ANCHORAGE CALCULATIONS



October 5, 2016

ARCADIS

SUBJECT: USACE PHILADELPHIA
CARGO BOX ANCHORAGE CALCS.
JOB NO:

BY: LAB DATE: 8/9/16
CHKD: DATE:

SHEET 1

EQUIPMENT ENCLOSURE 20' x 8' x 8' HIGH

WT ≃ 10,000# INCLUDING EQUIPMENT (25000# EMPTY)

SEE ATTACHED DESIGN LOADS PER ASCE 7-05/IBC 2009

WIND LOADS:

LATERAL LOAD = 16.5 x 20 x 8 = 2640#

UPLIFT = 19.2 x 20 x 8 = 3072#

M_{OT_W} = 2640 x 8/2 + 3072 x 8/2 = 22,848'# (OVERTURNING)

USE EMPTY WEIGHT → M_R = 5000 x 8/2 = 20,000'# (RESISTING)

CHECK LOAD COMBINATIONS:

IBC 2009 Eq 16-14: .6D + W

∴ M_R = .6 x 20,000 − 22,848 = −10,848'#

∴ UPLIFT ON EACH SIDE = $\frac{10848}{8}$ = 1356#

SEISMIC LOADS:

$Q_E = C_S \times D$ = .113 x 10,000 = 1130#

Eh = ρQ_E = 1130#

Ev = .056D = 560#

CHECK LOAD COMBINATIONS

IBC 2009 Eq 16-12 D + .7E w/ E = Eh + Ev

∴ LATERAL LOAD = .7 x (1130 + 560) = 1183#

1183# < 2640# ∴ WIND CONTROLS BY INSPECTION

ARCADIS

SUBJECT: USACE PHILADELPHIA
CARGO BOX ANCHORAGE

JOB NO:

BY: LAB DATE: 8/9/16

CHKD: DATE:

PAGE 2

SHEET 1

DESIGN ANCHORAGE FOR:

2646# TOTAL SHEAR

1356# TOTAL UPLIFT PER SIDE

ASSUME (2) ANCHORAGE POINTS ON EACH LONGSIDE*

∴ 2640/4 = 660# SHEAR/ANCHOR

1356/2 = 678# TENSION/ANCHOR

SEE ATTACHED HILTI ANCHORAGE CALCULATIONS

USE LOAD FACTOR OF 1.6 ON V AND T
FOR USE WITH ACI 318-08 DESIGN PROVISIONS

∴ V = 1056#/ANCHOR

T = 1084#/ANCHOR

ARCADIS

SUBJECT: USACE PHILADELPHIA

JOB NO:

BY: LAB DATE: 8/9/16

CHKD: DATE:

PAGE 3

SHEET 1

SUPPORT SLAB DESIGN

SAY 6" CONC PAD, 12" "LEDGE" ON ALL SIDES

@ 10,000# TOTAL WEIGHT, $q_{brg} = \frac{10000}{22 \times 10} = 45 psf$

SAY 100psf AND CHECK BENDING IN SLAB:

$100 \times 1' \times 1\frac{1}{2} = 50'\#/'$ SAY $M_u = 1.6 \times 50 = 80'\#/'$

d = 3"

$\therefore M_u/\phi bd^2 = 9.8$ VERY SMALL

PROVIDE WWF FOR SHRINKAGE AND TEMP CONTROL

USE 6x6 - W5.5 x W5.5 ' ($A_s = .11 in^2/'$)

Code Search

Code: International Building Code 2009

Occupancy:

Occupancy Group = F Factory

Occupancy Category & Importance Factors:

Occupancy Category =	II
Wind factor =	1.00
Snow factor =	1.00
Seismic factor =	1.00

Type of Construction:

Fire Rating:

Roof =	0.0 hr
Floor =	0.0 hr

Building Geometry:

Roof angle (θ)	0.00 / 12	0.0 deg
Building length (L)	20.0 ft	
Least width (B)	8.0 ft	
Mean Roof Ht (h)	8.0 ft	
Parapet ht above grd	0.0 ft	
Minimum parapet ht	0.0 ft	

Live Loads:

Roof

0 to 200 sf: 20 psf
200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
over 600 sf: 12 psf

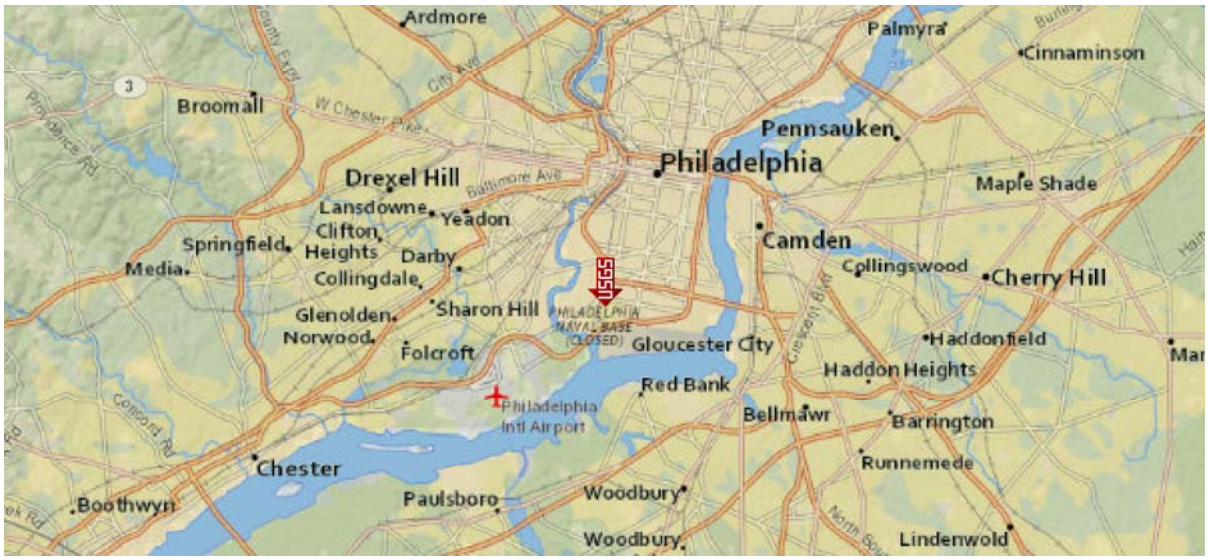
Floor:

Typical Floor	250 psf
	N/A
	0 psf

USGS Design Maps Summary Report

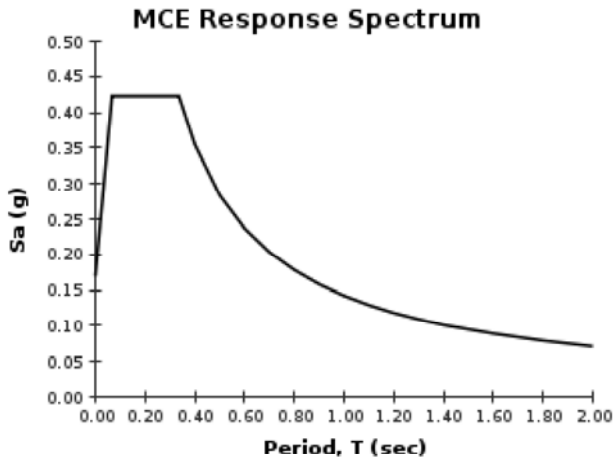
User–Specified Input

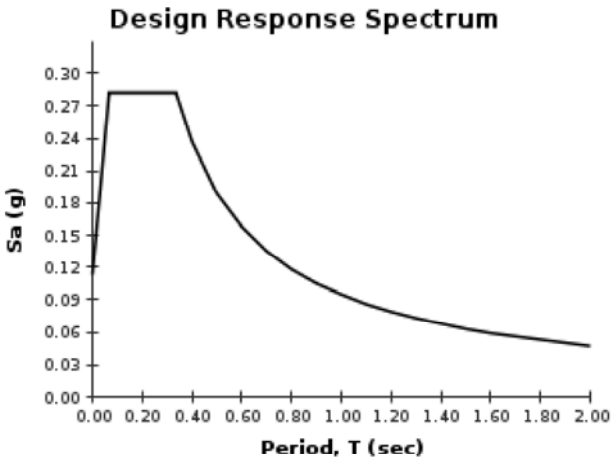
Report Title	Seismic Values for Philadelphia, PA Tue August 9, 2016 15:36:39 UTC
Building Code Reference Document	ASCE 7-05 Standard (which utilizes USGS hazard data available in 2002)
Site Coordinates	39.914°N, 75.19°W
Site Soil Classification	Site Class D – "Stiff Soil"
Occupancy Category	I/II/III



USGS–Provided Output

S_S =	0.267 g	S_{MS} =	0.423 g	S_{DS} =	0.282 g
S_1 =	0.059 g	S_{M1} =	0.142 g	S_{D1} =	0.095 g





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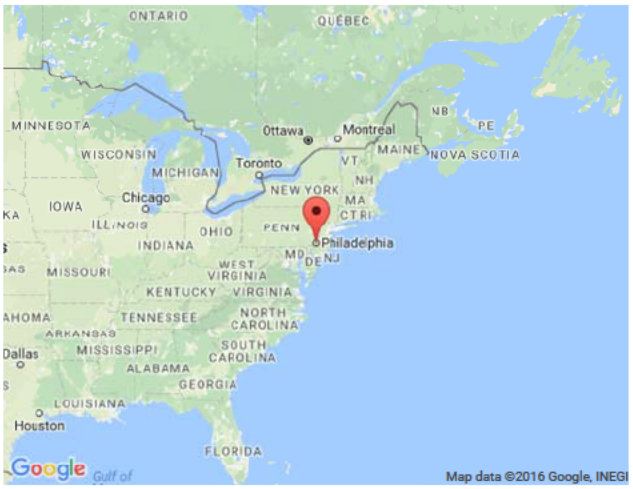
Search Results

Query Date: Tue Aug 09 2016
Latitude: 39.9140
Longitude: -75.1900

ASCE 7-10 Windspeeds
(3-sec peak gust in mph*):

Risk Category I: 105
Risk Category II: 115
Risk Category III-IV: 120
MRI 10-Year:** 76
MRI 25-Year:** 84
MRI 50-Year:** 90
MRI 100-Year:** 96

ASCE 7-05 Windspeed:
90 (3-sec peak gust in mph)
ASCE 7-93 Windspeed:
75 (fastest mile in mph)



*Miles per hour
**Mean Recurrence Interval

Users should consult with local building officials to determine if there are community-specific wind speed requirements that govern.

Print your results

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ARCADIS Design & Consultancy for natural and built assets

JOB TITLE	Equipment Enclosure Anchoring		
	USACE Former DSCP System Updgrades		
JOB NO.		SHEET NO.	
CALCULATED BY	LAB	DATE	8/9/16
CHECKED BY		DATE	

Wind Loads - MWFRS all h (Enclosed/partially enclosed only)

Kh (case 2) =	0.85	h =	8.0 ft	GCpi =	+/-0.18
Base pressure (q_h) =	**15.0 psf**	ridge ht =	8.0 ft	G =	0.85
Roof Angle (θ) =	0.0 deg	L =	20.0 ft	qi = qh	
Roof tributary area - (h/2)*L:	80 sf	B =	8.0 ft		
(h/2)*B:	32 sf				

Wind Surface Pressures (psf)

Surface	Wind Normal to Ridge B/L = 0.40 Cp	q_hGC_p	h/L = 1.00 w/+q_iGC_{pi}	w/-q_hGC_{pi}	Wind Parallel to Ridge L/B = 2.50 Dist.*	Cp	q_hGC_p	h/L = 0.40 w/ +q_iGC_{pi}	w/ -q_hGC_{pi}
Windward Wall (WW)	0.80	10.2	see table below			0.80	10.2	see table below	
Leeward Wall (LW)	-0.50	-6.4	-9.1	-3.7		-0.28	-3.5	-6.2	-0.8
Side Wall (SW)	-0.70	-8.9	-11.6	-6.2		-0.70	-8.9	-11.6	-6.2
Leeward Roof (LR)		**				Included in windward roof			
Windward Roof: 0 to h/2*	-1.30	-16.5	-19.2	-13.8	0 to h/2*	-0.90	-11.4	-14.1	-8.8
> h/2*	-0.70	-8.9	-11.6	-6.2	h/2 to h*	-0.90	-11.4	-14.1	-8.8
					h to 2h*	-0.50	-6.4	-9.1	-3.7
					> 2h*	-0.30	-3.8	-6.5	-1.1

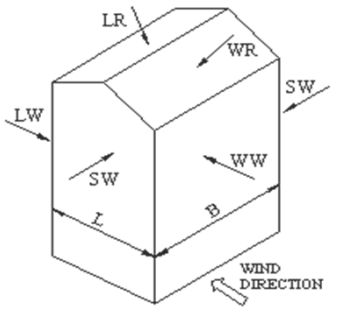
**Roof angle < 10 degrees. Therefore, leeward roof is included in windward roof pressure zones.

*Horizontal distance from windward edge

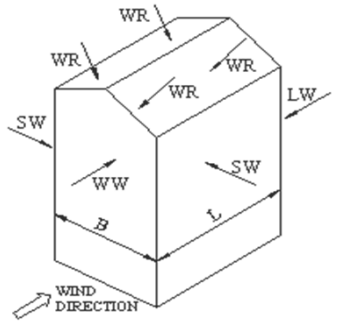
For monoslope roofs, entire roof surface is either windward or leeward surface.

Windward Wall Pressures at "z" (psf)

	z	Kz	Kzt	Windward Wall q_zGC_p	w/+q_iGC_{pi}	w/-q_hGC_{pi}	Combined WW + LW Normal to Ridge	Parallel to Ridge
h=	0 to 15'	0.85	1.00	10.2	7.5	12.9	16.5	13.7



WIND NORMAL TO RIDGE



WIND PARALLEL TO RIDGE

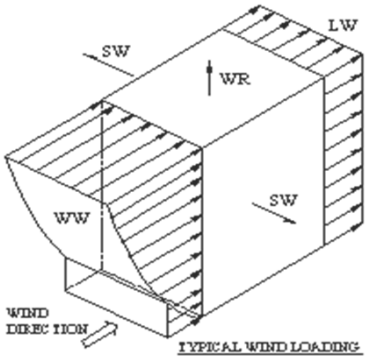
NOTE:
See figure in ASCE7 for the application of full and partial loading of the above wind pressures. There are 4 different loading cases.

Parapet

z	Kz	Kzt	qp (psf)
0.0 ft	0.85	1.00	0.0

Windward parapet: 0.0 psf (GCpn = +1.5)
Leeward parapet: 0.0 psf (GCpn = -1.0)

Windward roof overhangs (add to windward roof pressure) : 10.2 psf (upward)



TYPICAL WIND LOADING

Seismic Loads:

Occupancy Category : II
Importance Factor (I) : 1.00
Site Class : D

Ss (0.2 sec) = 26.70 %g
S1 (1.0 sec) = 5.90 %g

Fa =	1.586		Sms =	0.424	S_{DS} =	0.282	Design Category =	B
Fv =	2.400		Sm1 =	0.142	S_{D1} =	0.094	Design Category =	B

Seismic Design Category = **B**
Number of Stories: 1
Structure Type: Not applicable
Horizontal Struct Irregularities: No plan Irregularity
Vertical Structural Irregularities: No vertical Irregularity
Flexible Diaphragms: No
Building System: **Building Frame Systems**
Seismic resisting system: **Light frame walls with shear panels-all other materials**
System Structural Height Limit: **Height not limited**
Actual Structural Height (hn) = 8.0 ft

DESIGN COEFFICIENTS AND FACTORS

Response Modification Coefficient (R) = 2.5
Over-Strength Factor (Ωo) = 2.5
Deflection Amplification Factor (Cd) = 2.5
S_{DS} = 0.282
S_{D1} = 0.094

ρ = redundancy coefficient

Seismic Load Effect (E) = ρQ_E +/- $0.2S_{DS}D$ = ρQ_E +/- 0.056D — Q_E = horizontal seismic force
Special Seismic Load Effect (Em) = $\Omega o Q_E$ +/- $0.2S_{DS}D$ = 2.5 Q_E +/- 0.056D — D = dead load

PERMITTED ANALYTICAL PROCEDURES

Simplified Analysis - Use Equivalent Lateral Force Analysis

Equivalent Lateral-Force Analysis - Permitted

Building period coef. (C_T) = 0.020 — Cu = 1.70
Approx fundamental period (Ta) = $C_T h_n^x$ = 0.095 sec x= 0.75 — Tmax = CuTa = 0.162
User calculated fundamental period (T) = 0 sec — Use T = 0.095
Long Period Transition Period (TL) = ASCE7 map = 6
Seismic response coef. (Cs) = $S_{DS}I/R$ = 0.113
need not exceed Cs = Sd1 I /RT = 0.397
but not less than Cs = 0.044SdsI = 0.012
USE Cs = 0.113

Design Base Shear V = 0.113W

Model & Seismic Response Analysis - Permitted (see code for procedure)

ALLOWABLE STORY DRIFT

Structure Type: All other structures

Allowable story drift = 0.020hsx where hsx is the story height below level x

Company:		Page:	1
Specifier:		Project:	USACE Philadelphia
Address:		Sub-Project I Pos. No.:	Equipment Enclosure
Phone I Fax:	|	Date:	8/30/2016
E-Mail:			

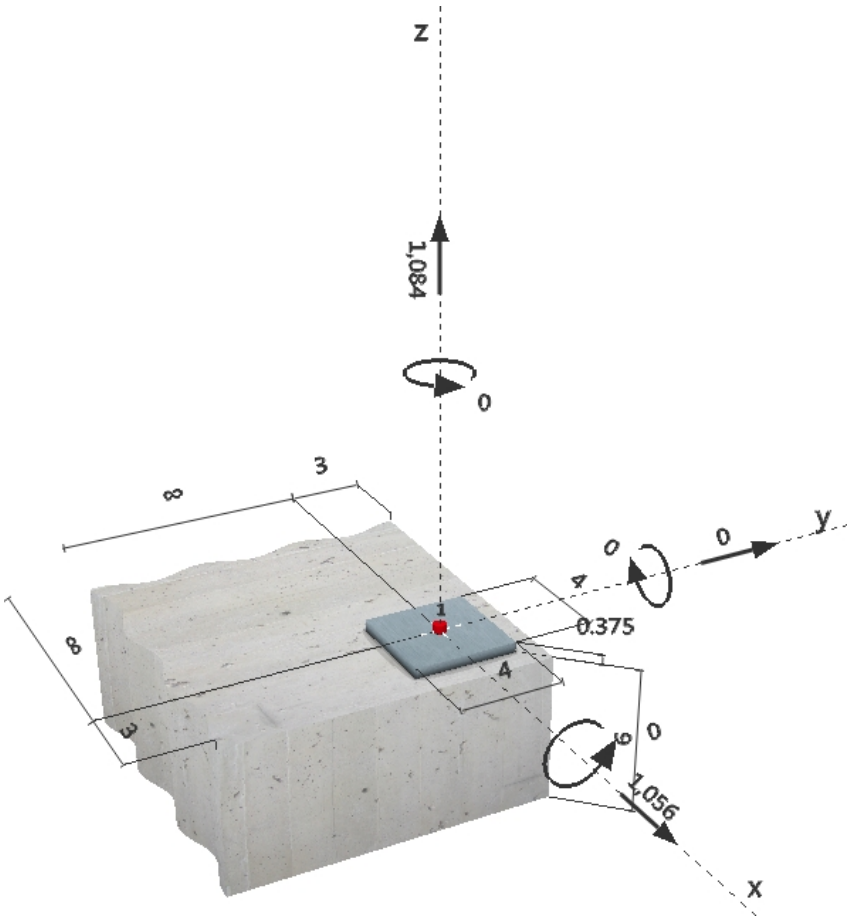
Specifier's comments:

1 Input data



Anchor type and diameter:	**HIT-HY 200 + HAS 1/2**
Effective embedment depth:	$h_{ef,opti}$ = 2.750 in. ($h_{ef,limit}$ = 4.750 in.)
Material:	5.8
Evaluation Service Report:	ESR-3187
Issued I Valid:	3/1/2016 | 3/1/2018
Proof:	Design method ACI 318-08 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.375 in.
Anchor plate:	l_x x l_y x t = 4.000 in. x 4.000 in. x 0.375 in.; (Recommended plate thickness: not calculated
Profile:	no profile
Base material:	uncracked concrete, 4000, f_c' = 4000 psi; h = 6.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	no

Geometry [in.] & Loading [lb, in.lb]



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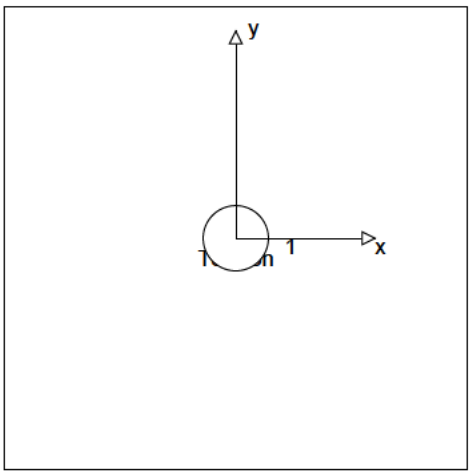
2 Load case/Resulting anchor forces

Load case: Design loads



Anchor reactions [lb]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	1084	1056	1056	0

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 1084 [lb]
resulting compression force in (x/y)=(0.000/0.000): 0 [lb]

3 Tension load

	Load N_{ua} [lb]	Capacity ϕN_n [lb]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	1084	6688	17	OK
Bond Strength**	1084	2263	48	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Strength**	1084	2583	42	OK

* anchor having the highest loading **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-3187
$\phi N_{sa} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.14	72500

Calculations

N_{sa} [lb]
10290

Results

N_{sa} [lb]	ϕ_{steel}	ϕN_{sa} [lb]	N_{ua} [lb]
10290	0.650	6688	1084

Input data and results must be checked for agreement with the existing conditions and for plausibility!
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3.2 Bond Strength

$N_a = \left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ed,Na}\, \psi_{cp,Na}\, N_{ba}$ ACI 318-11 Eq. (D-18)

$\phi\, N_a \geq N_{ua}$ ACI 318-11 Table D.4.1.1

A_{Na} = see ACI 318-11, Part D.5.5.1, Fig. RD.5.5.1(b)

$A_{Na0} = (2\, c_{Na})^2$ ACI 318-11 Eq. (D-20)

$c_{Na} = 10\, d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ ACI 318-11 Eq. (D-21)

$\psi_{ec,Na} = \left(\frac{1}{1 + \frac{e'_N}{c_{Na}}}\right) \leq 1.0$ ACI 318-11 Eq. (D-23)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ ACI 318-11 Eq. (D-25)

$\psi_{cp,Na} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ ACI 318-11 Eq. (D-27)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ ACI 318-11 Eq. (D-22)

Variables

$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\tau_{k,c}$ [psi]
1750	0.500	2.750	3.000	1750

$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
0.000	0.000	4.922	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
6.279	86.10	157.69	0.843

$\psi_{ec1,Na}$	$\psi_{ec2,Na}$	$\psi_{cp,Na}$	N_{ba} [lb]
1.000	1.000	1.000	7561

Results

N_a [lb]	ϕ_{bond}	$\phi\, N_a$ [lb]	N_{ua} [lb]
3481	0.650	2263	1084

Input data and results must be checked for agreement with the existing conditions and for plausibility!
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3.3 Concrete Breakout Strength

$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N}\, \psi_{c,N}\, \psi_{cp,N}\, N_b$ ACI 318-08 Eq. (D-4)

$\phi\, N_{cb} \geq N_{ua}$ ACI 318-08 Eq. (D-1)

A_{Nc} see ACI 318-08, Part D.5.2.1, Fig. RD.5.2.1(b)

$A_{Nc0} = 9\, h_{ef}^2$ ACI 318-08 Eq. (D-6)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\, e'_N}{3\, h_{ef}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-9)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ ACI 318-08 Eq. (D-11)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-08 Eq. (D-13)

$N_b = k_c\, \lambda\, \sqrt{f'_c}\, h_{ef}^{1.5}$ ACI 318-08 Eq. (D-7)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2.750	0.000	0.000	3.000	1.000

c_{ac} [in.]	k_c	λ	f'_c [psi]
4.922	24	1	4000

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
50.77	68.06	1.000	1.000	0.918	0.838	6922

Results

N_{cb} [lb]	$\phi_{concrete}$	$\phi\, N_{cb}$ [lb]	N_{ua} [lb]
3973	0.650	2583	1084

Input data and results must be checked for agreement with the existing conditions and for plausibility!
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4 Shear load

	Load V_{ua} [lb]	Capacity ϕV_n [lb]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	1056	3705	29	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Bond Strength controls)**	1056	4874	22	OK
Concrete edge failure in direction x+**	1056	1681	63	OK

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

$V_{sa} = (0.6\ A_{se,V}\ f_{uta})$ refer to ICC-ES ESR-3187
$\phi\ V_{steel} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$(0.6\ A_{se,V}\ f_{uta})$ [lb]
0.14	72500	6175

Calculations

V_{sa} [lb]
6175

Results

V_{sa} [lb]	ϕ_{steel}	$\phi\ V_{sa}$ [lb]	V_{ua} [lb]
6175	0.600	3705	1056

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4.2 Pryout Strength (Bond Strength controls)

$V_{cp} = k_{cp}\left[\left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ed,Na}\, \psi_{cp,Na}\, N_{ba}\right]$ ACI 318-11 Eq. (D-40)

$\phi\, V_{cp} \geq V_{ua}$ ACI 318-11 Table (D.4.1.1)

A_{Na} see ACI 318-11, Part D.5.5.1, Fig. RD.5.5.1(b)

$A_{Na0} = (2\, c_{Na})^2$ ACI 318-11 Eq. (D-20)

$c_{Na} = 10\, d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ ACI 318-11 Eq. (D-21)

$\psi_{ec,Na} = \left(\frac{1}{1 + \frac{e'_N}{c_{Na}}}\right) \leq 1.0$ ACI 318-11 Eq. (D-23)

$\psi_{ed,Na} = 0.7 + 0.3\left(\frac{c_{a,min}}{c_{ac}}\right) \leq 1.0$ ACI 318-11 Eq. (D-25)

$\psi_{cp,Na} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ ACI 318-11 Eq. (D-27)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ ACI 318-11 Eq. (D-22)

Variables

k_{cp}	$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]
2	1750	0.500	2.750	3.000

$\tau_{k,c}$ [psi]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
1750	0.000	0.000	4.922	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
6.279	86.10	157.69	0.843

$\psi_{ec1,Na}$	$\psi_{ec2,Na}$	$\psi_{cp,Na}$	N_{ba} [lb]
1.000	1.000	1.000	7561

Results

V_{cp} [lb]	$\phi_{concrete}$	$\phi\, V_{cp}$ [lb]	V_{ua} [lb]
6963	0.700	4874	1056

Input data and results must be checked for agreement with the existing conditions and for plausibility!
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Specifier:
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4.3 Concrete edge failure in direction x+

$V_{cb} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ed,V}\ \psi_{c,V}\ \psi_{h,V}\ \psi_{parallel,V}\ V_b$ ACI 318-08 Eq. (D-21)

$\phi\ V_{cb} \geq V_{ua}$ ACI 318-08 Eq. (D-2)

A_{Vc} see ACI 318-08, Part D.6.2.1, Fig. RD.6.2.1(b)

$A_{Vc0} = 4.5\ c_{a1}^2$ ACI 318-08 Eq. (D-23)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{2e'_v}{3c_{a1}}}\right) \leq 1.0$ ACI 318-08 Eq. (D-26)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ ACI 318-08 Eq. (D-28)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ ACI 318-08 Eq. (D-29)

$V_b = \left(7\left(\frac{l_e}{d_a}\right)^{0.2}\sqrt{d_a}\right)\lambda\sqrt{f'_c}\ c_{a1}^{1.5}$ ACI 318-08 Eq. (D-24)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
3.000	3.000	0.000	1.400	6.000

l_e [in.]	λ	d_a [in.]	f'_c [psi]	$\psi_{parallel,V}$
2.750	1.000	0.500	4000	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [lb]
33.75	40.50	1.000	0.900	1.000	2288

Results

V_{cb} [lb]	$\phi_{concrete}$	$\phi\ V_{cb}$ [lb]	V_{ua} [lb]
2402	0.700	1681	1056

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.479	0.628	5/3	76	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

6 Warnings

- Load re-distributions on the anchors due to elastic deformations of the anchor plate are not considered. The anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the loading! Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions
- The ACI 318-08 version of the software does not account for adhesive anchor special design provisions corresponding to overhead applications.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!

Fastening meets the design criteria!

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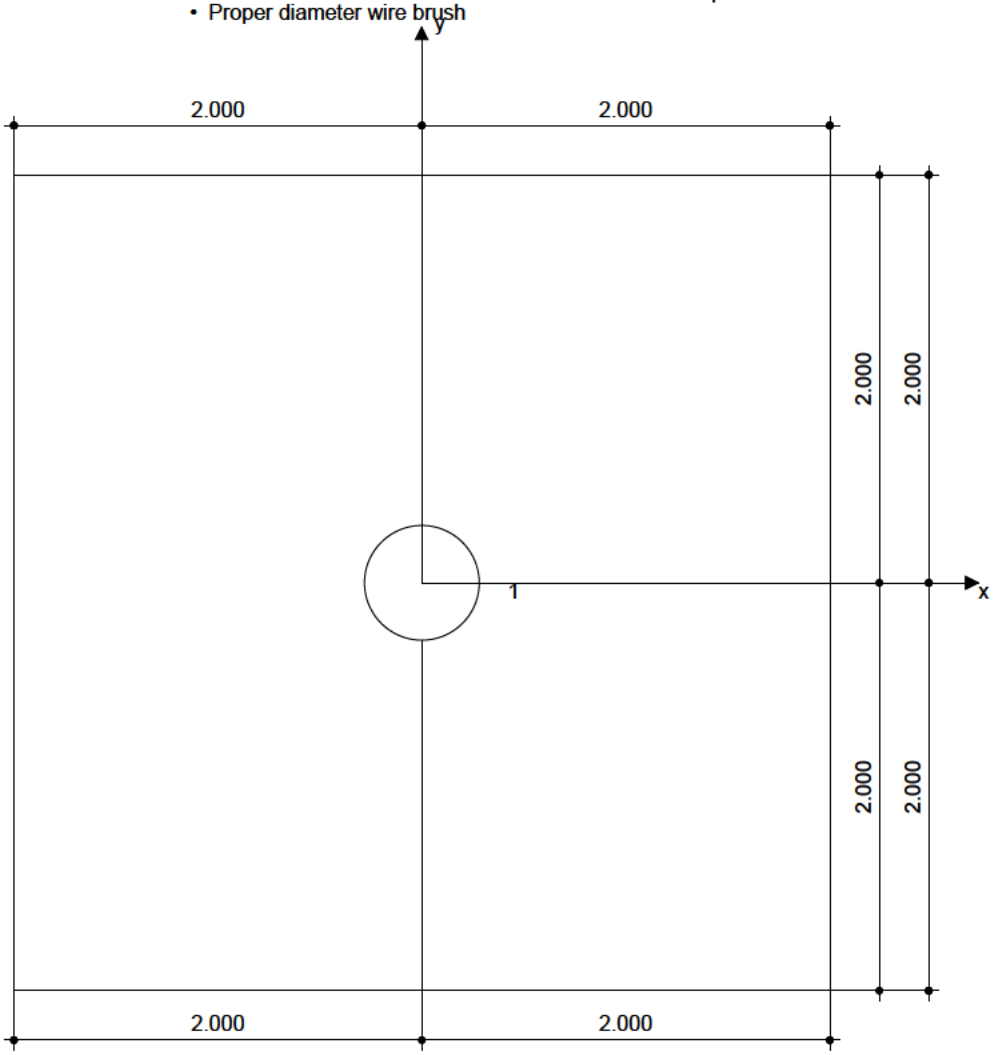
Company:
Specifier:
Address:
Phone I Fax: |
E-Mail:

7 Installation data

Anchor plate, steel: -
Profile: no profile
Hole diameter in the fixture: d_f = 0.563 in.
Plate thickness (input): 0.375 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Anchor type and diameter: HIT-HY 200 + HAS 1/2
Installation torque: 360.001 in.lb
Hole diameter in the base material: 0.563 in.
Hole depth in the base material: 2.750 in.
Minimum thickness of the base material: 4.000 in.
Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Compressed air with required accessories to blow from the bottom of the hole • Proper diameter wire brush	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	-	3.000	-	3.000

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Company:
Specifier:
Address:
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Appendix W

Subsection Three: Biovent/Biosparge System

Pilot Test Work Plan

Defense Supply Center Philadelphia

PILOT TEST WORK PLAN

Biovent/Biosparge System

Former Defense Supply Center Philadelphia
Philadelphia, Pennsylvania

June 2018

PILOT TEST WORK PLAN

Former Defense Supply Center Philadelphia
Philadelphia, Pennsylvania

Prepared for:
USACE

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CONTENTS

1 Executive Summary 1

2 Introduction 3

2.1 Purpose and Scope 3

3 Site Overview 4

3.1 Site History and Description 4

3.2 Extent of Contamination 4

4 Conceptual Site Model 6

5 Pilot System Design Revisions 7

5.1 Pilot Study Basis and Objectives 7

5.2 Revised Injection Well Network Layout and Design Basis 7

5.2.1 Biosparging Wells 7

5.2.2 Bioventing Wells 8

5.3 Conveyance Piping and Sparge Manifold 8

5.4 Pilot System Equipment and Operational Strategy 10

5.4.1 Pilot System Equipment 10

5.4.2 Optional Skimmer System Panel Upgrades 12

6 System ProveOut 13

6.1 Pressure Testing of Conveyance Piping 13

6.2 Controls and Electrical Acceptance Testing 13

6.3 Pilot System Performance Proveout Testing 14

7 Performance Monitoring 18

7.1.1 Performance Monitoring Wells 18

7.1.2 Performance Monitoring Data 18

8 Permit Ledger 20

9 References 21

FIGURES

Figure 1 Site Map

TABLES

Table 1 Performance Monitoring Summary
Table 2 Permit Ledger

APPENDICES

Appendix A 2018 Design Changes Summary
Appendix B Supplemental Investigation Letter Report
Appendix C Construction Drawings
Appendix D Supporting Calculations
Appendix E Proveout Factory Acceptance Test Sheets
Appendix F Testing Procedure Field Data Sheets

1 EXECUTIVE SUMMARY

This Pilot Test Work Plan (Work Plan) describes the implementation of a pilot bioventing and biosparging system (Pilot System) designed to increase the rate of cleanup in tandem with existing remediation infrastructure, while pursuing the definition of the Order. The Pilot System is based around remediation equipment, specifically two positive displacement-style rotary lobe blowers obtained from the United States Environmental Protection Agency's (USEPA's) Valmont Superfund (Valmont) Site by the United States Army Corps of Engineers (USACE) Philadelphia District. This Work Plan includes revisions to November 2016 "System Upgrades, Pilot Design and Study" (Design Report) (Arcadis, 2016).

The former Defense Supply Center Philadelphia (DSCP) was closed under the 1993 Base Realignment and Closure (BRAC) program and the property has since been redeveloped for commercial and industrial use. The DSCP as well the I-76 Schuylkill Expressway and the Philadelphia Housing Authority properties to the South collectively make up the Site for the purposes of ongoing remedial activities. Petroleum hydrocarbon impacts and related human health exposure pathways that exist at the Site are associated with light non-aqueous phase liquid (LNAPL) that is present above the groundwater table. LNAPL is also present in a "smear zone" where residual liquid phase is entrapped in pore spaces both above and below the average water table. Remediation began in 1996 using skimmer pumps installed to remove LNAPL from the shallow aquifer beneath the Site. A full-scale Vapor Enhanced Skimming (VES) system has been in operation since its installation in 2005. Ongoing Site remediation activities continue as required by the 1999 Administrative Order (Order) between the Defense Logistics Agency (DLA) and the Pennsylvania Department of Environmental Protection (PADEP).

While the existing VES system remains productive, its effectiveness is limited to impacts above the water table. Bioventing and biosparging remedial techniques may be implemented to improve remediation by affecting impacts above and below the water table and thereby shorten the overall lifecycle at the Site. Bioventing techniques, characterized by use of air venting or injection to induce airflow in the subsurface, are used to increase oxygen levels and enhance natural microbial biodegradation of organic constituents in the unsaturated soil zone. Biosparging techniques operate similarly, but deliver air below the water table, thereby increasing dissolved oxygen levels and promoting bioremediation in the saturated zone.

This Pilot Test Work Plan for the Pilot System has been prepared under Task Order No. [redacted] of Contract Number [redacted] (the Contract) for the USACE, Philadelphia District. This work builds upon the January 2014 In-situ Aerobic Biodegradation Basis of Design (BOD) report (Arcadis 2014), which discussed a flexible bioventing/biosparging-focused strategy for the treatment of LNAPL impacts at the former DSCP Site (Site), located in Philadelphia, PA. It also incorporates revisions to the Design Report document that was prepared under Task Order [redacted] under the Contract. The Design Report included a Site overview, bioventing/biosparging strategy, description and results of bioventing testing, supporting conceptual site model updates and criteria and recommendations for well locations, depths, and functionality (vadose zone forced air injection, biosparging or sparging). Both the BOD and the Design Report focused on the utilization of soil vapor extraction and air sparging remediation equipment obtained by the USACE from the USEPA's Valmont project.

Using interpreted hydrogeological conditions and localized "inward" groundwater flow directions while adjusting to account for the surface constraints and related constructability considerations, a well layout consisting of four groups was identified for the bioventing/biosparge system in the Design Report which represented a balance between the conceptual site model (CSM) and constructability. The four groups ('Expanded Case') contained a total of 32 biosparge wells and 16 bioventing wells. For the purposes of this Work Plan, only the revised groups 1 and 2 will be installed and tested.

The Design Report should be referenced for the background and supporting information regarding the selection of the equipment, locations of the pilot study biovent and biosparge wells, as well as the design requirements. For constructability reasons, certain elements of the design for the pilot Biovent/Biosparge system design required revision which was completed as part of this Work Plan. This Work Plan includes: revised construction drawings, revised supporting calculations, a description of the Pilot System design, system proveout procedure and a preliminary plan for pilot testing performance of the system under a

variety of operating conditions. A summary of the design changes presented in this Work Plan is provided in Appendix A.

2 INTRODUCTION

Arcadis has prepared this Work Plan for the former Defense Supply Center Philadelphia (DSCP) Pilot Biovent/Biosparge System (Pilot System) in accordance with, Task Order No. [redacted]1 of Contract Number [redacted] (the Contract) for the United States Army Corps of Engineers (USACE), Philadelphia District. This task order complements work both completed and ongoing under Contract task order numbers [redacted] and [redacted] in pursuit of cleanup goals defined in the 1999 Administrative Order (Order) between the Defense Logistics Agency (DLA) and the Pennsylvania Department of Environmental Protection (PADEP). The Order includes:

- Remedial activities to remove petroleum hydrocarbon light non-aqueous phase liquid (LNAPL) at the former DSCP Site (Figure 1) to the maximum extent practicable, and
- Required the Site meet "one or a combination of the remedial standards set forth in the Land Recycling Act and the regulations found in 25 Pa. Code Chapter 250."

This Work Plan describes the implementation of a pilot Pilot System designed to increase the rate of Site cleanup in tandem with existing Site remediation infrastructure, while pursuing the definition of the Order. The Pilot System is based around remediation equipment, specifically two positive displacement-style rotary lobe blowers obtained from the United States Environmental Protection Agency's (USEPA's) Valmont Superfund (Valmont) Site by the USACE Philadelphia District.

2.1 Purpose and Scope

The purpose of the Work Plan is twofold:

1) To present the revisions to the Pilot System design presented in the November 2016 Design Report (defined in the scope of work [SOW] dated December 2017) and
2) To provide a preliminary plan for the implementation and testing of the Pilot System presented in the Design Report.

These design changes were discussed in a team meeting on August 10, 2017 between the USACE and Arcadis to improve the constructability of the Pilot System. This Work Plan includes revised construction drawings, revised supporting calculations, a description of the Pilot System design, the system proveout procedure and a preliminary plan for pilot testing performance of the system under a variety of operating conditions. This Work Plan is intended to expand upon the Design Report); however, the revised construction drawings and supporting information included in this Work Plan are intended to be followed for the installation of the Pilot System. Since changes to the Pilot System design are discussed in this Work Plan, the Design Report should be referenced for the full background, conceptual site model (CSM), regulatory framework and basis of design.

3 SITE OVERVIEW

3.1 Site History and Description

The Former DSCP property was closed under the 1993 Base Realignment and Closure (BRAC) program. In 2001, the United States Army (Army) transferred the air and surface rights to the Philadelphia Authority for Industrial Development (PAID). All subsurface rights (deeper than 10 feet) belong to the Army. Shortly after the air rights were transferred, PAID began selling portions of the former DSCP property for re-development; however, redevelopment within the former DSCP property has been limited to commercial/industrial use as required by the Quitclaim Deeds for the various former DSCP property parcels.

Site remediation began in 1996 using skimmer pumps installed to remove LNAPL from the shallow aquifer zone. The 1999 Order established the regulatory framework for the Site and set specific cleanup objectives for the shallow aquifer zone (i.e., LNAPL recovery to the maximum extent practicable) and the larger Site (i.e., closure under an applicable Act 2 standard or set of standards). A full-scale vacuum enhanced skimming (VES) System was installed in 2005 to enable achievement of these objectives. The VES system is currently in operation as described in quarterly reports and as required by the Order. The VES system consistently recovers mass but is limited in effectiveness due to current aquifer conditions at historic highs. The total amount of LNAPL recovered as of December 31, 2017 is 1,060,424 gallons, including approximately 79,200 gallons recovered as vapor by the VES system between December 2011 and December 2017 (Arcadis 2018). By comparison, carbon dioxide isotope data is used to estimate LNAPL degradation in-situ. This estimate of cumulative mass degraded in-situ from December 2011 through December 2017 is 230,600 gallons (Arcadis 2018), nearly 3 times the amount recovered by the VES system over the same time period. Since the mass remediated by in-situ biodegradation is occurring at a greater rate than mass recovery, and because mass recovery is anticipated to continue to decline, a bioremediation strategy is a viable remedial technology for this site. This bioventing/biosparge pilot test has been designed to prove the use of this technology.

The Site, as visible in Figure 1, is generally defined by the land area bordered by Oregon Avenue, 20th Street, Penrose Avenue and South 26th Street, and covers approximately 87 acres in south Philadelphia, Pennsylvania. An east-west portion of Interstate 76 (I-76) bisects the Site, and along the western side of the Site, parallel to South 26th Street lie elevated railroad tracks located atop fill soil bedding approximately 20 feet thick. A large triangular area known as Siena Place and located south of I-76, west of Penrose Avenue and east of elevated railroad tracks is undergoing residential redevelopment. The west side of the Former DSCP is bounded by the large operating former Sun Oil Company (Sunoco) Point Breeze Refinery (currently owned by Philadelphia Energy Solutions [PES]), to the north and east by residential areas, and to the south by the Schuylkill Expressway and the Former Passyunk Homes property. The former Passyunk Homes property is currently the location of the Philadelphia Housing Authority (PHA) building and the Siena Place Homes housing development.

3.2 Extent of Contamination

Petroleum hydrocarbon constituents of concern (COC) and LNAPL are present in the Site's shallow (i.e., water table) aquifer zone and dissolved COC are present in the underlying deep aquifer zone. At the Site, both aquifer zones are hydraulically connected by a central hydrostratigraphic feature that is hypothesized to be a paleochannel and informally known as "the breach." "The breach" is an area where an increase in coarser materials within the lithology separating the shallow aquifer from the deep aquifer contributes to a flux from the shallow to the deep aquifer. The location of Site LNAPL as defined by inferred thickness-based contour maps provided in quarterly reports has remained largely stable through time and focused above this feature. The distribution of dissolved phase COC in the shallow aquifer zone has also remained stable and above the breach through this time. Like the LNAPL, the COC distribution suggests a spatially stable shallow aquifer zone impact area composed of lighter end (e.g., gasoline to

middle-distillate) constituents above the central and western portions of “the breach”, with generally lower concentrations of these constituents elsewhere beneath the Site. These areas are also coincident with an area of largely downward head potentials as indicated by quarterly reported measurements obtained from paired shallow and deep aquifer zone wells (Arcadis 2016; Arcadis 2017; Arcadis 2018).

The idea of using an air-injection in-situ biodegradation remedy to augment the existing VES system was supported by observations of the chemistry of extracted soil vapor during VES system optimization testing. Specifically, the high levels of carbon dioxide (CO_2) and methane (CH_4) were observed in the vapor stream of the VES system combined with the declining volatile organic compound (VOC) mass recovery by VES, which indicates that in-situ biodegradation of petroleum hydrocarbons is actively occurring in the shallow aquifer. However, the presence of CH_4 combined with a lack of oxygen (O_2) in the vapor stream indicates that this process is currently largely anaerobic, and that aerobic biodegradation is O_2 limited. More information on extracted soil vapor chemistry can be found in the Basis of Design (BOD) Report and Design Report).

The Design Report included mass removal rate calculations based on oxygen utilization rates estimated from in-situ respiration testing performed in the pilot test area in 2012 and 2016. For the revised injection well network described below in Section 5.2, an estimated 314 pounds per day of mass degraded by bioventing, and 1.45 pounds per day of mass degraded by biosparging is expected. These estimates are based on one half of the mass degradation estimates for the “Expanded Case” scenario provided in the Design Report, as one half of the area shown in the “Expanded Case” are planned to be installed for the pilot test.

4 CONCEPTUAL SITE MODEL

As stated in the BOD report, “an understanding of the CSM is important because it provides background information for the basis of the bioventing system design.” The BOD identified three Site areas where CSM elements, engineering considerations (e.g., proximity to buildings with installed vapor intrusion [VI] controls), VES system optimization testing (e.g., respirometry and radius of influence testing) and operation and maintenance (O&M) data collectively supported the design and installation of a biovent/biosparge system based around the aforementioned remediation equipment. Through consideration of these criteria, and the additional data collected since publication of the BOD report, BOD Area 1, located on PHA property and adjacent to the Site’s southern skimming system became the focus of the Pilot System.

Appendix B includes the Pars Environmental Letter Report (Pars, August 2016). Based on the integration of direct push-direct sensing data with existing Site and Area 1 CSM information, the report presents a BOD Area 1-focused interpretation of the Site’s hydrogeologic and hydrostratigraphic framework within the larger context of Site and regional hydrogeological conditions.

5 PILOT SYSTEM DESIGN REVISIONS

5.1 Pilot Study Basis and Objectives

The primary objective of revised Pilot System described herein is to evaluate biovent/biosparge performance in BOD Area 1 (Pilot Study Area), in conjunction with the existing VES system, and in support of the Order and Act 2 cleanup goals. Bioventing/biosparging was proposed as a means to oxygenate the shallow aquifer zone's smear zone and transition biodegradation from an anaerobic to an aerobic process (i.e., to a faster and more effective process for in-situ petroleum hydrocarbon degradation). Additional basis for design and selection of treatment area are included in the BOD and the Design Report.

5.2 Revised Injection Well Network Layout and Design Basis

Revised construction drawings for the pilot study have been prepared, and are provided in Appendix C. The Pilot System layout is illustrated in Appendix C, Sheet C-2. A full description of the injection well layout and design basis can be found in the Design Report. Biosparge and biovent well locations presented originally in the Design Report represent a balance between the CSM and constructability criteria. A total of four groups were provided in the 'Expanded Case' containing 32 biosparge wells and 16 bioventing wells. The Design Report also described a 'Base Case' containing only the northern most well group with 8 biosparge wells and 4 biovent wells. The revised construction drawings included in this Work Plan represents the "Base Case" plus one additional well group (groups 1 and 2 as shown in Drawing C-2 in Appendix C). This system may be enhanced in the future by installing the well groups 3 and 4 as shown in the 'Expanded Case' scenario in the Design Report. For the purposes of this Work Plan, however, only well groups 1 and 2 (the wells located in unpaved areas) are being installed as part of the Pilot Study.
Wells are arranged into two groups within the Pilot Study Area. Groups are intended to be operated separately, which allows the entire flow from the bioventing blower to be provided to one well group at a time. This also allows the flows between these groups to be pulsed on and off (cycling the groups) during operation. Employing a pulsed approach often allows additional mass recovery by way of constantly changing the pressure in portions of the smear zone.

5.2.1 Biosparging Wells

The revised design provided in this Work Plan consists of the installation of 14 biosparge wells in two groups; 8 wells in Group 1 and 6 wells in Group 2, as shown on Drawing C-2 in Appendix C. The layout of the individual biosparge wells within each well group is based on a 13-foot radius of influence (ROI). The layout of the well groups is based on other criteria (such as site restrictions as well as hydrogeologic criteria), as discussed in the Basis of Design (Arcadis 2014). Since Site-specific data are not available to use as the basis for estimating biosparging influence in the subsurface, a 13-foot ROI was selected based on an assumed 45-degree cone of influence extending from the top of well screen to the average water table surface elevation within the Pilot Study Area. This method is generally considered to provide a conservative estimate for ROI in aquifer sparging applications.

A maximum total depth of 35 feet (ft) below ground surface (bgs) was selected for the biosparge well design, based on review of subsurface lithology and permeability modeling data from the pre-design investigation as well as the capabilities of the biosparge blower. Figures B-5 and B-6 (included in Appendix B) provide views of the direct push-direct sensing (i.e., MiHPT) estimated hydraulic conductivity and general lithology beneath the Pilot Study Area at elevations of -5 ft mean sea level (MSL) and -10 ft MSL, respectively, and provide justification for the selected biosparge well design depth. These figures illustrate that the contact between the relatively permeable and sandy material of the Trenton Gravel and the lower permeability intermittent clay layer generally occurs at elevations deeper than -15 ft to -20ft MSL beneath much of the Pilot Study Area (35 to 40 ft bgs). Additionally, the MIP responses are generally highest at approximately -10ft MSL (approximately 30ft bgs), which indicates that the majority of

the residual hydrocarbon mass is also concentrated within and above the permeable material where the biosparge wells will be screened. Final biosparge well depths will be field-determined based on the actual subsurface lithology encountered at each location during drilling and may be adjusted slightly high or lower in order to install the wells within the permeable material near the base of the Trenton Gravel and not the lower permeability clay layer below.

Biosparge wells will be 2 inches in diameter and constructed of Schedule (Sch) 40 PVC with a 2-ft screen length. The wells will be completed at the surface within flush-mounted road-boxes set within an 18-inch square concrete collar. Well construction details and specifications are provided in the Pilot Study construction drawings which are included as Appendix C.

Biosparging wells will be developed following installation to remove fine-grained sediment accumulated in the casing and sand filterpack and improve hydraulic communication with the surrounding formation. Well development procedures are provided in the construction drawings in Appendix C.

5.2.2 Bioventing Wells

A total of 7 bioventing pilot wells will be installed in Groups 1 and 2, with 4 wells and 3 wells, respectively, for the Pilot Study. A 30-foot design ROI is estimated for the bioventing wells using the pore volume exchange method. This ROI estimate was developed based on an average pneumatic conductivity of approximately 2.8 $x10^{-4}$ centimeters per second (cm/s). This estimate for the permeable, sandy/gravelly unsaturated zone material within the Pilot Study Area was derived using wellhead pressure response readings measured during respiration testing. The 30-foot ROI is fairly conservative in that it assumes a bioventing airflow rate of 10 standard cubic feet per meter (scfm) per well, based on air injection flow rates used during respiration testing, and an exchange rate of 2 pore volumes per day. Pore volume exchange calculations are provided in Appendix D for reference.

The bioventing portion of the Pilot System is designed to target residual hydrocarbon mass in the permeable smear and unsaturated zone material above the water table within the Pilot Study Area. Since the targeted zone is narrow at most locations, it is important that the wells are screened appropriately for the system to achieve its objective. The bioventing well screen interval was therefore selected based on hydrogeologic controls using the upper silt layer and water table depth as upper and lower bounds, respectively. As shown in cross sections AA', BB', CC' and DD' in Appendix B of this report, the relatively impermeable upper silt layer is located from approximately 5 ft to 11 ft bgs beneath the Pilot Study Area, thereby providing a static upper limit to the section of well open to air venting or injection. Similarly, the water table provides a variable lower limit (typically between 18 to 22 ft bgs). The section of permeable material between the water table and silt layer is that which is available for airflow. A screen interval of 15 to 25 ft bgs was selected for the bioventing wells to target the section of permeable material between these two low flow boundaries. The wells are designed to penetrate below the water table. This is not expected to impact performance as the positive pressure applied by the bioventing blower will displace the water downward somewhat during active bioventing operations. Rather, this will provide additional design flexibility and value allowing these wells to be used for other purposes, either as part of Site-wide groundwater monitoring efforts, or for pilot test performance monitoring purposes. Additionally, in the event that extra vacuum ROI is needed, these wells could potentially be converted to VES wells at some point in the future.

The bioventing wells will be constructed of 4-inch diameter Sch 40 PVC, with 10-ft screen lengths and identical surface completions as the bioventing wells. Construction details for the bioventing wells are provided in the Pilot System Construction Specifications included as Appendix C.

5.3 Conveyance Piping and Sparge Manifold

In order to avoid costs associated with providing power and a building that meets code requirements on the PHA property, the blowers for the Pilot System will be installed in the VES building located on the DSCP portion of the Site (north of I-76). A combination of new conveyance piping, as well as existing piping routed under I-76 will be utilized to bring the compressed air from the DSCP side of the Site to a new sparge manifold located in the Pilot Study Area on the PHA property. The conveyance piping

travelling from the Pilot System equipment on the DSCP Site to the Pilot Study Area will consist of two pipes: 3-inch piping for the biosparge system and 4-inch piping for the biovent system. The conveyance piping will start at the outlet of the heat exchangers for the Pilot System blowers located behind the motor control room of the VES Building. The conveyance piping will be constructed of Standard Dimension Ratio 11 (SDR-11) high density polyethylene (HDPE) piping mounted above-grade on pipe racks as shown on Detail 1 on Sheet C-7 in Appendix C. The above grade piping will continue around the fenced compound of the VES system to the northwest corner of the compound as shown on Sheet C-4, Appendix C. At that point, the piping will continue sub-grade in a trench to the exit pits (the vaults where the piping transiting under the expressway are accessed) as shown on Detail 2 on Sheet C-7 in Appendix C.

The conveyance piping will remain SDR11 HDPE but will employ bolted flange fittings for the sections within the exit pits to allow removal if cleaning of the transit piping is needed in the future. A brass ball valve will be installed on the bottom of the piping at the low point of each pipe run within the exit pit to allow for draining of condensate if necessary. The conveyance piping will then connect to the existing 4-inch and 3-inch SDR11 HDPE pipes which transit under I-76 (one in each of the exit pits, on each side of the expressway). This piping has been pressure tested by the Engineer and appears to be in good working order. The Contractor will be required to clean out these pipes prior to use however, as they have silt and water in them from prior flooding of the exit pits. The conveyance piping will then continue on the PHA side, exiting the exit pits subgrade, before coming back above grade, crossing the drainage swale, and continuing along the fenceline mounted on pipe racks to the sparge and vent manifolds located inside of a shed in the Pilot Study Area.

Pipe racks set on grade will be placed on stone where needed to prevent vegetation from growing and not require maintenance by PHA landscapers. All of the SDR-11 HDPE will be fusion welded together with gentle, long radius bends wherever possible. HDPE elbows, flanges, and piping in the exit pits will also be fusion welded together as shown on the Sheets M-5 and M-6 in Appendix C. Pipe trenches in paved areas will be restored as shown on Detail T5/T6 on Sheet C-3 in Appendix C. Trenches in unpaved areas will be direct buried as shown on Details T1, T2, T3, and T4 on Sheet C-3 in Appendix C.

Airflow will be conveyed to each of the wells using dedicated individual piping runs (home runs) installed below grade in common trenches from the sparge manifold located inside the shed in the Pilot Study Area. Piping runs to the biosparging wells will be installed using coils of 1-inch diameter SDR-11 HDPE pipe. The 1-inch diameter HDPE is flexible and available as long continuous rolls, which should greatly reduce the number of fusion joints required and accelerate construction. Buried piping runs to the bioventing wells will be 2-inch diameter Sch 40 PVC. The larger diameter conveyance piping will serve to improve design flexibility by allowing the bioventing wells to operate at higher airflow rates if desired during the pilot test without experiencing excessive losses.

Subsurface piping runs in trenches and piping connections to biosparge and bioventing wellheads will be installed a minimum of 21-inches below grade. Although the maximum frost depth per Philadelphia building code is 30-inches; a 21-inch burial depth is considered appropriate for this application as the piping will convey air, not water. Generation and potential freezing of condensation in the conveyance piping is not as great of a concern for an air injection system, as it might be in a vapor extraction application, since the moisture content of the ambient air injected is generally fairly low during the wintertime. Subsurface conveyance piping will also be sloped towards individual biosparge and biovent wells to allow any accumulated condensate to drain back into the wells. Finally, the system will be designed to allow condensate to be physically cleared from the conveyance piping using compressed air delivered under a low pressure. Therefore, condensate in the piping should not be an issue, and freezing of pipes during cold weather should not be a concern.

Subsurface piping will connect directly to the individual biosparging and bioventing well riser pipes at piping tees installed below-grade. Subsurface piping runs from the wells will be stubbed-up above grade inside the sparge manifold shed and connected to the manifold by flexible rubber compressed air hose at piping penetrations through the floor of the shed as shown on Sheets C-6, M-3, and M-4 in Appendix C. Each of the individual manifold legs will be fitted with a ball valve and gate for on/off control and flow

adjustment, a rotometer style flowmeter to measure airflow (repurposed from the former Valmont Site remediation system) and a pressure gauge. The manifolds will be constructed with two branches corresponding to each of the well groups, and all of the wells in each flow group will be connected to their respective branches. This setup of individually metered and controlled piping runs will allow for a much greater degree of system operation control and optimization and will improve flexibility of the design.

5.4 Pilot System Equipment and Operational Strategy

The calculations of the design flows and pressures discussed below were provided in the Design Report. Revisions to layout of the Pilot System required revisions to the headloss portions of the calculations. These revised calculations are found in Appendix D of this Work Plan. As discussed in the Design Report, the objective of biosparging is to distribute oxygen to the saturated zone, without volatilization of hydrocarbon constituents. For this reason, air is typically delivered to the formation at low flow rates, generally between 1 to 3 scfm. In keeping with this, biosparging airflow rates will likely be within this range during the pilot study, with the actual airflow rates determined based on formation response and performance monitoring data. In the interest of design flexibility, however, the biosparging blower, system and air distribution piping network will be designed to operate at airflow rates of 120 scfm at 12 psi pressure, allowing airflow to be delivered at approximately 15 scfm to all wells within a single group (8 wells in Group 1 and 6 wells in Group 2) at once, assuming the formation will allow for it. Excess airflow will be discharged to the atmosphere by the bleed airline when the system is operating in biosparging mode with lower air injection flow rates. This flexible design will enable the biosparge system to perform air sparging at an aggressive rate should it be desired at some point in the future.

The formation breakout pressure that must be overcome for air to begin flowing from the biosparge wells into the formation was calculated following the procedure outlined in the USACE In-Situ Air Sparging Manual (USACE 2013) and was estimated in the Design Report to vary between approximately 6.26 and 6.91 pounds per square inch (psi) for the Pilot Study Area depending the water table depth. The Valmont system blower will be configured to supply a maximum pressure of 12 psi, which will be more than sufficient to overcome this pressure. The theoretical formation fracture pressure was also calculated following the method outlined in the USACE In-Situ Air Sparging Manual (USACE 2013) and is estimated to be approximately 30 psi. This is well above the maximum pressure attainable by the blower.

As discussed in the Design Report, a flow range of 20 to 30 scfm design airflow was selected for the bioventing system based on achieving more than 2 pore volume exchanges of air per day with a 30-foot ROI. Air injected at 20 scfm to the saturated zone within the Pilot Study Area during respiration testing demonstrated that this is attainable. During the test, wellhead pressures at this flow rate averaged approximately 40 inches of water column (inch wc). Similar pressures should be expected during the pilot study. As with the biosparge system, the bioventing blower and conveyance piping network have been designed with additional capacity to provide for flexibility of operation. The bioventing blower is designed to operate within an airflow rate of approximately 140 to 210 scfm and a pressure of approximately 4.2 psi. This will allow the system to deliver airflow to all 7 bioventing wells simultaneously at a flow of 20 to 30 scfm, or to smaller groups of biovent wells at higher flow rates as tolerated by the formation.

Airflow will be applied to the biosparge well groups in a cyclic approach during the pilot study, where one or more groups are operated in a rotating cycle controlled manually by changing the valve settings in the sparge manifold shed. Bioventing may also be applied this way. As discussed above and in the Design Report, cycling airflow to the wells can lead to increased mass removal over full time operation as a result of the effect of varying the pressure gradients applied to the smear zone. Additionally, the pulsed strategy is a way to supply air to more injection points utilizing a smaller blower than would be required to operate at all injection points at once (i.e. less capital cost).

5.4.1 Pilot System Equipment

As discussed above, the blowers for the Pilot System will be installed inside of the motor control room of the VES building on the DSCP Site. The blowers, and other equipment used to construct the system will

be repurposed from the Valmont system which is currently staged at the Site. The remaining equipment will be purchased new. The blowers are both Tuthill-MD Pneumatics positive displacement-style rotary lobe blowers obtained from the Valmont Site. Each of these blowers is currently equipped with a 7.5 horsepower (hp) motor and mounted inside of a Pnuemax-300 sound-deadening cabinet. During system proveout, the noise level of the blowers will be tested. If additional hearing protection is needed, sound-deadening panels or sound reducing walls will be installed around the blowers. The proposed layout of blowers inside of the motor control room of the VES Building are shown on the Pilot System construction drawings included as Appendix C. The construction drawings also include an equipment list identifying all of the equipment from the Valmont Site to be re-used as well as additional major equipment that must be purchased to build the system. Note that this list of major equipment to be included in the construction of the pilot treatment system is not intended to be a comprehensive list of every component necessary for construction. The Contractor will be responsible for obtaining all equipment for construction of the Pilot System.

The Valmont Site blower that will be used to supply airflow for the biosparge system is already designed as a pressure package, equipped with an air bleed valve and silencer. However, the existing 7.5 hp motor must be replaced by a new larger 10 hp minimum motor and the drive pulley setup reconfigured in order to operate at a higher pressure required to overcome the expected formation entry and line losses required to deliver airflow to the saturated zone. The other Valmont-sourced blower was originally a soil vapor extraction (SVE) package that will be converted for pressure operation to supply airflow to the bioventing system. The blower can supply the design airflow and pressure for the bioventing system with the existing 7.5 hp motor after the drive pulley setup has been reconfigured. Heat exchangers will also need to be installed and operated with the blowers in order to reduce blower effluent air temperatures to levels appropriate for the conveyance piping and injection into the formation. The heat exchangers are also useful to enable condensate to form and be removed at the head exchanger location instead of farther down the line in low spots in the conveyance piping (such as in the exit pits). Pneumatic automated mechanical drain valves will be installed at the heat exchangers and in the northern exit pits to continuously drain condensing liquid from the piping at these low spots.

The heat exchangers will be installed on a new level concrete pad using the specifications shown in the construction drawing G-2. The blowers will be mounted to the elevated concrete pad inside of the motor control room as shown and anchored to the pad at all four corners using anchor bolts. The air compressor for the skimmer system is currently residing on this pad. As part of the installation scope of work, the contractor will be required to extend the elevate pad and shift the air compressor and chiller over to allow room for the installation of the blowers. Additionally, an option for the contractor to install sound-deadening panels or sound reducing walls around the blowers and existing air compressor could be considered. Details for the equipment placement, concrete pad work, and similar details are provided in the construction drawings referenced above and included as Appendix C.

The contractor will install a programmable logic controller (PLC) for the pilot treatment system which will control system operations. The PLC will be located in a remote-control panel (RCP) staged inside of the motor control room near the blowers. The PLC on the Pilot System will be connected to the main PLC in the VES system master control panel (MCP) via an Ethernet cable to allow for communication to the existing components of the treatment system. While a local control panel will be located near the blowers, the contractor will integrate the pilot system equipment with the existing VES control system such that the operator will be able to be control it from the VES system supervisory control and data acquisition (SCADA) system personal computer ([redacted] located inside of the control room. This installation will provide flexibility as well as remote monitoring of the pilot treatment system alongside the main VES treatment system. Sheets I-L, I-B, and I-1 through I-8 located in Appendix C, detail the construction and requirements for construction of the Pilot System PLC.

The Contractor will provide a licensed electrician to make electrical connections to the pilot system equipment, and panels. Electrical power for the pilot system equipment will be obtained by connecting to a spare disconnect provided on the motor control center located in the motor control room. Power will be supplied as shown on the one-line electrical distribution drawings, Sheets E-1 through E-6.

5.4.2 Optional Skimmer System Panel Upgrades

The current SCADA system that controls the VES system is not currently connected to the south or north skimming systems, and there is no provision for connection of a separate PLC on the south side for control of the proposed pilot system from the SCADA [redacted] in the VES control room. While some information is relayed from the north skimmer system via copper wire, it is not all inclusive, and no information is currently provided from the south skimmer system to the VES system SCADA [redacted] in the control room. As an optional part of the electrical upgrade scope of this design, the south and north skimmer systems will be connected to the main SCADA system via Ethernet radios. This requires the existing control panels at the skimmer systems to be upgraded with new remote-control panels as shown on Sheets I-N0 through I-N5 and I-S0 through I-S8, to include a PLC and radio located within the respective enclosures at the North Side and South Side Skimmer aboveground storage tanks (ASTs).

Additionally, a radio would need to be installed in the MCP inside of the VES control room by the contractor for this optional work scope. This hardware along with the necessary antennas will allow for these remote panels to communicate with the MCP. Once the data is all in one location, previous upgrades to the SCADA system can be utilized to improve remote reporting of data and events. It is anticipated that this scope of work will ultimately lead to less operator time onsite, allow quicker reaction to change when the operator is not onsite, and not significantly increase the operator's workload with respect to the concomitant operation of the VES and Pilot systems.

6 SYSTEM PROVEOUT

The selected contractor installing the Pilot System will be responsible for system prove-out upon completion of construction. This will be performed over approximately a three-day period, starting with a final inspection of all system equipment followed by startup/shakedown testing of the system. Some examples of prove-out inspections and testing activities that the contractor will perform are listed below.

- Checking motor rotation
- Testing set points of process safety devices (e.g., pressure relief valves)
- Testing PLC inputs, outputs, alarms and interlocks
- Testing accuracy and calibration of instrumentation (e.g., flow meters)
- Testing blower and heat exchanger operation and operational settings
- Testing piping and equipment for leakage
- Measuring groundwater and total depths in bioventing, biosparging and new performance monitoring wells
- Checking pressure drop from manifold to wellheads
- Checking amp draw on motors

The following startup and shakedown inspection and testing procedure will be followed prior to completion of construction. The proveout inspection and testing will be documented using the factory acceptance forms included in Appendix E.

6.1 Pressure Testing of Conveyance Piping

Prior to the commencement of shakedown testing activities, the conveyance piping from the heat exchangers to the sparge manifold must be pressure tested. Pressure testing shall be accomplished by hydrostatic methods where the 4-inch and 3-inch conveyance piping are filled with potable water, then pressurized to 1.5 times the design pressure to a total pressure of 18 psi for 2 hours. The pressure can then be released slowly, and the water drained from the line through the drain valves in the exit pits. The potable water may be pumped out to the storm drain on the DSCP Site. The sparge manifold piping and conveyance piping to the wellheads will not be pressure tested other than checking for leaks during normal operation, as it is not desirable to have water in this piping and would be difficult to drain.

6.2 Controls and Electrical Acceptance Testing

The controls and electrical proveout testing for the installed equipment will be completed in accordance with the factory acceptance test sheets included in Appendix E. The Contractor will be expected to complete this testing to the satisfaction of the Engineer.

The control panel factory acceptance testing sheets in the Appendix E require that the contractor test the power, operation, and input and output wiring to the PLC to confirm that the PLC responds appropriately when signals are provided. One sheet should be prepared for the RCP and another for MCP. These factory acceptance testing sheets walk through each parameter to be tested and provide a forum to document the results of the tests. If the optional scope of work for the two remote panels for the skimmer system ASTs are also selected, then the contractor must prepare acceptance test sheets for each of these panels as well.

The motor and pump acceptance testing sheet in Appendix E will be used to test each motor and any associated motor variable frequency drives (VFD). These sheets describe the parameters to be tested to ensure that each motor has the appropriate electrical power, is wired correctly, spins the correct direction, has the appropriate amperage draw and performance in accordance with its manufacturer's data plate. The contractor will complete these tests and then document the test by completing the acceptance forms. One form will be filled out for each motor installed (such as blowers, head exchanger fans, etc.) by the contractor.

The instrumentation and switches acceptance testing sheets in Appendix E require that each switch and instrument installed be tested for proper operation. These forms list what parameters should be tested

and allow documentation that each switch or instrument generates the expected input or receives the expected output from the PLC and operates as designed. All interlocks and alarms will also be tested at this time. One form will be filled out for each instrument and switch installed by the contractor.

6.3 Pilot System Performance Proveout Testing

After successful completion of the controls and electrical acceptance testing, the Contractor will conduct performance testing of the Pilot System with the Engineer. For this phase of testing, the blowers will be operated by the Contractor to confirm proper system performance in variety of operational conditions while field readings are collected by the O&M Engineer. At least two technicians are required onsite for proveout testing (at least one technician from the Contractor must be present). The Engineer/O&M Contractor's technician, who fulfills the required role of Site Safety and Health Officer (SSHO), will also be present during proveout testing as well as the Design Engineer. This testing is anticipated to take 2 to 3 days to complete. Field data sheets have been prepared for this testing procedure and are included in Appendix F. The following procedure should be followed for this test and documented on the field data sheets:

- Prior to operation of the Pilot System, the VES system must be on, operating from Recovery Wells PH-RW-A, PH-RW-2, PH-RW-B2, PH-RW-I2, PH-RW-V2 and PH-RW-W2, and background headspace data must be collected from the Recovery Wells and Monitoring Wells shown on the data sheets. A synoptic round of groundwater liquid level data will also be collected by the O&M Contractor prior to the start. The GEM2000 Landfill Gas Meter, MiniRAE photoionization detector (PID), and Dwyer Digital Manometer currently at the site will all be needed in the Pilot Study Area during the test.

- Check to ensure that all valves are in the correct position to allow flow to the Pilot Study Area, and then start the Biosparge blower at 50% on the VFD with the bleed air valve open 100% at first. Ensure that its heat exchanger is on.

- Open the valves on the biosparge manifold to allow flow to the Group 1 biosparge wells. Ensure that the flow meters are adjusted so that flow is not impeded. Then, increase pressure to the well field by slowly closing the bleed air valve, while the flow and pressure is monitored at both the sparge manifold and the blower. Pressure should be increased by closing bleed air, then adjusting up the VFD as needed until flow is observed in the manifold to the Group 1 biosparge wells. The design estimates that approximately 7 psi of pressure will be required to generate flow. Adjust the flow valves on the manifold until 1 to 3 scfm is achieved in each biosparge well. The blower should be operated at the minimum pressure necessary to achieve this flow target. The VFD and bleed air valves should be adjusted as needed for this purpose. Do not exceed 12 psi at the blower or 10 psi at the manifold during testing. Record the pressure and flow readings at all points on the biosparge system when the flow is balanced to all points in the design flow range.

- Conduct monitoring of ambient air continuously with the Landfill Gas Meter and the PID during testing to check for fugitive emissions at ground level, in the breathing zone and periodically along utilities in the vicinity of the Pilot Study Area. Testing will be discontinued immediately if air quality monitoring criteria described in the Accident Prevention Plan (APP) and/or Activity Hazard Analysis (AHA) are exceeded. If any change in the atmosphere of nearby Pollock-Packer Avenue sewer or other utilities is observed as a result of bioventing testing, the testing will be discontinued.

- While testing is being conducted, every 30 minutes, induced pressure/vacuum data will be recorded at the monitoring wells using a Dwyer digital manometer and headspace readings using the Landfill Gas Meter and PID. This monitoring will be done by collecting a sample in a tedlar bag with a pump. Continue this monitoring for up to 4 hours to determine if pressure/vacuum or well headspace concentrations change.

- During the test, the temperature, pressure and flow performance of the blower will be checked against the data plate and the design to determine that it is performing as intended. An additional

copy of the blower motor acceptance test form should be filled out to document performance by the contractor. A no-contact infrared thermometer will be used to check temperatures of the conveyance piping.

- Influent vapor flow rate will be monitored during each test at the VES system manifold using the pitot tube flow indicators at the PLC screen. The downstream flow rate will be monitored by the pitot tube flow indicators at the PLC screen. A TSI Veloci-calc meter may be used to check flow rates in the manifold or at the well head using the ¼-inch sample port to check the pitot tube readings on the PLC (to determine if lateral infiltration is occurring). These flow rates, in addition to the applied vacuum will be recorded in 30-minute intervals during the test to document changes at each step.

- The VOCs, CH_4, CO_2, O_2 levels, and the percent lower explosive limit (LEL) observed at the inlet of the thermal oxidizer (TOX), at the VES system manifold and at the headspace of the air inlet and monitoring wells (using a PID and a GEM 2000 Plus Gas Analyzer, respectively, in the ¼-inch sample ports) will be recorded every 30 minutes during the test to document changes at each test step.

- Water recovery will be monitored in the VES system manifold by periodically inspecting and draining accumulating liquids (if necessary) and estimating the amount recovered during each step/flow condition if water entrainment is observed. Accumulated/drained water will be managed using the VES system's existing infrastructure (i.e., trash pump and hoses). Recovered groundwater will be stored on-Site in 55-gallon drums pending disposal (i.e., stored, and subsequently disposal in the same manner lateral-recovered groundwater has been addressed to date).

- Thermal oxidizer (the unit currently online) behavior will be monitored during testing to ensure air permit compliance. The destruction efficiency and dilution air required to maintain normal operation will be recorded every 30 minutes during the test.

- After 4 hours, discontinue the test of the first biosparge group and repeat the test with the second biosparge well group.

- At the completion of the test for each group, the liquid level in the monitoring wells and the extraction wells will be gauged using an interface probe to compare to the background data.

After completion of the biosparge system testing, the biosparge may be left operating using the last well group tested, and the Biovent testing will commence using a similar step-wise method. Since the biovent system is designed to operate shallower, and at a greater flow, fugitive emissions and or changes in VES system operation are more likely during this test.
Assuming that the baseline test was completed prior to the biosparge test, the biovent test may be completed as follows:

- Check to ensure that all valves are in the correct position to allow flow to the Pilot Study Area, and then start the Biovent blower at 50% on the VFD using 100% bleed air at first. Ensure that its heat exchanger is on.

- Open the valves on the biovent manifold to allow flow to all seven biovent wells. Ensure that the flow meters are adjusted so that flow is not impeded. Then, increase pressure to the well field by slowly closing the bleed air and adjusting up the VFD as needed, while the flow and pressure is monitored at both the manifold and the blower. Pressure should be increased until flow is observed in the manifold to the biovent wells. The design estimates that approximately 4 to 5 psi of pressure will be required to generate flow. Adjust the flow valves on the manifold until 5 scfm (25% of the target design flow of 20 scfm) is achieved in each biovent well. The blower should be operated at

the minimum pressure necessary to achieve this flow target. The VFD and bleed air valves should be adjusted as needed for this purpose. Do not exceed 7 psi at the blower during testing.

- Conduct monitoring of ambient air continuously with the Landfill Gas Meter and the PID during testing to check for fugitive emissions at ground level, in the breathing zone and periodically along utilities. Testing will be discontinued immediately if air quality monitoring criteria described in the APP and/or AHA are exceeded. If any change in the atmosphere of the Pollock-Packer Avenue sewer or other utilities is observed as a result of bioventing testing, the testing will be discontinued.

- While testing is being conducted, every 30 minutes, induced pressure/vacuum data will be recorded at the monitoring wells using a Dwyer digital manometer and headspace readings using the Landfill Gas Meter and PID. This monitoring will be done by collecting a sample in a tedlar bag with a pump. Continue this monitoring for up to 4 hours to determine if pressure/vacuum or well headspace concentrations change.

- During the test, the temperature, pressure and flow performance of the blower will be checked against the data plate and the design to determine that it is performing as intended. An additional copy of the blower motor acceptance test form should be filled out to document performance by the contractor. A no-contact infrared thermometer will be used to check temperatures of the conveyance piping. Record the pressure and flow readings at all points on the biosparge system when the flow is balanced to all points in the design flow range.

- Influent vapor flow rate will be monitored during each test at the VES system manifold using the pitot tube flow indicators at the PLC screen. The downstream flow rate will be monitored by the pitot tube flow indicators at the PLC screen. A TSI Veloci-calc meter may be used to check flow rates in the manifold or at the well head using the ¼-inch sample port to check the pitot tube readings on the PLC (to determine if lateral infiltration is occurring). These flow rates, in addition to the applied vacuum will be recorded in 30-minute intervals during the test to document changes at each step.

- The VOCs, CH_4, CO_2, O_2 levels, and the percent LEL observed at the inlet of the thermal oxidizer, at the VES system manifold and at the headspace of the air inlet and monitoring wells (using a PID and a GEM 2000 Plus Gas Analyzer, respectively, in the ¼-inch sample ports) will be recorded every 30 minutes during the test to document changes at each test step.

- Water recovery will be monitored in the VES system manifold by periodically inspecting and draining accumulating liquids (if necessary) and estimating the amount recovered during each step/flow condition if water entrainment is observed. Accumulated/drained water will be managed using the VES system's existing infrastructure (i.e., trash pump and hoses). Recovered groundwater will be stored on-Site in 55-gallon drums pending disposal (i.e., stored, and subsequently disposal in the same manner lateral-recovered groundwater has been addressed to date).

- Thermal oxidizer (the unit currently online) behavior will be monitored during testing to ensure air permit compliance. The destruction efficiency and dilution air required to maintain normal operation will be recorded every 30 minutes during the test.

- Provided that there are no fugitive emissions and that the VES system thermal oxidizers can handle any increases in mass recovery observed the next flow step can start after 4hrs. The flow to the biovent system may be increased to 10 scfm per well for this second step, and 20 scfm at the third step with the above test procedure repeated at each step. Increase the blower pressure by adjusting the bled air and VFD as needed to achieve the target design flow. Do not exceed 6 psi at the blower during testing.

- At the completion of the test at each flow step, the liquid level in the monitoring wells and the extraction wells will be gauged using an interface probe to compare to the background data.

For the purposes of proveout testing of the Pilot System, changes in the headspace chemistry in the VES wells or monitoring points will be used to demonstrate that the biosparge/biovent system is operating as designed. With the biosparge/biovent system operating at the design flow, it is anticipated that an increase in oxygen concentration of at least 2% above background concentration should be observed after 4hrs of testing as the system begins to provide a surplus of oxygen above the microbial utilization rate. Any change observed can be confirmed by shutting of the biovent/biosparge system, which should result in a rapid return to background oxygen concentration. This is based on pre-design respirometry testing discussed in the Design Report, where oxygen utilization rates of 9% per hour up to 20% per hour were observed when testing wells within the Pilot Study Area.

No change may be apparent from operation of only the biosparge system during these short-term tests as changes to groundwater chemistry will take longer to occur. Success of the biosparge system will therefore be judged over the longer-term pilot groundwater monitoring.

At the completion of proveout performance testing, the pilot system will be left operational and long-term Pilot System performance monitoring will commence.

7 PERFORMANCE MONITORING

Detailed O&M procedures for the Pilot System will be provided in a separate system O&M Manual. The following section briefly summarizes the long-term performance monitoring that will be completed to evaluate the success of the pilot test.

7.1.1 Performance Monitoring Wells

Several existing Site monitoring and extraction wells, including PH-RW-A, PH-RW-A2, PH-RW-B, PH-RW-B2, PH-PH-2, and PH-PH-21, are located close enough to the proposed bioventing/biosparge well groups to be used as performance monitoring points. However, most of these existing wells are located in the vicinity of the northernmost bioventing/biosparge well Group 1. Only a few are located close enough to Group 2 or the other well groups discussed in the "Expanded Case" in the Design Report, to be suitable as performance monitoring points, especially for the biosparging wells which have an estimated ROI of 13 feet. Two new monitoring wells (names to be determined) are proposed at the locations shown in Appendix C, Sheet C-2, to provide additional performance monitoring points in the vicinity of bioventing/biosparge well Groups 1 and 2. Each of these new performance monitoring wells would be installed approximately 10 feet from one or more of the proposed biosparge wells, to provide data within the assumed 13-foot ROI. Performance monitoring wells would be constructed of 4-inch diameter Sch 40 PVC, installed with 20-foot screens, extending from approximately 13 to 33 feet bgs across most of the permeable Trenton Gravel. This longer screen interval will allow the wells to monitor performance of both the biosparge and bioventing portions of the Pilot System. Longer screens coupled with the 4-inch well diameter with allow these wells to be used for other purposes, such as groundwater monitoring at discrete depth intervals within the aquifer, or operation as extraction wells with the VES system at some point in the future as needed. Performance monitoring well construction specifications are provided in the pilot study design drawings included as Appendix C.

The performance monitoring network will likely include a total of 8 wells, with 2 new wells (as discussed above) and the rest existing wells located within the Pilot Study Area. Performance monitoring wells will be selected such that the locations and screen intervals are appropriate for monitoring both bioventing and biosparging performance, to the extent possible.

7.1.2 Performance Monitoring Data

The following performance monitoring data will be collected for the bioventing and biosparging systems during the pilot test. The monitoring requirements are also provided in Table 1 – Performance Monitoring Summary for clarity. These tasks include:

- Field measurements from the monitoring well headspace for Oxygen, carbon dioxide, Methane (by Multi-gas meter), VOCs (measured by PID), pressure (by manometer), temperature (by laser thermometer) and relative humidity (digital hygrometer) of vadose zone formation air. Field screening samples to be collected by pump and tedlar bag. These measurements will be taken bi-weekly for the first month, then monthly thereafter.
- Monitoring well groundwater geochemistry, including groundwater depth, dissolved oxygen, oxidation reduction potential, temperature and pH using YSI-style field measurement or a submersible datalogger-style field measuring device from the monitoring wells discussed above. These measurements will be taken bi-weekly for the first month, then monthly thereafter.
- Monitoring well groundwater samples to be analyzed by a laboratory on the schedule discussed below for:
    - PADEP Short List of Petroleum Products for Leaded Gasoline, Aviation Gasoline and Jet Fuel, plus dissolved arsenic, methyl tert-butyl ether (MTBE), and tert-butyl alcohol (TBA) (see DSCP quarterly reports, Arcadis 2016-2018), via lab methods:
        - EPA 8260B for VOCs
        - EPA 8011 for SVOCs
        - EOA 6020A for field-filtered dissolved lead and arsenic (including speciation of arsenic)
    - Monitored Natural Attenuation (MNA) parameters, including nitrate, nitrite, sulfate, sulfide, carbon dioxide, methane, arsenic (total and dissolved), iron (total and dissolved), lead (total and

dissolved), manganese (total and dissolved), 2,2,4-trimethylpentane, and ethanol, via lab methods:

- EPA 8260B for VOCs
- EPA 300.0 for sulfate
- EPA 4500 for S_2F for sulfide
- EPA 353.2 for nitrate
- EPA 4500 NO_2 for nitrite
- EPA GAT 004-07 for dissolved methane and carbon dioxide
- EPA 6010C for total and dissolved metals+

As discussed in section 6.3, a complete set of baseline readings including groundwater samples will be collected from all performance monitoring wells prior to the start of the Proveout Testing. This baseline monitoring will include groundwater quality monitoring and a synoptic round of groundwater liquid levels. During the pilot test, groundwater samples discussed above will be collected three total times including: baseline, after 2 months of operation, then after 5 months of operation.

Additional performance monitoring data on the individual biovent and biosparge wells as well as VES system performance checks and adjustments will also be required routinely as part of the pilot study. The monitoring requirements are also provided in Table 1 – Performance Monitoring Summary for clarity. These tasks include:

- Weekly biovent/Biosparge system performance check (SCADA system, instrumentation and wellfield balancing) and maintenance.
- VES system performance checks and adjustments including:
  - Recording VES system instrumentation and SCADA readings and tracking performance adjustments to the VES system.
  - Recording gauge and SCADA readings and tracking performance adjustments to the thermal oxidizers to maintain compliance with air discharge permit.
  - Collecting weekly vapor influent samples for VOCs CH_4, CO_2, O_2 levels, and the percent LEL observed at the inlet of the thermal oxidizer and at the VES system manifold (using a PID and a GEM 2000 Plus Gas Analyzer, respectively, in the ¼-inch sample ports).
  - Conducting weekly checks of the VES skimming and recovery wells to determine effect during pilot operations and make adjustments to the VES and skimming systems as a result.
  - Collecting monthly summa canister samples from the VES manifold (combined), TOX inlet and TOX discharge for mass recovery tracking, mass degraded tracking as well as air discharge permit compliance.
  - Continue to operate the VES system during the pilot test to maintain compliance with the PADEP Order to remediate the LNAPL.

Performance monitoring data will be reviewed by the engineering team to evaluate the success of the pilot study and identify any potential operational adjustments that might be needed to help optimize the Pilot System's performance. Based on pre-design testing, it is anticipated that increases in dissolved oxygen will be apparent in the Pilot Study Area groundwater within the first two months of operation. Longer term reductions in groundwater VOC concentrations as well as headspace methane concentrations will take longer to appear as the Pilot Study Area becomes more aerobic and will continue to be evaluated during O&M over the long term.

The Pilot System will be shut down temporarily within the first couple weeks of the pilot study operation for a period of one to two weeks to perform an in-situ respiration test on the bioventing system. During the test, well headspace readings (identified above) will be collected from a subset of the performance monitoring wells and several of the bioventing wells to evaluate the rate at which oxygen decreases and how other headspace readings change following system shutdown. These data will be used to calculate an oxygen utilization rate and estimated vadose zone hydrocarbon biodegradation rate for the pilot test area, which will help evaluate the success of the pilot study. A second in-situ respiration test will be completed at the end of the pilot study. Additional tests may also be performed during the course of the pilot study if needed.

8 PERMIT LEDGER

Permits required for the installation and operation of the biovent/biosparge system where identified as part of the design process. Three types of permits were determined to be necessary to install and startup the system, as summarized in Table 2 of the Design Report. The only necessary permits are anticipated to be a building permit, and electrical permits. The Site currently has a valid air permit with Philadelphia Air Management Services, a division of the City of Philadelphia Public Health Department. The Pilot System will not warrant a change to the current air permit as air will only be injected into the formation at low flow rates and not extracted. The contractor selected to build this Study will be responsible for confirming and obtaining all permits.

9 REFERENCES

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"System Upgrades, Pilot Design and Study." Arcadis for USACE, November 2016

FIGURES



Legend:

- Sewer Line
- Manhole
- Interpreted Limits of the** "Hole/Breach"
- Extension of Deep Aquifer Site for Modeling Purposes
- Former DSCP Site Location (Shallow and Deep Aquifers)[1]

Notes:

1. The color coded lines define the land area that is the "Site" as defined under Act 2 and in the report text. Within the boundaries of the Site lies the LNAPL, and related petroleum hydrocarbon impacts to groundwater, soil and vapor, for which release of liability under Act 2 is being pursued as required by the Administrative Order. The Act 2 Site includes the former DSCP facility, the Admin Order defined "Affected Area," and other properties that have been determined through characterization to contain the LNAPL and related GW, soil and VI impacts.

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE

0 270 540 810 1,080

SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA

PILOT TEST WORK PLAN
BIOVENT/BIOSPARGE SYSTEM

SITE MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

PATH: Z:\GISProjects_ENV\DLA\RIR\mxd\Fig2_SiteMap.mxd 1/15/2018 9:20:37 AM Last save by: jchen

TABLES

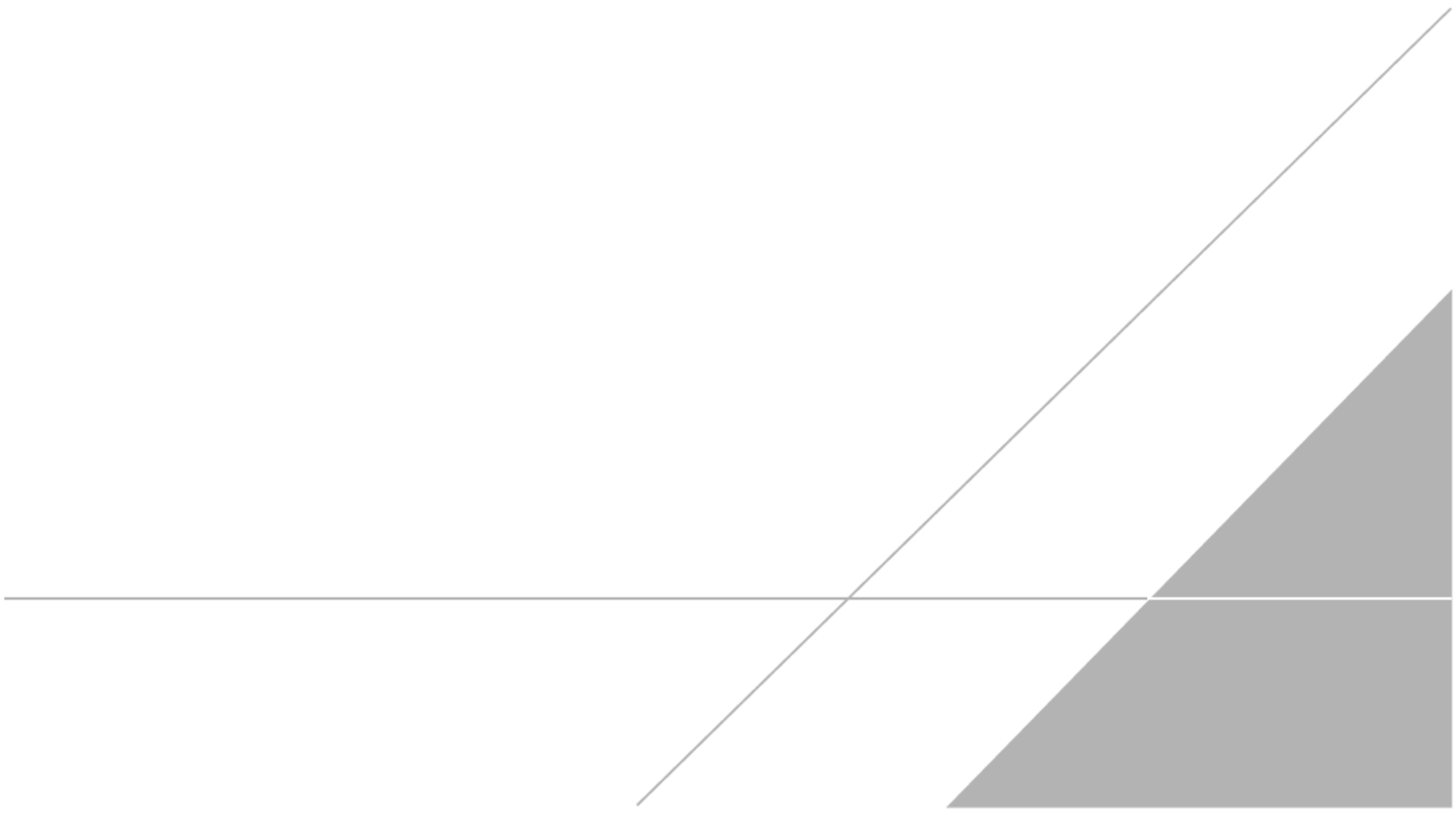


Table 1 - Performance Monitoring Summary

	Constituent	Pertinent Equipment	Pertinent Lab Methods	VES Manifold	Thermal Oxidizer	Well ID							
						PH-RW-A	PH-RW-A2	PH-RW-B	PH-RW-B2	PH-PH-2	PH-PH-21	2 New MWs	key
Monitoring Well Headspace	oxygen	Multi-gas meter				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1 baseline reading
	carbon dioxide	Multi-gas meter				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	2 testing every 2 weeks for the first month of pilot
	methane	Multi-gas meter				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	3 monthly testing after the first month of pilot
	VOCs	PID				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	4 testing after 2 months of operation
	pressure	manometer				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	5 testing after 5 months of operation
	temperature	laser thermometer				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	6 testing weekly during pilot
	relative humidity of vadose zone formation air	digital hygrometer				1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	1,2,3	7 testing monthly during pilot
Well Groundwater Geochemistry (field measurements)	depth to NAPL / Depth to water	interface probe				1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	dissolved oxygen	YSI or similar				1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	oxidation reduction potential	YSI or similar				1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	temperature	YSI or similar				1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	pH	YSI or similar				1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
Well Groundwater Geochemistry (laboratory analysis)	PADEP Short List of Petroleum Products for Leaded Gasoline, Aviation Gasoline, and Jet Fuel		EPA 8260B			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	dissolved arsenic		EOA 6020A			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	methyl tert-butyl ether (MTBE)		EPA 8011			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	tert-butyl alcohol (TBA)		EPA 8260B			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
						1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	nitrate		EPA 353.2			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	nitrite		EPA 4500 NO2			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	sulfate		EPA 300.0			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	sulfide		EPA 4500 for S2F			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	carbon dioxide		EPA GAT 004-07			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	methane		EPA GAT 004-07			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	arsenic (total)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	arsenic (dissolved)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	iron (total)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	iron (dissolved)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	lead (total)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	lead (dissolved)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	manganese (total)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	manganese (dissolved)		EPA 6010C			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	2,2,4-trimethylpentane		EPA 8260B			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
	ethanol		EPA 8260B			1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	1,4,5	
VES System Performance Checks	airflow rates	SCADA				1,6	1,6	1,6	1,6	1,6	1,6	1,6	
	individual well pressure	gauges				1,6	1,6	1,6	1,6	1,6	1,6	1,6	
	VES system performance checks	gauges / SCADA				1,6	1,6	1,6	1,6	1,6	1,6	1,6	
	vapor influent- oxygen	GEM 2000 Plus Gas Analyzer		1,6	1,6								
	vapor influent- carbon dioxide	GEM 2000 Plus Gas Analyzer		1,6	1,6								
	vapor influent- methane	GEM 2000 Plus Gas Analyzer		1,6	1,6								
	vapor influent- VOCs	PID		1,6	1,6								
	percent LEL	GEM 2000 Plus Gas Analyzer		1,6	1,6								
	summa canister samples		EPA TO-15	7	7								
	TOX inlet / discharge	PID		7	7								
	visual check			6	6	6	6	6	6	6	6	6	
Respirometry Testing of select wells		GEM 2000 Plus Gas Analyzer				1,5			1,5			1,5	

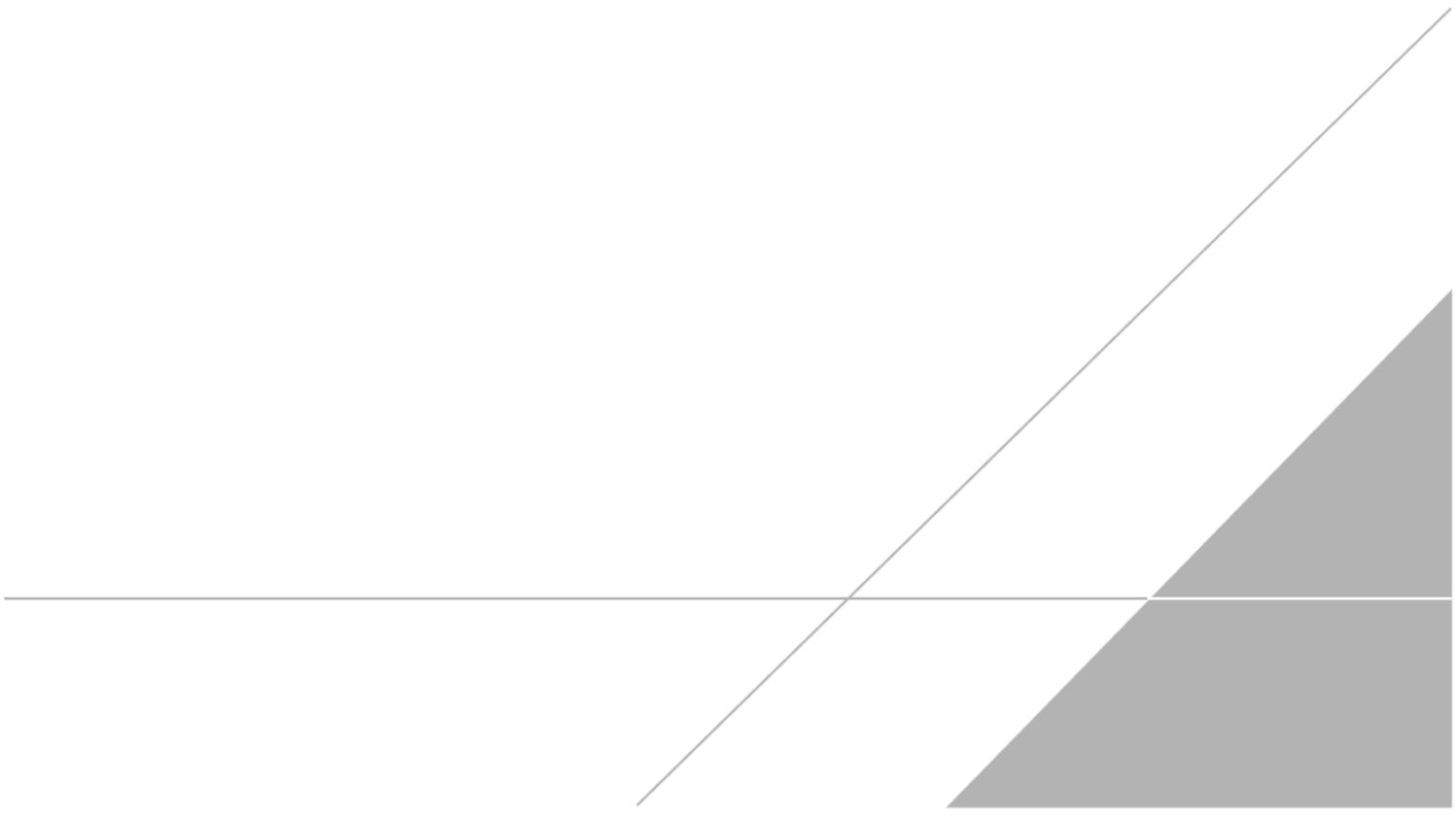
TABLE 2 - PERMIT LEDGER

Location: Philadelphia, PA

Permit	Permit Type	Permitee	Issuer	Deliverables	Estimated Cost	Procurement Period
Construction						
	Building Permit	Contractor	City of PHL	Application for Building Permit Form; Registration Permit; 3 sets of Building Plans; Geotechnical soil investigation report; Energy Conservation Forms	$100 filing fee; $150 permit fee	20 business days
	Electrical Permit	Electrician	City of PHL	Application by Electrician	Application by Electrician	Not Specified

APPENDIX A

Plan C Design Changes Summary



Appendix A
Summary of 2018 Design Changes for Biovent/Biosparge System

The following design changes were made in 2018, subsequent to the publication of the 2017 design report:

- Relocate Valmont blowers to be installed inside the motor control room of the VES building with conveyance piping to the PHA side utilizing existing 3" and 4" HDPE spare conduit under I-76.

- Eliminate seabox and its concrete pad.

- Utilize four existing spare electrical disconnects in the motor control center, to eliminate all of the power supply and transformer upgrade costs.

- Introduce phased approach to reduce costs on well drilling and trenching:
    - Install two (2) well groups in the first phase.
    - These groups are in the grassy area to allow ditch-witch/direct bury installation
    - Postpone installation of the two (2) well groups in the parking lot into a second phase, delaying the more costly DOT spec trenching and pavement restoration.

- Revise Civil and Electrical scopes of work as follows:
    - Locate air pressure packages in motor control room next to air compressor
    - Locate blowers in the rear left corner of the room, drawing air from inlet air filters mounted outside of the rear wall.
    - Optional interior wall/door to reduce noise.
    - Electrician to connect blowers and VFDs to motor control center, add conduit and wires to instrumentation.
    - Add piping from blowers go to heat exchangers behind building.
    - Piping is 4" SDR 11 HDPE, above grade from heat exchangers to propane tank compound using Unistrut and concrete piers.
    - DOT spec trenching/restoration required to go from the compound to the I-76 crossing vault in U-Haul parking lot
    - Piping enters vault through cored hole and then connects to existing spare 4" HDPE pipe under highway.
    - DOT spec trenching/restoration required to go from the I-76 crossing exit vault in PHA parking lot to the fence line against I-76
    - Piping then travels above grade on Unistrut rack and piers along fence line to a valve box located at Group 1. Evaluate direct-burying the 4" above grade run on the PHA side.
    - Valve Box is a small temporary enclosure (not a shed).
    - Ditch-witch is then used to install the smaller piping from the valve box to each wellhead. All 1" and 2" HDPE can be thinner wall SDR17 to allow spools of pipe to be purchased, resulting in less fusion welding onsite.

- Revise Controls scope as follows:
    - Install a small sub-panel in VES building to control the Valmont blowers integrated with the existing PLC/SCADA.
    - Upgrade VES system PLC with more inputs and outputs if necessary.
    - Upgrade south side control panel, but now it can be smaller since it's not controlling sparge system
    - Well groups to be cycled manually to lower controls cost.
    - Include North side AST integration as an option.

- Revise pressure and head loss calculations for new system layout.

- Verify design assumptions:
    - Test to confirm that conduits under I-76 are intact and air-tight.
    - Investigate potential conflicts with existing subsurface utilities.
    - Consider potential vandalism/tampering with above-ground piping runs.
    - Consider condensation in above ground piping
    - Consider efficacy of ventilation and noise reduction design elements for blowers installed inside of the motor control room.

APPENDIX B

Supplemental Investigation Letter Report

PARS
Environmental
Inc.

500 Horizon Drive
Suite 540
Robbinsville, NJ 08691

Tel: 609-890-7277
Fax: 609-890-9116

RE: Supplemental Investigation to Support System Upgrades, Pilot Design, and Study
Former Defense Supply Center Philadelphia (DSCP) Facility
Philadelphia, Pennsylvania

Introduction

This letter report and attachments describes recent subsurface investigative work that was completed to support the design of system upgrades, pilot design, and study (the Design) at the Former Defense Supply Center Philadelphia (DSCP), Philadelphia, Pennsylvania (the Site). Work was completed by PARS Environmental Inc. (PARS) and Arcadis US (Arcadis) under Work Authorization WA03 as part of Master Subcontract Agreement D13-0178 between PARS and Arcadis, and under Arcadis contract W912BU-13-D-0002 to the United States Army Corps of Engineers, Philadelphia District (USACE). The work was completed on the western portion of the Philadelphia Housing Authority (PHA) property located south of the DSCP, focused specifically in "Area 1" as described in the In-Situ Aerobic Biodegradation Basis of Design (BOD) Report[1]. On background, the BOD evaluated the viability of re-using remediation equipment procured from the Valmont Superfund Site (Valmont) to increase the rate of Site light non-aqueous phase liquid (LNAPL) remediation as required by the 1999 Administrative Order (Order) between the PADEP and the Defense Logistics Agency (DLA). The BOD determined that design and installation of a bioventing/biosparge system in Area 1 based on obtained Valmont equipment (e.g., positive displacement blowers) could supplement the Site's existing Vacuum Enhanced Skimming (VES) remediation system in pursuit of Order-defined LNAPL cleanup goals.

This supplemental investigation was aimed specifically at filling data gaps key to further understanding of subsurface conditions in Area 1 to support the well field design of a bioventing/biosparge remediation system to augment the existing VES system. Furthermore it is the intent of this investigation and report to identify within Area 1 the most favorable conditions for the implementation of additional remediation infrastructure based on the hydrogeologic framework and contaminant distribution within Area 1. The field investigation was completed between April 8th and April 20th, 2016 and included the following activities:

- Subsurface utility screening using an inductive utility locating tool and Ground Penetrating Radar (GPR)
- Direct-push drilling outfitted with subsurface direct sensing technology
- Installation of four vapor monitoring probes within the direct-push boreholes
- Survey of utilities and vapor monitoring probes

[1] In-Situ Aerobic Biodegradation Basis of Design (BOD) Report, Arcadis, 2014.

The information collected during the field phase of the work was integrated into the existing 3-dimensional Site model created using CTech Earth Volumetric Studio (EVS) software from which various subsurface cross-sections and images of the study area could be extracted. The resulting subsurface views illustrated where the best overlap between petroleum hydrocarbon contamination and high-permeability zones occurred which were then used to support the selected locations for additional remediation infrastructure.

Since 2001, direct-push/direct sensing work has been conducted on the various properties that occupy the Site including: the former DSCP, within the Quartermaster Plaza parking lot (near Home Depot and BJ's), on the Siena Place residential housing property, the PHA maintenance facility, the Defense Realty property, and within the SEPTA south bus terminal. Direct observation, several downhole direct sensing tools, and sampling methods were employed on these various properties depending on data needs from each area. A total of 34 Membrane Interface Probe (MIP) and Hydraulic Profiling Tool (HPT) (combined-MiHPT), four Electrical Conductivity (EC), two fuel fluorescence detector (FFD), and two direct-observation (direct-push core) borings were advanced, while two piezometers and one monitoring well have been installed at the Site since 2012. Soil pore gas samples were collected from the four EC locations south of the Siena Place housing development from specific vertical intervals. A description of the various investigations completed at the Site has been presented previously in Quarterly Progress Reports[2]. This most recent investigation included advancing an additional four MiHPT borings within BOD Area 1, located in portions of the PHA parking lot and the grassy area between the parking lot and I-76 (Attachment 1; Figures 1, and 6 through 9).

In support of the Design and specifically to relate hydrogeological elements to the details of the proposed Valmont equipment-based bioventing/biosparge remediation system, this letter report: 1) summarizes the Site geology and hydrogeology framework, 2) describes each of the subsurface direct-sensing tools utilized at the PHA property (i.e., Area 1), and 3) presents the results of the investigation through figures and cross-sections developed through integration of recently generated data with historical Site information.

Site Location and Regional Geology

The former DSCP property lies to the east of the Schuylkill River and north of the Delaware River and Former Philadelphia Navy Yard (Figure 1). The Site is bounded to the west by the Sunoco Refinery, to the north and east by residential areas, and to the south by the Schuylkill Expressway and the Former Passyunk Homes property. The former Passyunk Homes property is currently the location of the PHA building and the Sienna Homes housing development. The land surface topography of the Site and surrounding area is relatively flat with the land surface elevation generally around 20 feet (ft) above mean sea level (ft amsl).

Broadly, the region around the Site is divided into two aquifer systems: the consolidated Piedmont aquifer system and the unconsolidated Coastal Plain sediment aquifer system[3]. These two systems are separated

[2] Fourth Quarter 2014 and Calendar Year 2014 Summary Progress Report for the Former Defense Supply Center Philadelphia Facility, Philadelphia, PA, Arcadis, 2015.

[3] Geohydrology and Ground-Water Resources of Philadelphia, Pennsylvania, USGS Water-Supply Paper 2346, 1991.

by the Fall Line, which follows the landward extent of the Coastal Plain across Philadelphia, trending southwest to northeast[3]. The crystalline bedrock of the Piedmont Physiographic Province outcrops northwest of the Fall Line and northwest of the Site. The Site and the surrounding area lie to the south and east of the Fall Line within the Atlantic Coastal Plain Physiographic Province. The coastal plain begins at the Fall Line as a very thin veneer of unconsolidated sediment which thickens to the south and east[3].

The Coastal Plain consists of numerous distinct geologic units which outcrop in bands striking northeast to southwest, parallel to the Fall Line. The Site and surrounding area are underlain by a number of these units which together are termed the Potomac-Raritan-Magothy (PRM) aquifer system consisting of a wedge-shaped mass of Cretaceous age unconsolidated sediments that are comprised of highly permeable sands and gravels separated by less-permeable layers of silts and clays[4]. The PRM system unconformably overlies Paleozoic age bedrock, and at the Site and adjacent area underlies Quaternary age silt and gravel. Not all units of the PRM system are present near the Fall Line or at the Site; some only appear to the south and east. The PRM system is thinnest near the Fall Line and gradually thickens to the southeast toward the coast, where these deposits are several thousand feet thick. Regionally, the aquifers are largely confined, except in isolated areas where younger permeable sediments are in direct contact with underlying Cretaceous sediments as a result of Pleistocene erosion and deposition.

Regionally and within the confined portions of the PRM aquifer, groundwater flows to the southeast in the down dip direction[3]. Locally within the outcrop area, groundwater flow is impacted by many factors including the presence of rivers, changes to land use accompanying urbanization, and the effects of pumping from wells completed in the lower aquifer zone. In the past, two large groundwater pumping facilities were active in the area: the Former Philadelphia Navy Yard to the south and Publicker Industries to the east[4]. Withdrawals from these facilities resulted in changes to groundwater flow directions such that water flowed toward the pumping centers[4]. In addition, as hydraulic heads in lower units dropped below those in upper units, a downward vertical groundwater flow pattern developed[4]. Though pumping at the naval shipyard and at Publicker Industries was discontinued in the mid-1960s and 1990s, respectively, pumping increased in New Jersey across the Delaware River. As a result, water levels recovered, but the downward vertical gradients remained[4].

Site Geology and Hydrogeology

The Site's hydrogeological framework has been described in previous Site documents. To provide a frame of reference for subsequent interpretations of BOD Area 1 direct push/MiHPT data, the summary below, from the *Final Data Gap Analysis Report Former Defense Supply Center Philadelphia Facility, Philadelphia, Pennsylvania* (Arcadis, June 2013) is presented:

[4] Simulation of Ground-Water Flow in the Potomac-Raritan-Magothy Aquifer System Near the Defense Supply Center Philadelphia, and the Point Breeze Refinery, Southern Philadelphia County, Pennsylvania, (USGS), 2001.

The Site, Sunoco Refinery, and surrounding area are underlain by the PRM aquifer system that consists of Coastal Plain sediments that range in age from Late Cretaceous to Holocene. The PRM aquifer system is divided into numerous distinct and laterally extensive units that are present at the Site and throughout the adjacent investigation area. These sediments consist of highly permeable sands and gravels separated by less-permeable layers of silts and clays. The PRM aquifer system in Pennsylvania is divided into several units including an upper clay, upper sand, middle clay, middle sand (only present in the southernmost portion of the investigation area), lower clay, and lower sand. Not all units are continuous; near the Fall Line, pinching out of upper units, including confining units, results in regions of the lower sand unit that are directly overlain by alluvium (USGS 2001). The PRM is overlain by Pleistocene age deposits referred to informally as the Trenton gravel, which are overlain by Holocene fine grained alluvial materials (i.e., informally known at the Site as “the upper silt layer”) and fill (USGS, 2001). The PRM aquifer system is underlain throughout the study area by relatively impermeable crystalline rocks of the Wissahickon Formation. Throughout the system, all beds dip to the southeast (USGS, 1991).

Subsurface/Shallow Aquifer Zone

As discussed above, the upper silt layer and Trenton gravel constitute the shallow aquifer at the Site and surrounding area. Each of these units is discussed in more detail below.

Urban Historic Fill

Throughout south Philadelphia and as observed during subsurface investigations at the Site, there exists a layer of historic fill that lies between the ground surface and the top of the silt layer (where present) and the Trenton Gravel. This fill is a result of generations of construction and development throughout the area; the origins of the materials themselves is unknown and certainly is a mix of various sources. The constant property redevelopment in and near the Site has created a mix of historic fill, the upper silt layer and Trenton Gravel to varying degrees at the Site.

Upper Silt Layer

In the vicinity of the Site and the surrounding area, natural surficial materials reportedly consists primarily of a silt layer with varying amounts of sand and clay deposited by the Schuylkill and Delaware Rivers during alluvial processes and periodic flood events. The silt layer is generally present across the entire area of the Site, the Sunoco Refinery, and the surrounding area although excavation has disturbed or removed this layer in some areas. Throughout much of the area the silt layer has either been replaced or covered over by fill. The fill layer is generally thin and discontinuous, but is much thicker at locations that were excavated during installation of underground utilities or construction of buildings or roads. Both the fill and silt layers are identified in boring logs and in cross-sections in numerous documents describing investigative activities at the Site, the adjacent Sunoco Refinery property, and other parcels within the larger investigation area.

Heterogeneous Sand & Gravel (Trenton gravel)

At the Site and surrounding area, the heterogeneous sand and gravel is generally synonymous with the Trenton gravel but may locally include portions of the upper sand of the PRM aquifer system (where the upper clay is missing) or coarser portions of the overlying silt or fill layer. The Trenton

gravel was noted to underlie the silt/fill layer throughout much of the study area with the exception of the southernmost portion of the Sunoco Refinery site where the gravel layer is absent as noted on cross sections in published reports by Langan Engineering (2011). While the Trenton gravel is described as consisting of gravel, sand, and minor amounts of clay suggesting relatively high permeability, observation made of these materials during various field investigations indicate that there is a fair amount of cementation and mineralization that potentially decreases hydraulic permeability. In boring logs and cross sections from the Sunoco Refinery and the Site, the thickness of the unit, where present, varies from a few feet to over 30 feet with the thickness increasing to the southeast. Most of the unconfined aquifer system consists of the Trenton gravel. Where the shallow aquifer has a defined bottom confining unit, the water table is generally encountered between 13 and 20 feet bgs. Where there is a connection between upper and lower aquifer (e.g. the breach) water is encountered between 17 and 20'bgs.

Confining Units

The lower/middle clay layer is an extensive and important component of the confining unit throughout most of the investigation area, except where it was affected by Pleistocene erosion and re-deposition. This unit separates the unconfined to semi-confined shallow aquifer from all of the underlying deep aquifer; however, in discreet areas the confining unit is laterally discontinuous, allowing for hydraulic connection of the shallow to the deep aquifer. One such 'breach' has been identified and is centrally located at the Site. (Sloto, 2010). The lower/middle clay is identified in boring logs and cross section at both the Site, the Sunoco Refinery, and in the surrounding area.

Deep Aquifer Zone

The deep aquifer zone at the Site and the surrounding area consists of the units directly below the lower clay unit, most notably the lower sand unit. The lower sand unit (also called the Farrington Sand) of the PRM consists of fine gravel and coarse sand grading upward into medium to fine sand with a few layers of clay (USGS 1991). Portions of this unit lie unconformably on the crystalline bedrock, while others are separated from the bedrock by a layer of saprolite (USGS 1991). Thickness varies at the Site and surrounding areas. The lower sand unit forms a wedge that thickens from very thin at the Fall Line to about 90 ft to the southeast, where the sands filled in paleo-river channels of the ancestral Delaware and Schuylkill rivers (USGS 1991).

Groundwater Flow in the Shallow Aquifer Zone

Groundwater in the shallow aquifer generally flows from the northwest corner of the Site to the southeast and then more to the south. Groundwater recharging the shallow aquifer from the former DSCP property ultimately exits the southwest corner of the property under current hydrologic conditions or enters the deeper aquifer zone through leakage through the confining unit (lower/middle clay). This leakage occurs through the above described breach. Recent (i.e., 2016) potentiometric contours for the shallow and deep aquifers indicate that in the vicinity of the breach, groundwater flow is toward the breach and then downward into the deep aquifer. This gradient indicates a downward flow, where groundwater is transmitted from the shallow aquifer to the deep. Shallow groundwater in

the larger area ultimately discharges to surface water or descends through leaky portions of the confining unit into the deeper aquifer.

Groundwater Flow in the Deeper Aquifer Zone

As indicated above, groundwater flow in the deeper aquifer in the area surrounding the Site has historically been controlled by recharge to the aquifer from the outcrop area and the presence of large pumping centers located to the east and south of the Site (USGS 2001). Since the cessation of large-scale removal and use of groundwater from the deeper aquifer in recent times, flow in the aquifer has largely returned to more natural conditions, although continued pumping in nearby New Jersey preserves the vertical hydraulic gradients that allow for downward leakage (USGS 2001). Regionally, groundwater within the deeper aquifer flows to the southeast along dip. Locally significant recharge from the shallow aquifer occurring through leaky portions of the confining unit may impact this overall flow direction. At the Site, for that portion of the deeper aquifer where data are available, groundwater flow is largely to the south-southeast.

Direct Push and Direct Sensing Technology

Electrical Conductivity (EC)

Traditionally, EC logging is used to determine variations in subsurface lithology, such as defining permeable sand zones and impermeable clay confining layers. EC logging is achieved by passing an electrical current through the formation between two probe contacts. This current is measured along with the resultant voltage. The conductivity is a ratio of current to voltage times a constant which results in EC readings in milli-Siemens per meter (mS/m). The electrical conductivity of unsaturated unconsolidated materials is a function of the moisture content of the material and the conducting properties of the pore fluids and sediments. In the saturated zone (below the water table), where variations in moisture content are small, fluid properties (chemistry variations) and matrix properties (fine vs. coarse grained sediments; mineralogy) are the major factors that influence EC. Silt and sand-sized particles are generally less conductive than clays – clay-sized particles, such as phyllosilicates, humic substances, and iron and manganese oxides and oxyhydroxides, tend to be highly conductive due to their extremely small size, relatively high surface area per unit volume, and charge characteristics. Thus, in geologic settings such as at the DSCP Site where fine and coarse-grained materials are inter-bedded, EC logs provide a very detailed profile of the vertical distribution of various geologic materials.

Typically EC results range from 0.1 to 10 mS/m for sands and gravels and 10 to 400 for clays. Results greater than 400 with specific patterns potentially suggest the presence of fill material. The attached logs show EC values that vary across this range; higher values (line shifting to the right) indicate increasing amounts of silt, clay, and other fines, while lower values (shifts left) are indicative of coarser-grained units such as sands and gravels.

Hydraulic Profiling Tool (HPT)

The HPT system is designed to evaluate the hydraulic characteristics of unconsolidated materials. Clean water is pumped through a screen on the side of the probe at a low flow rate (i.e., 300 mL/min) while the HPT probe is pushed or hammered at a constant rate (approximately 2 cm/s). Injection pressure and injection water flow rate are measured and plotted with depth which provide an indication of the hydraulic properties of the soil. A relatively low pressure response would indicate a relatively large grain size and the ability to easily transmit water while higher pressures would indicate a smaller grain sizes and a reduced ability to transmit water.

Pressure values typically range between 20 pounds per square inch (psi) for coarse grained materials and 100 psi for very clays or indurated/cemented materials. Similar to the EC logs, the attached HPT logs show HPT values that vary across this range; higher values (line shifting to the right) indicate increasing amounts of silt, clay, and other fines, while lower values (shifts left) are indicative of coarser- grained units such as sands and gravels. Post-processing of the pressure log data involves an empirical derivation of estimates of hydraulic conductivity (K) and water table elevation. Estimated K values generally range between 0 and 80 feet per day (ft/day). When observing the estimated K logs, the opposite is true of the pressure logs – higher values (to the right) indicate coarser/more permeable materials. These K values are used in conjunction with the EC information to cross-reference lithological interpretations with expected corresponding hydraulic properties to arrive at a “multi-proxy” solution of the geologic profile.

Membrane Interface Probe (MIP)

The MIP is used to provide semi-quantitative concentrations of volatile organic compounds (VOCs) in the gaseous, sorbed, dissolved or free phases in the subsurface. A semi-permeable polymer “Membrane” is installed on the probe within a block that is heated to approximately 120 degrees C. Diffusion of VOCs through the membrane occurs due to the concentration gradient imparted between the impacted soil and the clean carrier gas behind the membrane. A constant gas flow of 35-45 mL/min sweeps behind the membrane and carries the diffused VOCs to the gas phase detectors at the surface. Two detectors are typically used – a flame ionization detector (FID) and a photoionization detector (PID).

MIP values are measured in microvolts (uV) and typically range from 104 uV where no contamination is encountered to 107 uV in the smear zone. Detection limits for typical MIP configurations generally correspond to 1ppm and 150ppb or less, depending upon contaminant concentrations and soil matrix. Travel time from the membrane interface to the detector(s) is approximately 60-75 seconds (depending on the length of trunkline, flow rate, and ambient air temperature). Increasing values (shift right) indicates higher concentrations of total VOCs in the subsurface.

Field Investigation Results

Results of the utility survey are included in Attachment 1. As shown therein, there are buried electric, water, sewer, and other unidentified utilities in BOD Area 1. Some of the unidentified utilities are likely associated with the DSCP remediation system infrastructure such as vacuum and LNAPL lines. From these figures and from discussions with PHA staff, most of the utilities are located within the medians between the parking lot bays oriented north-south in the parking lot.

The MiHPT logs for each of the four vapor probe locations (VP-1, VP-2, VP-3, and VP-5) are included in Attachment 2. From left to right, the logs include the EC and estimated hydraulic conductivity (K), maximum HPT pressure and piezometric pressure, the flame ionization detector (FID) (Detector 1 Max) and the photoionization detector (PID) (Detector 2 Max) which are the two MIP components.

As described above, the EC response is generally used to determine changes in material grain size with depth. Each of the EC logs show EC shifting to the right between approximately 2 and 12 feet bgs before shifting left. This shift is indicative of the silt layer that has been identified in several other EC logs on the PHA property and across the Site. Between approximately 20 and 40 feet, the EC response generally shifts to the right until about 40 feet bgs before again moving left until the total depth. This patters appears less pronounced in VP-1; however, this appearance is largely due to the differing horizontal scales on each plot. The EC plot for VP-1 also shows a significant shift to the right at about 21 feet bgs which indicated the presence of a fine-grained layer most likely associated with a clay.

The HPT data sets do not begin until the probe has reached the water table as shown by the start of the data set between 20 and 21.5 feet bgs. The large red dot on the piezometric pressure log marks the top of the groundwater table. The HPT plots generally follow the same trends as the EC plots. These concomitant shifts are due to the increasing pressures measured by the HPT due to the finer grained layers being less hydraulically conductive than coarser grained materials. The estimated K values shown on the EC plot naturally vary inversely with HPT pressure; as more highly conductive layers will allow more water flow into the formation from the probe and exert less pressure. So in general, EC and HPT logs are directly related while K is inversely related to EC and HPT. Of note and as seen in the HPT for all four logs, there is a zone of very low K between 38 and 44 feet bgs which likely represents the presence of the “lower/middle clay” at those depths in these four logs. Below those depths, relatively high K values are observed together with low EC and HPT pressure values suggesting coarse and conductive materials associated with the Farrington sand (lower sand unit).

The MIP response (FID and MIP) shown in the two plots on the right of the logs illustrate the presence and character of the LNAPL “smear zone”. Starting at approximately 19 to 21 feet bgs, the MIP shifts rapidly to the right with depth before gradually shifting back to the left at approximately 40 feet bgs. The thickness of this smear zone is likely due to historical fluctuations in groundwater elevation that have carried LNAPL contamination vertically through this zone and “smeared” it onto the soil matrix. Values above 1.0×10^7 microvolts (uV) are indicative of the highest concentrations and in some cases suggest the presence of free-phase LNAPL. Values of this magnitude can be seen in each of the logs but generally are limited to small vertical intervals. It is important to recognize that the gradual decay of MIP values with depth is also due, in small part, to the smearing imparted by the probe as it is advances, and the delay in the clearing of the sweep gas as it flows through the MIP trunkline.

Data Analysis with Earth Volumetric Studio (EVS)

Data generated from each of the direct push events were synthesized together with existing traditional boring log data to generate a 3-dimensional representation of the subsurface geology, hydrogeology, and contaminant architecture using C-Tech’s EVS software. EVS allows for fully three-dimensional visualization

rendering of geology as well and can be used to estimate volumes and masses of contaminant plumes. The geologic and chemical models are generated independently (using the various different direct push data sets), and then combined to generate 3-D interactive cross-sections and fence diagrams.

The geologic portion of the model was created using existing shallow and deep aquifer zone monitoring well boring logs from the Site and the newly-acquired MiHPT data. This information was viewed in the context of the Site hydrogeological conceptual model elements described in various reports (and above), including investigation, remedial design and risk assessment reports published under the Order prior to 2011 and local/regional reports published by the United States Geological Survey (USGS) and other agencies. A bedrock surface was first created using all bedrock contact elevations included in existing boring logs to define the model "bottom". Various contacts or lithology "picks" within the unconsolidated aquifer systems were selected using both borehole and downhole data. These "picks" were then correlated between Site locations (e.g., direct push borings, existing Site wells, etc.) and then bridged by EVS to generate a volumetric representation of each hydrostratigraphic unit identified by the "picks". With the volumetric model generated, any cross-section, plan view, fence diagram, or horizontal slice can be viewed and exported.

The process described above was followed to create the four cross sections from the 3-D model at the locations shown in Figure 1. Figures 2, 3, 4, and 5 each contain 3 different data sets (geologic, MPT, and MIP) for cross-sections A-A', B-B', C-C', and D-D', respectively. Figures 6, 7, and 8 are horizontal slices of the subsurface cut at 0 feet amsl (above mean sea level), -5 feet amsl, and -10 feet amsl, and show the estimated K values at those elevations.

Figure 1 shows the traces of the four cross sections selected for analysis and the data points used to create each section. The points included in each section are a combination of monitoring wells, extraction wells, and MiHPT borings. These four slices were selected because they define a "box" centered within the BOD Area 1. The corners of the box are defined by VES wells PH-RW-A, PH-RW-B, PH-RW-I, and PH-RW-W. This sub-area of BOD Area 1 also is in an area that is largely within the grass to the north of the PHA parking lot, is clear of many utilities, is close to existing VES infrastructure, and has relatively elevated benzene concentrations and contains free-phase LNAPL.

Cross section A-A' runs west to east along the northern portion of the PHA property just south of the Schuylkill Freeway, or I-76 (Figure 1). Figure 2A illustrates the Site stratigraphy along A-A', which includes the hydrostratigraphic units described above, and shows the position of the 16 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections C-C' and D-D'. Figure 2B shows the same section but adds the estimated K values that were derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 2A. Finally, Figure 2C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Cross section B-B' runs west to east along the northern-middle portion of the PHA property, through the parking lot and is just north of the Packer Avenue sewer (Figure 1). Figure 3A illustrates the Site stratigraphy along B-B', which includes the hydrostratigraphic units described above, and shows the position of the 13 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections C-C' and D-D'. Figure 3B shows the same section but adds the estimated K values that were

derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 3A. Finally, Figure 3C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Cross section C-C' runs south to north along the western edge of the PHA property and cuts across the entire PHA property (Figure 1). Figure 4A illustrates the Site stratigraphy along C-C', which includes the hydrostratigraphic units described above, and shows the position of the 7 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections A-A' and B-B'. Figure 4B shows the same section but adds the estimated K values that were derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 4A. Finally, Figure 4C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Cross section D-D' also runs south to north along the western portion of the PHA property but to the east of section C-C' and west of the PHA maintenance building (Figure 1). Figure 5A illustrates the Site stratigraphy along D-D', which includes the hydrostratigraphic units described above, and shows the position of the 7 wells and borings used to create the section, the HPT pressure logs, and the positions of cross-sections A-A' and B-B'. Figure 5B shows the same section but adds the estimated K values that were derived from the HPT logs overlain on the linework of the stratigraphic contracts from Figure 5A. Finally, Figure 5C replaces the HPT pressure logs with the corresponding MIP-FID logs and adds the MIP-FID isolines as kriged by EVS.

Data Discussion and Interpretation

Major features common to all of the cross sections shown in Figures 2A, 3A, 4A, and 5A are the geologic/hydrostratigraphic units shown in the legends. The two predominant features are the upper and lower aquifer systems defined by the Pleistocene Trenton Gravel and the Cretaceous Lower Sand (Farrington), respectively. These two aquifers are separated in certain locations by a confining unit – defined here as the upper, middle, and lower sand and clay, collectively. These three beds together are collectively treated as the confining unit that largely hydraulically separates the upper (water table) aquifer from the lower aquifer. Where the Trenton Gravel and Lower Sand are not separated, that is where they are in direct contact with one another, is what has been described as the trough-like feature or "breach" hypothesized to be a paleochannel. This feature has been referenced in the Site Quarterly Status reports and has been mentioned in previous meetings with PADEP (e.g., March 2016). The local presence and absence of this separating feature has been the focus of much of the mapping and characterization efforts conducted at the Site to date.

It should be noted that the position of the heavy line delineating the top of the confining unit does not necessarily match at all depths and locations with the geologic contacts presented in the "Site Stratigraphy" cross section series (Figures 2A, 3A, 4A, and 5A). The positions of the geologic contacts shown in these cross sections between boreholes are in part a function of the kriging algorithm used by EVS that interpolates the contact between points and how it handles "pinch-outs" and beds that extinguish from one borehole to the next. A key example of this artifact can be seen in Figure 2A (cross section A-A'') between DSCP-MiHPT-17 and well PH-PH-20, where the confining unit appears to drape over a thicker section of

the lower clay (where they should be shown as having being eroded into by the Trenton Gravel. A second example is near DSCP-MiHPT-09 where the heavy contact line rises up from the lower Sand into the upper aquifer. The discrepancy between the two contact positions in this example is due to the fact that the heavy line uses the HPT data set to modify the position of the contact based on the differing hydraulic properties of the upper and lower aquifers.

With the above overall description being said, below are key take-away points in each cross-section.

Cross-Section A-A' (Figures 2A, 2B, and 2C)

- Section A-A' appears to cut the breach longitudinally between well PH-PH-20 and boring DSCP-MiHPT-09, with the edges of the breach shown west of PH-RW-B2 and east of DSCP-MiHPT-09.
- The northern boundary of the BOD Area 1 "box" (along A-A' between Section Lines C-C' and D-D' and wells PH-RW-A2 and PH-RW-B2) appears to lie atop a relatively thick sequence of the confining unit (approximately 20 feet) and lies to the west of the breach.
- The dashed portions of the heavy blue line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above. This line is generally positioned coincident with the top of the confining unit.
- The most vertically contiguous areas of high K values occur within the "breach".
- In general, the areas with the highest kriged MIP-FID values are collocated with the areas of highest hydraulic conductivity as illustrated by the HPT response.
- Note that on this cross section and on every other, it is in the upper zone where the highest MIP-FID values occur and; the MIP response always lies in the shallow, as such we believe this to represent the known petroleum hydrocarbon "smear zone" in the upper aquifer.

Cross-Section B-B' (Figures 3A, 3B, and 3C)

- As with A-A', section B-B' also appears to cut the breach longitudinally but is closer to the southern edge of the breach. This is supported by the confining unit being more pronounced and thicker across the section.
- The southern boundary of the BOD Area 1 "box" (between Section Lines C-C' and D-D' and wells PH-RW-W2 and PH-RW-I2) lies atop a slightly thinner sequence of the confining unit where the breach edges are just to the east and south.
- The heavy blue dashed line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above.
- The areas of highest K values occur within the "breach", but are more punctuated by the presence of the confining unit. This suggests "sub-channels" or multiple cuts through the confining unit.
- The portion of the blue line that is denoted as "breach" is not as laterally contiguous as it is further to the north as seen in section A-A''.
- In general, the areas with the highest kriged MIP-FID values are collocated with the areas of highest hydraulic conductivity as illustrated by the HPT response in the upper aquifer.

Cross-Section C-C' (Figures 4A, 4B, and 4C)

- Section C-C' appears to cut the breach laterally which is most pronounced between DSCP-MiHPT-12 and PH-RW-W2. On either side of these points, the confining unit is greater than 10 feet thick.
- The western boundary of the BOD Area 1 "box" (between Section Lines B-B' and A-A' and wells PH-RW-W2 and PH-RW-A2) lies atop a thick sequence of the confining unit (greater than 10') with the breach just to the south of the BOD Area 1 "box".
- The heavy blue dashed line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above.
- As with the other sections, the highest K values occur in both aquifer units where they are hydraulically connected within the breach.
- The highest MIP-FID values again occur at the edge of the breach near PH-RW-W2 and DSCP-MiHPT-02.
- The MIP-FID response is greatest in the upper aquifer, but also extends slightly into the confining unit.

Cross-Section D-D' (Figures 5A, 5B, and 5C)

- Similar to section C-C', Section D-D' appears to cut the breach laterally which is well-defined between points DSCP-MiHPT-05 and RW-H.
- The eastern boundary of the BOD Area 1 "box" (between Section Lines B-B' and A-A' and wells PH-RW-I2 and PH-RW-B2) lies atop a slightly thinner sequence (< 5 feet) of the confining unit with the breach just to the south and east of the BOD Area 1 "box".
- The heavy black dashed line demarcates the approximate interpreted contact between the shallow and deep aquifer zones and the formations that define those zones as described above.
- The high K values derived from DSCP-MiHPT-05 are over the within the breach and in contact with the lower aquifer high K zones.
- The MIP-FID response is greatest in the upper aquifer most of the way across the section and is coincident with areas of high K.

Horizontal slices at 0', -5', and -10' amsl (Figures 6, 7, and 8)

- Figures 6, 7, and 8 show HPT-derived K values in horizontal "slices" at various depths in BOD Area 1, together with the kriged MIP-FID isolines.
- As is the case with each of the cross-sections described above, there is a high degree of correlation between areas of high K and high MIP-FID response.
- The areas where high K and high MIP-FID areas collocate are within and near the BOD Area 1 "box".
- MIP-FID values are generally greater at -5' and -10' amsl than they are at 0' amsl, this elevation corresponds to depth of approximately 25 to 30 feet bgs.
- In the -5' amsl slice, there is a small sub-circular-shaped area around well PH-RW-W2 of maximum MIP response within an area of K values between 30 and 45 feet/day.

- In the -10' amsl slice, there is an hourglass-shaped area near Cross-Section C-C' of maximum MIP response that contains two discrete areas of maximum K values (greater than 60 feet/day); the southern portion of which corresponds to the circular area observed at -5' amsl.

Figure 9 presents a depth-to-top of confining unit contour map. It is important to recognize that this map contours depths to, not elevations of, the top of the confining unit as determined through making geologic unit assignments (picks) to various boring logs advanced in the area. While the contoured surface is based on geologic picks made at boring locations, it is interpolated by EVS at distances away from each boring, and therefore subject to verification. Future work will re-evaluate the picks originally made from the boring logs by considering the HPT data set that provides a secondary line of evidence for making such geologic picks. This presentation explains the anomalous feature that trends north to south along the western margins of the figure which is the surface elevation of the elevated CSX Railway bed skewing depth to confining unit values.

The surface topography of the area within the BOD Area 1 "box", however, is relatively flat, which eliminates anomalous values of depth to the top of the confining unit resulting from changing surface topography (like with the CSX railway). Therefore, while depth contours are shown, the topography of the top of the confining unit, which appears as a circular feature within the "box" represents a thicker portion or "hill" in the confining unit. That this feature also represents the bottom or "floor" of the "Subsurface/Shallow Aquifer Zone". As this "floor" underlies the relatively permeable shallow aquifer zone within the "box", a resulting "sandbox-like" feature occurs which is a favorable volume for petroleum hydrocarbon removal through bioventing/biosparge, as described in the BOD Report. Furthermore, this area is largely within a grassy portion off the PHA property, away from PHA activities and parking infrastructure.

The BOD Area 1 "box" is entirely underlain by the confining unit, but lies to the northwest of the breach feature. As described in the BOD Report, the ideal target areas in BOD Area 1 are those that contain both highly permeable geology (i.e., high K) and contain elevated levels of LNAPL impacts (in dissolved phase and as NAPL). These two attributes generally overlap in the smear zone that exists between the bottom of the silt and the confining unit. In addition, the presence of the confining unit beneath the entire BOD Area 1 "box" (the "floor") precludes the downward vertical migration of petroleum hydrocarbon impacts, as observed through the MIP response in MiHPT borings advanced in this area, and demarcates the theoretical maximum depth to which to install biosparge wells.

PARS
Environmental
Inc.

Attachment 1:

Geophysical Utility Screen Results

ACE Geophysics

April 18, 2016

Mr. Eric White, PG
Senior Project Manager
PARS Environmental Inc
500 Horizon Drive
Suite 540
Robbinsville, NJ 08691

Re: Utility Location
DSCP-Philadelphia
Project 16014

Dear Mr. White:

ACE Geophysics (ACE) has prepared this letter report for PARS Environmental Inc. to document the geophysical survey performed at the DSCP facility located in Philadelphia. ACE screened six drilling locations prior to intrusive activities. Utilities detected during the investigation are shown on Figure 1.

A two-phased geophysical survey was performed at the site. The first phase included using a utility locator to perform inductive or conductive tracing. Inductive locating is used for locating a particular object or several points along a buried pipeline or cable and is the preferred method for locating unknown or lost conductors. Conductive tracing is used for tracing an individual pipe or cable (conductive) or for use when other conductors or metal objects are nearby. As part of this phase, ACE also utilized a 50/60 Hertz locator to screen or loaded (active) underground power lines.

The second phase of the investigation was conducted using a SIR-3000 GPR control unit with a 400 MHz GPR antenna manufactured by Geophysical Survey Systems located in Salem, New Hampshire. The GPR survey was conducted along traverses oriented in multiple directions. The GPR profiles were reviewed in the field for anomalies with characteristics of possible underground

utilities. Parabolic shaped anomalies are characteristic of possible underground utilities when the GPR antenna crosses the utility at a perpendicular angle.

Figure 1 presents the results of the geophysical investigation. Utilities detected by the utility locator and the GPR are shown on Figure 1. Whenever possible, ACE marked the utilities with the appropriate spray paint color (orange=communications; green=sewer; red=electric; yellow=gas; blue=water). Unknown utilities were marked with white or pink spray paint on the ground surface.

Figure 2 includes photographs taken at Borings A and B. As shown on Figure 1, there are two unknown anomalies at Boring A and at Boring B there is the electrical line for the parking lot lights and a storm sewer pipe located in the landscaping between the parking areas.

Figure 3 includes photographs from Borings C and D. As shown on Figure 1 and Figure 3, there is a storm sewer pipe located in the landscaping between the parking areas. Boring D is located in the grass area on the north side of the parking area. The GPR and utility locators showed the presence of several utilities in the area. The original location of Boring D had to be moved to the east away from several water and electrical lines. These lines are part of the remediation treatment system.

Figure 4 includes photographs taken at Borings E and F. Boring E is near the fire hydrant; however, the utility locator followed the line to the east away from the boring location. An electrical conduit bank was marked (red) in the vicinity during a previous investigation. During this geophysical investigation, the utility locator did not detect the presence of electrical signals. One unknown utility was marked traversing from southwest to northeast. The original location of Boring E was moved to the west away from these marked utilities. Boring F is located on the west side of the building. Several unknown anomalies with features similar to pipes were marked on the ground surface.

SURVEY LIMITATIONS

The results stated and the conclusions drawn from this report furnished by ACE Geophysics to the client hereunder shall represent the opinion, efforts and judgment of ACE Geophysics, based on standard industry practices; however, ACE Geophysics cannot and does not warrant or guarantee that the accuracy or correctness thereof will always meet desired results and expectations. Any action which client (or those associated with client) may take as a result of or based on such reports and the data to which it refers shall be client's own responsibility and ACE Geophysics shall not be liable or responsible for any loss, cost, damages or expenses whatsoever, including incidental or consequential damages, incurred or sustained by client resulting therefrom for which client hereby releases ACE Geophysics; provided that all such reports, data and information, as well as the basic data upon which they are based, are acquired, compiled and prepared, as the case may be, in accordance with the contract.

SUMMARY

ACE scanned grids approximately 10 feet by 10 feet around each planned boring location. This survey was not a site wide utility survey. It is possible that utilities are present in other sections of

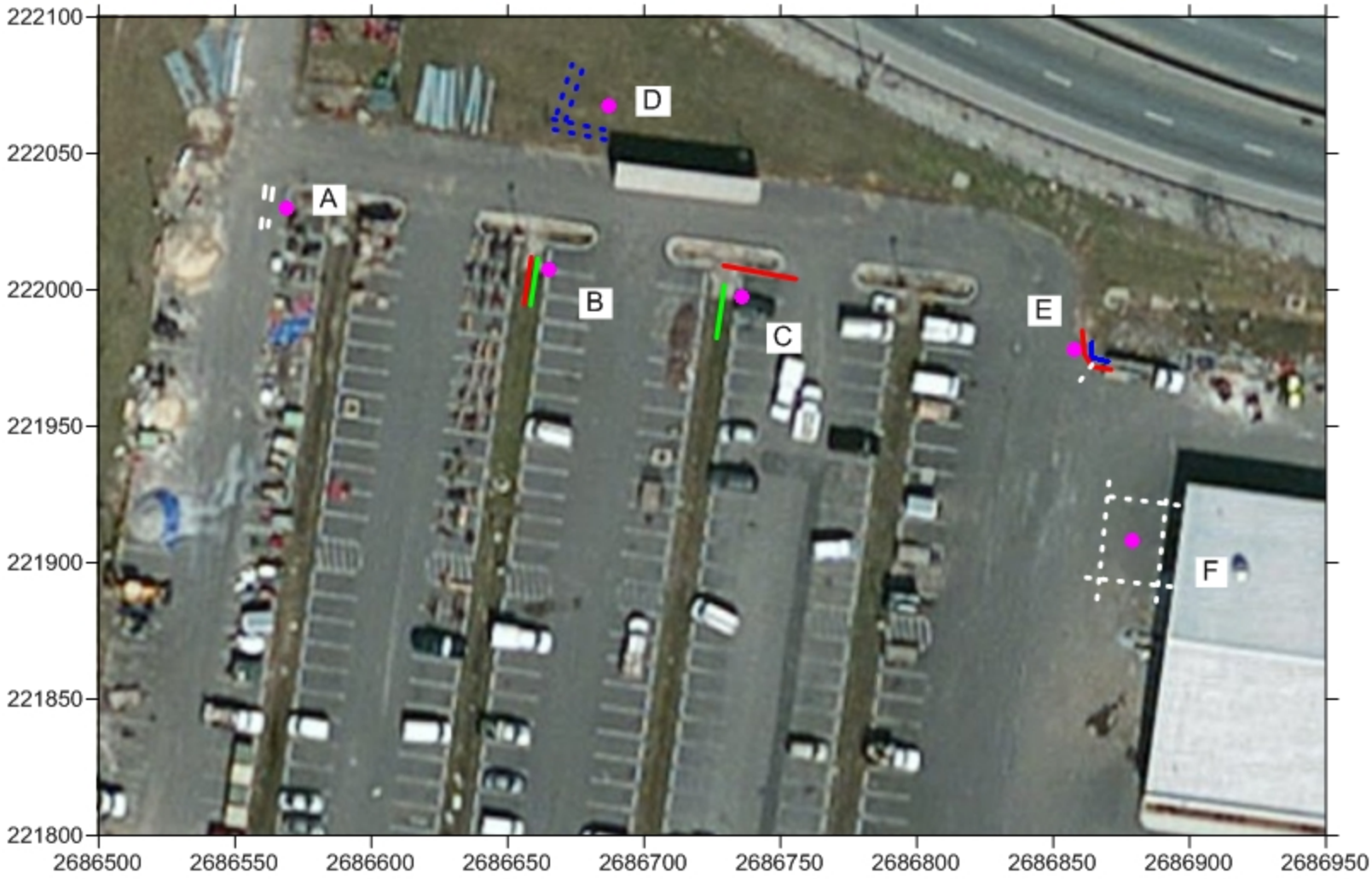
the property. If you have any questions or require any further information, please feel free to contact us at your convenience.

Sincerely,

ACE Geophysics LLC

Beth A. Williams

Beth A. Williams, P.G.
President - Senior Geophysicist



Feet

0 25 50 75 100

Underground Electric

Sewer

Water

Unknown Utility

Unknown Utility

Coordinates are in NAD83
Pennsylvania-South, Feet, WGS 1984

N

Boring Locations	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 1



Boring A



Boring B

Photographs of Borings A and B	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 2



Boring C



Boring D

Photographs of Borings C and D	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 3

Boring E









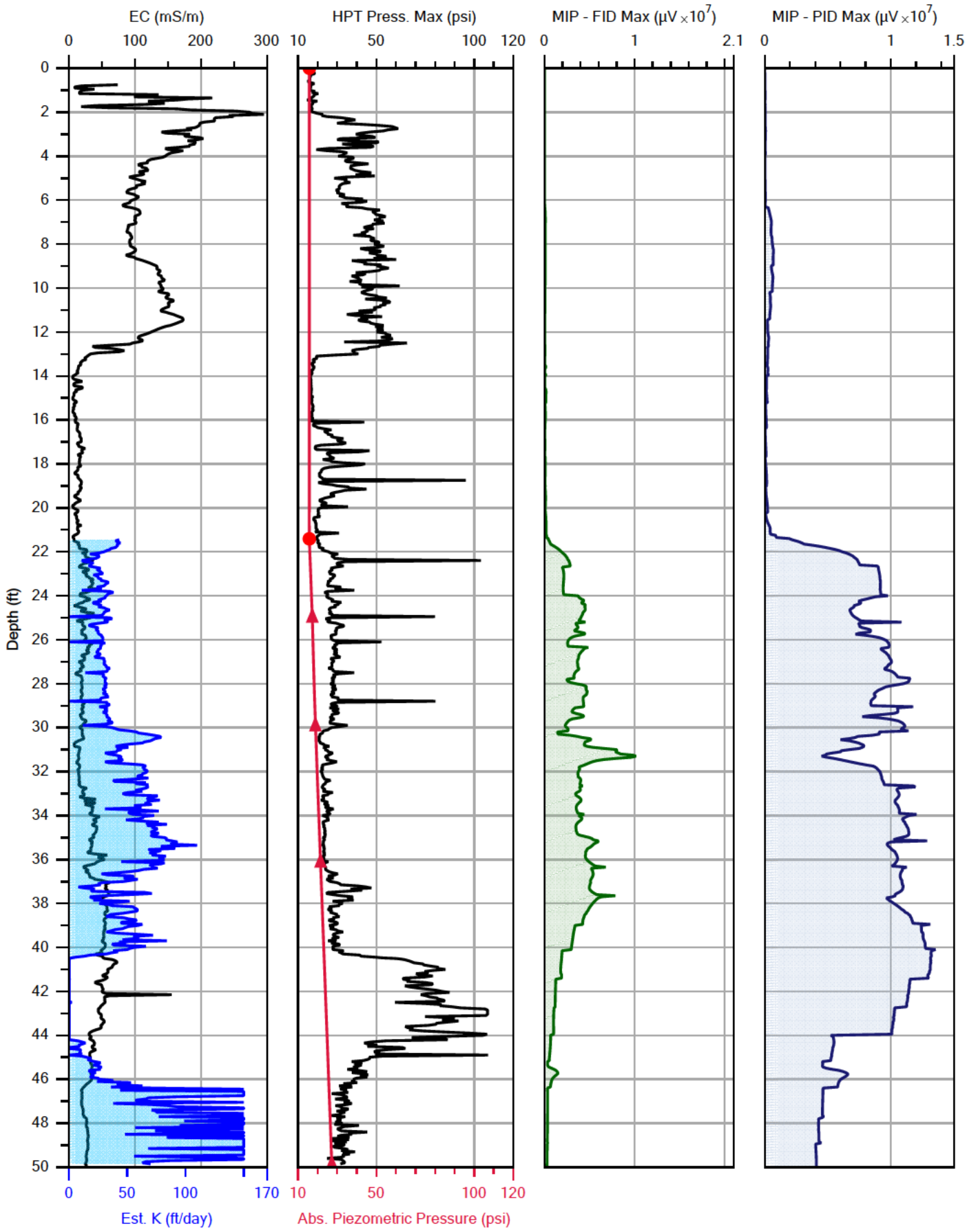
Boring F

Photographs of Borings E and F	
DSCP - Philadelphia PARS Envionmental Inc. Philadelphia, Pennsylvania	
April 2016	16014
Archeological Construction Environmental	Figure 4

PARS
Environmental
Inc.

Attachment 2:

MiHPT Logs and Construction Summaries of Vapor Monitoring Probes VP-1, VP-2, VP-4, and VP-5



PARS ENVIRONMENTAL INC.

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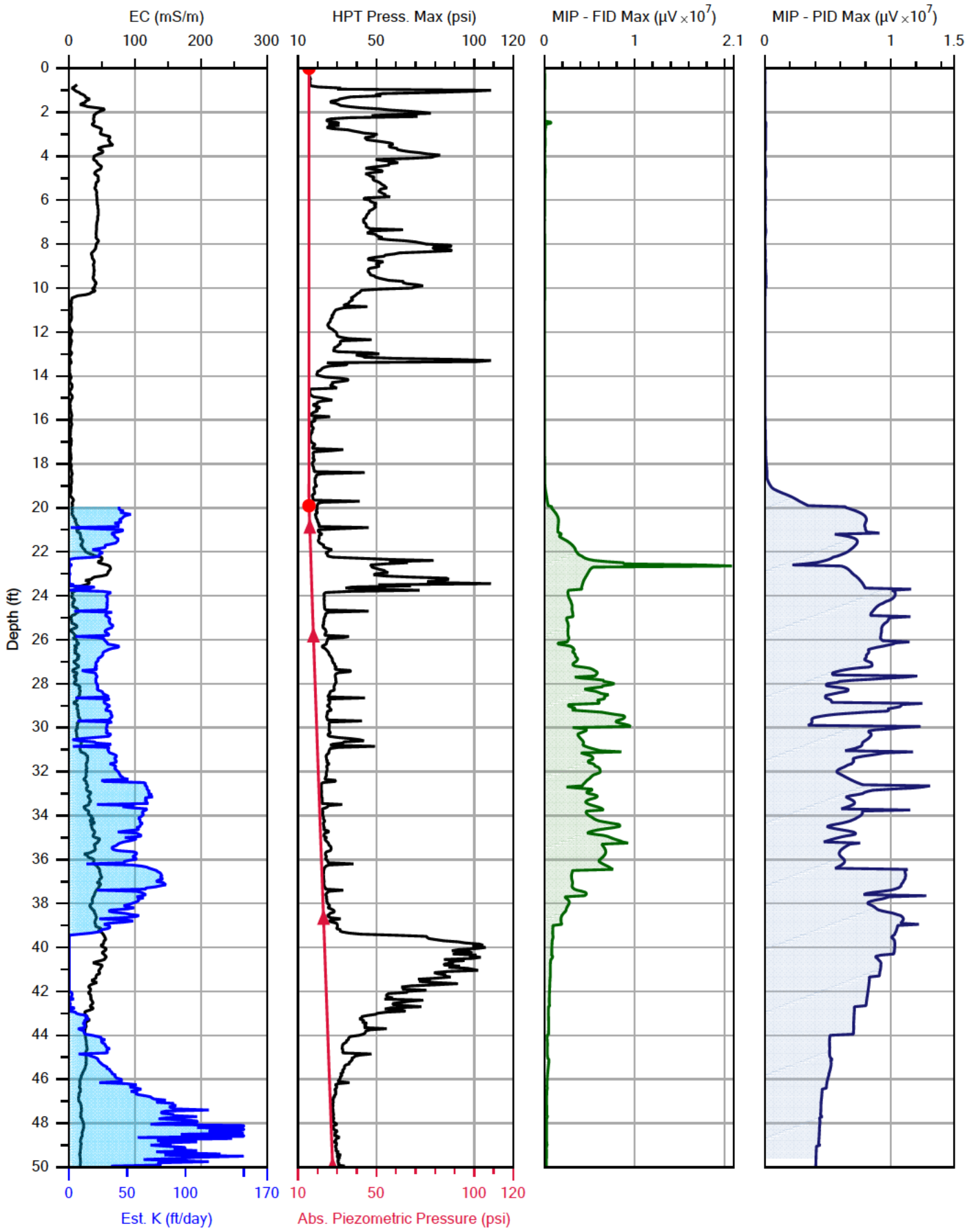
Project ID: DSCP-PHA 2016	Client: PARS	Location:



PARS ENVIRONMENTAL INC.

Company: S2C2	Operator: TK		File: PH-MiHPT-02
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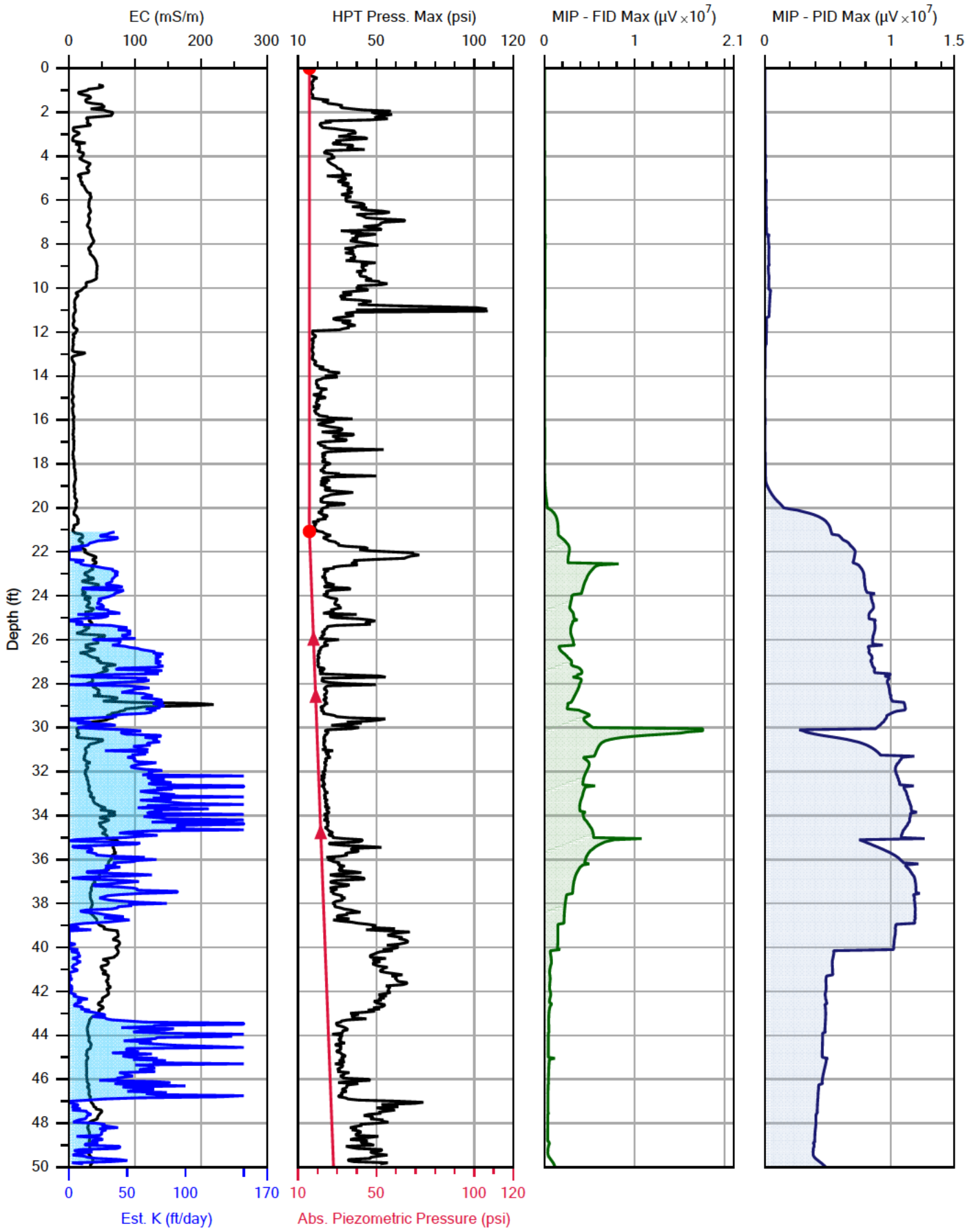
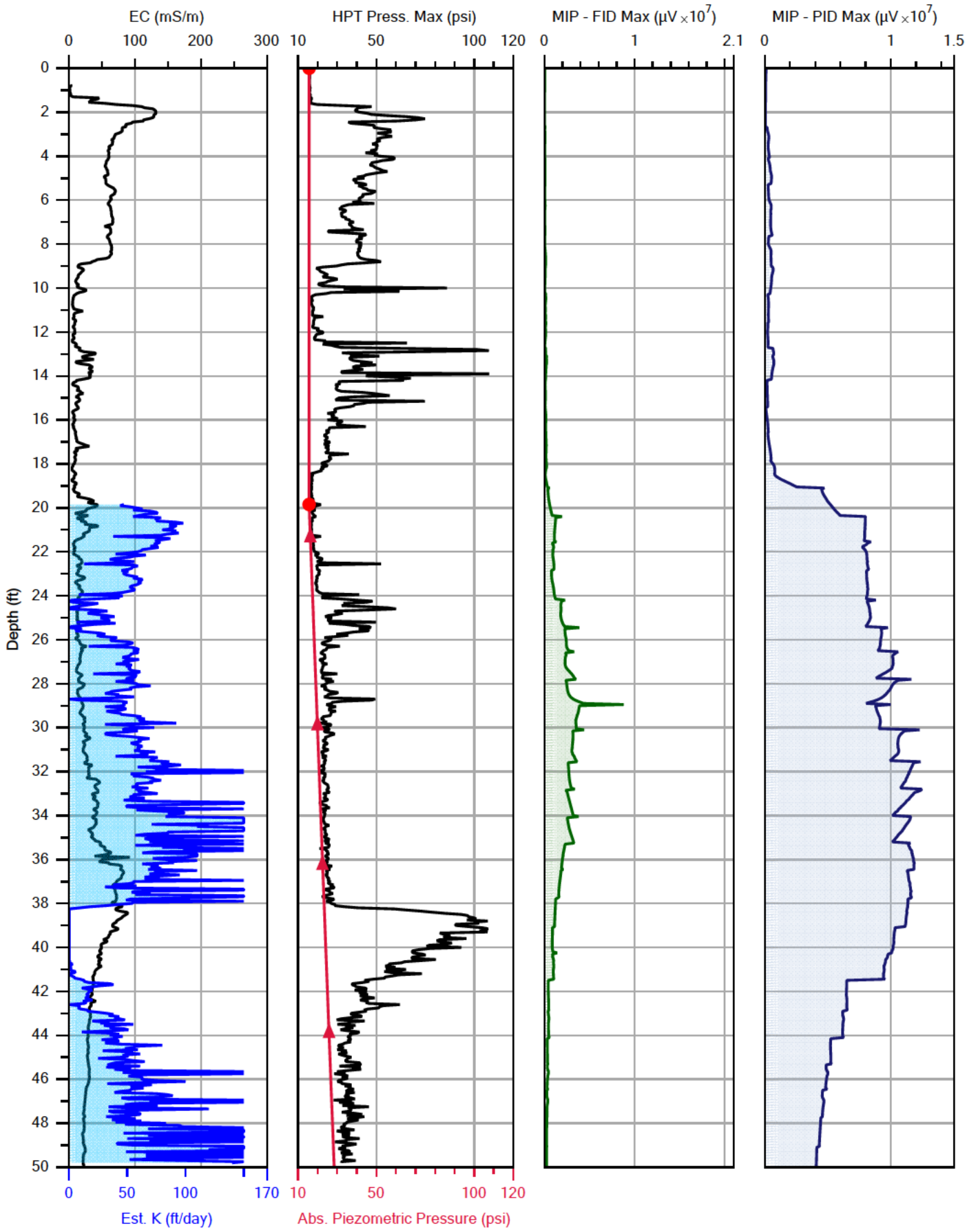
			Location:



PARS ENVIRONMENTAL INC.

		File: PH-MiHPT-04
Company: S2C2	Operator: TK	Date: 4/13/2016
Project ID: DSCP-PHA 2016	Client: PARS	Location:



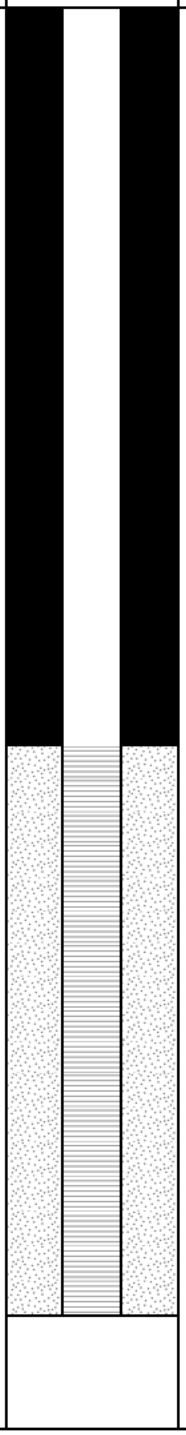
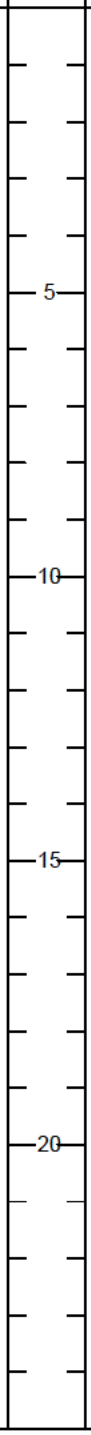
PARS ENVIRONMENTAL INC.

Company: S2C2	Operator: TK	File: PH-MiHPT-05
Project ID: DSCP-PHA 2016	Client: PARS	Date: 4/12/2016
		Location:

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-1 (PH-MiHPT-01)

Drill Method: Direct Push	**Date Drilled:** 4/13/2016	**Logged By:** Dan Habecker
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
							DTW - 22.5' bgs

Completion Notes:

VP-1 installed to a depth of 23' bgs with 10' of screen from 13' to 23' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 23' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

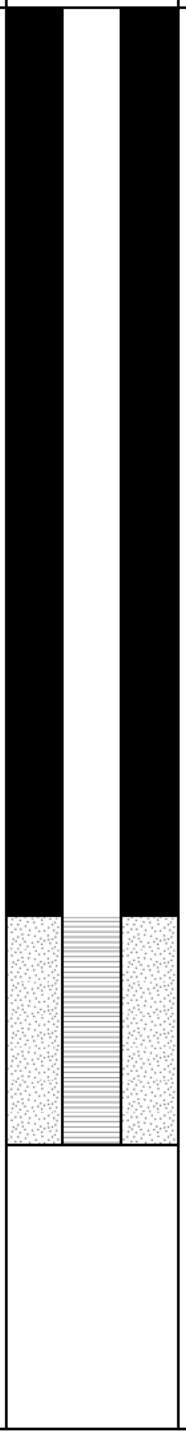
Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-2 (PH-MiHPT-02)

Drill Method: Direct Push	**Date Drilled:** 4/12/2016	**Logged By:** Pasquale Pozzolano
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
					5 10 15 20		DTW - 19.5' bgs

Completion Notes:

VP-2 installed to a depth of 20' bgs with 4' of screen from 16' to 20' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 20' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

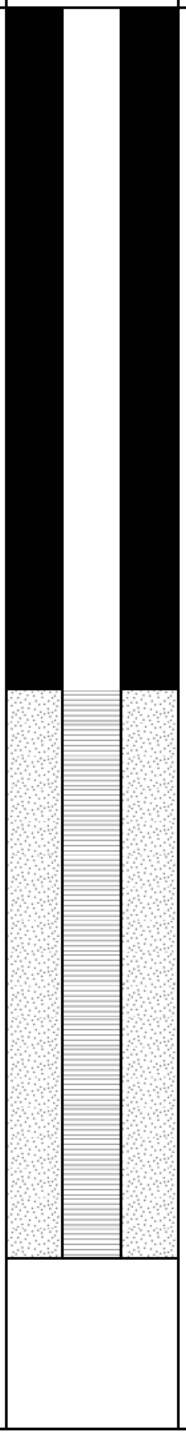
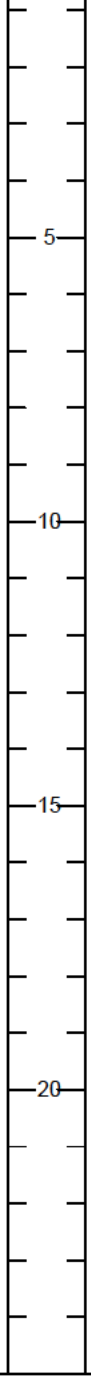
Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-4 (PH-MiHPT-04)

Drill Method: Direct Push	**Date Drilled:** 4/13/2016	**Logged By:** Dan Habecker
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
							DTW - 21' bgs

Completion Notes:

VP-4 installed to a depth of 22' bgs with 10' of screen from 12' to 22' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 22' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

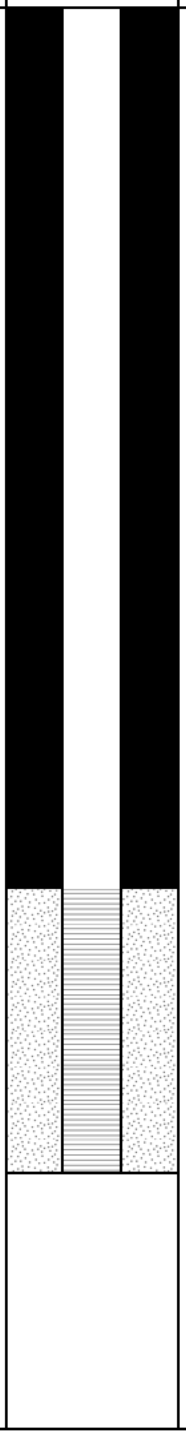
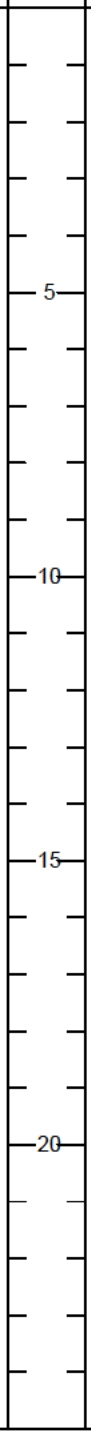
Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

PARS ENVIRONMENTAL INC.

LOG OF VAPOR POINT
VP-5 (PH-MiHPT-05)

Drill Method: Direct Push	**Date Drilled:** 4/12/2016	**Logged By:** Pasquale Pozzolano
Drilling Contractor: S2C2	**Permit No:**	

Recovery (Ft)	Blow Counts	Completion	PID Response (ppm)	Lithology	Depth Feet	Description	Remarks
							DTW- 20' bgs

Completion Notes:

VP-5 installed to a depth of 20.5' bgs with 10' of screen from 15' to 20.5' bgs. Well and screen constructed of 1" outer diameter Schedule 40 PVC. Base of hole grouted using powdered bentonite slurry. 2.25" outer diameter knockout point of push rods left in place at 20.5' bgs. No.1 quartz sand emplaced across screen interval. Bentonite chips emplaced above screen interval and hydrated.

Site: FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
Philadelphia Housing Authority
PHILADELPHIA, PA

Project No: 1018-03

Attachment 3:

Figures 1-9



Legend:

- Monitoring Well
- Recovery Well
- MiHPT Boring
- Manhole
- Sewer Line
- Interpreted Limits of the Potential Area of Confining Bed thinning and/or Absence**
- A A' Cross Section Line Location and Label

Notes:

** Approximate edges of the breach in the confining bed between the Site's shallow and deep aquifer zones as discussed during the March 6, 2013 meeting with the PADEP, DLA and USACE.

0 250 500 750 1,000

SCALE IN FEET

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA
DSCP/PASSYUNK HOMES, PHILADELPHIA

CROSS SECTION LINE LOCATIONS

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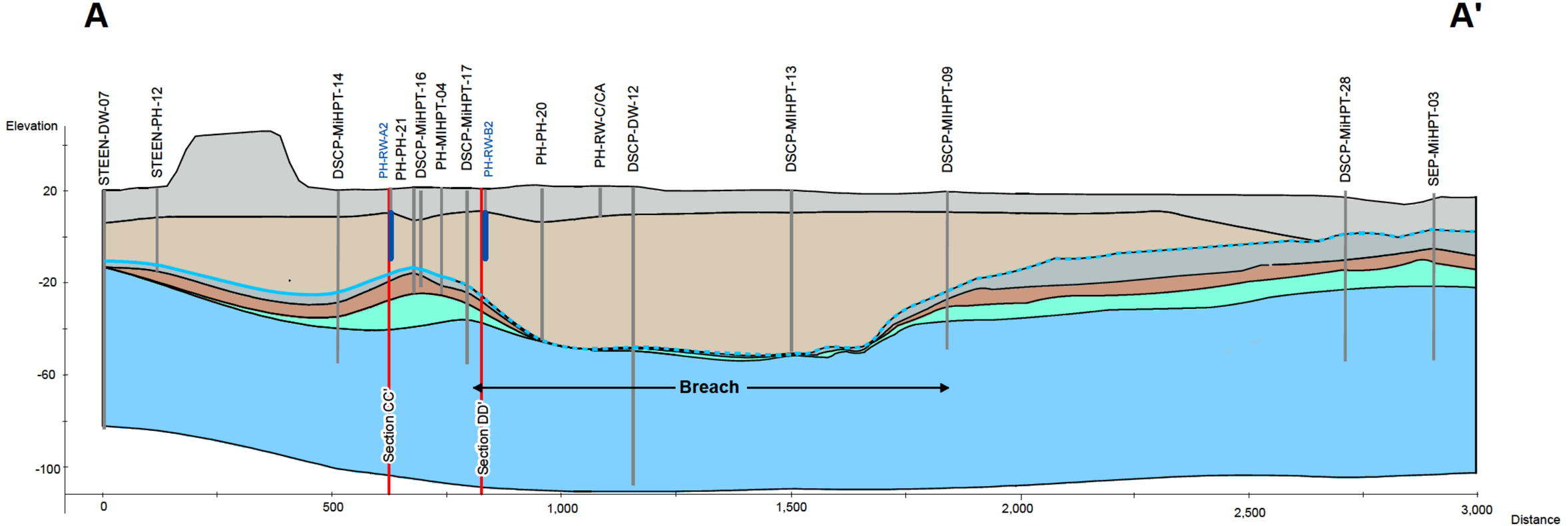
FIGURE 1

CITY: SF DIV/GROUP: ENV/IM DB: MESTIFANOS LD: PIC: PM: TM: TR:
PROJECT: (PROJECT #)
PATH: Z:\GIS\PROJECTS_ENV\DLA\DesignLetterReport\DSCP_SiteMap_and_X-sctionLines.mxd 8/8/2016 5:04:36 PM



Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Recovery Well Screen
- Projected Boring
- Cross Section Intersection
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

0 135 270 540 Feet

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/12/2016	**SCALE:** 1:2,640
PROJECT NO.	DSCP
DRAWN BY:	JCR
CHECKED BY:	

FIGURE 2A - CROSS SECTION AA'
SITE STRATIGRAPY

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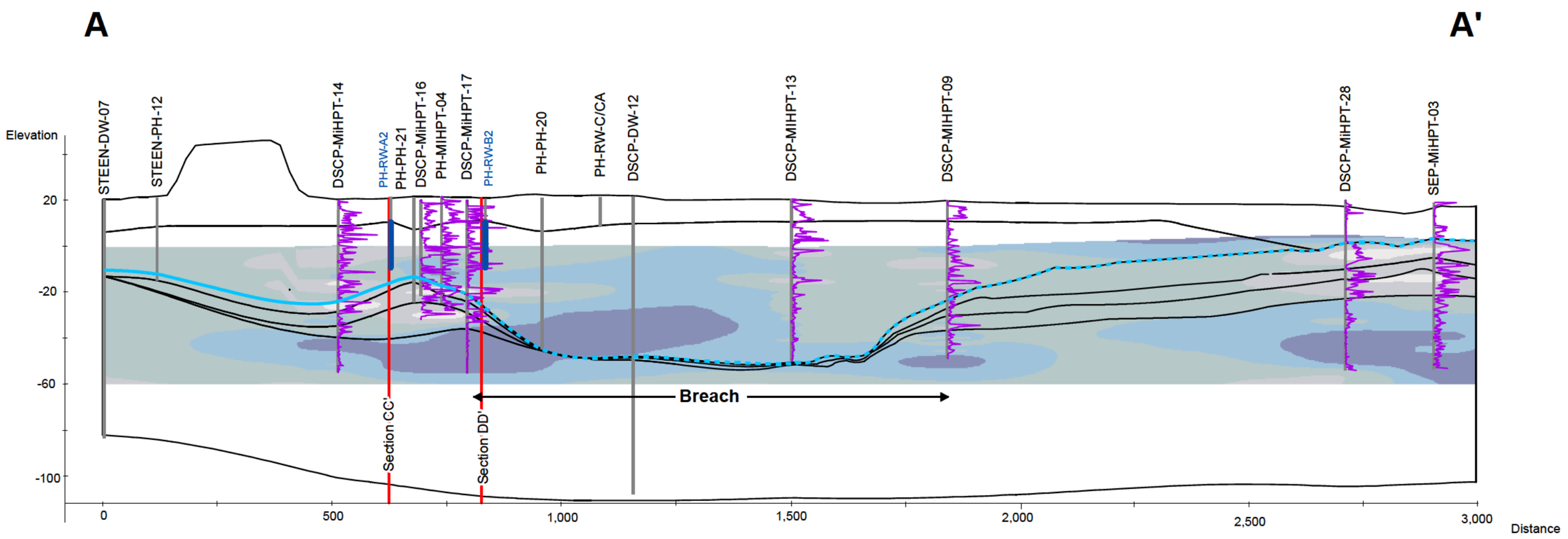

Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Recovery Well Screen
- Projected Boring
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

0 135 270 540 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/10/2016	**SCALE:** 1:2,640
	PROJECT NO.	DSCP
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	CHECKED BY:	

FIGURE 2B - CROSS SECTION AA'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)

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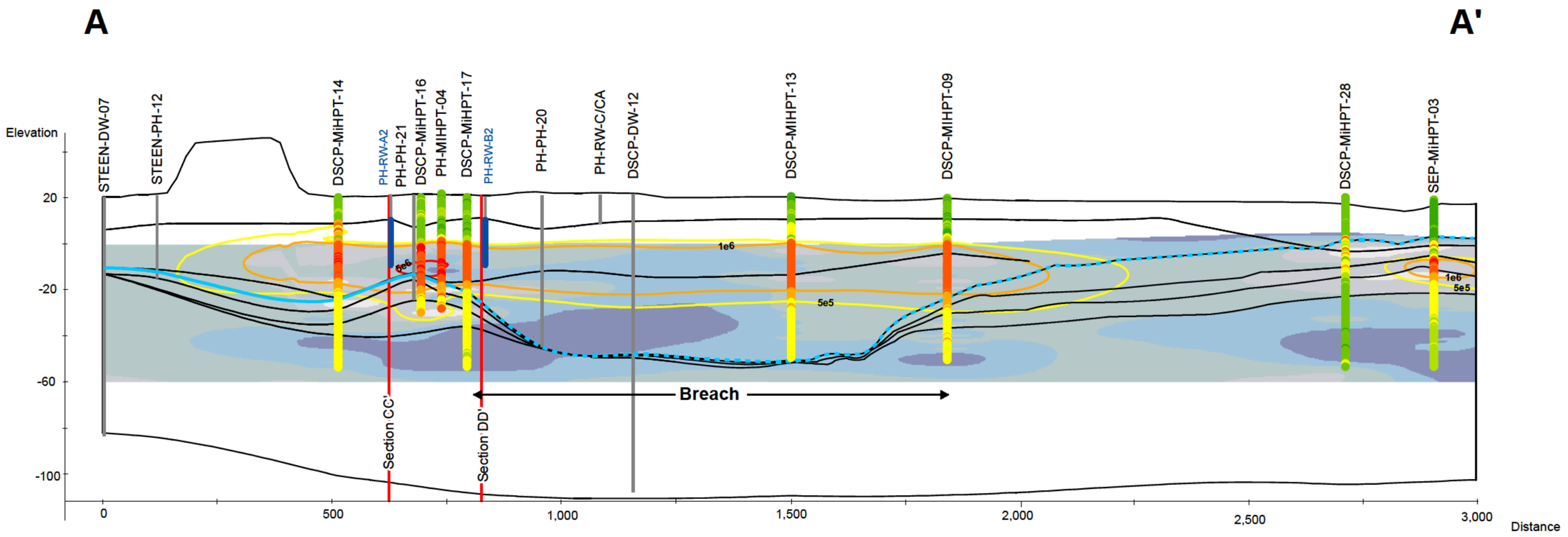

Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Recovery Well Screen
- Cross Section Intersection
- Projected Boring
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

0 135 270 540 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,640
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 2C - CROSS SECTION AA'
ESTIMATED K & MIP-FID RESPONSE

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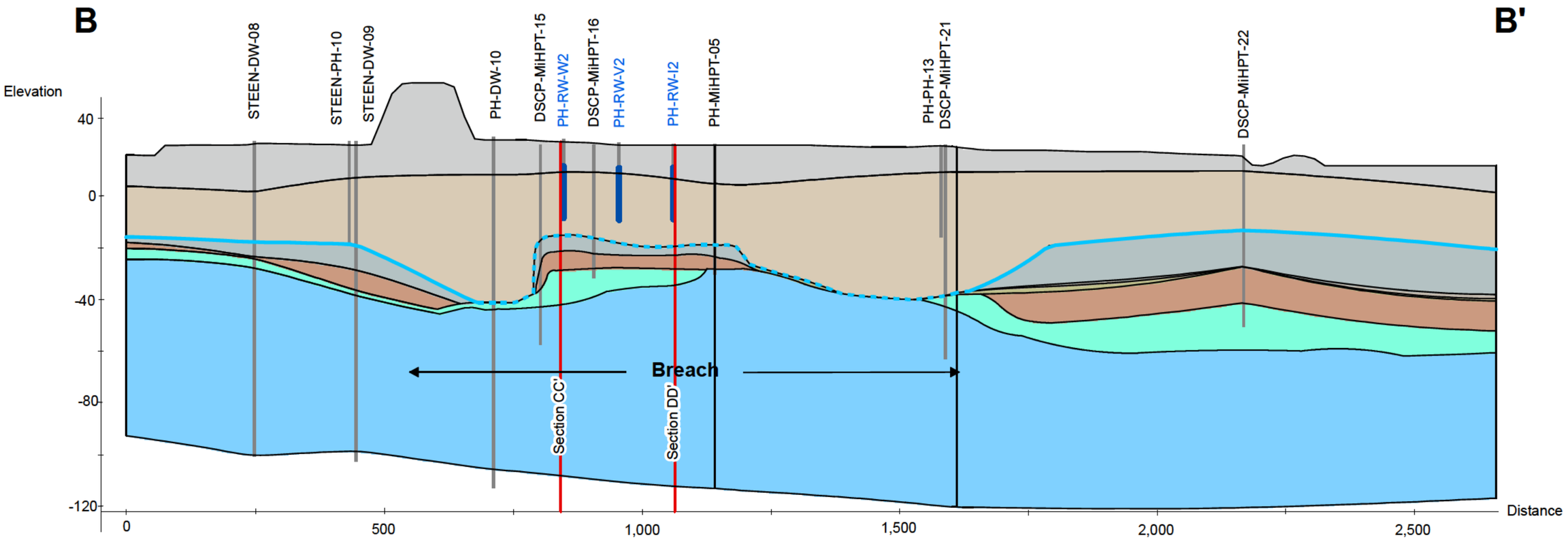

Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

0 125 250 500 Feet

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,400
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 3A - CROSS SECTION BB'
SITE STRATIGRAPY

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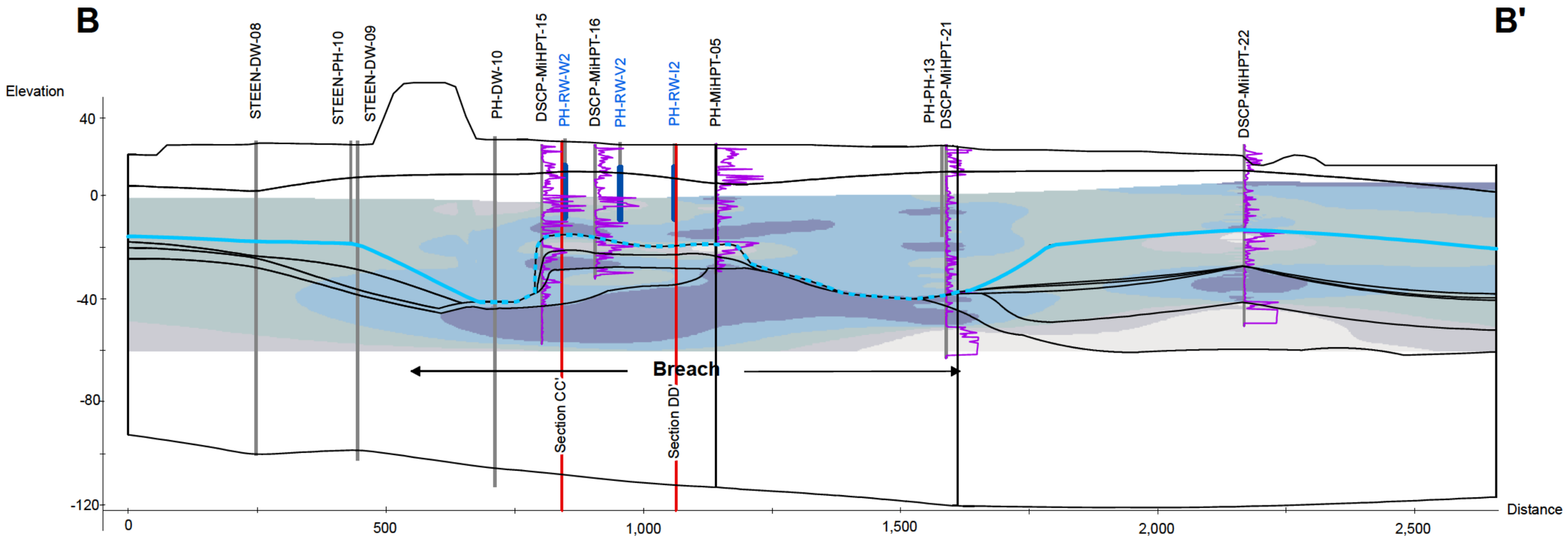

Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

0 125 250 500 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,400
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 3B - CROSS SECTION BB'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)

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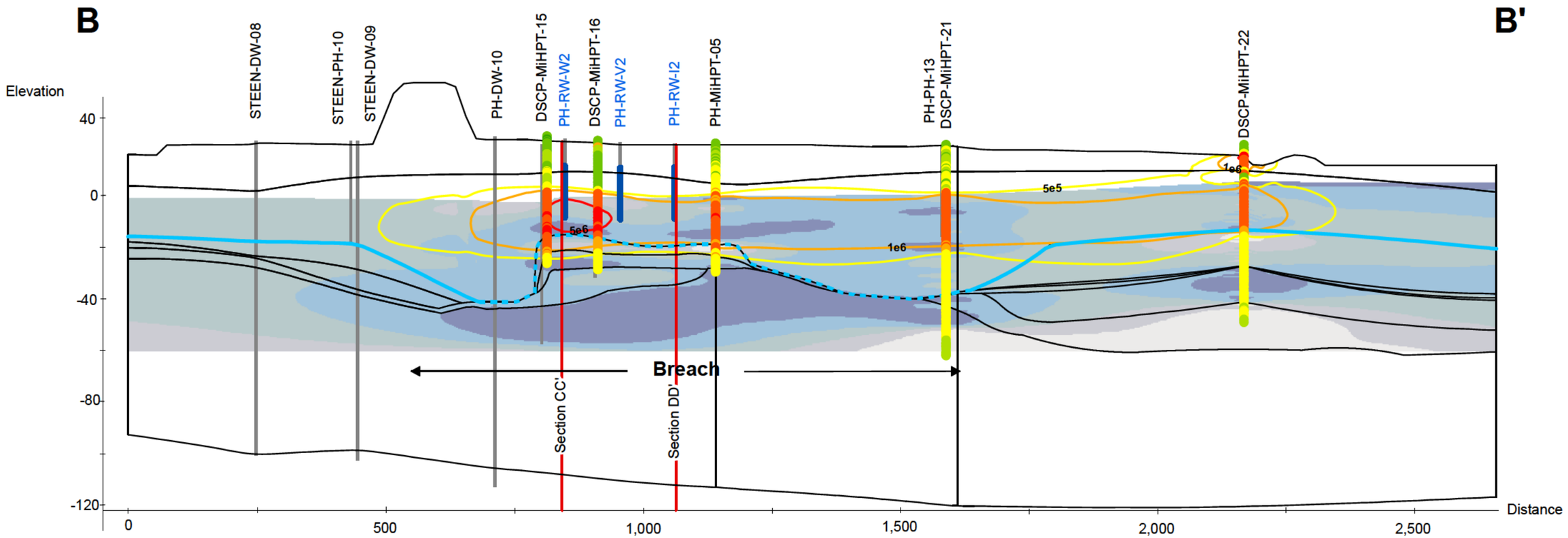

Vertical Exaggeration is 5x

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

0 125 250 500 Feet

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:2,400
	PROJECT NO.	DSCP
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	CHECKED BY:	

FIGURE 3C - CROSS SECTION BB'
ESTIMATED K & MIP-FID RESPONSE

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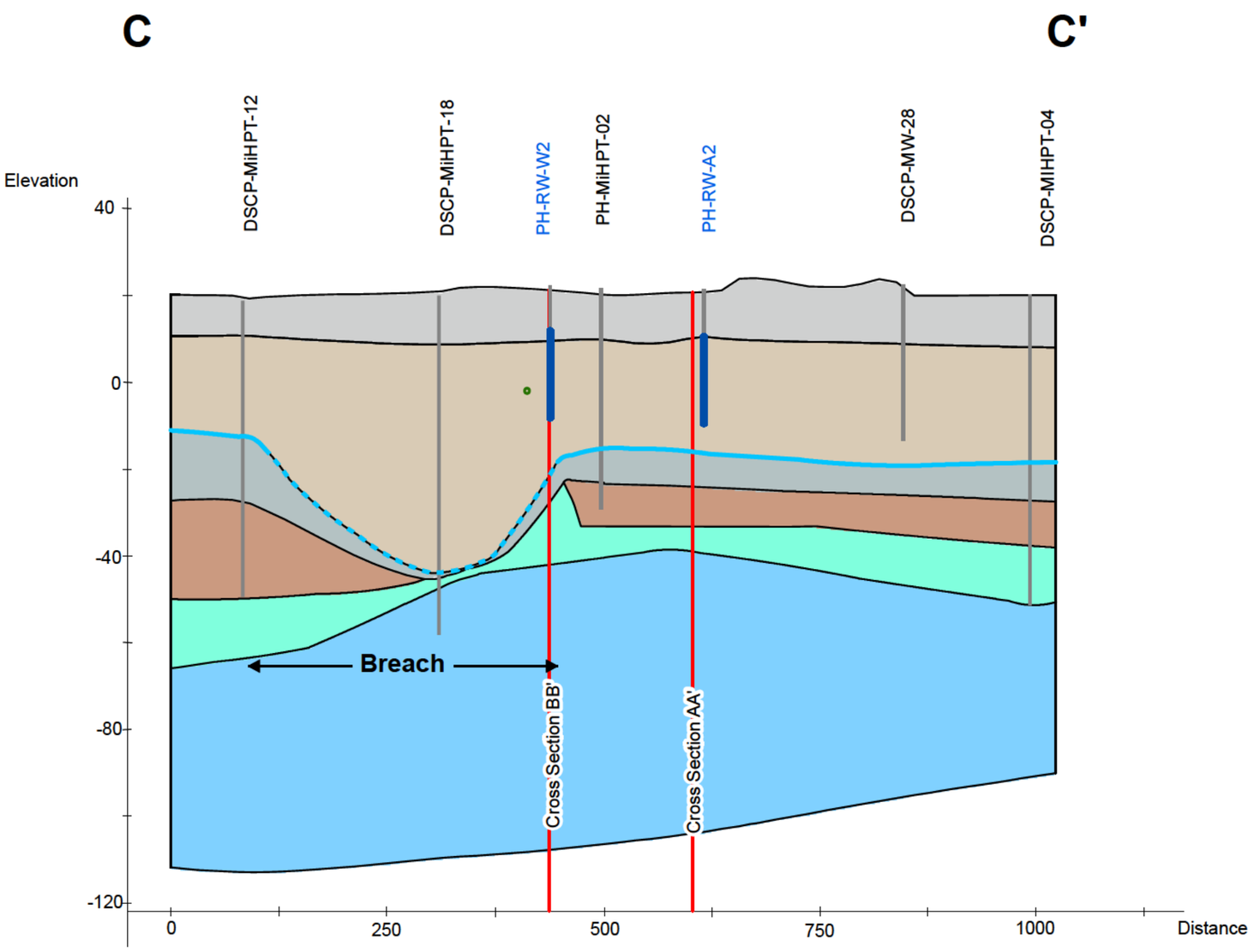

Vertical Exaggeration is 5x

0 95 190 380 Feet

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study	**DATE:** 10/12/2016	**SCALE:** 1:1,800
	PROJECT NO.	DSCP
FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 4A - CROSS SECTION CC'
SITE STRATIGRAPY

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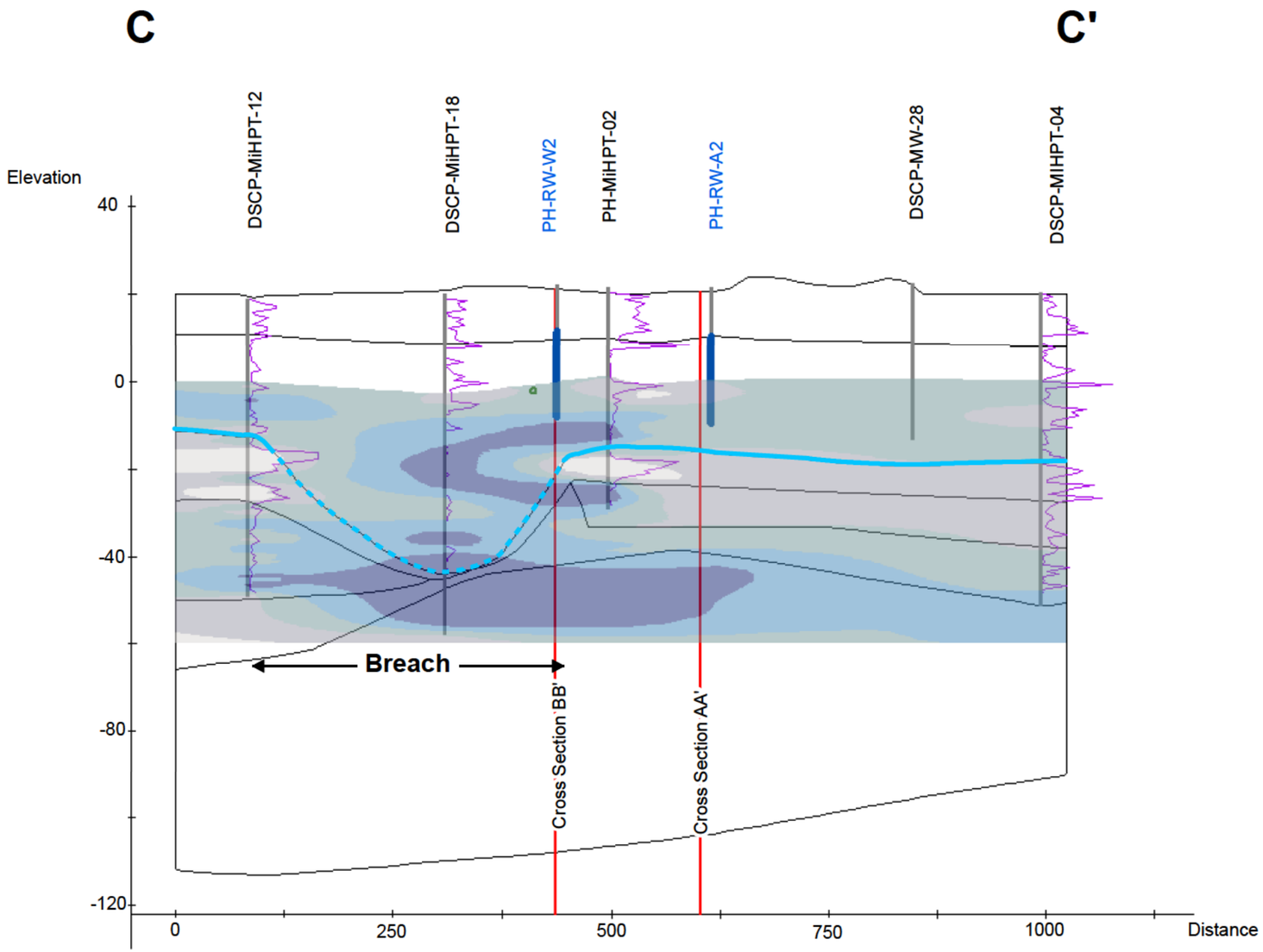

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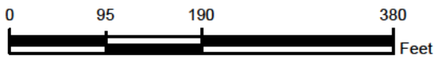

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:1,800
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 4B - CROSS SECTION CC'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)

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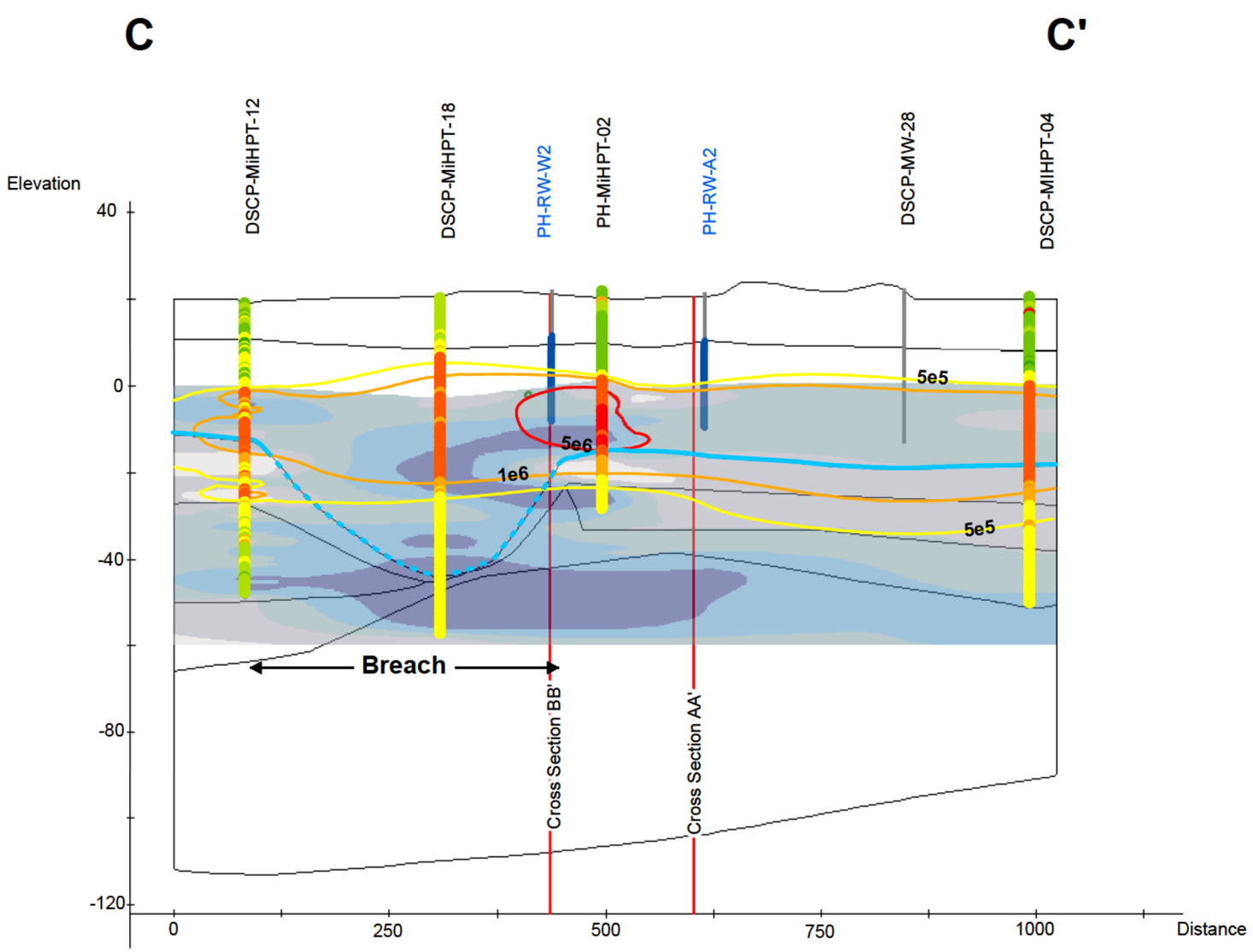

Vertical Exaggeration is 5x

0 95 190 380 Feet

Legend

Projected Borings and Wells

- Projected Boring
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:1,800
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 4C - CROSS SECTION CC'
ESTIMATED K 7 MIP-FID RESPONSE

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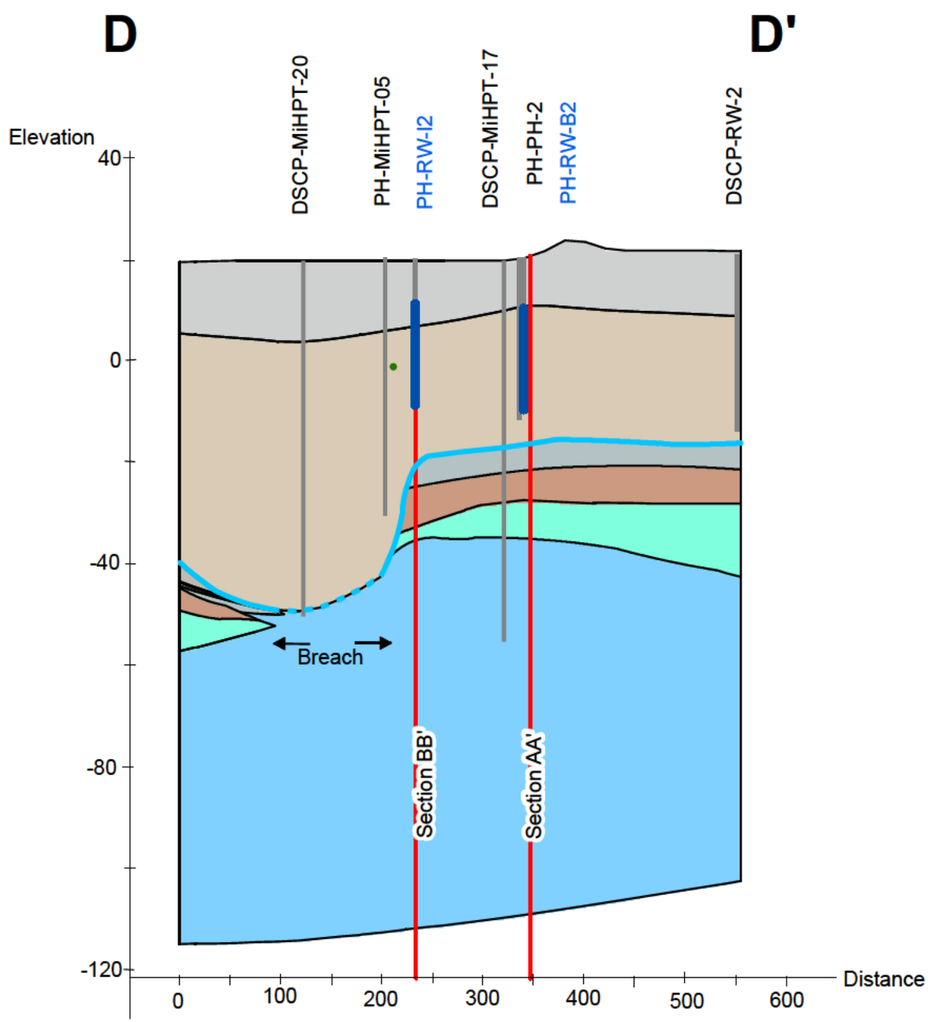

Vertical Exaggeration is 5x

Legend

Projected Wells and Borings

- Projected Borings
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

Site Stratigraphy

- Fill/Alluvium
- Trenton Gravel
- Breach Deposits
- Upper Clay
- Upper Sand
- Middle Clay
- Middle Sand
- Lower Clay
- Lower Sand

0 125 250 500 Feet

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ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 10/13/2016	**SCALE:** 1:1,800
PROJECT NO.	DSCP
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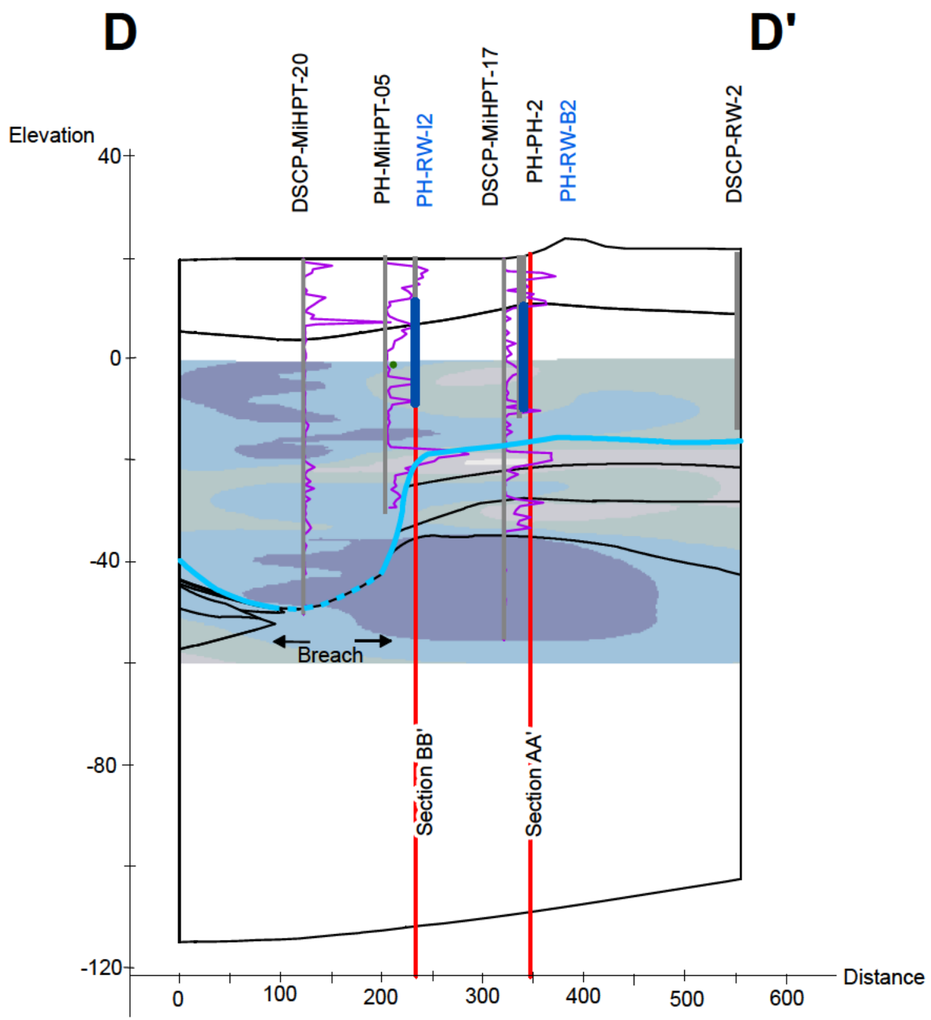
FIGURE 5A - CROSS SECTION DD'
SITE STRATIGRAPHY



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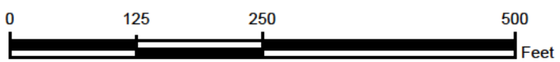

Legend

Projected Wells and Borings

- Projected Borings
- Recovery Well Screen
- Cross Section Intersection
- Corrected HPT Pressure Logs
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

- <15 ft/day
- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 10/14/2016	**SCALE:** 1:1,800
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
	CHECKED BY:	

FIGURE 5B - CROSS SECTION DD'
ESTIMATED HYDRAULIC CONDUCTIVITY (K)

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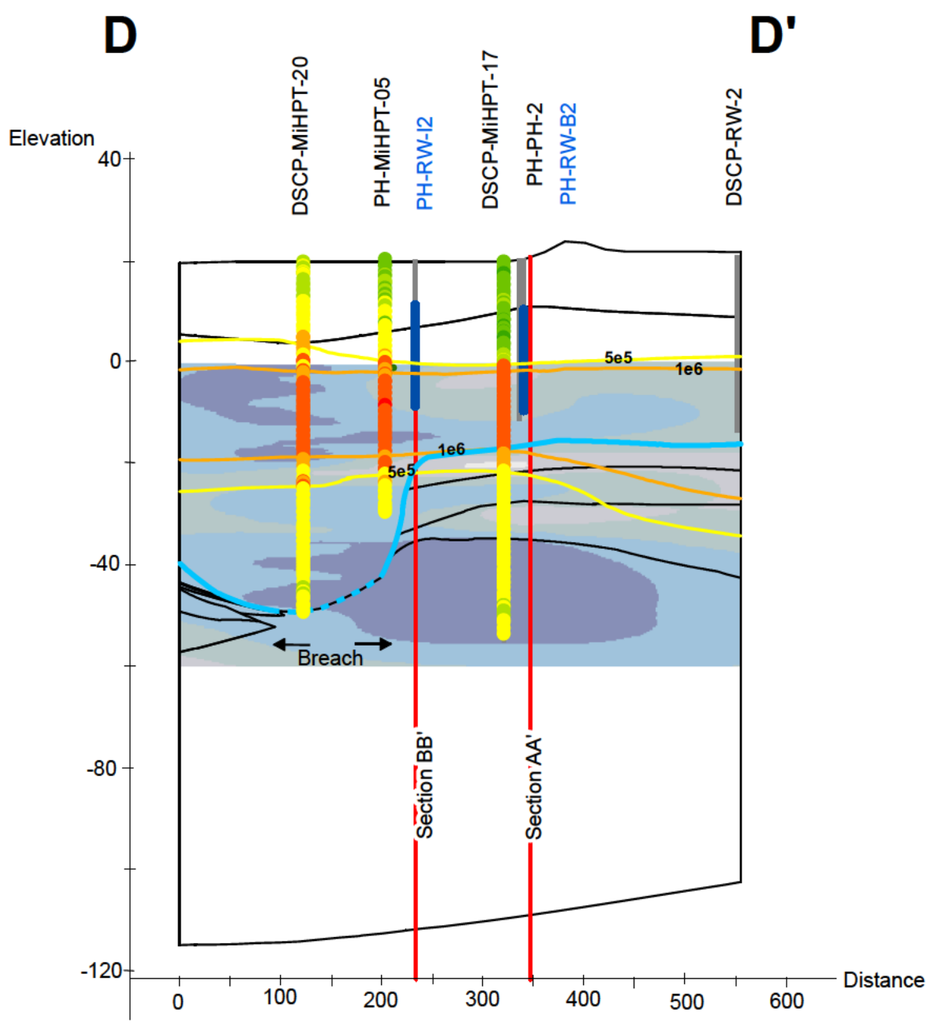


Vertical Exaggeration is 5x

Legend

Projected Wells and Borings

- Projected Borings
- Recovery Well Screen
- Cross Section Intersection
- Sewer Line (Not to Scale)
- Approximate contact between Pleistocene shallow aquifer materials, Cretaceous confining clays and Pleistocene and Cretaceous sands (the "breach").

HPT - Estimated K (ft/day)

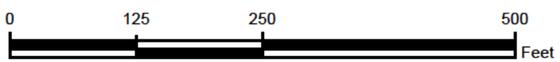
- <15 ft/day
- 15-30 ft/day
- 30-45 ft/day
- 45-60 ft/day
- 60-75 ft/day

MIP-FID Response (uV)

- <1.0e4 uV
- 1.0e4 - 5.0e4 uV
- 5.0e4 - 1.0e5 uV
- 1.0e5 - 5.0e5 uV
- 5.0e5 - 1.0e6 uV
- 1.0e6 - 5.0e6 uV
- >1.0e7 uV

Kriged MIP-FID Isoline (uV)

- 5.0e5 uV
- 1.0e6 uV
- 5.0e6 uV



NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module and are shown from an estimated water table surface as predicted by the HPT tool to 60 ft MSL, which is approximately the elevation of the bottom of the deepest direct-sensing boring. Geologic contacts are interpreted from selected historic borings and recent direct-sensing data.

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Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study	**DATE:** 10/14/2016	**SCALE:** 1:1,800
FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	PROJECT NO.	DSCP
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FIGURE 5C - CROSS SECTION DD'
ESTIMATED K & MIP-FID RESPONSE

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N
W
E
S

CSX-MW2
DSCP-MW-2
DSCP-MiHPT-01
DSCP-MW-28
PH-MW-55
STEEN-PH-12
DSCP-RW-2
DSCP-MiHPT-14
PH-MiHPT-04
1.0e6
DSCP-MW-29
PH-RW-A
PH-PH-1
PH-PH-21
DSCP-DW-12
STEEN-MW-63
DSCP-MiHPT-11
DSCP-MiHPT-15
PH-RW-B
PH-MiHPT-02
PH-PH-2
PH-PH-20
STEEN-DW-09
PH-RW-C
DSCP-MiHPT-16
PH-MiHPT-01
STEEN-PH-10
PH-RW-W
PH-RW-V
DSCP-MiHPT-17
PH-RW-I
PH-DW-10
PH-RW-CA
PH-MiHPT-05
PH-MWS-1
PH-RW-U
DSCP-MiHPT-19
PH-MW-43
DSCP-MiHPT-20
DSCP-MiHPT-18
PH-DW-11
PH-PH-22
DSCP-MiHPT-12
1.0e5
5.0e5
0
62.5
125
250
Feet

A
A'
B
B'
C
C'
D
D'

Legend

Select PHA Area Wells
- Well
- MiHPT Borings

Estimated K (ft/day)
- < 15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

Kriged MIP-FID Isoline (uV)
- 1.0e5
- 5.0e5
- 1.0e6
- 5.0e6

Site Features
- A A' Cross Section Lines and Label
- Sewer Line

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 8/8/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
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FIGURE 6 - ESTIMATED K HORIZONTAL SLICE - 0 FT MSL

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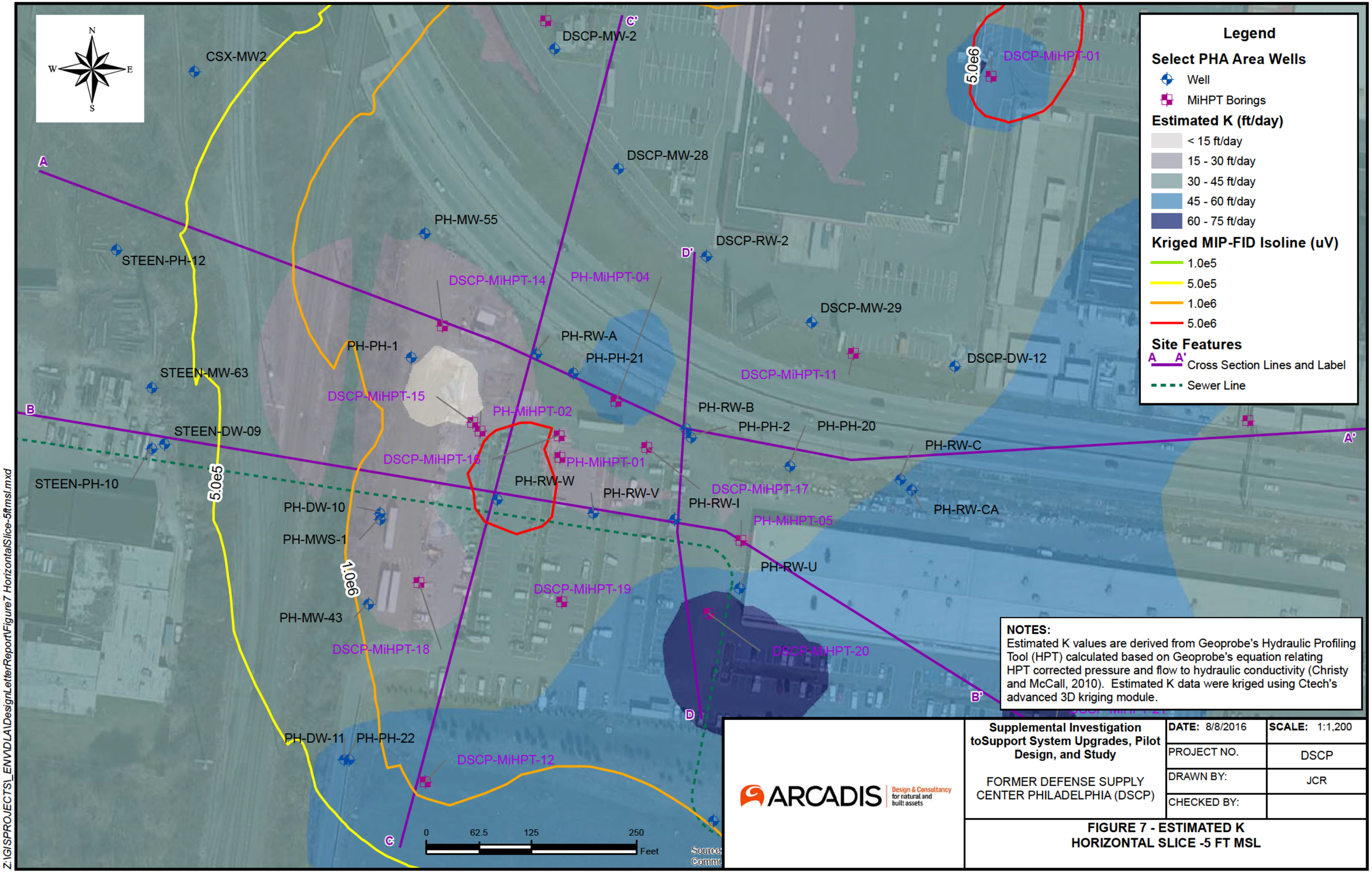

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ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study

FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)

DATE: 8/8/2016	**SCALE:** 1:1,200
PROJECT NO.	DSCP
DRAWN BY:	JCR
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FIGURE 7 - ESTIMATED K HORIZONTAL SLICE -5 FT MSL

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N
W
E
S

CSX-MW2
DSCP-MW-2
C'
DSCP-MiHPT-01
1.0e6
DSCP-MW-28
A
PH-MW-55
STEEN-PH-12
DSCP-RW-2
D'
5.0e6
DSCP-MiHPT-14
PH-MiHPT-04
5.0e6
DSCP-MW-29
PH-RW-A
PH-PH-1
PH-PH-21
DSCP-DW-12
STEEN-MW-63
DSCP-MiHPT-11
B
DSCP-MiHPT-15
PH-MiHPT-02
PH-RW-B
PH-PH-2
PH-PH-20
STEEN-DW-09
PH-RW-C
A'
5.0e5
DSCP-MiHPT-16
PH-MiHPT-01
STEEN-PH-10
PH-RW-W
PH-RW-V
DSCP-MiHPT-17
PH-RW-I
PH-DW-10
PH-RW-CA
PH-MiHPT-05
PH-MWS-1
PH-RW-U
DSCP-MiHPT-19
PH-MW-43
DSCP-MiHPT-18
DSCP-MiHPT-20
B'
D
PH-DW-11
PH-PH-22
DSCP-MiHPT-12
C
0
62.5
125
250
Feet

Legend

Select PHA Area Wells
- Well
- MiHPT Borings

Estimated K (ft/day)
- < 15 ft/day
- 15 - 30 ft/day
- 30 - 45 ft/day
- 45 - 60 ft/day
- 60 - 75 ft/day

Kriged MIP-FID Isoline (uV)
- 1.0e5
- 5.0e5
- 1.0e6
- 5.0e6

Site Features
- A A' Cross Section Lines and Label
- Sewer Line

NOTES:
Estimated K values are derived from Geoprobe's Hydraulic Profiling Tool (HPT) calculated based on Geoprobe's equation relating HPT corrected pressure and flow to hydraulic conductivity (Christy and McCall, 2010). Estimated K data were kriged using Ctech's advanced 3D kriging module.

ARCADIS Design & Consultancy for natural and built assets

Supplemental Investigation toSupport System Upgrades, Pilot Design, and Study FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP)	**DATE:** 8/8/2016	**SCALE:** 1:1,200
	PROJECT NO.	DSCP
	DRAWN BY:	JCR
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FIGURE 8 - ESTIMATED K HORIZONTAL SLICE - 10 FT MSL

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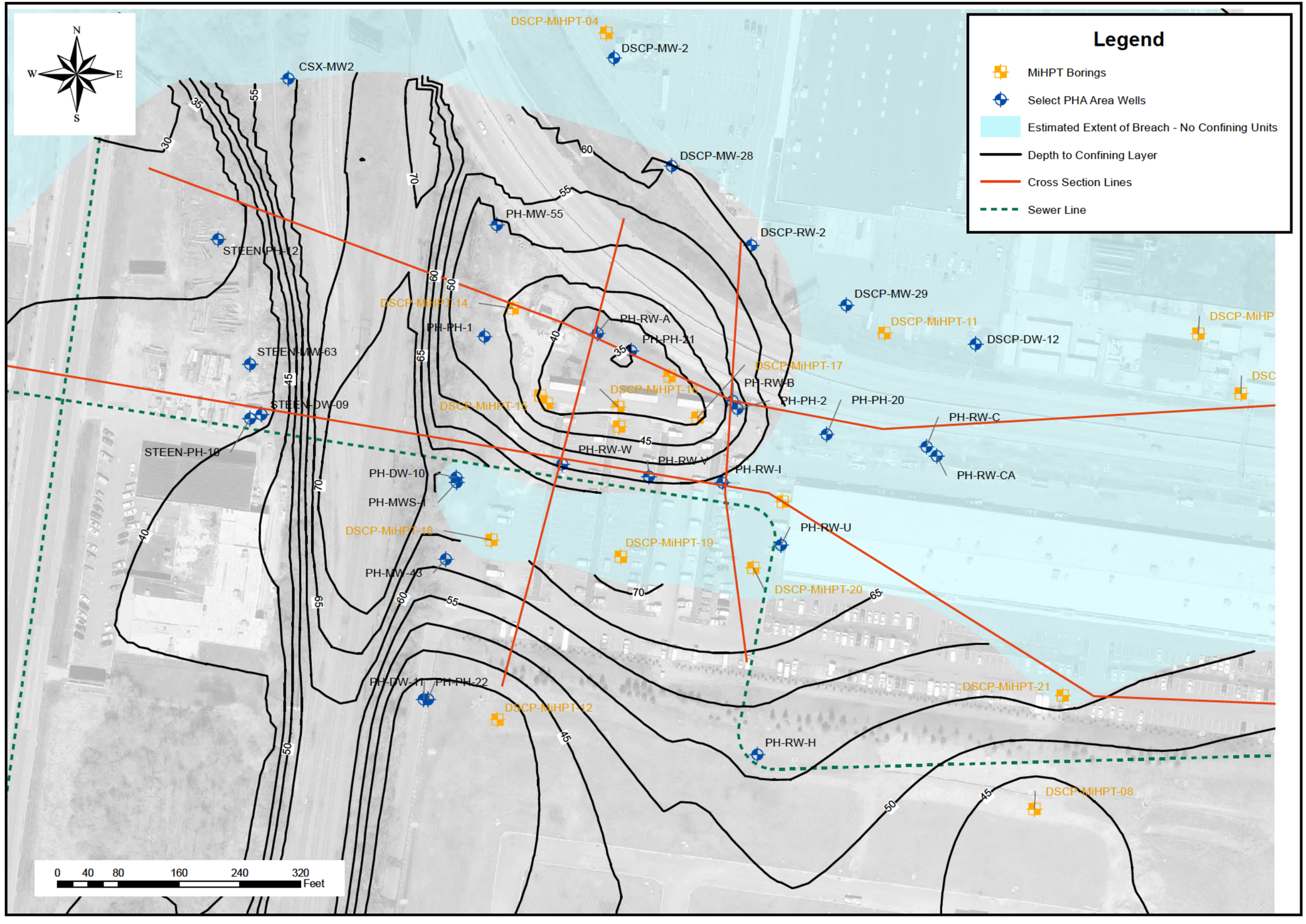

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DEFENSE SUPPORT CENTER
PHILADELPHIA, PA

TITLE

PHILADELPHA HOUSING AUTH.
TOP OF CONFINING UNITS

FIGURE 9

SCALE 1:1,500

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APPENDIX C

Construction Drawings

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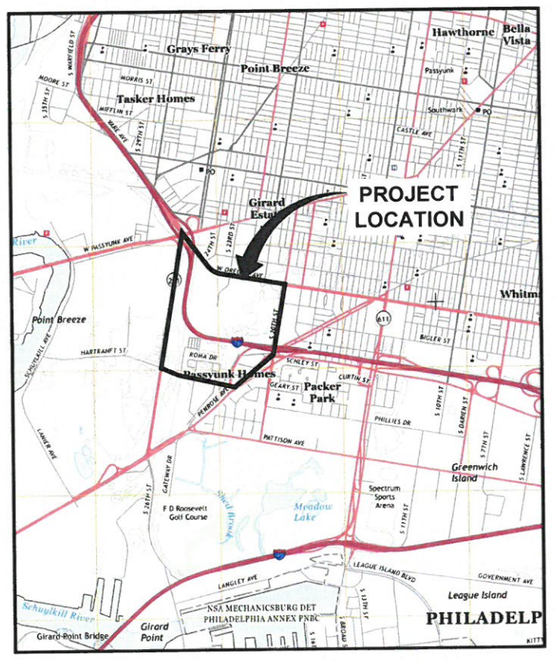
CONSTRUCTION DRAWINGS

SYSTEM UPGRADES, PILOT DESIGN AND STUDY
FORMER DEFENSE SUPPLY CENTER (DSCP) - PHILADELPHIA
PHILADELPHIA, PENNSYLVANIA
CONTRACT NUMBER: W912BU-13-D-0002



REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: PHILADELPHIA, PA, DATED 2013.

ORIGINAL DATE ISSUED:
NOVEMBER 18, 2016

REVISED WORK PLAN ISSUED:
JUNE 13, 2018

2990 SOUTH 20th STREET
PHILADELPHIA, PA 19145

PREPARED FOR:
UNITED STATES ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

ARCADIS

ARCADIS U.S., INC.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED
MATTHEW S. SWENSSON
ENGINEER
PE077907

INDEX TO DRAWINGS

COVER PAGE

GENERAL

G-1 CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2 CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3 MAJOR EQUIPMENT AND INSTRUMENT LIST

CIVIL

C-1 SITE PLAN
C-2 PILOT TEST SYSTEM LAYOUT
C-3 TRENCHING DETAILS
C-4 PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)
C-5 EXISTING REMEDIATION BUILDING: SOUTH EXTERIOR WALL
C-6 PILOT SYSTEM MANIFOLD ENCLOSURE
C-7 ABOVEGROUND PIPE DETAILS AND CROSSINGS

MECHANICAL

M-1 BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS
M-2 PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS
M-3 PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4 PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5 NORTH EXIT VAULT DETAILS
M-6 SOUTH EXIT VAULT DETAILS
M-7 BIOSPARGE/BIOVENT BLOWER PACKAGE

PID

PID-1 BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM
PID-2 BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM
PID-3 PIPING AND INSTRUMENTATION DIAGRAM LEGEND

INSTRUMENTATION

I-L PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT
I-B PILOT TREATMENT SYSTEM CONTROL PANEL BILL OF MATERIALS
I-1 PILOT TREATMENT SYSTEM CONTROL PANEL POWER DISTRIBUTION WIRING DIAGRAM
I-2 PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 DISCRETE INPUTS
I-3 PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX RELAY OUTPUTS
I-4 PILOT TREATMENT SYSTEM CONTROL PANEL SLOTS 1 AND 2 ANALOG INPUTS
I-5 PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 3 ANALOG INPUTS AND OUTPUTS

INSTRUMENTATION, CONTINUED

I-6 PILOT TREATMENT SYSTEM CONTROL PANEL - THIS PAGE LEFT INTENTIONALLY BLANK
I-7 PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 1 OF 2)
I-8 PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 2 OF 2)
I-N0 NORTHERN SKIMMER SYSTEM PANEL LAYOUT
I-N1 NORTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-N2 NORTHER SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-N3 NORTHERN SKIMMER SYSTEM MICROLOGIX RELAY OUTPUTS
I-N4 NORTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-N5 NORTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S0 SOUTHERN SKIMMER SYSTEM PANEL LAYOUT
I-S1 SOUTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-S2 SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-S3 SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS
I-S4 SOUTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-S5 SOUTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S6 SOUTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-S7 COMPRESSOR CONTROL ENCLOSURE (CCE) PANEL LAYOUT
I-S8 SOUTHERN SKIMMER SYSTEM MOTOR CONTROL PANEL WIRING DETAILS

ELECTRICAL

E-1 ELECTRICAL SYMBOL LEGEND AND SPECIFICATIONS
E-2 PILOT TREATMENT SYSTEM ELECTRICAL SINGLE LINE DIAGRAM (SHEET 1 OF 2)
E-3 PILOT TREATMENT SYSTEM ELECTRICAL SINGLE LINE DIAGRAM (SHEET 2 OF 2)
E-4 PILOT TREATMENT SYSTEM ELECTRICAL LAYOUT DIAGRAM
E-5 SOUTHERN SKIMMER SYSTEM ELECTRICAL SINGLE LINE DIAGRAM
E-6 NORTHERN SKIMMER SYSTEM ELECTRICAL SINGLE LINE DIAGRAM

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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1.0 INTRODUCTION

1.1 GENERAL

THE ENCLOSED DRAWINGS AND SPECIFICATIONS CONTAIN INFORMATION FOR THE CONSTRUCTION AND INSTALLATION OF A PILOT BIOSPARGE AND BIOVENT TREATMENT REMEDIATION SYSTEM TO BE INSTALLED AT THE FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP) SITE. THE FOLLOWING DRAWINGS DEPICTING THE REMEDIATION SYSTEM ARE REQUIRED FOR CONSTRUCTION AND INSTALLATION:

DRAWING NO.	TITLE
G-1	CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2	CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3	MAJOR EQUIPMENT AND INSTRUMENT LIST
C-1	SITE PLAN
C-2	PILOT TEST SYSTEM LAYOUT
C-3	TRENCHING DETAILS
C-4	PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)
C-5	EXISTING REMEDIATION BUILDING: SOUTH EXTERIOR WALL
C-6	PILOT SYSTEM MANIFOLD ENCLOSURE
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M-1	BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS
M-2	PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS
M-3	PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4	PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5	NORTH EXIT VAULT DETAILS
M-6	SOUTH EXIT VAULT DETAILS
M-7	BIOSPARGE/BIOVENT BLOWER PACKAGE
PID-1	BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM
PID-2	BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM
PID-3	PIPING AND INSTRUMENTATION DIAGRAM LEGEND

1.2 DEFINITIONS

ENGINEER'S PROJECT MANAGER: MATTHEW LESLEY (ARCADIS)
ENGINEER: ARCADIS
OWNER: UNITED STATES DEFENCE LOGISTICS AGENCY
OWNER'S AGENT: UNITED STATES ARMY CORPS OF ENGINEERS
PROPERTY OWNER: CITY OF PHILADELPHIA HOUSING AUTHORITY

2.0 HEALTH AND SAFETY

1. THE CONTRACTOR (INCLUDING WORKERS AND SUBCONTRACTORS) SHALL
PREPARE AN ACCIDENT PREVENTION PLAN (APP) AND APPROPRIATE ACTIVITY HAZARD ANALYSIS (AHA) AS REQUIRED BY THE ARMY CORPS SAFETY AND HEALTH MANUAL EM385 PRIOR TO BEGINNING ANY WORK, AND SHALL ABIDE BY THE APP AND APPROPRIATE AHA DURING ALL SITE WORK. A COPY OF THE APP SHALL BE PROVIDED TO THE ENGINEER PRIOR TO BEGINNING ANY SITE WORK.

2. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL, AND OWNER-SPECIFIED HEALTH AND SAFETY REQUIREMENTS.

3. THE CONTRACTOR SHALL ESTABLISH AN EXCLUSION ZONE AROUND ALL WORK AREAS TO RESTRICT ACCESS AND PROVIDE APPROPRIATE PROTECTIONS DURING BOTH WORKING AND NON-WORKING HOURS.

4. DURING EXCAVATION WORK THE CONTRACTOR SHALL SURROUND THE WORK AREA WITH TEMPORARY CHAIN-LINK CONSTRUCTION FENCING TO RESTRICT ACCESS AND PROVIDE A SAFE WORK ENVIRONMENT. TEMPORARY FENCE SHALL BE INSTALLED AT A MINIMUM 10 FT SETBACK DISTANCE FROM EXCAVATIONS. THE CONTRACTOR SHALL USE TEMPORARY FENCE OR OTHER APPROVED SAFETY MARKERS SUCH AS BARRICADES, CONES, CAUTION TAPE AND ORANGE SNOW FENCE TO FURTHER DELINEATE, AND RESTRICT ACCESS TO THE WORK AREA AS APPROPRIATE DURING OTHER PHASES OF CONSTRUCTION. AT THE END OF EACH WORK DAY, ALL EXCAVATIONS SHALL EITHER BE BACKFILLED TO GRADE, OR SURROUNDED COMPLETELY BY TEMPORARY FENCING. DURING SPRING, SUMMER AND FALL EXCAVATIONS MAY ALSO BE COVERED BY STEEL ROAD PLATES (TRENCH PLATES) AFTER WORKING HOURS, ANCHORED TO THE GROUND CAPABLE OF SUPPORTING VEHICULAR TRAFFIC. IF TRENCH PLATES ARE USED, CONTRACTOR SHALL MAKE SURE THE TRENCH PLATES ARE CLEARLY MARKED AND VISIBLE. USE OF TRENCH PLATES DURING WINTERTIME SHALL ONLY BE PERMITTED AT THE APPROVAL OF THE ENGINEER AND OWNER DUE TO THE POTENTIAL IMPACT ON SNOW REMOVAL OPERATIONS.

5. IN ADDITION TO PROVIDING TEMPORARY FENCING SURROUNDING WORK AREA, CONTRACTOR WOULD ALSO NEED TO MAINTAIN A FENCED STAGING AREA FOR STAGING EQUIPMENT, ROLL-OFFS FOR HOLDING SOIL/DEBRIS FROM EXCAVATION, ETC. DURING THE ENTIRE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL CONTAIN LOOSE DEBRIS AND SECURE CONSTRUCTION MATERIALS ON A DAILY BASIS PRIOR TO DEPARTURE FROM THE SITE TO PROVIDE A CLEAN AND ORDERLY WORK AREA.

6. ALL EMPLOYEES OF THE CONTRACTOR AND THEIR SUBCONTRACTORS SHALL BE CURRENT WITH THEIR 40-HOUR HAZWOPER TRAINING AND 8-HOUR REFRESHER. PROOF OF SAID TRAINING DOCUMENTATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF WORK AND SHALL BE KEPT ONSITE DURING CONSTRUCTION.

7. CONTRACTOR SHALL MARK ALL POTENTIAL OVERHEAD AND/OR TRIP HAZARDS IN YELLOW.

8. CONTRACTOR SHALL MAKE SURE THAT ALL CONSTRUCTION EQUIPMENT AND FIELD PERSONNEL VEHICLES SHALL HAVE FIRE EXTINGUISHER IN THEM. THE FIRE EXTINGUISHERS SHALL BE FREELY ACCESSIBLE DURING ALL CONSTRUCTION ACTIVITIES.

3.0 SPECIFICATIONS

THE FOLLOWING SPECIFICATIONS OUTLINE THE REQUIREMENTS FOR CONSTRUCTION AND INSTALLATION OF THE PILOT REMEDIATION SYSTEM.

3.1 GENERAL

1. THE CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PENNDOT) PUBLICATION 408/2016 CONSTRUCTION SPECIFICATIONS, THE INTERNATIONAL BUILDING CODES, THE NATIONAL ELECTRIC CODE, AND ALL OTHER APPLICABLE FEDERAL, STATE AND LOCAL CODES.

2. ALL NECESSARY CONSTRUCTION PERMITS, APPROVALS AND INSPECTIONS SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR. PERMITS REQUIRED FOR CONSTRUCTION WILL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING.

- BUILDING/CONSTRUCTION PERMIT
- ZONING PERMIT (IF DETERMINED TO BE NECESSARY BY PHILADELPHIA DEPARTMENT OF LICENSES AND INSPECTIONS)
- ELECTRICAL PERMIT
- WELL INSTALLATION PERMIT

3. A PRE-CONSTRUCTION MEETING BETWEEN OWNER, THE CONTRACTOR, AND ENGINEER WILL BE REQUIRED BEFORE ANY WORK BEGINS. THE MEETING WILL BE HELD AT THE SITE.

4. THE SELECTED CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER'S PROJECT MANAGER SHALL BE NOTIFIED OF ANY DISCREPANCY. ANY DEVIATIONS FROM DESIGN CONSTITUTE A STOP WORK. ENGINEER SHALL BE NOTIFIED, AND VERIFICATION OF ENGINEERING CALCULATIONS MUST BE COMPLETED PRIOR TO MAKING FIELD CHANGES. ALL CHANGES ARE TO BE DOCUMENTED VIA THE ENGINEER'S FORMAL SUBMITTAL PROCESS.

5. ALL MATERIALS USED FOR CONSTRUCTION OF THE SYSTEM SHALL BE NEW UNLESS OTHERWISE NOTED.

6. EQUIPMENT AND INSTRUMENTS THAT ARE SPECIFIED TO BE SUPPLIED OR EXISTING ONSITE WILL BE PROVIDED FOR INSTALLATION BY THE CONTRACTOR UNLESS OTHERWISE NOTED.

7. WHERE MATERIALS OR PRODUCTS CALLED FOR UNDER THIS CONTRACT ARE INSTALLED BEFORE THE INSTALLATION OR ERECTION OF ADEQUATE PROTECTIVE STRUCTURES, THE CONTRACTOR, WITHOUT ADDITIONAL COMPENSATION, SHALL PROVIDE APPROVED, EFFECTIVE AND DURABLE MEASURES TO PROTECT SUCH MATERIALS OR PRODUCTS AGAINST DAMAGE FROM THE ELEMENTS OR FROM ANY OTHER CAUSES.

8. ALL MACHINERY, EQUIPMENT, PIPING, ACCESSORIES, AND APPURTENANCES SHALL BE ADEQUATELY SUPPORTED AND SAFEGUARDED AGAINST ALL DAMAGE OR INJURY DURING PERFORMANCE OF WORK UNDER THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE OR INJURY RESULTING FROM HIS OPERATIONS AND SHALL REPAIR SUCH DAMAGE IMMEDIATELY AND TO THE SATISFACTION OF THE ENGINEER.

9. UNDER THE PUBLIC UTILITIES ACT NO. 187, THE CONTRACTOR SHALL COMPLY WITH THE ACT OF DECEMBER 10, 1974 (PUBLIC LAW 852, NO. 287), AS AMENDED, WHICH DEFINES THE PROCEDURES FOR NOTIFICATION TO PUBLIC UTILITIES PRIOR TO EXCAVATION, DRILLING OR DEMOLITION WORK USING POWER EQUIPMENT OR EXPLOSIVES. THE CONTRACTOR SHALL CONTACT CONTRACTOR SHALL CONTACT THE PENNSYLVANIA ONE-CALL SYSTEM AT 1-800-242-1776 TO LOCATE UTILITIES WITHIN THE WORK AREA AT LEAST THREE (3) BUT NOT MORE THAN TEN (10) DAYS BEFORE THE START OF EXCAVATION, DRILL OR SIMILAR INTRUSIVE ACTIVITIES. ONE-CALL TICKET INFORMATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.

10. THE CONTRACTOR SHALL ALSO CONTRACT A UTILITY LOCATION AND IDENTIFICATION SERVICE PROVIDER TO PERFORM A PRIVATE UTILITY LOCATION SURVEY OF THE ENTIRE WORK AREA PRIOR TO THE START OF INTRUSIVE WORK. A REPRESENTATIVE OF THE CONTRACTOR WHO IS FAMILIAR WITH THIS SCOPE OF WORK SHALL BE PRESENT ONSITE TO SUPERVISE DURING THE PRIVATE UTILITY LOCATION SURVEY. DETAILS OF THE UTILITY SURVEY SHALL BE PROVIDED TO AND REVIEWED WITH THE ENGINEER PRIOR TO THE START OF CONSTRUCTION TO DETERMINE WHETHER ANY ADJUSTMENTS TO TRENCHING ROUTES, WELL LOCATIONS OR SIMILAR ARE NECESSARY. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING ANY MARKS INDICATING BURIED INFRASTRUCTURE. IF MARKS FADE OR QUESTION ABOUT THE LOCATION OF BURIED INFRASTRUCTURE OCCURS, THE CONTRACTOR WILL BE RESPONSIBLE FOR PERFORMING ADDITIONAL PRIVATE UTILITY LOCATION SURVEY.

11. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO UNDERGROUND UTILITIES, PIPING AND ADJOINING STRUCTURES. IF SUBSURFACE WORK MUST TAKE PLACE WITHIN 30 INCHES OF A UTILITY LINE MARKING, THE UTILITY MUST BE EXPOSED (POTHOLED) BY SOFT DIG / CLEARANCE METHODS PRIOR TO STARTING SUBSURFACE INTRUSIVE WORK. NO MECHANIZED EQUIPMENT IS PERMITTED FOR THE EXPOSING OF THE UTILITY. WHEN TRENCHES MUST CROSS A UTILITY, THE UTILITY MUST BE EXPOSED 30 INCHES FROM THE OUTER EDGE IN A 360° DIRECTION. THE CONTRACTOR SHALL ENSURE ALL UNCOVERED UTILITIES ARE SUPPORTED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS AND SPECIFICATIONS.

12. THE CONTRACTOR SHALL WARRANTY ALL MATERIALS, CONSTRUCTION AND WORKMANSHIP FOR A PERIOD OF ONE YEAR. ALL DEFECTS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

13. THE CONTRACTOR SHALL MAKE SURE THAT THE WORK AREA IS CLEAN AND ORDERLY BOTH DURING CONSTRUCTION AND UPON COMPLETION PRIOR TO DEMOBILIZING FROM THE SITE. THE CONTRACTOR SHALL CONTAIN LOOSE DEBRIS AND STORE CONSTRUCTION MATERIALS ON A DAILY BASIS PRIOR TO DEPARTURE FROM THE SITE.

3.2 WELL INSTALLATION

1. ALL WELLS SHALL BE CONSTRUCTED AS INDICATED ON THE CONTRACT DRAWINGS AND UTILIZING PVC PIPING - ASTM F 480, TYPE 1, GRADE 1, PVC 12454, NSF WC OR NSF PW, SCHEDULE [40] WITH FLUSH THREADED JOINT FITTINGS, UNLESS OTHERWISE SPECIFIED. THREADED JOINTS SHALL BE WRAPPED WITH FLUOROPOLYMER TAPE AND PROVIDED WITH NITRILE O-RING GASKETS.

2. WELL SCREENS SHALL BE LOCATED AS INDICATED ON THE CONTRACT DRAWINGS. SLOT SIZE SHALL BE AS INDICATED. SLOTTED OPENINGS SHALL BE DISTRIBUTED UNIFORMLY AROUND THE CIRCUMFERENCE OF THE SCREEN. OPEN AREA SHALL APPROACH THE FORMATION'S NATURAL POROSITY.

3. PROVIDE FILTERPACK AND VERY FINE CHOKER SAND SEPARATION LAYER AS INDICATED ON THE CONTRACT DRAWINGS.

4. NEAT CEMENT GROUT - PROVIDE NEAT CEMENT GROUT IN ACCORDANCE WITH ASTM D 5092. CEMENT SHALL BE IN ACCORDANCE WITH ASTM C 150. QUICK SETTING ADMIXTURES SHALL NOT BE ALLOWED. DRILLING MUD OR CUTTINGS SHALL NOT BE USED AS A SEALING MATERIAL.

5. PROVIDE FLUSH THREADED SOLID PLUG AT THE BOTTOM OF THE WELL. PLUG SHALL BE THE SAME MATERIAL AS THE WELL CASING OR SCREEN TO WHICH IT IS ATTACHED. JOINTS SHALL BE WRAPPED WITH FLUOROPOLYMER TAPE AND PROVIDED WITH NITRILE O-RING GASKETS.

6. BOREHOLE SHALL BE ADVANCED USING CONVENTIONAL HOLLOW-STEM AUGER DRILLING METHODS. IF IT IS THE OPINION OF THE CONTRACTOR THAT AN ALTERNATE DRILLING METHOD IS REQUIRED, JUSTIFICATION FOR A BORING METHOD CHANGE SHALL BE SUBMITTED TO THE ENGINEER, AND APPROVAL FOR THE CHANGE GRANTED PRIOR TO DRILLING. DRILL CREW SHALL BE EXPERIENCED AND TRAINED IN DRILLING AND SAFETY REQUIREMENTS FOR CONTAMINATED SITES, AND LICENSED IN THE STATE OF PENNSYLVANIA.

7. IF DRILLING IS SEQUENCED TO COINCIDE WITH PIPING TRENCH EXCAVATION WORK THE CONTRACTOR MAY STOCKPILE SOIL CUTTINGS FROM THE BOREHOLES WITH SOIL EXCAVATED FROM THE PIPING TRENCHES AS DESCRIBED UNDER SECTION 3.3 BELOW. IF DRILLING ACTIVITIES DO NOT COINCIDE WITH TRENCHING WORK, THEN THE SOIL CUTTINGS SHALL BE PLACED IN 55-GALLON DOT APPROVED HAZARDOUS DRUMS WHICH WILL BE STAGED ONSITE PROXIMAL TO THE WORK AREA. THE CONTRACTOR SHALL SCREEN SOIL CUTTINGS AND CORES FROM BOREHOLES FOR HYDROCARBON IMPACTS USING A HAND-HELD PHOTOIONIZATION DETECTOR (PID). IT IS EXPECTED THAT IMPACTED SOIL WILL BE ENCOUNTERED AT SOME DRILLING LOCATIONS. IF SOIL CUTTINGS ARE BEING STOCKPILED, AND SOILS ARE ENCOUNTERED EXHIBITING A PID READING OF GREATER THAN 50 PPM OR SIMILAR EVIDENCE OF IMPACTS SUCH AS STAINING OR ODORS, THE CONTRACTOR SHALL SEGREGATE THESE SOILS BY EITHER PLACING THEM IN SEPARATE STOCKPILES AND MANAGING AS DISCUSSED IN SECTION 3.3 BELOW, OR PLACING THEM IN 55-GALLON DOT APPROVED HAZARDOUS DRUMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORT AND DISPOSAL OF ALL SOIL (CLEAN OR IMPACTED), DEVELOPMENT/DECONTAMINATION WATER, AND OTHER CONSTRUCTION DEBRIS GENERATED DURING DRILLING, ALONG WITH ANY WASTE CHARACTERIZATION SAMPLING REQUIRED. THE CONTRACTOR SHALL ASSUME ALL SOIL IS NON-HAZARDOUS WHEN DEVELOPING COSTING.

8. WELL CASINGS, SCREENS, PLUGS, AND CAPS SHALL BE CERTIFIED CLEAN BY THE MANUFACTURER UPON DELIVERY. THESE MATERIALS SHALL BE DELIVERED, STORED, AND HANDLED IN SUCH MANNER AS TO ENSURE THAT GREASE, OIL, OR OTHER CONTAMINANTS DO NOT CONTACT ANY PORTION OF THE WELL SCREEN AND CASING ASSEMBLY PRIOR TO INSTALLATION. IF DIRECTED BY THE ENGINEER, THE WELL SCREEN AND CASING ASSEMBLY SHALL BE CLEANED WITH HIGH PRESSURE WATER PRIOR TO INSTALLATION. CENTRALIZERS SHALL BE USED TO ENSURE THAT THE WELL SCREEN AND CASING ASSEMBLY IS INSTALLED CONCENTRICALLY IN THE BOREHOLE. WHEN THE ASSEMBLY HAS BEEN INSTALLED AT THE APPROPRIATE ELEVATION, IT SHALL BE ADEQUATELY SECURED TO PRECLUDE MOVEMENT DURING PLACEMENT OF THE FILTER PACKS AND ANNULAR SEALS. THE TOP OF THE WELL CASING SHALL BE CAPPED DURING FILTER PACK PLACEMENT.

9. FILTER PACK AND CHOKER SAND SEPARATION LAYER - FILTER PACK AND VERY FINE CHOKER SAND SEPARATION LAYER SHALL BE PLACED AS INDICATED ON THE APPROVED WELL CONSTRUCTION DRAWINGS TO FILL THE ENTIRE ANNULAR SPACE BETWEEN THE SCREEN AND CASING ASSEMBLY AND THE OUTSIDE WALL OF THE BOREHOLE. PLACE USING A TREMIE PIPE IN ACCORDANCE WITH EPA 600-4-89-034 AND ASTM D 5092. PLACEMENT BY GRAVITY OR FREE FALL METHODS IS NOT ALLOWED. CONTROL SPEED OF SAND PLACEMENT TO PREVENT BRIDGING AND TO ALLOW FOR SETTLEMENT. PRIOR TO COMMENCEMENT OF WORK, EQUIPMENT AND METHODS REQUIRED TO PLACE FILTERS SHALL BE APPROVED BY THE ENGINEER.

10. NEAT CEMENT GROUT - NEAT CEMENT GROUT SHALL BE PLACED IN THE ANNULAR SPACE ABOVE THE VERY FINE CHOKER SAND SEPARATION LAYER AS INDICATED ON THE WELL CONSTRUCTION DRAWINGS. GROUT SHALL BE PLACED AS A SLURRY THROUGH A TREMIE PIPE, AND INJECTED UNDER PRESSURE TO REDUCE CHANCE OF VOIDS. GROUT SHALL BE INJECTED IN ONE CONTINUOUS OPERATION UNTIL FULL STRENGTH GROUT FLOWS OUT AT THE GROUND SURFACE WITHOUT EVIDENCE OF DRILLING CUTTINGS OR FLUID. CEMENT GROUT SHALL CURE A MINIMUM OF 48 HOURS BEFORE BEGINNING WELL DEVELOPMENT OPERATIONS.

11. WELLS SHALL BE INSTALLED WITHIN 8-INCH DIAMETER, FLUSH-MOUNTED, H-20 TRAFFIC LOAD RATED VAULTS CONSTRUCTED TO THE SPECIFICATIONS SHOWN ON DRAWING M-1. IF DRILLING WORK IS SEQUENCED TO COINCIDE WITH PIPING TRENCH INSTALLATION THE CONTRACTOR MAY POSTPONE INSTALLING THE WELL VAULTS UNTIL AFTER SUBSURFACE CONVEYANCE PIPING RUNS ARE CONNECTED, PROVIDED THAT THE WELL LOCATIONS ARE SECURED WITHIN THE WORK AREA PERIMETER FENCE AND PROPERLY PROTECTED AGAINST ACCIDENTAL DAMAGE IN THE INTERIM.

12. CONTRACTOR SHALL DEVELOP BIOSPARGE WELLS, PERFORMANCE MONITORING WELLS AND ANY BIOVENTING WELLS WITH GREATER THAN 4 FEET OF STANDING WATER DEPTH. WELLS SHALL BE DEVELOPED BY BAILING, SURGING, AND PUMPING/OVERPUMPING/BACKWASHING METHODS. AIR SURGING AND JETTING ARE PROHIBITED. METHOD OF DEVELOPMENT SHALL BE APPROVED BY THE ENGINEER. WELL DEVELOPMENT SHALL NOT BEGIN UNTIL THE WELL INSTALLATION IS COMPLETE AND ACCEPTED BY THE ENGINEER. WELL DEVELOPMENT OPERATIONS SHALL BE CONDUCTED CONTINUOUSLY UNTIL DEVELOPMENT WATER FLOWS CLEAR AND FREE OF SEDIMENT WITH A TURBIDITY OF LESS THAN 50 NTU. WELL DEVELOPMENT SHALL CONTINUE FOR A MINIMUM OF AT LEAST 30 MINUTES AND A MAXIMUM OF 60 MINUTES. WATER FROM THE WELL DEVELOPMENT OPERATIONS SHALL BE DISPOSED OF BY THE CONTRACTOR AS DISCUSSED ABOVE.

13. A BOREHOLE LOG SHALL BE COMPLETED FOR EACH BORING DRILLED. BOREHOLE LOGS SHALL BE PREPARED BY THE CONTRACTOR DURING ALL WELL DRILLING AND INSTALLATION ACTIVITIES. INFORMATION PROVIDED ON THE LOGS SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

   a. NAME OF THE PROJECT AND SITE.
   b. BORING/WELL IDENTIFICATION NUMBER.
   c. LOCATION OF BORING (COORDINATES, IF AVAILABLE).
   d. MAKE AND MANUFACTURER'S MODEL DESIGNATION OF DRILLING EQUIPMENT AND NAME OF DRILLING FIRM.
   e. DATE BORING WAS DRILLED.
   f. REFERENCE DATA FOR ALL DEPTH MEASUREMENTS.
   g. NAME OF DRILLER AND NAME AND SIGNATURE OF GEOLOGIST PREPARING LOG.
   h. NOMINAL HOLE DIAMETER AND DEPTH AT WHICH HOLE DIAMETER CHANGES.
   i. TOTAL DEPTH OF BORING.
   j. METHOD OF DRILLING, INCLUDING SAMPLING METHODS AND SAMPLE DEPTHS, INCLUDING THOSE ATTEMPTED WITH NO RECOVERY. INDICATION OF PENETRATION RESISTANCE SUCH AS DRIVE HAMMER BLOWS GIVEN IN BLOWS PER 6 INCHES OF DRIVEN SAMPLE TUBES. INFORMATION SHALL INCLUDE HAMMER WEIGHT AND DROP DISTANCE. INFORMATION SUCH AS ROD SIZE, BIT TYPE, PUMP TYPE, ETC., SHALL BE RECORDED. A DESCRIPTION OF ANY TEMPORARY CASING USED, DRILL FLUIDS AND FLUID ADDITIVES USED, IF ANY, INCLUDING BRAND NAME AND AMOUNT USED, ALONG WITH THE REASON FOR AND START (BY DEPTH) OF ITS USE SHALL BE INCLUDED. IF MEASURED, MUD VISCOSITIES AND WEIGHT SHALL BE RECORDED.
   k. DESCRIPTION OF THE MATERIAL OF WHICH EACH STRATUM IS COMPOSED, IN ACCORDANCE WITH ASTM D 2488, AND/OR STANDARD ROCK NOMENCLATURE, AS NECESSARY. SOIL PARAMETERS FOR LOGGING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, CLASSIFICATION, DEPOSITIONAL ENVIRONMENT AND FORMATION, IF KNOWN, UNIFIED SOIL CLASSIFICATION SYMBOL, SECONDARY COMPONENTS AND ESTIMATED PERCENTAGES, COLOR (USING FSUP SOIL COLOR CHART OR GSA RCC-001), PLASTICITY, CONSISTENCY (COHESIVE SOILS), DENSITY (NON-COHESIVE SOIL), MOISTURE CONTENT, STRUCTURE AND ORIENTATION, AND GRAIN ANGULARITY. ROCK CORE PARAMETERS FOR LOGGING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, ROCK TYPE, FORMATION, MODIFIER DENOTING VARIETY (SHALY, CALCAREOUS, SILICEOUS, ETC.), COLOR (USING GSA RCC-001), HARDNESS, DEGREE OF CEMENTATION, TEXTURE, CRYSTALLINE STRUCTURE AND ORIENTATION, DEGREE OF WEATHERING, SOLUTION OR VOID CONDITIONS, PRIMARY AND SECONDARY PERMEABILITY, AND LOST CORE. THE RESULTS OF ANY CHEMICAL FIELD SCREENING SHALL ALSO BE INCLUDED ON THE BORING LOG. CLASSIFICATION SHALL BE PREPARED IN THE FIELD AT THE TIME OF SAMPLING. THE RESULTS OF VISUAL OBSERVATION OF THE MATERIAL ENCOUNTERED, AND ANY UNUSUAL ODOR DETECTED SHALL ALSO BE DULY NOTED AND RECORDED. DEPTH OF ANY OBSERVED FRACTURES, WEATHERED ZONES, OR ANY ABNORMALITIES ENCOUNTERED. DEPTH TO WATER, AND ANY NON-AQUEOUS PHASE LIQUIDS (NAPLS) AND DATE MEASURED BEFORE, DURING, AND AFTER EACH DRILLING SHIFT, AND PRIOR TO WELL INSTALLATION.

14. A WELL DEVELOPMENT RECORD SHALL BE PREPARED FOR EACH WELL INSTALLED. INFORMATION PROVIDED ON THE WELL DEVELOPMENT RECORD SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

   a. DATE, TIME, AND ELEVATION OF WATER LEVEL IN THE WELL, BEFORE DEVELOPMENT.
   b. DEPTH TO BOTTOM OF WELL, NAME OF PROJECT AND SITE, WELL IDENTIFICATION NUMBER, AND DATE OF DEVELOPMENT.
   c. METHOD USED FOR DEVELOPMENT, TO INCLUDE SIZE, TYPE AND MAKE OF EQUIPMENT, BAILER, AND/OR PUMP USED DURING DEVELOPMENT.
   d. TIME SPENT DEVELOPING THE WELL BY EACH METHOD, TO INCLUDE TYPICAL PUMPING RATE, IF PUMP IS USED IN DEVELOPMENT.
   e. VOLUME AND PHYSICAL CHARACTERISTICS OF WATER REMOVED, TO INCLUDE CHANGES DURING DEVELOPMENT IN CLARITY, COLOR, PARTICULATES, AND ODOR.
   f. CLARITY OF WATER BEFORE, DURING, AND AFTER DEVELOPMENT. NEPHELOMETRIC TURBIDITY UNIT (NTU) MEASUREMENTS.
   g. TOTAL DEPTH OF WELL AND THE STATIC WATER LEVEL AS PER ASTM D 4750 FROM TOP OF THE CASING, IMMEDIATELY AFTER PUMPING/DEVELOPMENT, AND 24 CONSECUTIVE HOURS AFTER DEVELOPMENT.
   h. READINGS OF PH, SPECIFIC CONDUCTANCE, DO, ORP, AND TEMPERATURE TAKEN BEFORE, DURING, AND AFTER DEVELOPMENT.
   i. NAME AND JOB TITLE OF INDIVIDUAL DEVELOPING WELL.
   j. DESCRIPTION OF DEVELOPMENT WATER DISPOSAL.

15. ALL AUGERS, TOOLING AND OTHER DOWN-HOLE EQUIPMENT THAT HAS CONTACTED SUBSURFACE SOIL SHALL BE DECONTAMINATED BETWEEN DRILLING LOCATIONS BY HOT WATER PRESSURE WASHER (STEAM CLEANING). CONTRACTOR SHALL CONSTRUCT A TEMPORARY DECONTAMINATION PAD ONSITE FOR THIS PURPOSE. CONTRACTOR SHALL ASSUME THAT POTABLE WATER IS NOT AVAILABLE AT THE SITE AND SHALL PROVIDE A DECONTAMINATION WATER SOURCE. CONTRACTOR SHALL DISPOSE OF DECONTAMINATION WATER, RESIDUAL SOIL AND DECONTAMINATION PAD MATERIALS UPON COMPLETION OF WORK AS DESCRIBED ABOVE.

3.3 EXCAVATION/RESTORATION

1. WHERE PROCESS PIPING IS INSTALLED BELOW GROUND, THE PIPE SHALL BE BURIED IN A TRENCH EXCAVATED TO THE DIMENSIONS SHOWN ON DRAWING C-3. MINIMUM PIPING BURIAL DEPTH IS 21 INCHES MEASURED FROM GROUND SURFACE TO THE TOP OF THE PIPE UNLESS OTHERWISE STATED.

2. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO UNDERGROUND UTILITIES, PIPING, AND ADJOINING STRUCTURES DURING EXCAVATION WORK.

3. EXCAVATIONS SHALL EITHER BE BACKFILLED TO GRADE AT THE END OF EACH WORK DAY PRIOR TO DEPARTING THE SITE, OR SURROUNDED COMPLETELY BY TEMPORARY CHAIN-LINK CONSTRUCTION FENCING OR COVERED BY TRENCH PLATES TO PREVENT ACCESS. ADDITIONAL DETAILS ON PROTECTION OF EXCAVATIONS ARE PROVIDED UNDER THE GENERAL SPECIFICATIONS ABOVE.

4. EXCAVATIONS THROUGH CONCRETE OR ASPHALT PAVEMENT SHALL BE SAWCUT TO PROVIDE A SQUARE VERTICAL JOINT FOR REPAVING.

5. FOLLOWING REMOVAL OF ASPHALT FROM THE PROPOSED TRENCH, THE CONTRACTOR SHALL SCAN THE ENTIRE PERIMETER OF THE TRENCH WITH A COMMERCIAL GRADE METAL DETECTOR. LOCATIONS OF METALLIC ANOMALIES ALONG THE TRENCH SHALL BE MARKED WITH ORANGE PAINT AND THEN HAND CLEARED DURING EXCAVATION.

6. EXCAVATED SOIL SHALL BE STOCKPILED WITHIN A BERMED AREA INSIDE THE FENCED WORK ZONE. SOIL STOCKPILES SHALL BE PLACED ON 10-MIL PLASTIC VISQUEEN AND COVERED WITH A MINIMUM OF 6-MIL PLASTIC VISQUEEN. EARTHEN MATERIALS SHALL NOT BE USED TO SECURE THE PLASTIC LINERS OR COVERS.

7. THE CONTRACTOR SHALL SCREEN EXCAVATED SOIL FOR HYDROCARBON IMPACTS USING A HAND-HELD PHOTOIONIZATION DETECTOR (PID). PETROLEUM HYDROCARBON IMPACTED SOIL IS NOT ANTICIPATED DUE TO THE SHALLOW DEPTH OF EXCAVATION; HOWEVER, IF SOIL IS ENCOUNTERED EXHIBITING A PID READING OF GREATER THAN 50 PPM OR SIMILAR EVIDENCE OF IMPACTS SUCH AS STAINING OR ODORS, IT SHALL BE SEGREGATED AND STOCKPILED IN AN AREA DESIGNATED BY THE ENGINEER. THE CONTRACTOR WILL THEN SAMPLE THE SOIL FOR PETROLEUM HYDROCARBON CONTENT AND WASTE CHARACTERIZATION PARAMETERS FOLLOWING CONSULTATION WITH THE ENGINEER.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE WASTE CHARACTERIZATION SAMPLING, TRANSPORTATION AND DISPOSAL OF ALL SOIL (CLEAN OR IMPACTED), ASPHALT AND OTHER CONSTRUCTION DEBRIS GENERATED UNDER THIS SCOPE OF WORK. THE CONTRACTOR SHALL ASSUME ALL SOIL IS NON-HAZARDOUS WHEN DEVELOPING COSTING. THE SITE OWNER SHALL BE RESPONSIBLE FOR SIGNING WASTE DISPOSAL MANIFESTS. CONTRACTOR SHALL ONLY CHARGE FOR DISPOSAL OF MATERIALS SENT TO OFFSITE DISPOSAL FACILITIES. CONTRACTOR SHALL BE REQUIRED TO SUBMIT WEIGH TICKETS FOR PAYMENT.

9. THE CONTRACTOR SHALL RESTORE ALL EXCAVATED AREAS TO MATCH EXISTING SURFACE COMPLETION. FOR COSTING PURPOSES CONTRACTOR SHALL ASSUME A TOTAL TRENCHING LENGTH OF 520 LF WITH 70 LF ACROSS ASPHALT PAVEMENT AND 450 LF ACROSS GRASS/UNPAVED SURFACE.

10. PIPING TRENCH RESTORATION DETAILS ARE PROVIDED ON DRAWING C-3. PIPING TRENCHES INSTALLED IN PAVED AREAS SHALL BE BACKFILLED WITH IMPORTED CLEAN PIPE BEDDING SAND FROM THE BOTTOM OF THE TRENCH TO THE BASE OF THE PAVEMENT FOUNDATION LAYER.

COMMONWEALTH OF PENNSYLVAN

11. THE PAVEMENT FOUNDATION LAYER SHALL BE CONSTRUCTED OF PENNDOT NO. 2A OR NO. OGS COARSE AGGREGATE AS SPECIFIED IN PENNDOT PUBLICATION 408/2016 CONSTRUCTION SPECIFICATIONS RECYCLED CONCRETE AGGREGATE (RCA) MAY ALSO BE USED PROVIDED IT MEETS THE GRAIN SIZE DISTRIBUTION AND SPECIFICATIONS FOR COARSE AGGREGATE PAVEMENT SUBBASE OUTLINED IN PENNDOT PUBLICATION 408/2016. AGGREGATE SHALL BE PLACED IN A SINGLE 8-INCH LIFT SO THAT THE FINAL COMPACTED THICKNESS IS 6-INCHES. THE AGGREGATE SHALL BE COMPACTED USING A VIBRATORY PLATE COMPACTOR UNTIL THE MATERIAL DOES NOT MOVE UNDER THE COMPACTION EQUIPMENT. A NON-WOVEN CLASS 1 TYPE GEOTEXTILE FABRIC SHALL BE INSTALLED BETWEEN THE SAND AND PAVEMENT FOUNDATION MATERIAL AS A SEPARATION LAYER TO PROVIDE SUPPORT DURING INSTALLATION AND COMPACTION.

12. PAVEMENT SHALL BE HOT MIX ASPHALT MEETING THE APPLICABLE DESIGN AND INSTALLATION SPECIFICATIONS OUTLINED IN PENNDOT PUBLICATION 408/2016. ASPHALT PAVEMENT WILL CONSIST OF 1.5 INCHES OF WEAR COURSE MATERIAL (SUPER PAVE MIXTURE 9.5MM) PLACED OVER 4 INCHES OF BINDER COURSE MATERIAL (SUPERPAVE MIX 25MM) AS SHOWN ON DRAWING C-3. THE ASPHALT MIX SHALL BE COMPACTED USING TANDEM ROLLERS UNTIL NO FURTHER COMPRESSION CAN BE OBTAINED AND ROLLING MARKS ARE ELIMINATED. IN AREAS TOO SMALL FOR THE ROLLER, A VIBRATING PLATE COMPACTOR SHALL BE USED TO ACHIEVE THOROUGH COMPACTION.

13. A BITUMINOUS TACK COAT OF EMULSIFIED ASPHALT (CLASS AT-E) SHALL BE APPLIED AT A RATE OF BETWEEN 0.02 - 0.07 GAL/YD2 TO THE PAVEMENT FOUNDATION LAYER PRIOR TO PLACING THE PAVEMENT BINDER COURSE, AND TO THE SURFACES OF ALL TRANSVERSE AND LONGITUDINAL JOINTS TO ENSURE PROPER BONDING BETWEEN SURFACES. TACK COAT SHALL BE APPLIED AS SPECIFIED IN PENNDOT PUBLICATION 408/2016.

14. THE CONTRACTOR SHALL RETURN TO THE SITE ONE WEEK AFTER ASPHALT PLACEMENT AND APPLY ASPHALT JOINT SEALER ALONG THE ENTIRE PERIMETER OF ALL NEWLY INSTALLED ASPHALT PAVEMENT AND TO ANY OTHER JOINTS WITHIN THE PAVEMENT AS SPECIFIED IN PENNDOT PUBLICATION 408/2016.

15. AS SHOWN ON DRAWING C-3, TRENCHES INSTALLED IN UNPAVED AREAS SHALL BE BACKFILLED WITH CLEAN PIPE BEDDING SAND TO A MINIMUM OF 4 INCHES ABOVE THE PIPING, FOLLOWED BY CLEAN NATIVE SOIL EXCAVATED FROM THE TRENCH. CONTRACTOR SHALL ASSUME FOR COSTING PURPOSES THAT SOIL EXCAVATED DURING TRENCHING IS SUITABLE FOR USE AS CLEAN BACKFILL (I.E., NO PETRLEUM HYDROCARBON IMPACTS, SUFFICIENT FINES TO ACHIEVE PROPER COMPACTION AND FREE OF ROCKS, ROOTS OR OTHER DEBRIS), BUT THIS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER DURING CONSTRUCTION. IF NATIVE SOIL IS DETERMINED TO BE UNSUITABLE FOR USE AS BACKFILL DURING CONSTRUCTION, CLEAN IMPORTED FILL OR PIPE BEDDING SAND WILL BE USED AS BACKFILL INSTEAD. SOIL SHALL BE PLACED AND COMPACTED IN 6-INCH LOOSE LIFTS DURING BACKFILLING USING A VIBRATORY PLATE COMPACTOR (**JUMPING JACK OR SIMILAR IMPACT COMPACTOR NOT PERMITTED**). TRENCHES SHALL BE RESTORED AT THE SURFACE WITH A MINIMUM 6-INCHES OF TOPSOIL.

16. TRENCHING INSTALLED IN UNPAVED AREAS AND ALL PORTIONS OF THE WORK AREA WHERE EXISTING VEGETATION WAS DISTURBED BY CONSTRUCTION ACTIVITES, SHALL BE HYDROSEEDED UPON COMPLETION USING A SEED MIX APPROPRIATE FOR THE LOCATION TO RESTORE THE EXISTING GRASS COVER. IF NOT PRESENT IN HYDOSEED MIX, CONTRACTOR SHALL APPLY STARTER FERTILIZER TO THE SOIL WHERE SEED WILL BE APPLIED OF THE COMPOSITION AND AT THE APPLICATION RATE RECOMMENDED BY THE GRASS SEED MANUFACTURER. CONTRACTOR SHALL APPLY STRAW MULCH OVER ALL SEEDED SURFACES FOLLOWING APPLICATION.

3.4 EROSION AND SEDIMENTATION CONTROLS

1. CONTRACTOR SHALL INSTALL MEASURES TO DIVERT STORMWATER SHEET FLOW AROUND THE WORK AREA AND AWAY FROM OPEN EXCAVATIONS (E.G. TEMPORARY BERMS/CURBING USING HAYBALES OR SIMILAR) IN PAVED AREAS OR ELSEWHERE AS NECESSARY DURING CONSTRUCTION.

2. CONTRACTOR SHALL INSTALL SEDIMENT FILTERS IN STORM DRAINS LOCATED WITHIN OR ADJACENT TO TRENCHING WORK AREAS THAT RECEIVE SURFACE WATER RUNOFF FLOWS FROM THE WORK AREA.

3. CONTRACTOR SHALL CONTROL FUGITIVE DUST GENERATED DURING CONSTRUCTION AS NECESSARY BY APPLYING A LIGHT SPRAY OF WATER OR OTHER APPROVED DUST CONTROL MEASURES.

4. CONTRACTOR SHALL EMPLOY CONTROLS TO PREVENT CONSTRUCTION VEHICLES FROM TRACKING EXCAVATED SOIL OUT OF THE WORK AREA, AND SHALL DESIGN THE WORK AREA LAYOUT TO LIMIT THE POTENTIAL FOR TRAKCING OF SOIL OFFSITE. THE CONTRACTOR SHALL ALSO EMPLOY GOOD HOUSEKEEPING PRACTICES DURING CONSTRUCTION. RESIDUAL EXACATED SOIL SHALL BE CLEANED FROM PAVED SURFACES TO THE EXTENT PRACTICAL, TO PREVENT THIS MATERIAL FROM BECOMING ENTRAINED IN SURFACE WATER RUNOFF.

3.5 PROCESS PIPING

1. ALL UNDERGROUND PROCESS PIPING SHALL BE SCH. 40 PVC OR SDR-11 HIGH DENSITY POLYETHYLENE (HDPE) (UNLESS OTHERWISE INDICATED) AS SPECIFIED ON THE DRAWINGS.

2. ALL ABOVEGROUND COMPRESSED AIR PIPING SHALL BE GALVANIZED STEEL WITH THREADED FITTINGS, PRESSURE-RATED RUBBER AIR HOSE OR UV RESISTANT SDR11 HDPE. STEEL TO PVC TRANSITION FITTINGS SHALL BE USED WHERE INDICATED ON DRAWINGS M-1 AND M-4 AND COMPLETED BELOW GRADE.

3. HDPE PIPING JOINTS WILL BE FUSION WELDED.

4. FUSION WELDS OR SLIP WELDS SHALL MEET MANUFACTURER'S SPECIFICATIONS.

5. PVC PIPING JOINTS WILL BE GLUED USING LOW VOLATILE ORGANIC COMPOUND (VOC) MATERIALS.

6. INDIVIDUAL PIPING RUNS (HOME RUNS) SHALL BE INSTALLED TO EACH BIOVENTING AND BIOSPARGING WELL. PIPING SHALL CONNECT TO THE WELLHEADS AND REMEDIATION SYSTEM AS SHOWN ON DRAWINGS M-1, M-3 AND M-4

7. ALL ABOVEGROUND PIPING SHALL BE PERMANENTLY LABELED WITH DIRECTIONAL FLOW ARROWS AND LINE CONTENTS AT 5' INTERVALS. OUTDOOR ABOVE GRADE CONVEYANCE PIPING SHOULD BE SIMILARLY LABELED, BUT AT 30' INTERVALS

8. ALL 90° BENDS INSTALLED UNDERGROUND OR WHERE OTHERWISE INDICATED ON THE DRAWINGS SHALL BE CONSTRUCTED USING LONG-SWEEP 90° ELBOWS.

9. WHEN CONNECTING TO OR BYPASSING EXISTING UNDERGROUND PIPING, THE CONTRACTOR SHALL FIRST VERIFY THE EXISTING PIPING PATH.

10. CONVEYANCE PIPING RUNS FROM THE BIOSPARGE/BIOVENT WELLS SHALL BE PRESSURE TESTED USING HYDROSTATIC MEANS UPON COMPLETION OF BOTH ABOVE-GRADE AND BELOW-GRADE PIPE INSTALLATION. ABOVE-GRADE AND BELOW-GRADE PIPING RUNS SHALL BE TESTED SEPARATELY. TESTING OF THE EXISTING CONDUIT RUNS BETWEEN EXIST PITS BENEATH THE HIGHWAY IS NOT REQUIRED.

11. PRESSURE TESTING SHALL BE WITNESSED BY AN ENGINEER'S REPRESENTATIVE. CONTRACTOR SHALL KEEP A WRITTEN RECORD OF PRESSURE TESTING RESULTS AND TAKE PHOTOS OF THE INITIAL AND FINAL PRESSURE READINGS ON EACH OF THE LINES AND PROVIDE THESE RECORDS TO THE ENGINEER TO DOCUMENT THE TESTING.

12. TESTING OF PVC PIPE SHALL BE PERFORMED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN SECTION 7 OF ANSI/AWWA STANDARD C605. TESTING OF HDPE PIPE SHALL BE PERFORMED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN ASTM F2164. HYDROSTATIC TESTING SHALL BE PERFORMED AS FOLLOWS:

a. FILL PIPELINE SLOWLY TO MINIMIZE AIR ENTRAPMENT AND SURGE PRESSURES. FILL RATE SHALL NOT EXCEED ONE FOOT OF PIPE LENGTH PER SECOND IN THE PIPE BEING TESTED
b. EXPELL AIR FROM PIPE AS REQUIRED. OBTAIN APPROVAL OF ENGINEER PRIOR TO TAPPING PIPE FOR EXPELLING AIR.
c. EXAMINE JOINTS AND VALVES, AND MAKE REPAIRS TO ELIMINATE VISIBLE LEAKAGE.
d. FOR PVC PIPE, AFTER SPECIFIED WETTING PERIOD, ADD FLUID AS REQUIRED TO PRESSURIZE LINE TO REQUIRED TEST PRESSURE. MAINTAIN TEST PRESSURE FOR A STABILIZATION PERIOD OF TEN MINUTES BEFORE BEGINNING TEST.
e. FOR HDPE PIPE, AFTER FILLING PIPE, GRADUALLY PRESSURIZE PIPE TO TEST PRESSURE AND MAINTAIN REQUIRED TEST PRESSURE FOR THREE HOURS FOR PIPE TO EXPAND. DURING EXPANSION, ADD FLUID TO MAINTAIN REQUIRED TEST PRESSURE. BEGIN TIMED TEST PERIOD AFTER EXPANSION PERIOD AND OTHER REQUIREMENTS ARE MET.
f. TEST PRESSURE IS 8 PSI FOR BIOVENTING CONVEYANCE PIPING AND 14 PSI FOR BIOSPARGING CONVEYANCE PIPING (110% OF THE MAXIMUM EXPECTED LINE PRESSURE).
g. TIMED TEST PERIOD SHALL NOT BEGIN UNTIL AFTER THE PIPE HAS BEEN FILLED, EXPOSED TO THE REQUIRED WETTING PERIOD, AIR HAS BEEN EXPELLED AND PRESSURE STABILIZED.
h. TIMED TEST PERIOD SHALL NOT BEGIN UNTIL AFTER THE PIPE HAS BEEN FILLED, EXPOSED TO THE REQUIRED WETTING PERIOD, AIR HAS BEEN EXPELLED AND PRESSURE STABILIZED.
i. TIMED TEST PERIOD: AFTER THE STABILIZATION PERIOD, MAINTAIN TEST PRESSURE FOR AT LEAST 2 HOURS. DURING TIMED TESTING PERIOD, ADD FLUID AS REQUIRED TO MAINTAIN PRESSURE WITHIN 1 PSIG OF REQUIRED PRESSURE. FOR HDPE PIPE, AFTER THREE HOUR EXPANSION PHASE, DO NOT ADD ADDITIONAL FLUID. THE TEST PRESSURE SHALL THEN REMAIN STEADY FOR ONE HOUR INDICATING NO LEAKAGE.
j. PUMP FROM A TEST CONTAINER TO MAINTAIN TEST PRESSURE. MEASURE VOLUME OF FLUID PUMPED FROM TEST CONTAINER AND RECORD ON TEST REPORT. RECORD PRESSURE AT TEST PUMP AT 15 MINUTE INTERVALS FOR DURATION OF TEST.
k. TEST IS CONSIDERED PASSING IF PRESSURE DROP IS LESS THAN 5% OF TEST PRESSURE DURING THE COURSE OF THE TEST PERIOD.

13. CONTRACTOR IS REQUIRED TO SUPPLY ALL WATER AND EQUIPMENT NEEDED FOR HYDROSTATIC TESTING.

14. THOUGH NOT REQUIRED, IT IS ALSO RECOMMENDED THAT THE CONTRACTOR PERFORM SIMPLE VACUUM TESTS OF PIPING AT VARIOUS POINTS DURING INSTALLATION IN ORDER TO SIMPLIFY THE PROCESS OF IDENTIFYING AND REPAIRING ANY LEAKS DISCOVERED.

15. THE CONTRACTOR IS REQUIRED TO PROVIDE A PLAN TO THE ENGINEER TO COMPLETE HYDROSTATIC PRESSURE TESTING. A TESTING PROCEDURE MUST BE SUBMITED TO THE ENGINEER FOR REVIEW AND APPROVAL THE PRIOR TO THE START OF WORK.

16. ANY WATER THAT IS INTRODUCED INTO THE PIPING DURING PRESSURE TESTING OR THAT HAS OTHERWISE ACCUMULATED IN THE BELOW-GRADE PIPING DURING INSTALLATION SHALL BE REMOVED UPON COMPLETION OF THE WORK AND PRESSURE TESTING.

17. AS SHOWN ON DRAWING C-3, ALL UNDERGROUND PIPING TRENCHES WILL INCLUDE TRACER TAPE/WIRE FOR UTILITY LOCATING.

18. INSTALL EXPANSION LOOPS, OFFSETS AND ELBOWS ALONG ABOVE GRADE HDPE PIPING RUNS AS INDICATED ON DRAWINGS C-2 AND C-7.

19. ABOVE GRADE PIPING SHALL BE SUPPORTED AND SECURED AS SPECIFIED ON DRAWING C-7.

20. CONTRACTOR SHALL CONNECT BIOVENTING AND BIOSPARGING HEADER PIPES TO EXISTING HDPE PIPING CONDUITS EXTENDING BENEATH THE HIGHWAY AT EXISTING EXIT PITS ON THE NORTH AND SOUTH SIDES OF THE HIGHWAY AS SHOWN ON DRAWINGS M-5 AND M-6.

3.6 ELECTRICAL

THE ELECTRICAL SCOPE OF WORK INCLUDES THE FOLLOWING:

1. INSTALLATION OF A PROGRAMMABLE LOGIC CONTROLLER (PLC) TO CONTROL SYSTEM OPERATIONS, INCLUDING CONNECTION TO THE MAIN PLC ON THE VES SYSTEM, I-L, I-B, AND I-1 THROUGH I-8

2. THE EXISTING SCADA SYSTEM SHALL BE UPGRADED TO CONNECT TO THE PROPOSED PILOT BIOSPARGE/BIOVENT SYSTEM.

3. AS PART OF THE ELECTRICAL UPGRADE SCOPE OF THIS DESIGN, THE NEW PLC FOR CONTROL OF THE PROPOSED PILOT BIOSPAGE/BIOVENT SYSTEM, WILL BE CONNECTED TO THE MAIN SCADA SYSTEM VIA ETHERNET CABLE.

4. ELECTRICAL POWER FOR THE PILOT SYSTEM ENCLOSURE WILL BE INSTALLED AS SHOWN ON FIGURES E-1, THROUGH E-6. THE ELECTRICAL DESIGN HAS DETERMINED THAT THE CURRENT DISTRIBUTION PROVIDED TO THE MOTOR CONTROL CENTER LOCATED IN THE VES SYSTEM BUILDING SHOULD BE SUFFICIENT AT THE ANTICIPATED ELECTRICAL LOAD, AND HAS SPARE DISCONNECTS AVAILABLE.

5. ADDITIONAL DETAILS FOUND ON ELECTRICAL DRAWINGS.

3.7 REMEDIATION SYSTEM CONSTRUCTION AND STARTUP

1. THE CONTRACTOR SHALL INSTALL A NEW BIOSPARGING/BIOVENTING PIPING MANIFOLD ENCLOSURE AT THE LOCATION SHOWN ON DRAWING C-2.

2. SYSTEM MANIFOLD WILL BE INSTALLED WITHIN A PREFABRICATED 6'X10' WINDOWLESS METAL SHED WITH LOCKABLE DOORS, PURCHASED BY THE CONTRACTOR, AS SHOWN ON DRAWING C-6. THE SHED FOUNDATION WILL BE A 6" LAYER OF COMPACTED NO. 2A OR NO. OGS COARSE AGGREGATE EXTENDING 1 FOOT OUT FROM THE SHED'S FOOTPRINT. BIOSPARGING AND BIOVENTING MANIFOLD CONFIGURATIONS AND CONNECTION DETAILS ARE ILLUSTRATED ON DRAWINGS M-3 AND M-4. PROCESS AND INSTRUMENTATION DIAGRAMS FOR THE BIOSPARGING AND BIOVENTING SYSTEMS ARE PROVIDED ON DRAWINGS PID-1 AND PID-2.

3. THE CONTRACTOR SHALL INSTALL THE BIOVENTING AND BIOSPARGING SYSTEM EQUIPMENT AT THE EXISTING SITE REMEDIATION BUILDING COMPOUND, USING COMBINATION OF EXSITING EQUIPMENT THAT WILL BE REPURPOSED FROM ANOTHER FORMER REMEDIATION SYSTEM STAGED AT THE SITE, AND EQUIPMENT PURCHASED NEW. THE LAYOUT OF THE BIOVENTING/BIOSPARGING SYSTEM EQUIPMENT AT THE EXISTING REMEDIATION BUILDING IS ILLUSTRATED ON DRAWINGS C-4 AND C-5. A SYSTEM EQUIPMENT AND INSTRUMENTATION CONSTRUCTION LIST IS PROVIDED ON DRAWING G-3.

4. EXISTING EQUIPMENT WILL BE PROVIDED BY THE ENGINEER/OWNER'S AGENT AND AVAILABLE ONSITE PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PURCHASING ALL NEW EQUIPMENT AND MATERIALS REQUIRED TO CONSTRUCT THE SYSTEM.

5. CONTRACTOR TO SUPPLY AND INSTALL A 20 POUND ABC FIRE EXTINGUISHER INSIDE THE SYSTEM MANIFOLD ENCLOSURE IN ACCORDANCE WITH LOCAL FIRE CODES.

6. THE CONTRACTOR SHALL EXTEND THE CURRENT CONCRETE PAD IN THE UTILITY ROOM IN THE EXISTING REMEDIATION BUILDING AS DETAILED ON DRAWING C-4, TO PROVIDE A STABLE AND LEVEL PLATFORM ON WHICH TO PLACE THE BIOVENTING AND BIOSPARGING BLOWERS.

CONCRETE NOTES:

a. CONCRETE PAD SHALL HAVE THE FOLLOWING PROPERTIES
   1. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: 3,200 POUNDS PER SQUARE INCH (PSI).
   2. WATER / CEMENT RATIO MAXIMUM OF 0.50.
   3. 6% +/- 1% AIR ENTRAINMENT.
b. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "SPECIFICATIONS FOR STRUCTURAL CONCRETE" ACI 301.
c. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
d. CALCIUM CHLORIDE SHALL NOT BE PERMITTED NOR SHALL ANY ADMIXTURE CONTAINING CHLORIDE BE PERMITTED THAT RESULTS IN A TOTAL CONCRETE MIX IN WHICH THE PRESENCE OF CHLORIDE IONS EXCEED 0.15 PERCENT BY WEIGHT OF CEMENT.
e. CONCRETE FINISHING
   UNFORMED SURFACES: ACI 301, 5.3.4.2.C BROOM FINISH.
f. CURING MATERIALS
   MEMBRANE CURING COMPOUND: ASTM C309, TYPE I-D, CLASS B, CLEAR WITH FUGITIVE DYE WHICH DISAPPEARS APPROXIMATELY 24 HOURS AFTER EXPOSURE TO SUNLIGHT.

7. CONTRACTOR SHALL RELOCATE THE EXISTING AIR COMPRESSOR AND CHILLER UNITS ON THE EXISTING CONCRETE PAD IN THE UTILITY ROOM AS DETAILED ON DRAWING C-4, TO ACCOMMODATE EXPANSION OF THE CONCRETE PAD AND INSTALLATION OF THE BIOVENTING AND BIOSPARGING BLOWERS.

8. UPON COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL TEST THE REMEDIATION SYSTEM EQUIPMENT TO CONFIRM THAT IT IS ALL WORKING PROPERLY. THE CONTRACTOR SHALL THEN PROVIDE A TECHNICIAN FAMILIAR WITH THE SYSTEM AND ITS OPERATION TO WORK WITH THE ENGINEER FOR A 2 DAY PERIOD OF SYSTEM STARTUP AND OPERATIONAL TESTING

3.8 AS-BUILT SURVEY/DOCUMENTATION

1. UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AS-BUILT RECORD DRAWINGS (RED LINES) SHOWING ACTUAL DETAILS, DIMENSIONS, SURVEYED LOCATIONS/ELEVATIONS AND OTHER PERTINENT FEATURES, AND IDENTIFY ANY DEVIATIONS FROM THE ORIGINAL DESIGN.

2. THE AS-BUILT DRAWINGS SHALL BE BASED UPON AN ACTUAL LAND SURVEY OF FINAL POST-CONSTRUCTION CONDITIONS COMPLETED BY A PENNSYLVANIA LICENSED SURVEYOR. THE SURVEY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING SITE FEATURES: ALL NEW AND WELLS WITHIN THE CONSTRUCTION AREA (INCLUDING GROUND SURFACE AND TOP OF CASING ELEVATIONS); BELOW-GRADE PIPING TRENCHES AND ABOVE-GRADE CONVEYANCE PIPING RUNS; AND SYSTEM MANIFOLD ENCLOSURE. WELL TOP OF CASING AND GROUND SURFACE ELEVATIONS SHALL BE SURVEYED TO AN ACCURACY OF 0.01-FOOT. THE ENGINEER SHALL PROVIDE AN AUTOCAD FILE OF EXISTING SITE PLAN TO BE USED AS A BASE MAP FOR THE AS-BUILT SURVEY DRAWING.

4.0 OPTIONAL WORK

1. REPLACEMENT OF BOTH THE SOUTH AND NORTH SKIMMER SYSTEM CONTROL PANELS TO ALLOW COMMUNICATION WITH THE EXISTING SCADA SYSTEM AS SHOWN ON SHEETS I-N0 THROUGH I-N5 AND SHEETS I-S0 THROUGH I-S8.

2. INTEGRATING THE SOUTH AND NORTH SIDE SKIMMING SYSTEMS WITH THE EXISTING SCADA SYSTEM.

3. A RADIO WILL BE INSTALLED IN THE MAIN CONTROL PANEL (MCP) INSIDE OF THE VES CONTROL ROOM. THIS HARDWARE ALONG WITH THE NECESSARY ANTENNAS WILL ALLOW FOR THESE OPTIONAL SYSTEMS TO COMMUNICATE WITH EACH OTHER.

4. INSTALLATION OF SOUND-DEADENING WALLS AND/OR PANELS IN THE UTILITY ROOM AROUND THE BIOVENT/BIOSPARGE BLOWERS, IF DEEMED NECESSARY BASED ON SUSTAINED SOUND LEVELS ABOVE 85 DECIBELS.

5.0 CONSTRUCTION SCHEDULE

1. THE CONTRACTOR SHALL CONFIRM A CONSTRUCTION SCHEDULE WITH THE ENGINEER'S PROJECT MANAGER AT LEAST 14 DAYS PRIOR TO START OF WORK.

2. THE PROPOSED CONSTRUCTION SCHEDULE SHALL BE PRESENTED IN A TIMELINE FORMAT/GANTT CHART SHOWING ESTIMATED START DATE, DURATION, AND, COMPLETION TIMES FOR EACH ACTIVITY. ANY DEVIATION FROM THE ORIGINALLY PROPOSED SCHEDULE MUST BE COMMUNICATED TO THE ENGINEER'S PROJECT MANAGER WITHIN 24 HOURS.

6.0. SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE ENGINEER FOR REVIEW AND APPROVAL A MINIMUM OF 14 DAYS PRIOR TO THE START OF CONSTRUCTION.
   a. LIST OF PROPOSED MATERIALS AND SUBCONTRACTORS.
   b. SHOP DRAWINGS AND/OR SPECIFICATIONS FOR ANY PROPOSED EQUIPMENT/MATERIALS THAT VARY FROM THOSE IDENTIFIED IN THE SPECIFICATIONS.
   c. REQUIRED HAZWOPER TRAINING RECORDS FOR ALL CONTRACTOR AND SUBCONTRACTOR EMPLOYEES.
   d. CONSTRUCTION SCHEDULE
   e. ACCIDENT PREVENTION PLAN AND ACTIVITY HAZARD ANALYSIS
2. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE ENGINEER WITHIN 30 DAYS FROM COMPLETION OF WORK.
   a. AS BUILT RECORD DRAWINGS (RED LINES), INCLUDE ORIGINAL CADD FILES AND SURVEY DATA.
   b. MANUFACTURER DESCRIPTIONS, TECHNICAL SPECIFICATIONS, SHOP DRAWINGS, AND PRODUCT DATA FOR ANY EQUIPMENT/MATERIALS INSTALLED THAT DEVIATED FROM OR WERE NOT INCLUDED IN THE ORIGINAL SPECIFICATIONS.
   c. MANUFACTURER WARRANTIES.
   d. DATA FROM LEAKAGE TESTING OF CONVEYANCE PIPING.
   e. SOIL BORING/WELL CONSTRUCTION LOGS.
   f. SUPPORTING DATA OR CERTIFICATIONS AS APPROPRIATE.



CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
C:\Users\cmckeough\Dropbox (ARCADIS US, Inc)\USACE - PHILADELPHIA DISTRICT\USACE Workplan for Bioventing\2018\05262046.0010\Revised Work Plan\01-DWG\05262046-G01.dwg LAYOUT: G-2 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP:--
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No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587

State	Date Signed	Project Mgr.
PA	6/13/18	ML

Designed by	Drawn by	Checked by
EM	CCM	CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

G-2

BIOVENTING SYSTEM

TUTHILL PNEUMAX COMPETITOR SL 3006-22L2, 2 LOBE MODEL WITH 7.5 HP MOTOR

RATED FOR 4.2 PSIG @ 313 SCFM

EXISTING ONSITE EQUIPMENT TO BE REPURPOSED

ITEM	ITEM DESCRIPTION
1.	VI-101 - VACUUM GAUGE (0-30 IHG), QTY. 1
2.	PDI-101 - DIFFERENTIAL PRESSURE INDICATOR, DWYER INSTRUMENTS # 2020 (0-20 IWC). TO BE REUSED ON NEW INLET AIR FILTER, QTY. 1
3.	7 1/2 HP TEFC MOTOR, MARATHON ELECTRIC #213TTFC4026
4.	BLOWER, TUTHILL PNEUMATICS SL-3006-22L2
5.	PNEUMAX 300 SOUND-DEADENING ENCLOSURE, TUTHILL PNEUMATICS, INCLUDES
	a. DISCHARGE SILENCER (S-102)
	b. CHECK VALVE (CV-101)
	c. EXISTING VACUUM RELIEF VALVE - TO BE REMOVED OR DISABLED
6.	TISH-101 - NEMA 4 TEMPERATURE SWITCH, ASHCROFT #T424-TS-040-75/205° F (75 - 205 F), WITH 1/2" THERMOWELL, KOENIG-PRETEMPCO #KP140051A, QTY. 1
7.	PI-101 - BLOWER EFFLUENT PRESSURE GAUGE (0-15 PSI), QTY. 1
8.	TI-102 - BLOWER EFFLUENT TEMPERATURE GAUGE, NOSHOK #30.110.025.0-250° F, QTY. 1
9.	2" BRASS BLEED AIR VALVE, APOLLO #64-108-01, QTY. 1
10.	FI-BV-01 – FI-BV-07 - ROTAMETER FLOW METERS, KING INSTRUMENTS (4 - 48 SCFM) 7510-1-3-7A07, BRASS FITTINGS, QTY. 7
11.	PI-102 , PI-103, PI-104, AND PI BV-01 TO PI BV-07 - PRESSURE GAUGE, ASHCROFT (0-15 PSI), ¼" ID, QTY. 10

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	F-101 - 4" INLET AIR FILTER, QTY. 1
	a. MANUFACTURER: SOLBERG
	b. MODEL #: CSL-235P-400
	c. MAX FLOW RATE: 520 SCFM
	d. STYLE: MPT
	e. TEMP RATE: -15 TO 220 F
	f. MEDIA: POLYESTER
2.	NEW SHEAVING AND BELT FOR SL-3006-22L2 BLOWER
	a. MANUFACTURER: TUTHILL
	b. PART #S
	i. 23252-3 - 3" 3V SHEAVE, QTY. 1
	ii. 23252-13 - 6" 3V SHEAVE, QTY. 1
	iii. 23301-3 - JA 0.875 BUSHING, QTY. 1
	iv. 23532-7 - SH 1.375 BUSHING, QTY. 1
	v. 28210-13 - 3VX500 BELT, QTY. 2
3.	PIT-101 - PRESSURE TRANSMITTER, QTY. 1
	a. MANUFACTURER: OMEGA
	b. MODEL #: PX171-015GI
	c. PRESSURE RANGE: 15 PSIG
	d. CONNECTOR: MINI-DIN
	e. OUTPUT: 4 - 20 MA
4.	PRV-101 - 2" PRESSURE RELIEF VALVE, QTY. 1
	a. MANUFACTURER: KUNKLE
	b. MODEL #: 0337-H01ANE0007
	c. CONNECTION: 2"
	d. SET PRESSURE: 7 PSI
	e. MATERIAL: BRONZE
	f. VALVE: NON-CODE AIR/GAS
	g. SPRING: SST TYPE 17-7
5.	HEAT EXCHANGER WITH CONDENSATE DRAIN, QTY. 1
	a. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.
	b. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC. MODEL #: ACA-4361-3-G-T
	c. MATERIALS: STANDARD WITH GALVANIZED CABINET AND HERESITE COATED CORE AND FAN
	d. MOTOR: 60 HZ, 230/460 V, 3 PHASE, 1 HP
	e. OTHER: ½" FNPT 316 STAINLESS STEEL BALL VALVE ON CONDENSATE DRAIN
6.	FI-101 - FLOW METER FOR 4" PIPE (IN-LINE FLOW SENSOR), QTY. 1
	a. MANUFACTURER: DWYER INSTRUMENTATION
	b. MODEL #: DS-300 SERIES
	c. PART NUMBER: DS-300-4"
	d. DIFFERENTIAL PRESSURE RANGE: 0.28 - 34" WC
	e. TEMPERATURE: 0 TO 200F
7.	PDI-102 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 1
	a. MANUFACTURER: DWYER
	b. MODEL#: 2002
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 2" WC
	d. CONNECTIONS: 1/8" FNPT
	e. MAX PRESSURE RATING: 35 PSI
8.	PDIT-101 - DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER, QTY. 1
	a. MANUFACTURER: ASHCROFT
	b. MODEL #: IX3F0242STP2IW
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 2" WC
	d. 4 - 20 MA OUTPUT SIGNAL
9.	FI-102 - FLOW METER FOR 3" PIPE (IN-LINE FLOW SENSOR), QTY. 1
	a. MANUFACTURER: DWYER INSTRUMENTATION
	b. MODEL #: DS-300 SERIES
	c. PART NUMBER: DS-300-3"
	d. DIFFERENTIAL PRESSURE RANGE: 0.39 - 35" WC
	e. TEMPERATURE: 0 TO 200F
10.	PDI-103 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 1
	a. MANUFACTURER: DWYER
	b. MODEL#: 2003
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 3" WC
	d. CONNECTIONS: 1/8" FNPT
	e. MAX PRESSURE RATING: 35 PSI
11.	2" INLINE BLEED AIR SILENCER, QTY. 1
	a. MANUFACTURER: UNIVERSAL
	b. MODEL #: U5-2
12.	4" BRASS BALL VALVE, QTY. 1
13.	2" BRASS BALL VALVE, QTY. 11
14.	1/4" BALL VALVE, BRASS, FOR VACUUM AND PRESSURE GAUGE ISOLATION VALVES AND SAMPLE PORTS. QTY. 23
15.	2" BRASS GATE VALVE, QTY. 8
14.	4" BY 2" GCSP REDUCER, QTY. 6
15.	2" BY 1/4" GCSP REDUCER, QTY. 7
16.	4" HDPE BY 4" GCSP TRANSITION, QTY. 2



BIOSPARGING SYSTEM

TUTHILL PNEUMAX COMPETITOR SL 3003-22L2, 2 LOBE MODEL RATED FOR 120 SCFM @ 12 PSIG WITH UPGRADE TO 10 HP MOTOR

EXISTING ONSITE EQUIPMENT TO BE REPURPOSED

ITEM	ITEM DESCRIPTION
1.	VI-201 - VACUUM GAUGE (0-30 IHG), QTY. 1
2.	BLOWER, TUTHILL COMPETITOR SL 3003-22L2, 2 LOBE MODEL
3.	INLET AIR FILTER, SOLBERG MANUFACTURING - ASSEMBLY MODEL # CSL-851-250HC, REPLACEMENT ELEMENT # 851, QTY. 1
4.	PNEUMAX 300 SOUND-DEADENING ENCLOSURE, TUTHILL PNEUMATICS, INCLUDES
	a. DISCHARGE SILENCER (S-202)
	b. CHECK VALVE (CV-201)
	c. EXISTING PRESSURE RELIEF VALVE TO BE REPLACED (SEE BELOW)
5.	TI-202 - TEMPERATURE GAUGE, NOSHOK #30.110.025.0-250° F, QTY. 1
6.	PI-201 - PRESSURE GAUGE (0-15 PSI), QTY. 1
7.	TISH-203 - NEMA 4 TEMPERATURE SWITCH, ASHCROFT # T424-TS-040-75/205° F, INCLUDES 1/2" THERMOWELL, KOENIG-PRETEMPCO #KP140051A, QTY. 1
8.	2" BLEED AIR VALVE ASSEMBLY (GASHO #US-2), INCLUDES:
	a. 2" BRASS BALL VALVE, APOLLO #64-108-01
	b. 2" INLINE SILENCER, UNIVERSAL U5-2
9.	1" BRASS BALL VALVE - QTY. 10

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	PDI-201 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR - QTY. 1
	a. MANUFACTURER: DWYER INSTRUMENTS
	b. MODEL #: 2020
	c. CONNECTIONS: 1/8" FNPT
	d. RANGE: 0-20 INCHES WC
	e. MAX TEMPERATURE: 140 F
	f. OTHER: BRASS BALL VALVES ON TUBE CONNECTIONS TO LINE
2.	10 HP BLOWER MOTOR
	a. MANUFACTURER: BALDOR
	b. MODEL #: IDM3774T
	c. POWER: 460 V, 3-PHASE, 60 HZ
	d. FRAME: 215T
	e. SPEED 1,800 RPM
	f. INVERTER DUTY
3.	NEW SHEAVING AND BELT FOR SL-3006-22L2 BLOWER
	a. MANUFACTURER: TUTHILL
	b. PART #S
	c. 23532-3 - 0.875" SH BUSHING, QTY. 1
	d. 23128-6 - 1.375" SDS BUSHING, QTY. 1
	e. 28210-45 - 3VX487 BELT, QTY. 3
	f. 23106-4 - 3.5 OD 3V SHEAVE (QD), QTY. 1
	g. 23106-11 - 5.3 OD 3V SHEAVE (QD), QTY. 1
4.	PIT-201 - PRESSURE TRANSMITTER, QTY. 1
	a. MANUFACTURER: OMEGA
	b. MODEL #: PX171-015GI
	c. PRESSURE RANGE: 15 PSIG
	d. CONNECTOR: MINI-DIN
	e. OUTPUT: 4 - 20 MA
5.	PRV-201 - PRESSURE RELIEF VALVE, QTY. 1
	a. MANUFACTURER: KUNKLE
	b. MODEL #: 337-H01ANM0012
	c. CONNECTION: 2"
	d. SET PRESSURE: 12 PSI
	e. MATERIAL: BRONZE
	f. VALVE: NON-CODE AIR/GAS
	g. SPRING: SST TYPE 17-7
6.	HEAT EXCHANGER WITH CONDENSATE DRAIN, QTY. 1
	a. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.
	b. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.ODEL #: ACA-3361-3-G-T
	c. MATERIALS: STANDARD WITH GALVANIZED CABINET AND HERESITE COATED CORE AND FAN
	d. MOTOR: 60 HZ, 230/460 V, 3 PHASE, 1 HP
	e. OTHER: ½" FNPT 316 STAINLESS STEEL BALL VALVE ON CONDENSATE DRAIN
7.	FI-201 & FI-202 - FLOW METER FOR 2" PIPE (IN-LINE FLOW SENSOR), QTY. 2
	a. MANUFACTURER: DWYER INSTRUMENTATION
	b. MODEL #: DS-300 SERIES
	c. PART NUMBER: DS-300-2"
	d. DIFFERENTIAL PRESSURE RANGE: 0.75 - 75" WC
	e. TEMPERATURE: 0 TO 200F
8.	PDI-202 & PDI-203 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 2
	a. MANUFACTURER: DWYER
	b. MODEL#: 2002
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 4" WC
	d. CONNECTIONS: 1/8" FNPT
	e. MAX PRESSURE RATING: 35 PSI
	f. OTHER: BRASS BALL VALVES ON TUBING CONNECTIONS TO FLOW METER
9.	PDIT-201 - DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER, QTY. 1
	a. MANUFACTURER: ASHCROFT
	b. MODEL #: IX3F0242STP5IW
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 5" WC
	d. 4 - 20 MA OUTPUT SIGNAL
10.	TI-203 - TEMPERATURE GAUGE (0 - 250 F), QTY. 1
	a. MANUFACTURER: PYROMATION
	b. MODEL #: SERIES 440
	c. SHEATH: 1/4 INCH
	d. THERMOWELL: 3/4 INCH
	e. MATERIAL: 316 SS
	f. ELEMENT CONNECTION: 3 WIRE
	g. TEMP: 0-250 F
11.	PI-202, 203, 204, PI-BS-01 – PI-BS-14 - PRESSURE GAUGE, 0-20 PSI, QTY. 17
	a. MANUFACTURER: ASHCROFT
	b. MODEL #: 30ZZ91
	c. CONNECTION: ¼" NPT
	d. GAUGE TYPE: PROCESS
	e. DIAL SIZE: 4-1/2"
	f. MATERIAL: 316 SS
	g. RANGE: 0-30 PSI
12.	ROTAMETER FLOW METERS, KING INSTRUMENTS (0 - 14 SCFM) - QTY. 14
	a. MANUFACTURER: KING INSTRUMENTS
	b. MODEL #: 7510-2-3-7A-03
	c. CONNECTION: ¾" FNPT
	d. FLOW RATE: 0-14 SCFM
	e. MATERIAL: BRASS
13.	2" BRASS BALL VALVE, QTY. 4
14.	1/4"BRASS BALL VALVE, QTY. 37
15.	1" BRASS GATE VALVE, QTY. 15
16.	2" GCSP BY 2" HDPE TRANSITION, QTY. 2
17.	2" HDPE BY 3" HDPE EXPANSION, QTY. 1
18.	3" HDPE BY 2" HDPE REDUCER, QTY. 1
19.	2" BY 1" GCSP REDUCER, QTY. 16
20.	1" BY 1/4" GCSP REDUCER, QTY. 14

MANIFOLD ENCLOSURE

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	WINDOWLESS STEEL FRAMED SHED OR OUTBUILDING, MEASURING 9' X 12' WITH FLOOR, WEATHER RESISTANT SKIDS, AND A LOCKABLE DOOR. STEEL SHED- QTY. 1
	a. SELLER: GRAINGER
	b. ITEM/MODEL #: 2RMZ2 (OR SIMILAR)
	c. INSIDE DIMENSIONS: 78 INCHES HIGH X 106 INCHES WIDE X 148 INCHES DEEP
	d. SINGLE SWING-OUT DOOR, LOCKABLE
	e. MATERIAL: CORRUGATED GALVANIZED STEEL PANEL
	f. FLOOR: WOOD
	g. BASE: STONE, COMPACTED NO. 2A OR NO. OGS COARSE AGGREGATE, 6 INCHES THICK
2.	SOLAR POWERED MOTION SENSING INTERIOR LED LIGHT.
3.	20 POUND ABC-RATED FIRE EXTINGUISHER IN AN ALL-WEATHER CABINET.

MISCELLANEOUS EQUIPMENT

EXISTING EQUIPMENT

ITEM	ITEM DESCRIPTION
1.	TEMPORARY FENCE PANEL, QTY. 11

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	1" SDR-11 HDPE TO GALVANIZED STEEL TRANSITION FITTING FOR BIOSPARGE SUBSURFACE CONVEYANCE PIPING STUB-UPS AT MANIFOLD, QTY. 14
	a. MANUFACTURER: CONTINENTAL (AVAILABLE FROM - HDPE SUPPLY), OR APPROVED EQUIVALENT
	b. PART #: C4949-00 1914-00
	c. SIZE # 1" BY 1"
	d. 1" BUTT FUSION X 1" MNPT THREAD
2.	1" SCH 40 PVC TO SDR-11 HDPE TRANSITION FITTING FOR SUBSURFACE CONVEYANCE PIPING CONNECTIONS TO BIOSPARGE WELLHEADS, QTY. 14
	a. MANUFACTURER: POLY-CAM
	b. MODEL #: SERIES 737 ID CONTROLLED PVC/HDPE TRANSITION FITTING
	c. SIZE: 1" NOMINAL

NOTES

1. SEE ELECTRICAL AND INSTRUMENTATION DRAWINGS FOR EQUIPMENT LIST/SPECIFICATIONS FOR ELECTRICAL AND CONTROL WIRING AND INSTALLATION
2. ALL EQUIPMENT INSTALLED AND WIRED PER N.E.C. NEMA 4 NON-HAZARDOUS LOCATION AND U

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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Professional Engineer's Name	MATTHEW T. SWENSSON
Professional Engineer's No.	PE077587
State	PA
Date Signed	6/13/18
Project Mgr.	ML
Designed by	EM
Drawn by	CCM
Checked by	CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

MAJOR EQUIPMENT AND INSTRUMENT LIST

PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

G-3

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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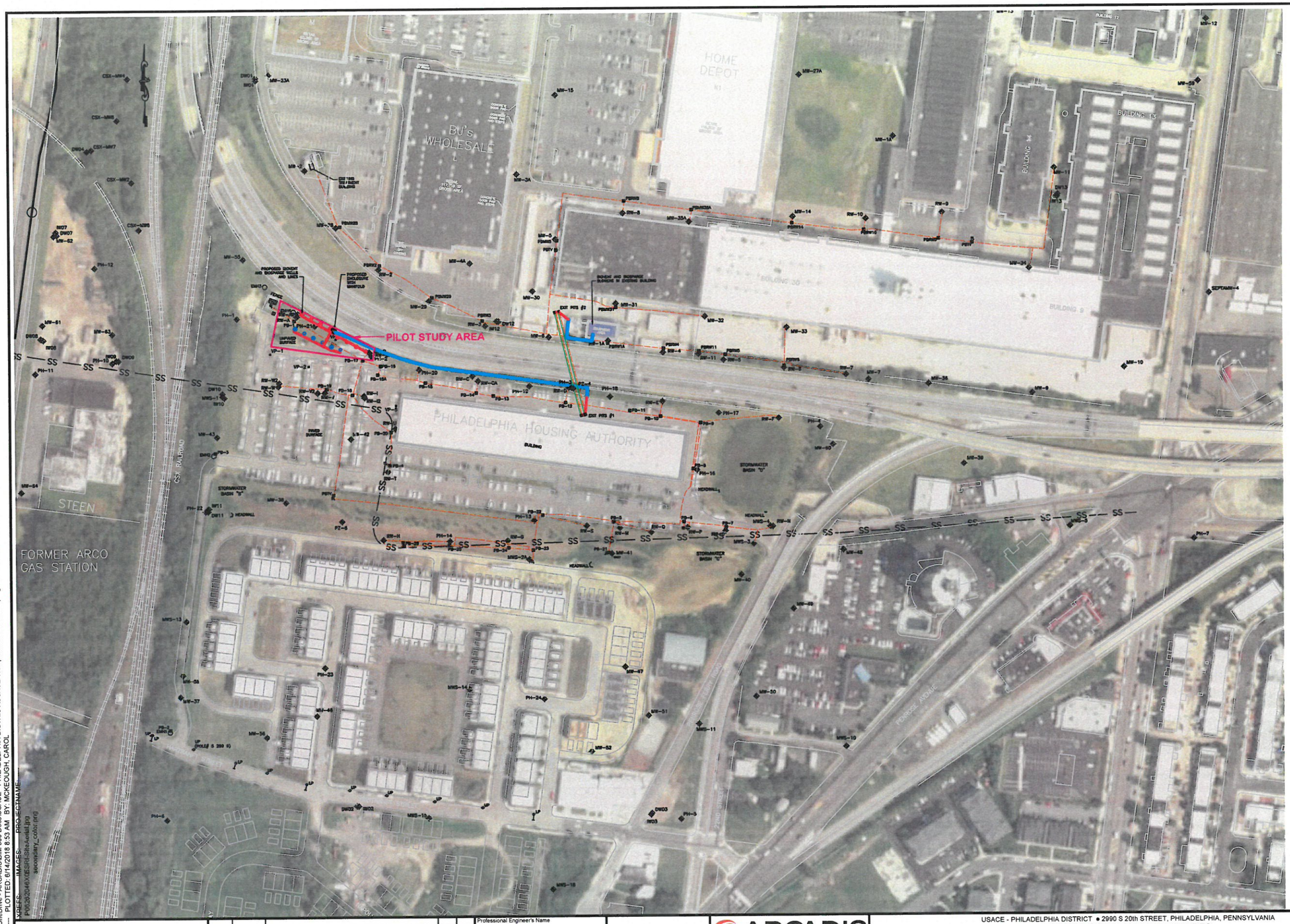

LEGEND:

- FENCE
- UTILITY POLE
- LIGHT POLE
- SHALLOW OR INTERMEDIATE WELL
- DEEP WELL
- VAPOR POINTS
- PB-10 ELECTRICAL PULL BOX
- WELL VAULT
- TERMINATION VAULT
- REMEDIATION SYSTEM TRENCH ROUTE
- ABANDONED ELECTRICAL CONDUIT
- ELECTRIC/COMMUNICATIONS LINE
- SS SEWER LINE (LOCATION APPROXIMATE)
- SD STORM DRAIN LINE (LOCATION APPROXIMATE)
- ELECTRICAL TRANSFORMER
- EMH4 ELECTRICAL MANHOLE
- PROPOSED ABOVE GRADE PIPING ON UNISTRUT RACK
- PROPOSED BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
- EXISTING BURIED CONDUIT

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTES:

CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC, DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."
2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1987. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.
5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 16, 2007. DWG: SK041007.
6) UTILITY PLAN, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.
7) PIPING TRENCH SURVEY, DENNIS W. SKLAR, INC.-PROFESSIONAL LAND SURVEYING, BENSALEM, PA, JUNE 6, 2010.
8) AERIAL PHOTO SOURCED FROM ESRI ARCMAP.

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Professional Engineer's Name	MATTHEW T. SWENSSON		
Professional Engineer's No.	PE077587		
State	PA	Date Signed	6/13/18
Project Mgr.	ML		
Designed by	EM	Drawn by	CCM
Checked by	CD/MS		

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

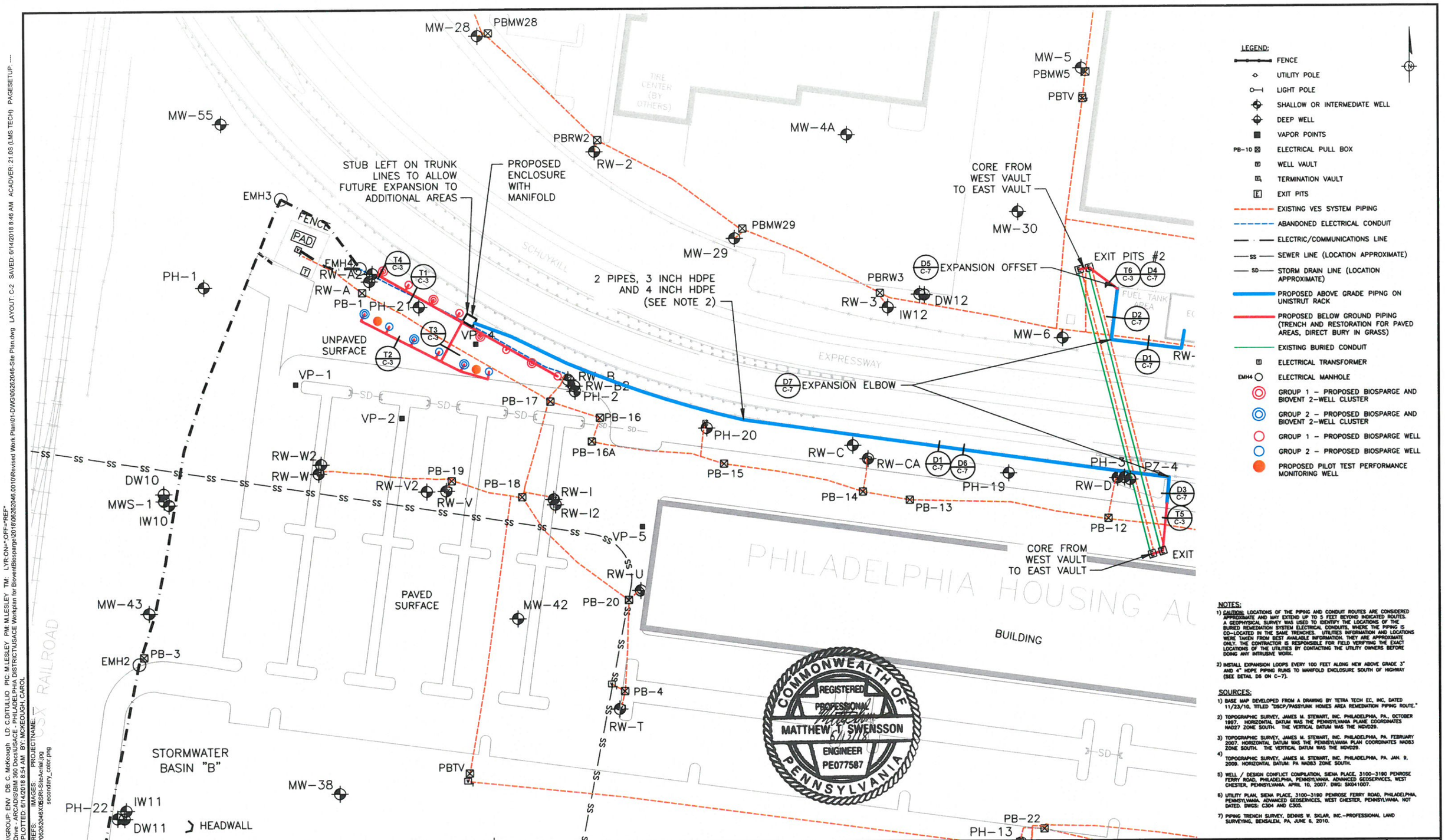
SITE PLAN

PROCESS

ARCADIS Project No.	06262046.0005.00004
Date	JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-1



NOTES:

1) CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS. WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

2) INSTALL EXPANSION LOOPS EVERY 100 FEET ALONG NEW ABOVE GRADE 3" AND 4" HDPE PIPING RUNS TO MANIFOLD ENCLOSURE SOUTH OF HIGHWAY (SEE DETAIL D6 ON C-7).

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC, DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."

2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.

3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.

4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.

5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 10, 2007. DWG: SK041007.

6) UTILITY PLAN, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.

7) PIPING TRENCH SURVEY, DENNIS W. SIGLAR, INC.–PROFESSIONAL LAND SURVEYING, BENSALEM, PA. JUNE 6, 2010.

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Professional Engineer's Name	MATTHEW T. SWENSSON		
Professional Engineer's No.	PE077587		
State	PA	Date Signed	6/13/18
Project Mgr.	ML		
Designed by	EM	Drawn by	CCM
Checked by	CD/MS		

ARCADIS

ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

PILOT TEST SYSTEM LAYOUT

PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-2

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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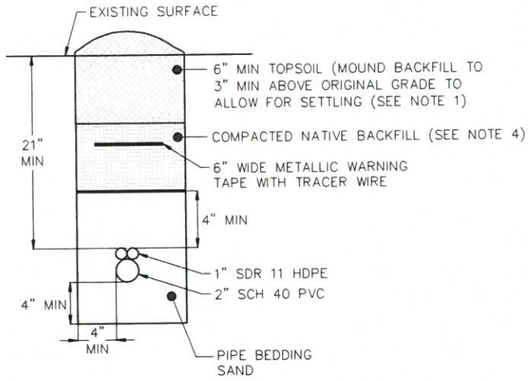
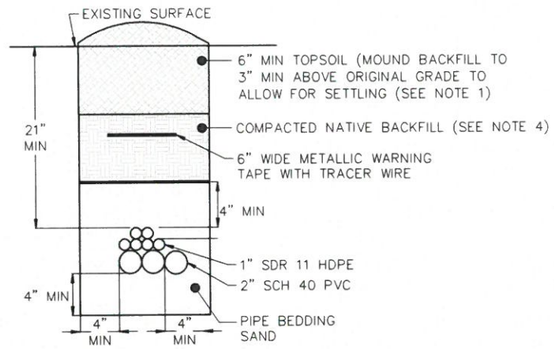


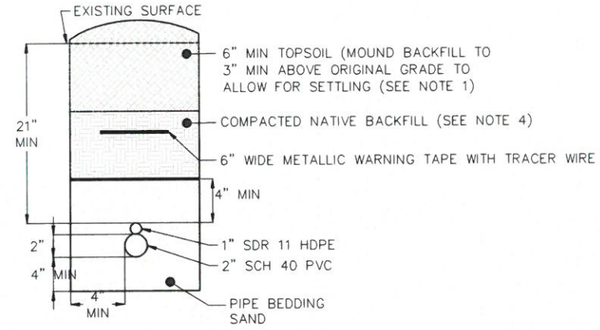
T1, T2 CROSS SECTION - UNPAVED SURFACE (T1 C-2) (T2 C-2)

NOT TO SCALE



T3 CROSS SECTION - UNPAVED SURFACE (T3 C-2)

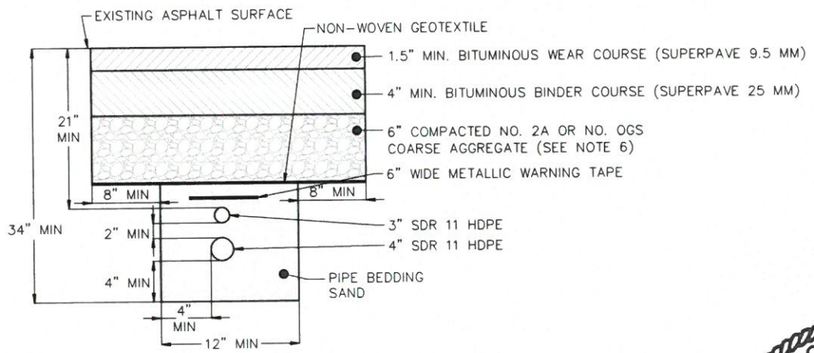
NOT TO SCALE



T4 TYPICAL CROSS SECTION - TO WELL CLUSTER (T4 C-2)

NOT TO SCALE

TABLE 1: PIPE RUN DETAILS				
TYPE	CONSTRUCTION	DIAMETER	DESCRIPTION	ASSOCIATED WELL TYPE
BIOSPARGING	SRD 11 HDPE	1"	COMPRESSED AIR DELIVERY LINE FROM MANIFOLD ENCLOSURE TO BIOSPARGING WELL	BS
BIOVENTING	SCH 40 PVC	2"	COMPRESSED AIR DELIVERY LINE FROM MANIFOLD ENCLOSURE TO BIOVENTING WELL	BV
BIOSPARGE HEADER	SRD 11 HDPE	3"	COMPRESSED AIR DELIVERY LINE FROM SYSTEM TO MANIFOLD ENCLOSURE	BS
BIOVENT HEADER	SRD 11 HDPE	4"	COMPRESSED AIR DELIVERY LINE FROM SYSTEM TO MANIFOLD ENCLOSURE	BV



T5, T6 CROSS SECTION - ASPHALT SURFACE (T5 C-2) (T6 C-2)

NOT TO SCALE



NOTES:

1. ONSITE TRENCHES WILL BE RESTORED TO MATCH EXISTING SURFACE COMPLETION. AREAS OF EXISTING ASPHALT SURFACE COMPLETION SHALL BE RESTORED TO THE MINIMUM SPECIFICATIONS SHOWN HERE AND AS DESCRIBED IN DRAWING G-1. CONTRACTOR TO RESEED IN VEGETATED AREAS WITH APPROPRIATE SEED MIX TO MATCH PRE-EXISTING GRASS COVER.
2. ARRANGEMENT OF PIPES SHOWN IN TRENCH CROSS SECTIONS IS FOR DEMONSTRATIVE PURPOSES ONLY AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND APPROVAL OF THE ENGINEER.
3. TRENCH BACKFILL AND PAVEMENT SUB-BASE MATERIAL SHALL BE PLACED AND COMPACTED IN 6" LIFTS AS SPECIFIED IN DRAWING G-1. DO NOT COMPACT TOPSOIL.
4. FOR TRENCHES IN UNPAVED AREAS, NATIVE EXCAVATION SPOIL WILL BE INSTALLED AS TRENCH BACKFILL FROM THE TOP OF THE PIPE BEDDING SAND TO A COMPACTED DEPTH OF 6" BELOW GRADE. IF NATIVE EXCAVATION SPOIL IS NOT SUITABLE FOR REUSE AS TRENCH BACKFILL (AS DEFINED IN DRAWING G-1), THEN USE SAND PIPE BEDDING INSTEAD.
5. ALL TRENCHES WILL BE EXCAVATED TO DEPTHS SHOWN ON THE CROSS-SECTIONS. NO TRENCHES WILL BE EXCAVATED TO GREATER DEPTH WITHOUT APPROVAL FROM THE ENGINEER. TRENCHES WILL NOT EXCEED 48" IN DEPTH WITHOUT ENGINEERING APPROVAL AND APPROPRIATE SAFETY MEASURES IN PLACE (E.G. TRENCH BOX).
6. RECYCLED CONCRETE AGGREGATE (RCA) MEETING REQUIRED SPECIFICATIONS IS AN ACCEPTABLE ALTERNATIVE FOR COARSE AGGREGATE (SEE DRAWING G-1).
7. ALL LOCATIONS WHERE TRENCHES CROSS EXISTING SUBGRADE PIPING MUST BE HAND CLEARED OR USE SOFT DIG TECHNOLOGY TO PREVENT DAMAGE.

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr.: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

TRENCHING DETAILS

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

C-3

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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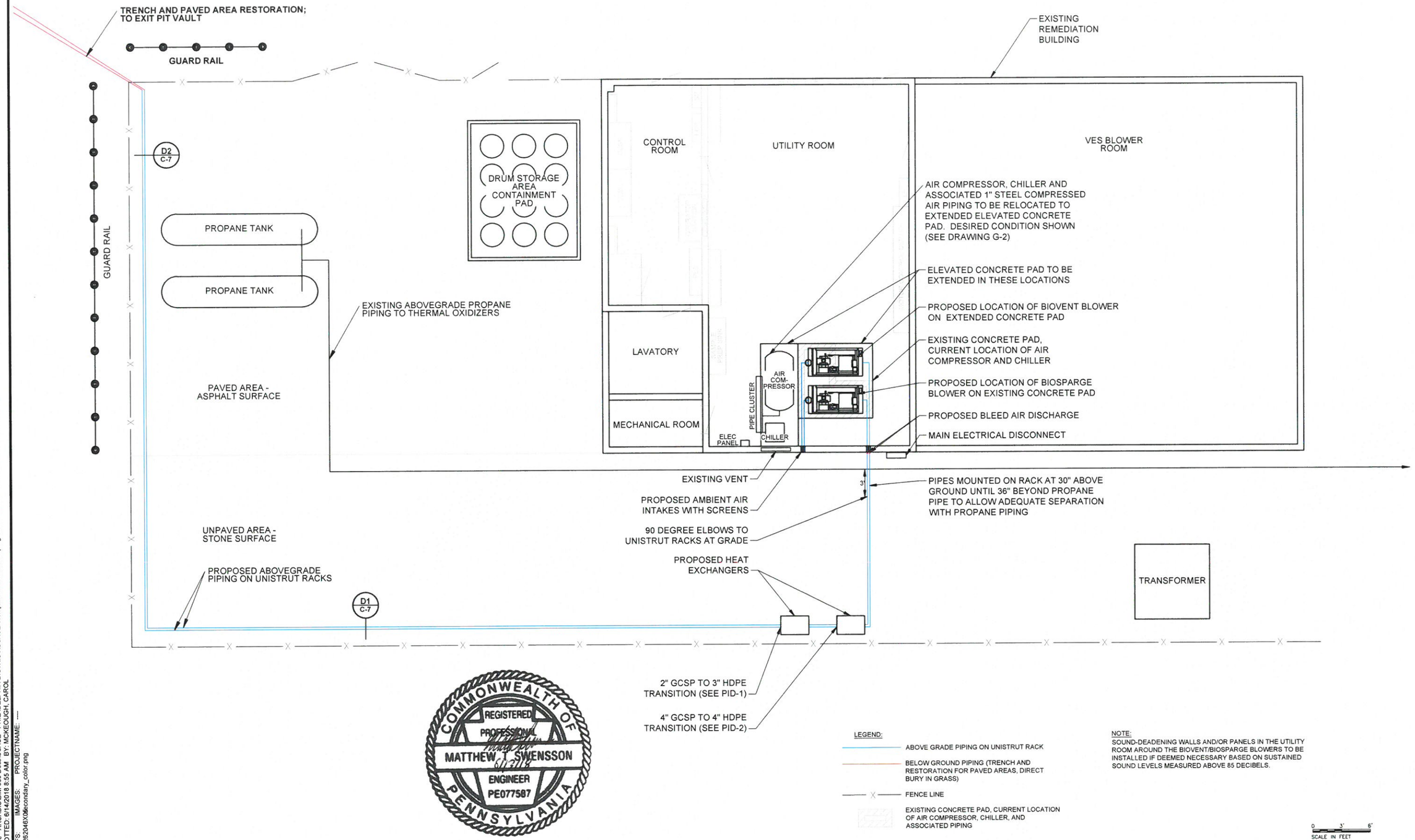

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587
6/13/18

LEGEND:
- ABOVE GRADE PIPING ON UNISTRUT RACK
- BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
- FENCE LINE
- EXISTING CONCRETE PAD, CURRENT LOCATION OF AIR COMPRESSOR, CHILLER, AND ASSOCIATED PIPING

NOTE:
SOUND-DEADENING WALLS AND/OR PANELS IN THE UTILITY ROOM AROUND THE BIOVENT/BIOSPARGE BLOWERS TO BE INSTALLED IF DEEMED NECESSARY BASED ON SUSTAINED SOUND LEVELS MEASURED ABOVE 85 DECIBELS.

0 3' 6'
SCALE IN FEET

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Professional Engineer's No.	PE077587		
State	PA	Date/Signed	6/13/18
Project Mgr.	ML		
Designed by	EM	Drawn by	CCM
Checked by	CD/MS		

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

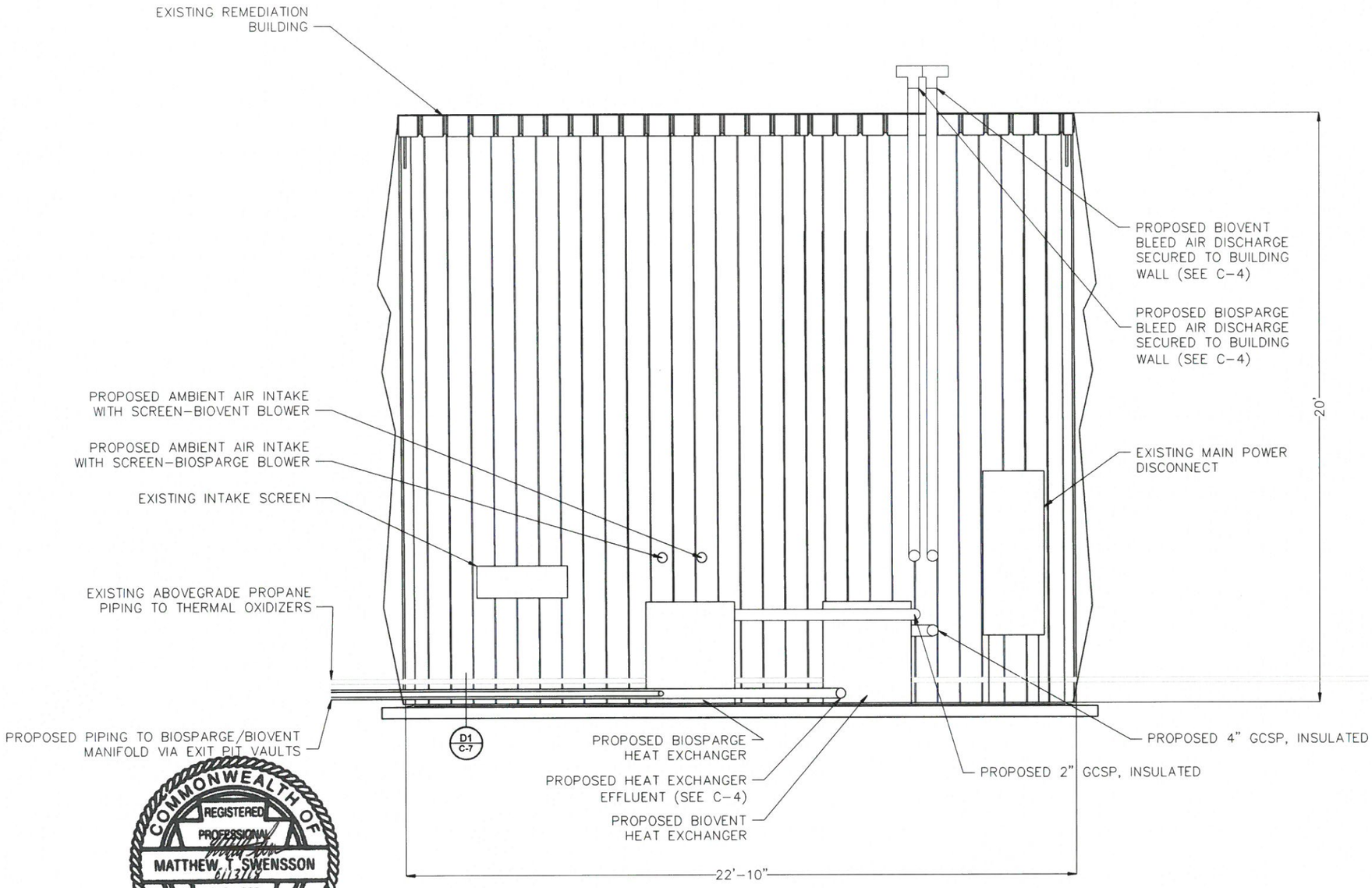
PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-4



COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
6/13/18
ENGINEER
PE077587

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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GRAPHIC SCALE 0 1.5' 3'

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Professional Engineer's Name	MATTHEW T. SWENSSON
Professional Engineer's No.	PE077587
State	PA
Date Signed	6/13/18
Project Mgr.	ML
Designed by	EM
Drawn by	CCM
Checked by	CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

EXISTING REMEDIATION BUILDING: SOUTH EXTERIOR WALL

CONSTRUCTION

ARCADIS Project No. 06262046.0005.00004
Date JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
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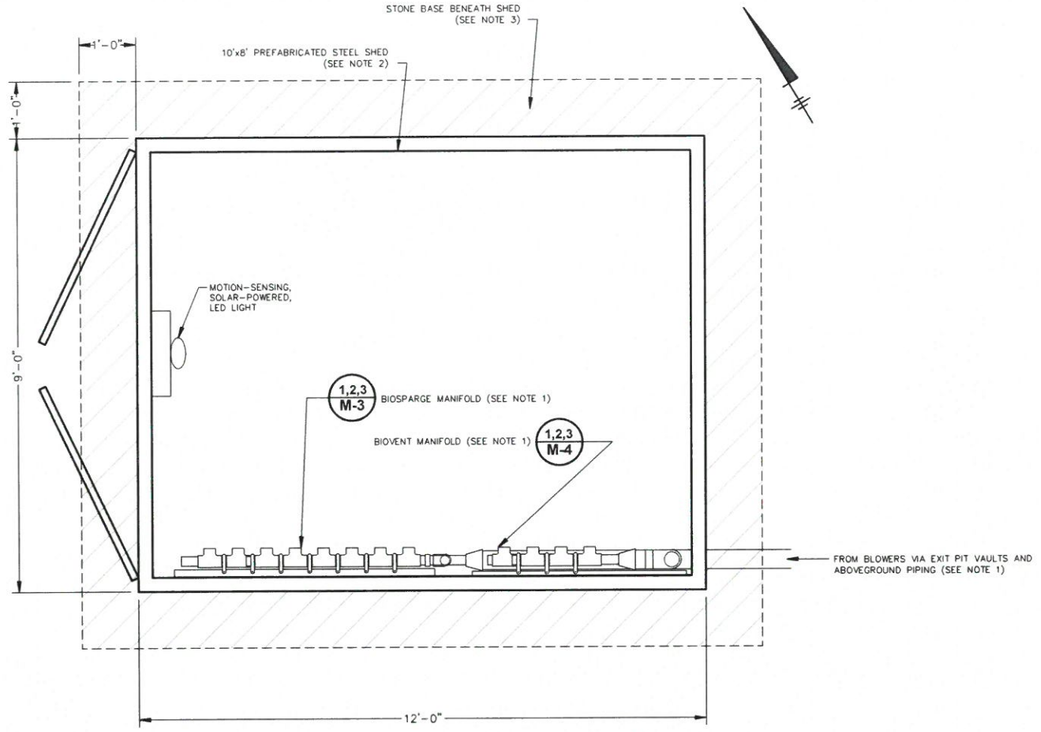
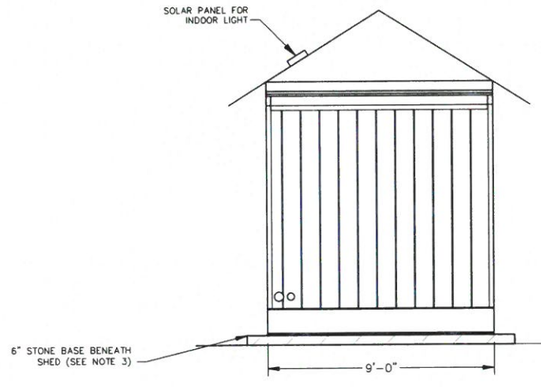
C-5



PLAN VIEW - MANIFOLD ENCLOSURE

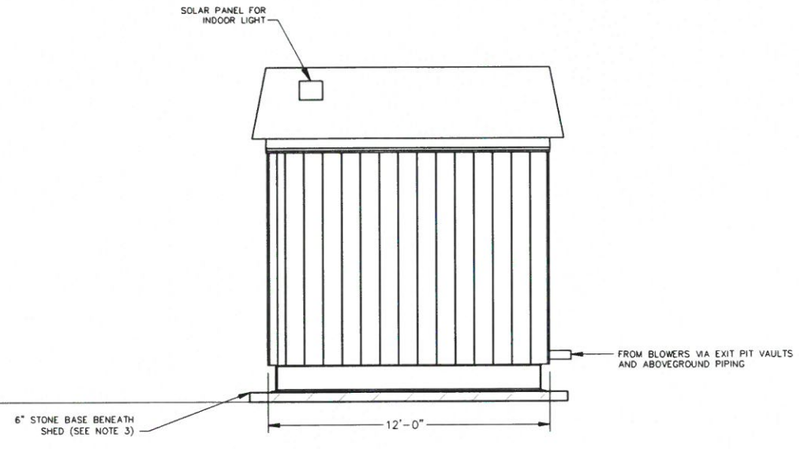
NOTES:

1. PIPING TO BIOSPARGE/BIOVENT WELLS EXTEND BENEATH MANIFOLD ENCLOSURE AND ENTER THROUGH FLOOR. BIOSPARGE/BIOVENT SUPPLY HEADER PIPES ENTER MANIFOLD ENCLOSURE THROUGH BASE OF SIDEWALL AT GRADE.
2. SEE G-3 FOR PREFABRICATED STEEL SHED SPECIFICATIONS.
3. STONE BASE TO BE 6" THICK NO. 2A OR NO. 0GS COARSE AGGREGATE COMPACTED TO LEVEL SURFACE. SEE G-2 FOR ADDITIONAL SPECIFICATIONS.



SIDE VIEW - NORTHWEST





FRONT VIEW - NORTHEAST

0 1' 2'
GRAPHIC SCALE

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Professional Engineer's Name: MATTHEW T. SWENSSON		
Professional Engineer's No.: PE077587		
State: PA	Date Signed: 6/13/18	Project Mgr.: ML
Designed by: EM	Drawn by: CCM	Checked by: CD/MS

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FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM MANIFOLD ENCLOSURE

CONSTRUCTION

ARCADIS Project No.
06262046.0005.00004

Date
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ARCADIS
824 MARKET STREET
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C-6

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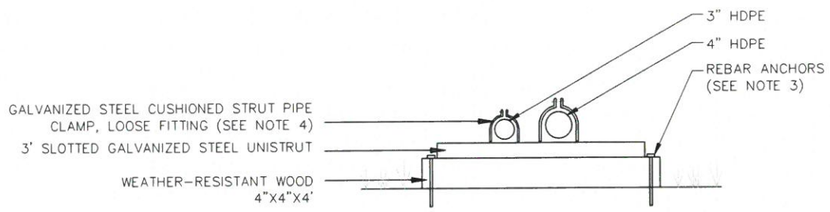
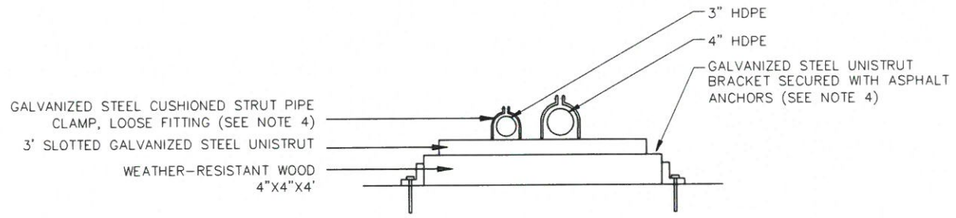
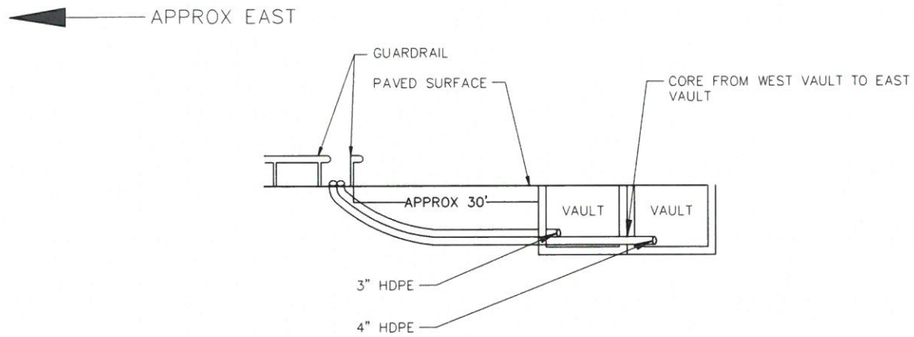


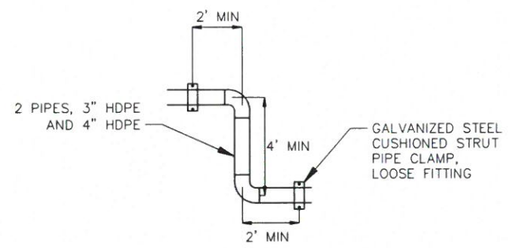
ABOVEGROUND PIPING SUPPORT D1/C2
NOT TO SCALE



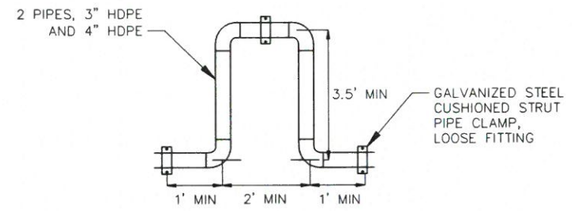
ABOVEGROUND PIPING SUPPORT IN PAVED AREA D2/C2
NOT TO SCALE



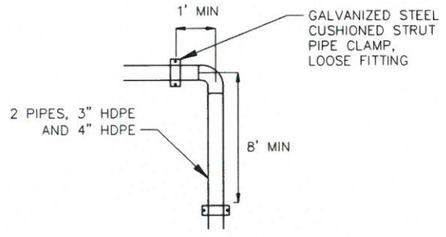
NORTH SIDE PAVEMENT CROSSING FROM COMPOUND TO NORTH SIDE EXIT PITS D4/C2
NOT TO SCALE



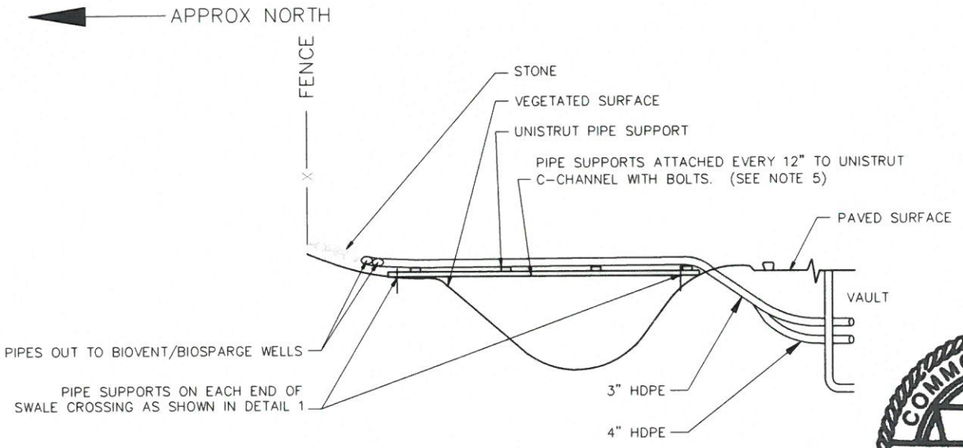
ABOVEGROUND PIPING EXPANSION OFFSET D5/C2
NOT TO SCALE



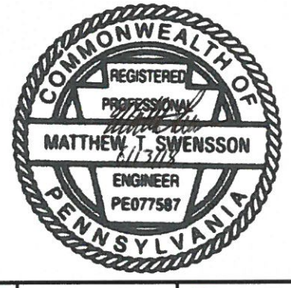
ABOVEGROUND PIPING EXPANSION LOOP D6/C2
NOT TO SCALE



ABOVEGROUND PIPING EXPANSION ELBOW D7/C2
NOT TO SCALE



SOUTH SIDE SWALE CROSSING DETAIL D3/C2
NOT TO SCALE



NOTES:

1. STONE SHALL BE PLACED BENEATH ENTIRE LENGTH OF PIPE RUNS AT LEAST 6 INCHES ON EITHER SIDE OF PIPES.
2. SUPPORTS SHALL BE PLACED FOR EVERY 10 FEET OF LINEAR PIPE.
3. PIPE SUPPORTS IN UNPAVED AREAS SHALL BE ANCHORED WITH REBAR IN EACH CORNER, ADVANCED AT LEAST 1 FOOT INTO GROUND.
4. PIPE SUPPORTS IN PAVED AREAS SHALL BE ANCHORED WITH 5/8"x 6" LONG ASPHALT ANCHORS, BOLTHOLD SP10-38 WITH BOLTHOLD EPX2 GROUT, OR APPROVED EQUIVALENT.
5. PIPE SUPPORTS FOR SWALE CROSSING TO BE 1/2" STEEL GRADE 8 BOLTS, NUTS, AND LOCKWASHERS.

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name	MATTHEW T. SWENSSON		
Professional Engineer's No.	PE077587		
State	PA	Date Signed	6/13/18
Project Mgr.	ML		
Designed by	EM	Drawn by	CCM
Checked by	CD/MS		

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

ABOVEGROUND PIPE DETAILS AND CROSSINGS

PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

C-7

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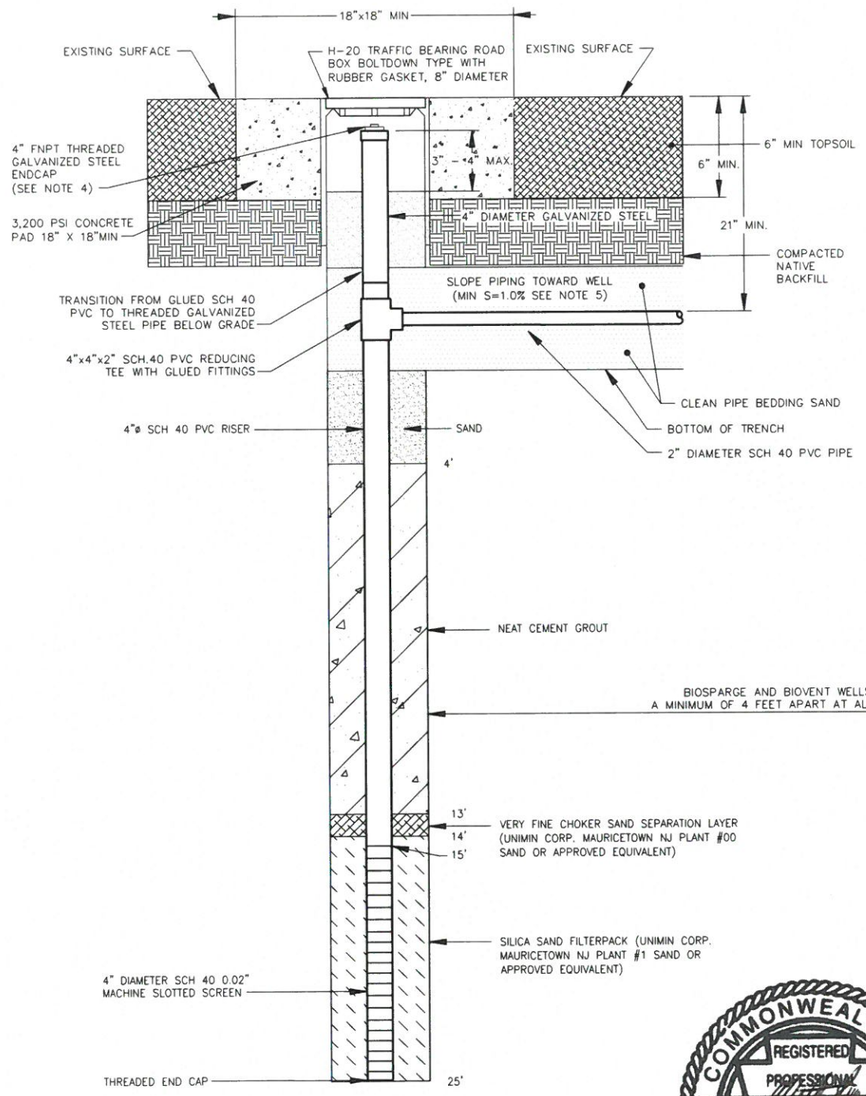
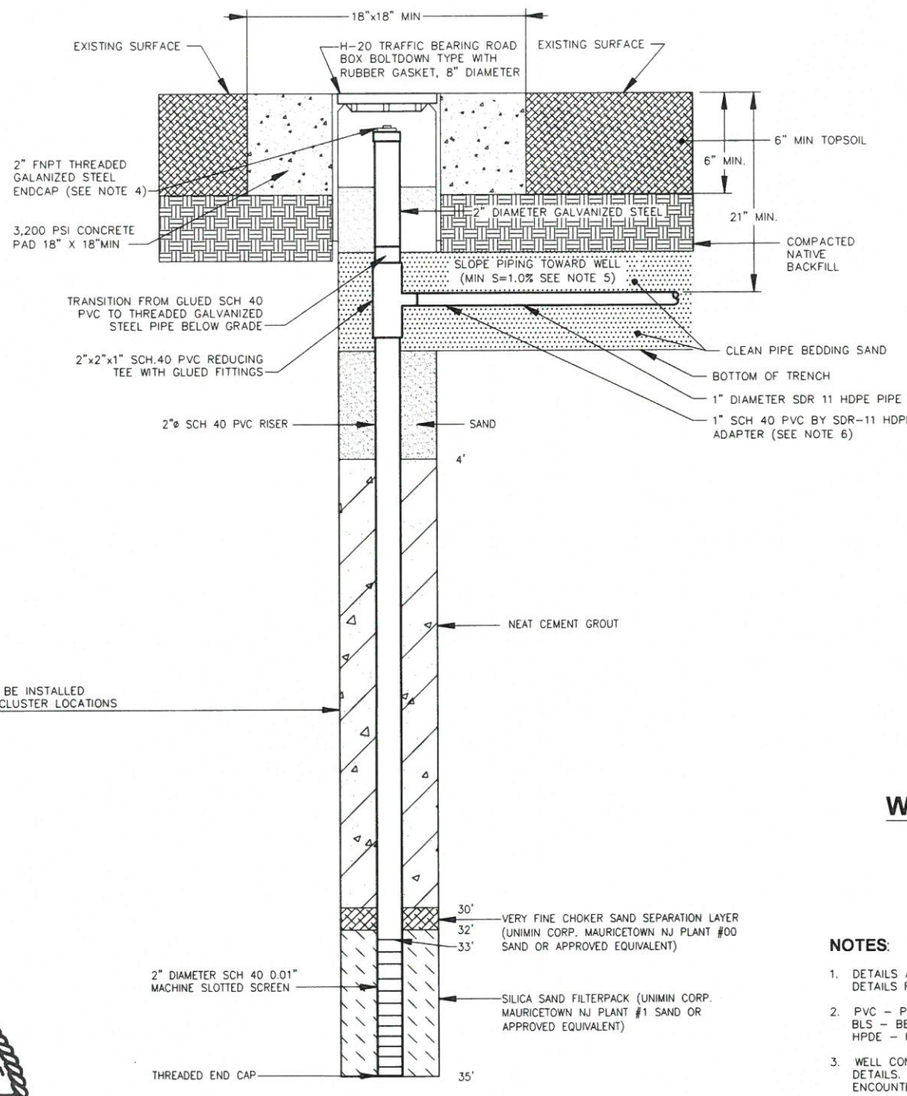


BIOVENT WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

1 / M-1

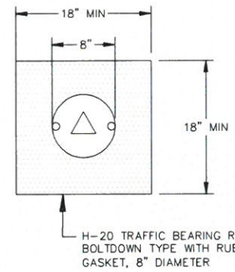
NOT TO SCALE



BIOSPARGE WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

2 / M-1

NOT TO SCALE



WELLHEAD MONUMENT DETAIL

NOTES:

1. DETAILS ARE APPROXIMATE AND NOT TO SCALE. REFER TO TRENCH CROSS SECTION DETAILS FOR TRENCH BACKFILL DESIGN SPECIFICATIONS.
2. PVC – POLYVINYL CHLORIDE
   BLS – BELOW LAND SURFACE
   HPDE – HIGH DENSITY POLYETHYLENE
3. WELL CONSTRUCTION DEPTHS ARE APROXIMATE. SEE DRAWINGS G-1 AND G-2 FOR DETAILS. FINAL DEPTHS TO BE DETERMINED BASED ON ACTUAL SUBSURFACE LITHOLOGY ENCOUNTERED IN THE FIELD DURING INSTALLATION.
4. THREADED GALVANIZED STEEL CAPS ON BIOSPARGE/BIOVENT WELLS SHALL BE EQUIPPED WITH A THREADED BRASS BALL VALVE WITH 1/8" NIPPLE FITTING FOR MEASURING OF WELLHEAD PRESSURE READINGS.
5. SUBSURFACE PIPING WILL BE SLOPED TOWARD INDIVIDUAL BIOSPARGE AND BIOVENT WELLS AND AWAY FROM MANIFOLD.
6. SCH 40 PVC TO SDR-11 HDPE ADAPTER FITTING WITH GLUED PVC TO PVC CONNECTION AS SPECIFIED ON DRAWING G-3.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
6/13/18
ENGINEER
PE077587

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Professional Engineer's Name: MATTHEW T. SWENSSON			
Professional Engineer's No.: PE077587			
State: PA	Date Signed: 6/13/18	Project Mgr: ML	
Designed by: EM	Drawn by: CCM	Checked by: CD/MS	

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS

PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

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SUITE 820
WILMINGTON, DE 19801
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M-1

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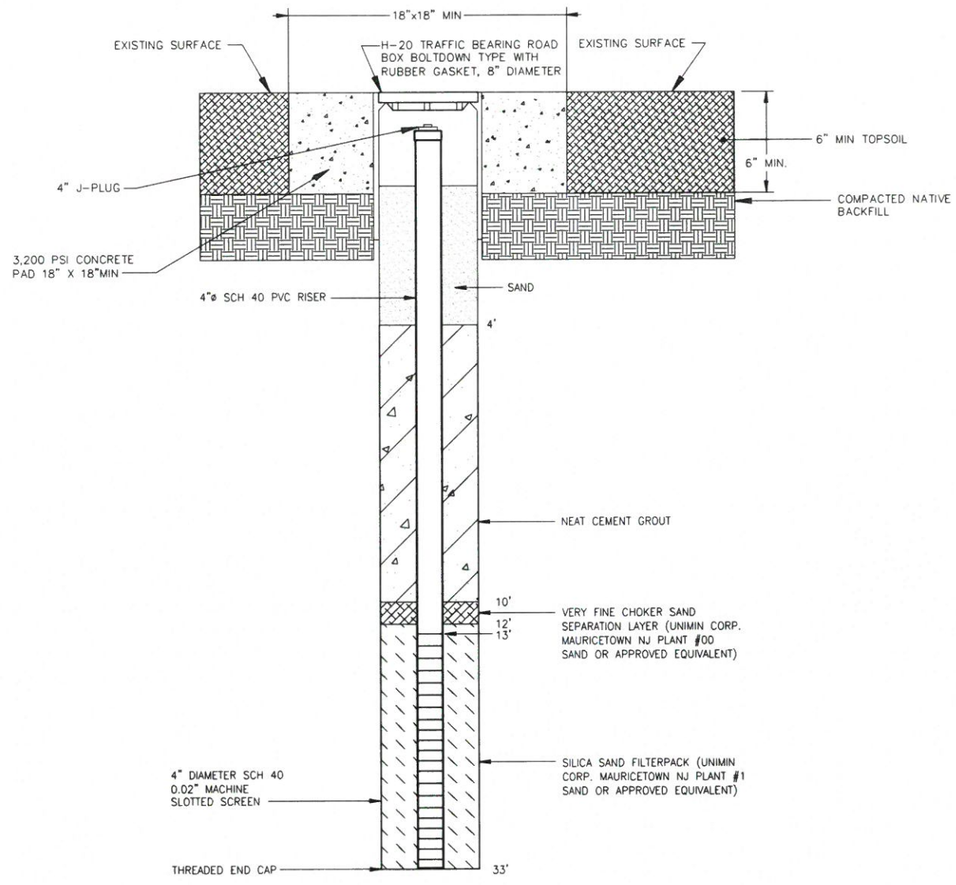

PERFORMANCE MONITORING WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

NOT TO SCALE

1 / M-2

NOTES:

1. DETAILS ARE APPROXIMATE AND NOT TO SCALE. REFER TO TRENCH CROSS SECTION DETAILS FOR TRENCH BACKFILL DESIGN SPECIFICATIONS.
2. PVC – POLYVINYL CHLORIDE
   BLS – BELOW LAND SURFACE
   HPDE – HIGH DENSITY POLYETHYLENE
3. WELL CONSTRUCTION DEPTHS ARE APROXIMATE. SEE DRAWINGS G-1 AND G-2 FOR DETAILS. FINAL DEPTHS TO BE DETERMINED BASED ON ACTUAL SURFACE LITHOLOGY ENCOUNTERED IN THE FIELD DURING INSTALLATION.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

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Designed by: EM | Drawn by: CCM | Checked by: CD/MS

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FORMER DSCP SYSTEM UPGRADES

PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS

PROCESS

ARCADIS Project No.: 06262046.0005.00004
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M-2

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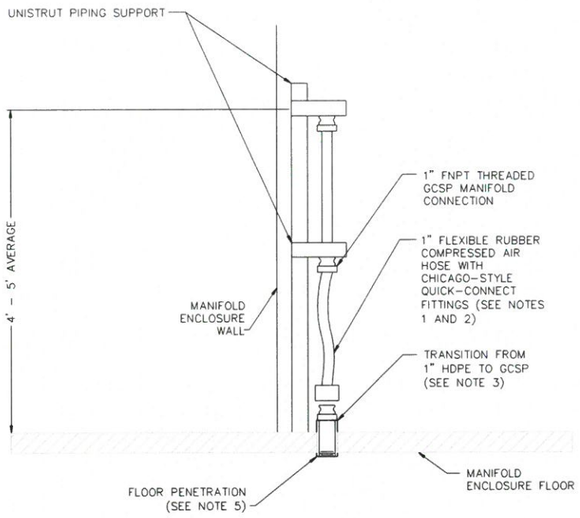
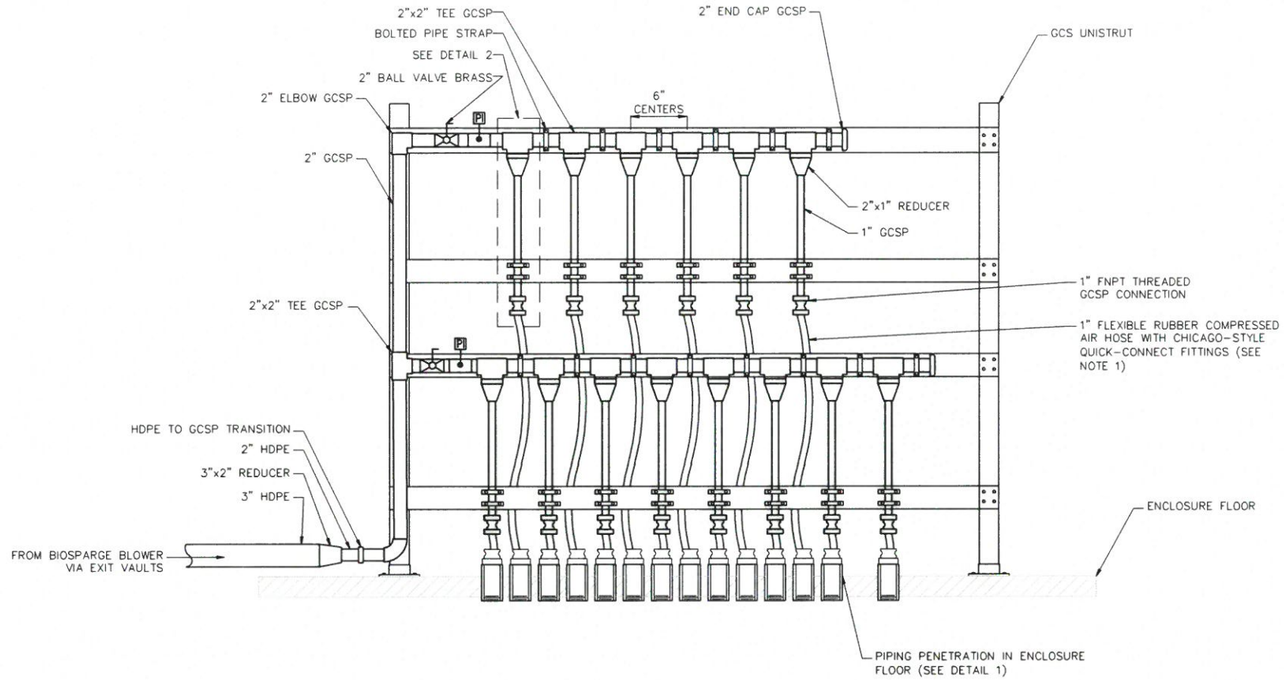


BIOSPARGE MANIFOLD PIPING CONNECTION DETAIL

1 / M-3

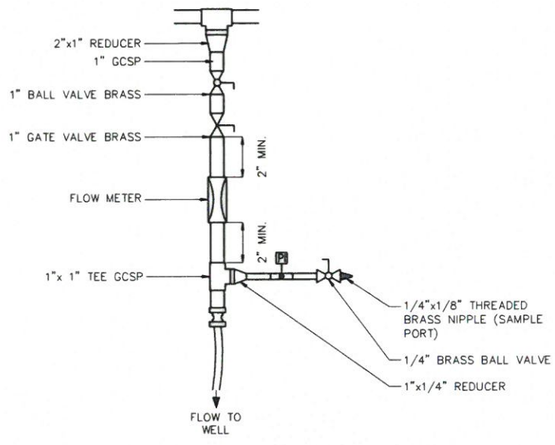
NOT TO SCALE



BIOSPARGE MANIFOLD DETAIL

3 / M-3

NOT TO SCALE



BIOSPARGE MANIFOLD VALVING/INSTRUMENTATION (TYP. OF 14)

2 / M-3

NOT TO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTES:

1. FLEXIBLE COMPRESSED AIR HOSES TO BE ANCHORED TO UNISTRUT SUPPORT AND/OR WALL BY WHIP-CHECKS.
2. FLEXIBLE RUBBER HOSE SHALL BE 200 PSI PRESSURE AND 200F TEMPERATURE RATED, UV RESISTANT, AND WITH CHICAGO-STYLE QUICK-CONNECT FITTINGS.
3. TRANSITION FROM SDR-11 HDPE TO GALVANIZED STEEL WITH MNPT THREADED END CONNECTION AS SPECIFIED ON DRAWING G-3.
4. GCSP - GALVANIZED CARBON STEEL PIPE
   PI - PRESSURE INDICATOR
5. CONTRACTOR TO CUT FLOOR TO ACCOMMODATE PIPING PENETRATIONS. SEAL GAPS BETWEEN PIPING PENETRATIONS AND SURROUNDING FLOOR UPON COMPLETION.

UNISTRUT PIPING SUPPORT

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Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr.: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS

PROCESS

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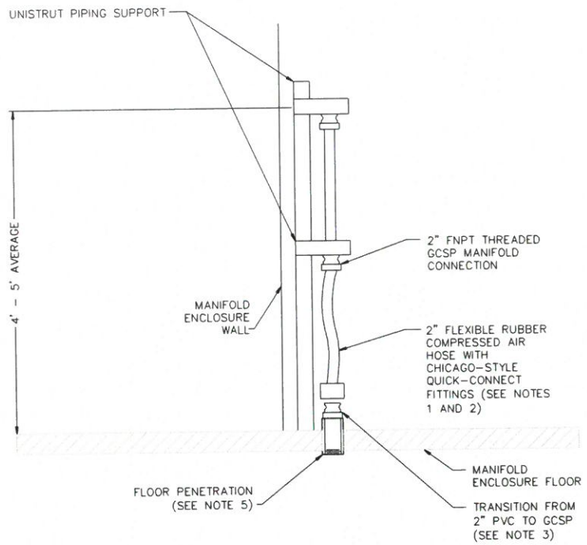

BIOVENT MANIFOLD PIPING CONNECTION DETAIL

1 / M-4

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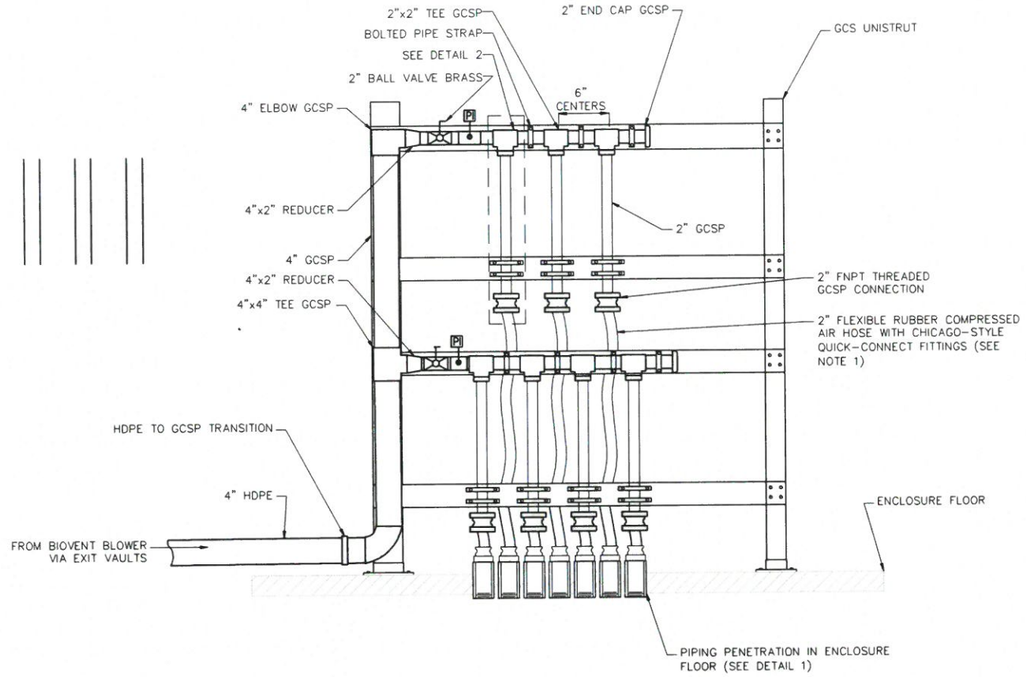
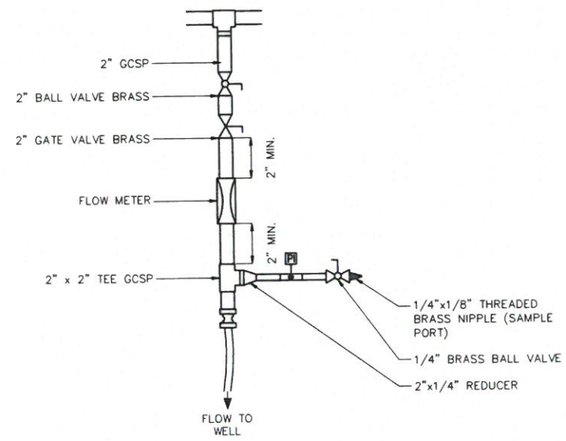


BIOVENT MANIFOLD DETAIL

3 / M-4

NOT TO SCALE



BIOVENT MANIFOLD VALVING/INSTRUMENTATION (TYP. OF 7)

2 / M-4

NOT TO SCALE

NOTES:

1. FLEXIBLE COMPRESSED AIR HOSES TO BE ANCHORED TO UNISTRUT SUPPORT AND/OR WALL BY WHIP-CHECKS.
2. FLEXIBLE RUBBER HOSE SHALL BE 200 PSI PRESSURE AND 200F TEMPERATURE RATED, UV RESISTANT, AND WITH CHICAGO-STYLE QUICK-CONNECT FITTINGS.
3. TRANSITION BELOW GRADE FROM PVC TO GCSP USING 2" SCH 40 PVC SLIP TO GCSP THREADED ADAPTER FITTING.
4. GCSP - GALVANIZED CARBON STEEL PIPE
   PI - PRESSURE INDICATOR
5. CONTRACTOR TO CUT FLOOR TO ACCOMMODATE PIPING PENETRATIONS. SEAL GAPS BETWEEN PIPING PENETRATIONS AND SURROUNDING FLOOR UPON COMPLETION.



No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON		
Professional Engineer's No.: PE077587		
State: PA	Date Signed: 6/13/18	Project Mgr.: ML
Designed by: EM	Drawn by: CCM	Checked by: CD/MS

ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM BIOVENT MANIFOLD DETAILS

PROCESS

ARCADIS Project No. 06262046.0005.00004

Date JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

M-4

CITY: Milwaukee, WI DIVGROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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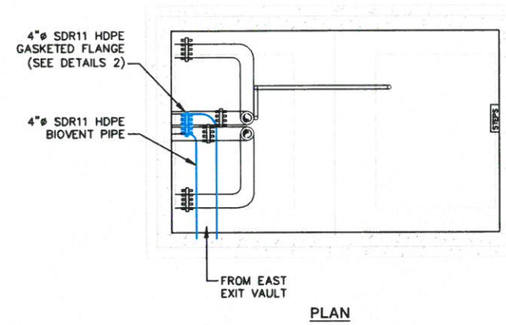

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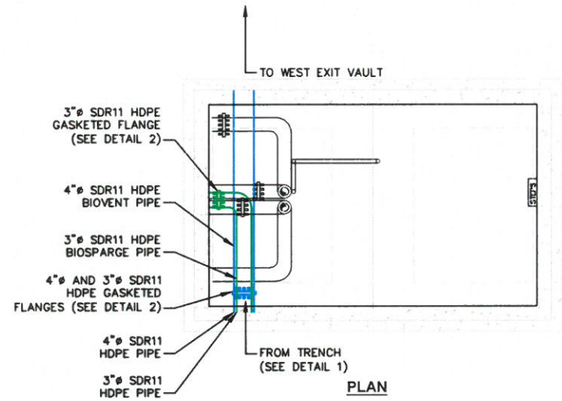

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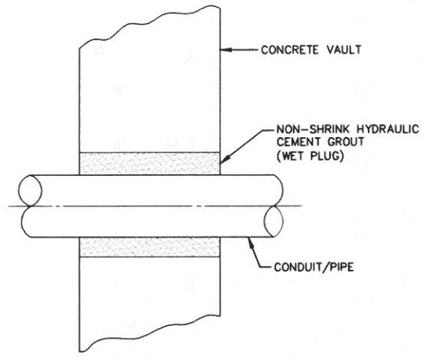
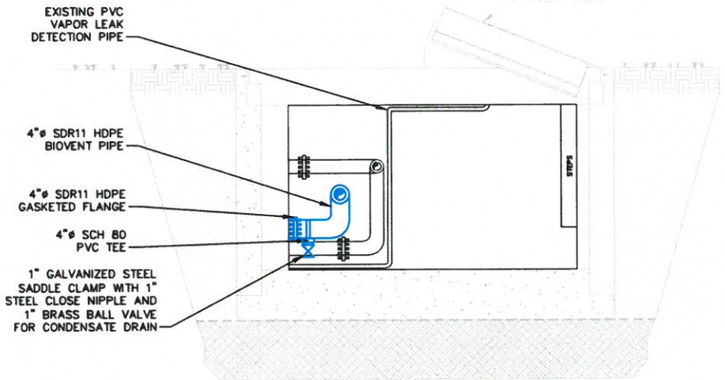


TYPICAL CONCRETE VAULT WALL PENETRATION DETAIL

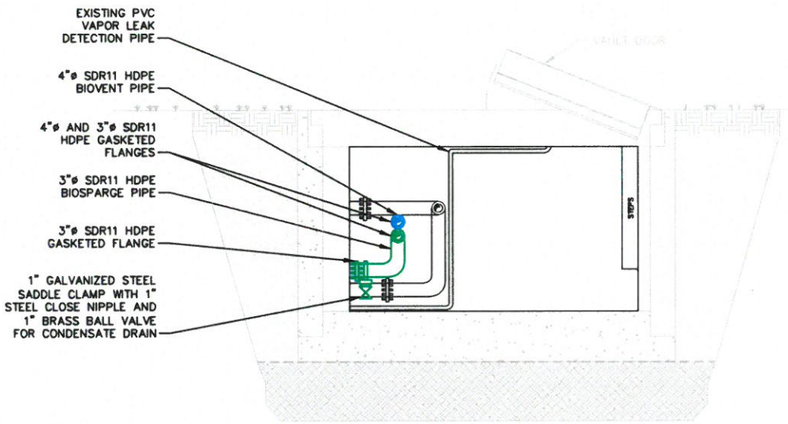
1 M-5 / 1 M-6

NOT TO SCALE



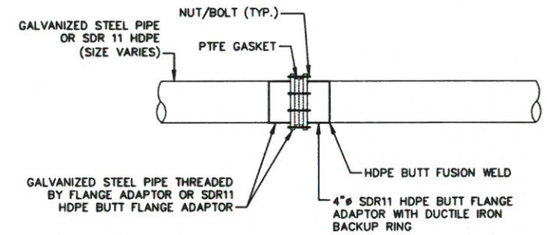
PROFILE

WEST EXIT VAULT



PROFILE

EAST EXIT VAULT



NOTE:

BUTT FUSION FITTINGS MAY BE CUT TO LENGTH TO ALLOW FOR GREATER CLEARANCE DURING INSTALLATION.

PIPE MATERIAL TRANSITION AND FLANGE DETAIL (TYP.)

2 M-5 / 2 M-6

NOT TO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTE:

NEW PIPING TO BE INSTALLED IN EXIT VAULTS IS SHOWN IN BLUE AND GREEN.
EXISTING PIPING IN EXIT VAULTS IS SHOWN IN BLACK.

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1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name	MATTHEW T. SWENSSON	
Professional Engineer's No.	PE077587	
State	PA	Date Signed 6/13/18
Project Mgr.	ML	
Designed by	EM	
Drawn by	CCM	
Checked by	CD/MS	

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FORMER DSCP SYSTEM UPGRADES

NORTH EXIT VAULT DETAILS

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

M-5

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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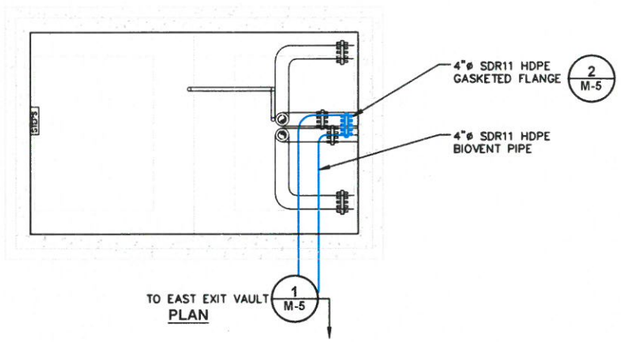

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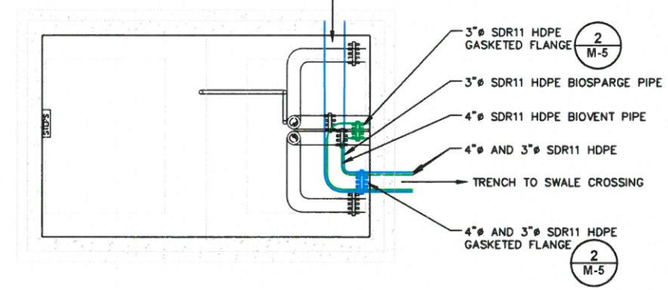

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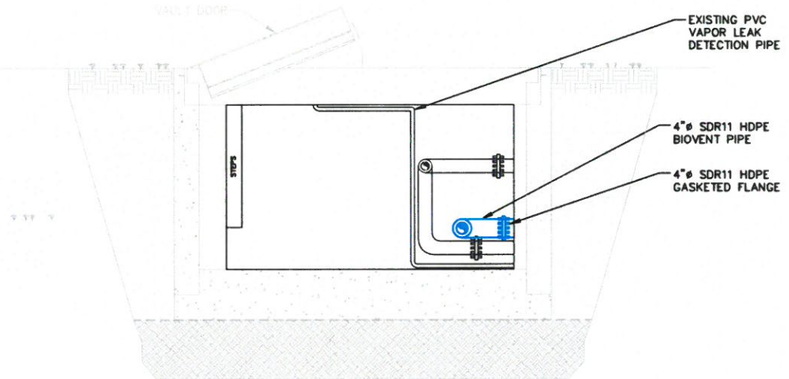
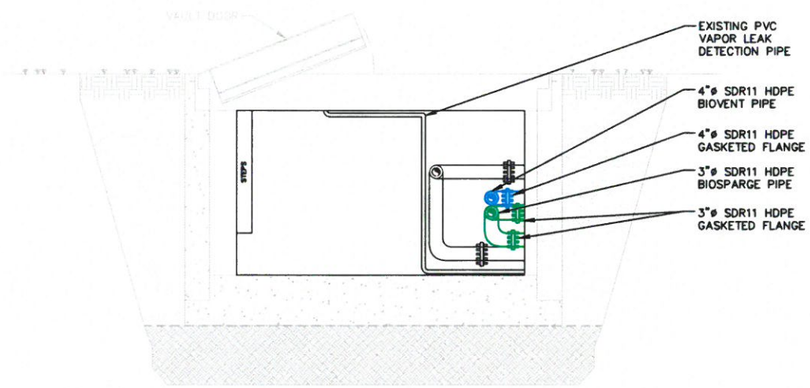


PROFILE

WEST EXIT VAULT



PROFILE

EAST EXIT VAULT



NOTE:

NEW PIPING TO BE INSTALLED IN EXIT VAULTS IS SHOWN IN BLUE AND GREEN.
EXISTING PIPING IN EXIT VAULTS IS SHOWN IN BLACK.

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Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr.: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

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FORMER DSCP SYSTEM UPGRADES

SOUTH EXIT VAULT DETAILS

PROCESS

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M-6

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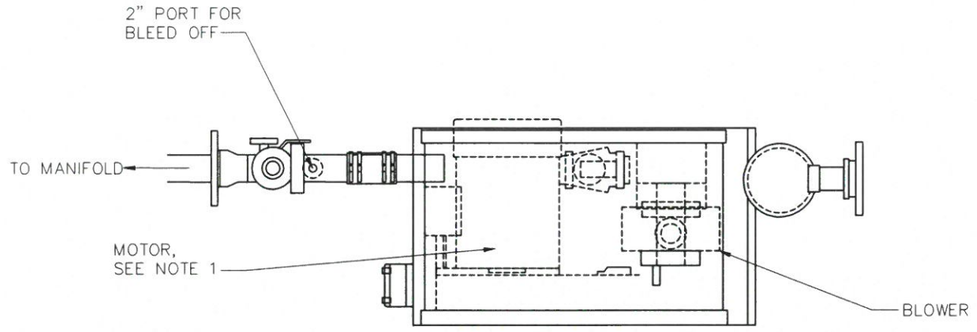
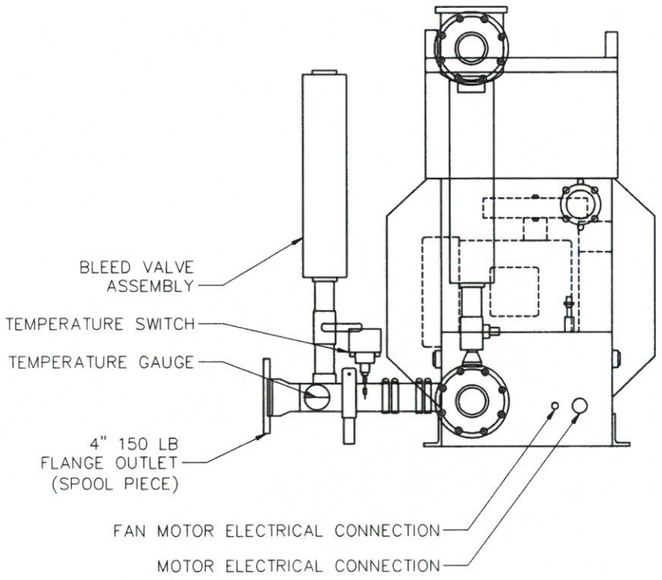


LIMITS OF BLOWER PACKAGE - TOP VIEW

NOT TO SCALE

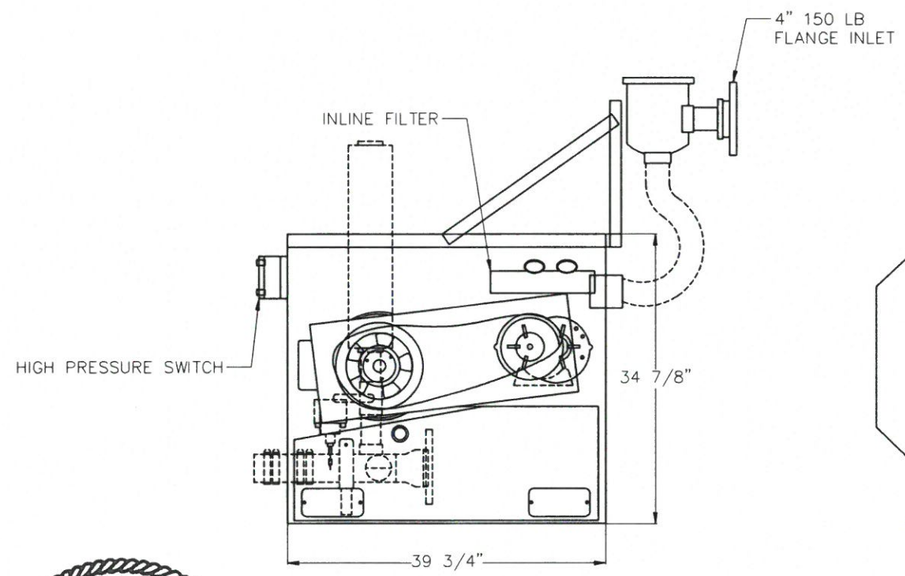
NOTES

1. 7.5 HP MOTOR TO BE UPGRADED TO 10 HP MOTOR FOR BIOSPARGE BY CONTRACTOR. 7.5 HP MOTOR FOR BIOVENT.
2. SEE DRAWING G-3 FOR MAJOR EQUIPMENT LIST.



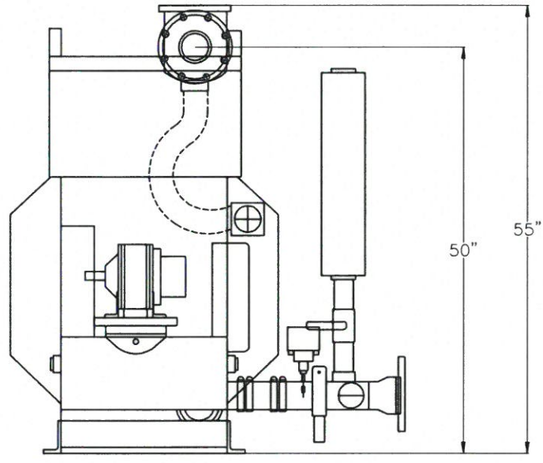
LEFT SIDE VIEW

NOT TO SCALE



FRONT VIEW

NOT TO SCALE



RIGHT SIDE VIEW

NOT TO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
6/13/18
ENGINEER
PE077587

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ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

BIOSPARGE/BIOVENT BLOWER PACKAGE

PROCESS

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TEL. 302.658.1718

M-7

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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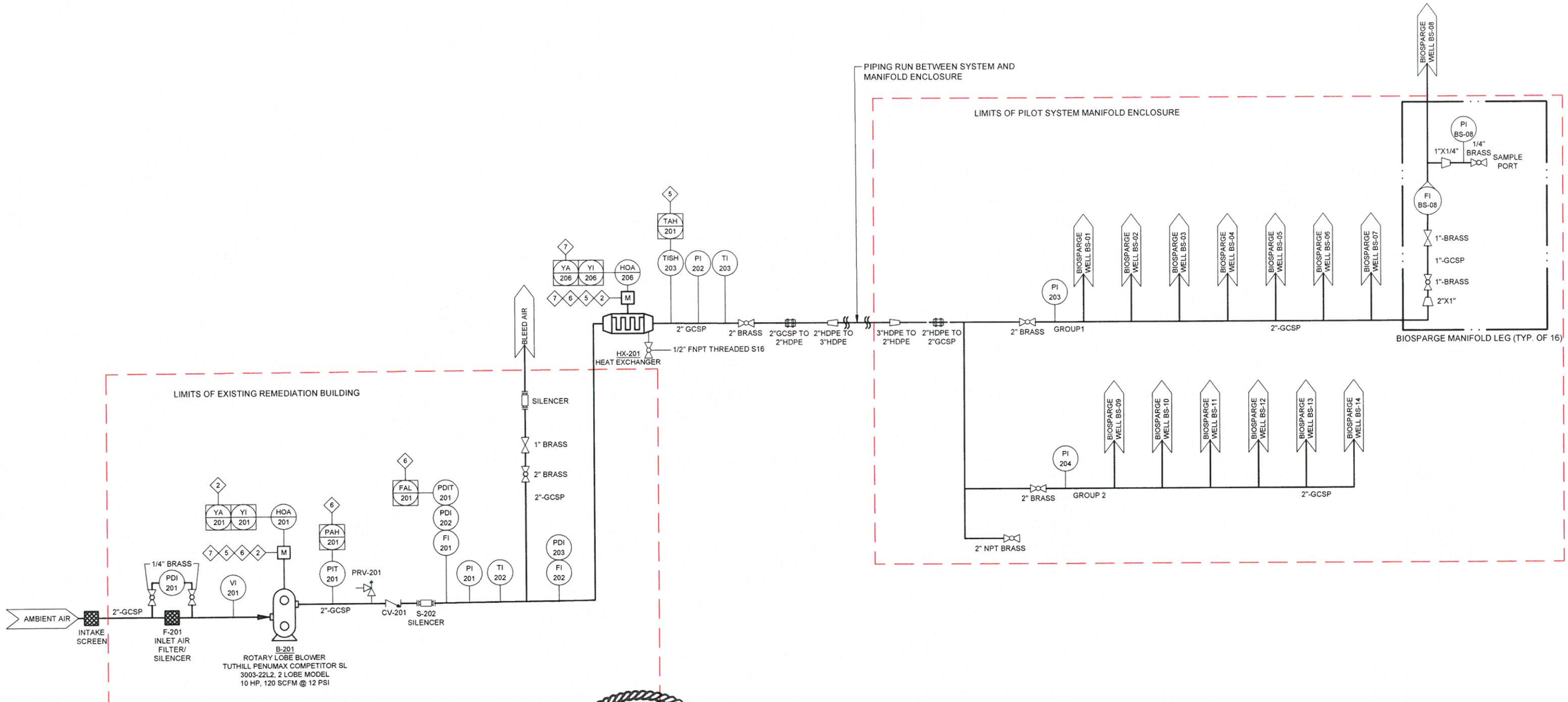

NOTES:

1. ROTAMETERS SHALL BE INSTALLED A MINIMUM OF 1.5 STRAIGHT PIPE DIAMETERS FROM VALVES, BENDS, OR SIMILAR SOURCES OF FLOW TURBULENCE.
2. OTHER FLOW MEASURING INSTRUMENTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS REGARDING DISTANCE FROM SOURCES OF FLOW TURBULENCE TO ENSURE ACCURACY OF READINGS.
3. WHERE APPLICABLE INSTRUMENTATION SHALL BE INSTALLED USING PIPING TEES AND REDUCERS IN LIEU OF PIPE TAPPING.
4. SEE DRAWING PID-3 FOR SCHEDULE OF ALARMS/INTERLOCKS AND SET POINTS.



No.	Date	Revisions	By	Ckd
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Project Mgr.	ML
Designed by	EM
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FORMER DSCP SYSTEM UPGRADES

BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM

PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

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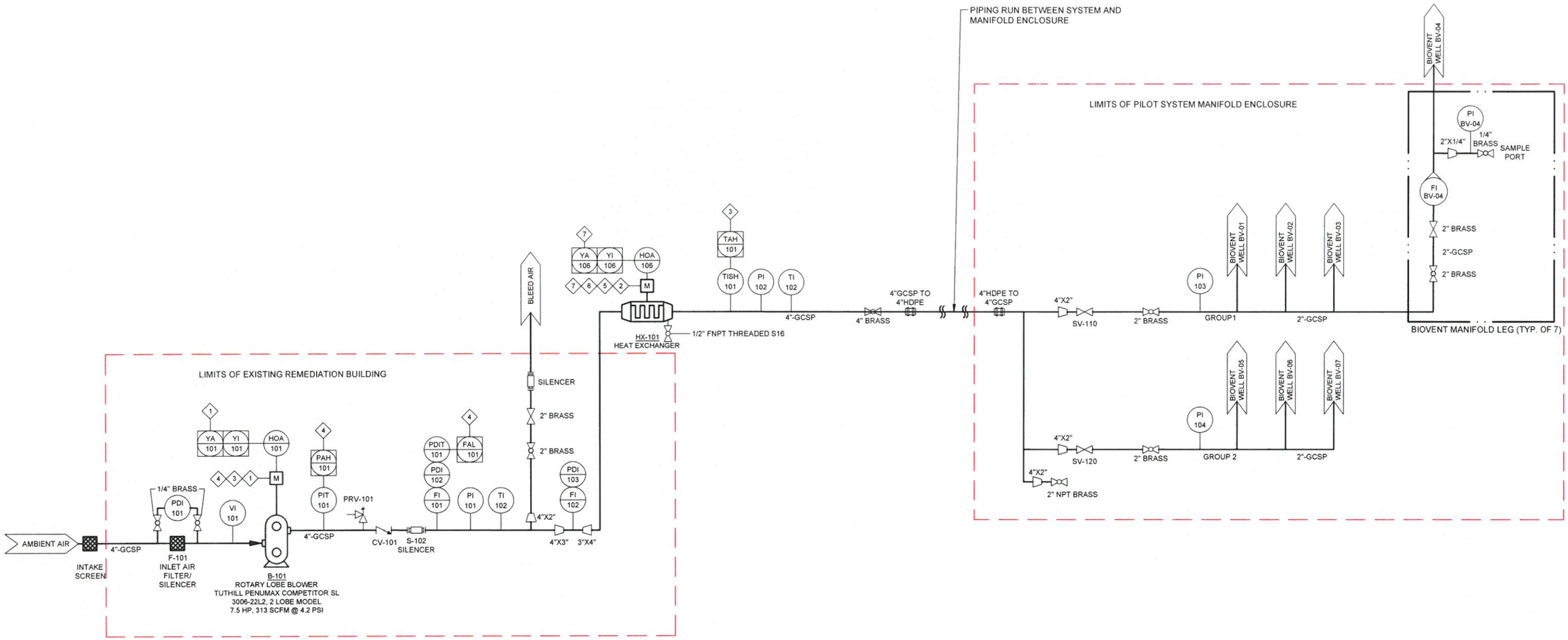

NOTES:

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4. SEE DRAWING PID-3 FOR SCHEDULE OF ALARMS/INTERLOCKS AND SET POINTS.



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FORMER DSCP SYSTEM UPGRADES

BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM

PROCESS

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06262046.0005.00004

Date
JUNE 13, 2018

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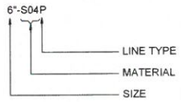
WILMINGTON, DE 19801
TEL. 302.658.1718

PID-2

LEGEND:

- PROCESS PIPING
- SKID MOUNTED EQUIPMENT
- INSTRUMENT SIGNAL
- TRUE UNION BALL VALVE
- GATE VALVE
- CHECK VALVE
- SOLENOID VALVE (NORMALLY CLOSED) (S)
- PRESSURE RELIEF VALVE
- REDUCER
- TRANSITION FITTING
- FLANGED CONNECTION
- SILENCER
- AIR FILTER
- HEAT EXCHANGER (M)
- BLOWER (M)
- ROTATOMETER (FI / X)

PIPELINE DESIGNATION:



TYPE:

D = DUCT
H = HOSE
C = DOUBLE WALL CONTAINMENT PIPE
P = PIPE
T = TUBE

MATERIAL:

BRZ - BRASS/BRONZE
CIR - CAST IRON
CST - CARBON STEEL
CPR - COPPER
CVC - CHLORINATED POLYVINYL CHLORIDE
DIR - DUCTILE IRON
FRP - FIBERGLASS
GCS - GALVANIZED CARBON STEEL
LCS - LINED CARBON STEEL
PET - POLYETHYLENE
POP - POLYPROPYLENE
PVC - POLYVINYL CHLORIDE
RUB - RUBBER
S04 - 304 STAINLESS STEEL
S4L - 304L STAINLESS STEEL
S16 - 316 STAINLESS STEEL
S6L - 316L STAINLESS STEEL
TEF - TEFLON
VIT - VITON
TYG - TYGON

ABBREVIATIONS:

%	PERCENT
AC	AIR COMPRESSOR
AD	AIR DRYER
AR	AIR RECEIVER TANK
CFM	CUBIC FEET PER MINUTE
E	ELECTRIC ACTUATOR
F	MULTIMEDIA FILTER
FAH	FLOW ALARM HIGH
FAL	FLOW ALARM LOW
FC	FLOW CONTROL
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIC	FLOW INDICATING CONTROL
FIR	FLOW INDICATE RECORDER
FIT	FLOW INDICATING TRANSMITTER
FM	FLOW METER
FQ	FLOW TOTALIZER
FQI	FLOW QUANTITY INDICATOR
FQIR	FLOW QUANTITY INDICATOR RECORDER
FQR	FLOW QUANTITY RECORDER
FQS	FLOW QUANTITY SWITCH
FT	FLOW TRANSMITTER
FV	FLOW VALVE
GAL	GALLON(S)
GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
HAZ	HAZARDOUS
HDPE	HIGH DENSITY POLYETHYLENE
HIM	HUMAN INTERFACE MACHINE
HOA	HAND/OFF/AUTO
HR	HOUR
HS	HAND SWITCH
INCH H2O	INCHES WATER COLUMN
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH HIGH
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW LOW
LB	POUND(S)
LC	LEVEL CONTROLLER
LE	LEVEL ELEMENT
LG	LEVEL GAUGE
LI	LEVEL INDICATOR
LIC	LEVEL INDICATING CONTROL
LIR	LEVEL INDICATE RECORDER
LIT	LEVEL INDICATING TRANSMITTER
LPGAC	LIQUID PHASE GRANULAR ACTIVATED CARBON
LS	LEVEL SWITCH
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LT	LEVEL TRANSMITTER
M	MOTOR
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NPT	NATIONAL PIPE THREAD
PAH	PRESSURE ALARM HIGH
PAHH	PRESSURE ALARM HIGH HIGH
PAL	PRESSURE ALARM LOW
PDAH	PRESSURE DIFFERENTIAL ALARM HIGH
PDAHH	PRESSURE DIFFERENTIAL ALARM HIGH HIGH
PDE	PRESSURE DIFFERENTIAL ELEMENT
PDI	PRESSURE DIFFERENTIAL INDICATOR
PDIR	PRESSURE DIFFERENTIAL INDICATE RECORDER
PDIT	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER
PDITSH	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER SWITCH HIGH
PDSH	PRESSURE DIFFERENTIAL SWITCH HIGH
PE	PRESSURE ELEMENT
PI	PRESSURE INDICATOR
PIR	PRESSURE INDICATE RECORDER
PISH	PRESSURE INDICATING SWITCH HIGH
PISL	PRESSURE INDICATING SWITCH LOW
PIT	PRESSURE INDICATING TRANSMITTER
PRV	PRESSURE RELIEF VALVE
PSIG	PRESSURE PER SQUARE INCH GAUGE
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
SC	SPEED CONTROL
SI	SPEED INDICATOR
SIC	SPEED INDICATING CONTROL
ST	SPEED TRANSMITTER
T	TANK
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH HIGH
TAL	TEMPERATURE ALARM LOW
TC	TEMPERATURE CONTROL
TET	TEMPERATURE ELEMENT TRANSMITTER
TI	TEMPERATURE INDICATOR
TIR	TEMPERATURE INDICATE RECORDER
TISH	TEMPERATURE INDICATE SWITCH HIGH
TOC	TOP OF CASING
TSH	TEMPERATURE SWITCH HIGH
TW	THERMAL WELL
TYP	TYPICAL
V	VALVE
VFD	VARIABLE FREQUENCY DRIVE
VPGAC	VAPOR PHASE GRANULAR ACTIVATED CARBON
YA	STATUS ALARM
YI	STATUS INDICATOR
ZA	POSITION INDICATING ALARM
ZAC	POSITION ALARM VALVE FAILED TO CLOSE
ZAO	POSITION ALARM VALVE FAILED TO OPEN
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPENED

Schedule of Alarms/Interlocks

Alarm	Description	Interlock	
Shut Down	Notification of system shutdown not associated with the other alarm conditions	--	
E-Stop	System emergency stop button depressed	--	
Power Failure	System power failure	--	
B-101 OLD	Biovent blower (B-101) motor overload	1	Disable B-101
B-201 OLD	Biovent blower (B-101) motor overload	2	Disable B-201 and Heat Exchanger (HX-201)
TAH-101	Biovent heat exchanger (HX-101) high effluent temperature	3	Disable B-101 and HX-101
PAH-101	Biovent blower (B-101) high effluent pressure	4	Disable B-101
FAL-101	Biovent blower (B-101) low flow or differential pressure indicator transmitter PDIT-101 failure		
TAH-201	Biospарge heat exchanger (HX-201) high effluent temperature	5	Disable B-201 and HX-201
PAH-201	Biospарge blower (B-201) high effluent pressure	6	Disable B-201 and HX-201
FAL-201	Biospарge blower (B-201) low flow or differential pressure indicator transmitter PDIT-201 failure		
HX Fail	Heat Exchanger HX-201 failure	7	Disable B-201

* PLC sends out email/text notification for all alarms

Process Safety Devices/Controls and Set Points

Process Safety Device/Control	Set Point
Control panel emergency stop	--
Biovent blower motor overload	--
Biovent heat exchanger (HX-101) high effluent temperature switch/alarm (TISH-101/TAH-101)	130 F
Biovent blower (B-101) high effluent pressure switch/alarm (PIT-101/PAH-101)	7.5 psi
Biovent blower (B-101) low flow alarm (FAL-101)	10 cfm*
Biovent blower pressure relief valve (PRV-101)	7 psi
Biospарge heat exchanger high effluent temperature switch/alarm (TISH-203/TAH-201)	130 F
Biospарge blower (B-201) high effluent pressure switch/alarm (PIT-201/PAH-201)	12.5 psi
Biospарge blower (B-201) low flow alarm (FAL-201)	5 cfm*
Biospарge blower pressure relief valve (PRV-201)	12 psi
* 5 minute delay on low flow alarm upon blower startup.	

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D =	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = PULSE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VACUUM, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED	DRIVE, ACTUATOR, FINAL CONTROL ELEMENT	

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS			
SHARED DISPLAY, SHARED CONTROL			
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.			
PROGRAMMABLE LOGIC CONTROLLER FUNCTION			

LEGENDS NOTES:

1. ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: PD = DIFFERENTIAL PRESSURE FQ = TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: PH
3. MEANING OF A "USER'S CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
4. UNCLASSIFIED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT, THE MEANING SHALL BE SPECIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
5. THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

GENERAL NOTES:

1. ALL ANALOG SETPOINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE SCREEN.
2. ALARMS THAT SHUT DOWN EXTRACTION WELLS AND TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
3. THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
4. WHERE APPLICABLE, TEES AND REDUCERS SHALL BE INSTALL IN LIEU OF PIPE TAPPING.



No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr.: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PIPING AND INSTRUMENTATION DIAGRAM LEGEND

PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

PID-3

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
C:\Users\cmckeough\OneDrive - ARCADIS\IBM 360 Docs\USACE - PHILADELPHIA DISTRICT\USACE Workplan for Biovent\Biospange\20180526262046.0010\Revised Work Plan\01-DWG\06262046-PID Diagrams.dwg LAYOUT: PID-3 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ----
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XREFS: IMAGES: PROJECTNAME: ----
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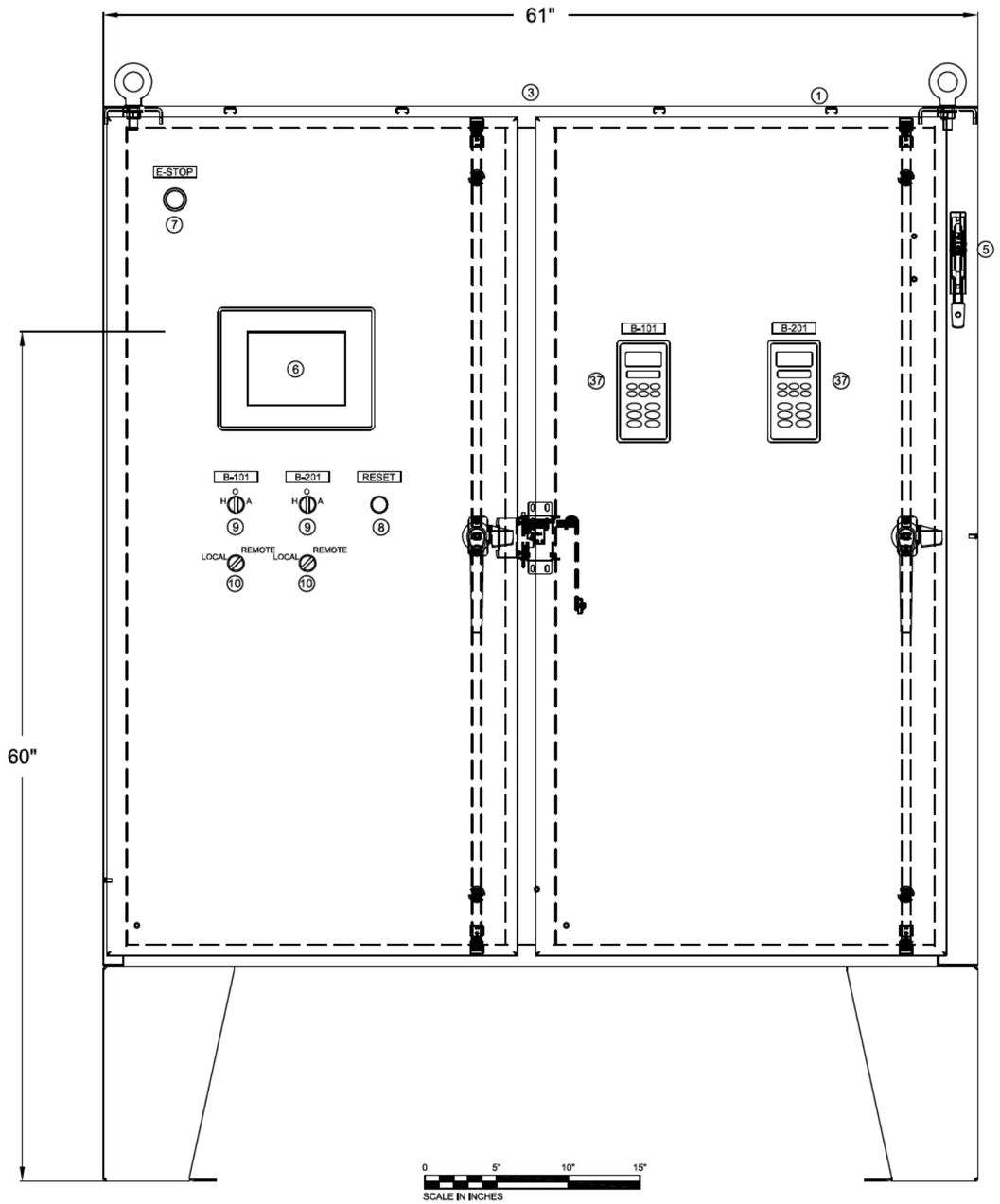
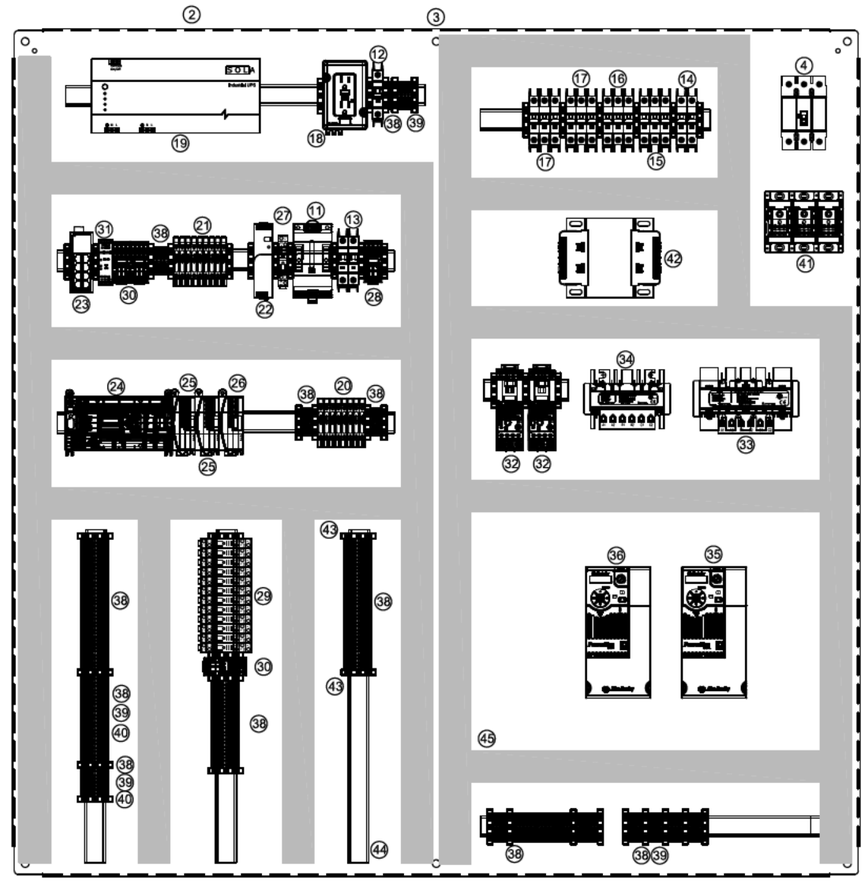


75"



NOTES:

1. ALL VFDS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER VERTICAL STACKING STANDARDS. A MINIMUM OF 2 INCHES OF FREE SPACE MUST EXIST AROUND ALL SIDES OF THE VFD.

2. ALL TERMINATIONS MUST BE A MINIMUM OF 2 INCHES FROM THE NEAREST WIRE TROUGH.

3. THE TOP OF ALL DISPLAYS (HIM OR VFD CONTROLLERS) SHALL BE NO HIGHER THAN 66" FROM THE FLOOR.

4. WHERE POSSIBLE MAINTAIN SEPARATION OF CONDUCTORS CARRYING DIFFERENT VOLTAGES IN WIRE TROUGHS.

5. ALL WIRES SHALL BE LABELED ACCORDING TO THESE SCHEMATICS AT EVERY TERMINATION POINT.

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: D.LARSON PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*OFF=*REF*
M:\EIC_DWG\PROJECTS\DSCP\DWG\CAD\BV-BS PANELS.dwg LAYOUT: I-L SAVED: 6/12/2018 8:32 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: — PLOTTED: 6/12/2018 8:33 AM BY: ERICKSON, KEVIN
XREFS: IMAGES: PROJECTNAME: —
E0626046X05

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.

USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	6/11/2018	FINAL	KE	DL

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Professional Engineer's Name: **DAVE M. OBERLE**
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER DAVID M. OBERLE PE076383

ARCADIS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-L

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 6	**BSTI Job No.:** 868	**Date:** 11/12/2018	
Project Title: Former DSCP System Installation		**Phone #:** [redacted]	
Location of Work: PHA side of 76		**Fax #:**	
Description: HDPE fusion of pipe for trenched area			
Weather: Mostly Sunny		**Heat Index:**	
Precip: No	**High Temp:** 53	**Low Temp:** 34	**WINDS:** 0

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number	Man Hours	Number	Man Hours	Number	Man Hours
		1	8.00	1	8.00	2	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI
Date: 11/12/2018

Daily Report Number: 6

3. Work Performed Today:

- Conducted health and safety meeting.
- Fused 280' section of 3" & 4" for the trenched area

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 11/12/2018

Daily Report Number: 6

6. Manpower Hours by Personnel

Project Manager:	
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/12/2018

Daily Report Number: 6

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: Wednesday 11/14/18
- Complete 3" above ground pipe
- Complete 4" above ground pipe

This Week: No additional work beyond 11/14/18

Following Weeks: Continue Pipe installation

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 11/12/2018

November 13, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/13/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 16	Total Days:

Weather Conditions			
AM Conditions	Light Rain	Temp Min. (°F): 44	Temp Max. (°F): 47
PM Conditions	Cloudy	Temp Min. (°F): 47	Temp Max. (°F): 51

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Laborer		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8 8
	F-150 Excavator Skid Steer	Field Vehicles 305 Excavator with auger 259 Skid Steer	2 1 1	Yes Yes No	8 8 8
BSTI		Job Trailer	0	No	0
		Confined Space Equipment	0	No	0
		6500 Watt Generator	0	No	0
		2000 Watt Generator Butt Fusion Welding Machine Electrofusion Welding Machine	0 0 0	No No No	0 0 0

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 10/13/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 16	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, and Arcadis Personnel on Site. [redacted] arrives and holds daily safety briefing.	None	None
0900	Pars crew heads to PHA Site.	None	None
0925	Start pumping water from all sonotubes.	None	None
0935 1200	Start replacing damaged sonotube to 48" depth. Also install the last sonotube at 6' length for the expansion loops. Skid Steer got stuck in ditch.	Slippery Slope. Skid Steer got stuck	Dug it out. Graded DGA material on slope
1440 1710	Continue replacing damaged sonotube. Finish for the day.	None	None
1720	*PARS crew leaves Site for the day.*	None	None

[redacted]
Signature

Site Manager
Position

11/13/2018
Date

November 14, 2018

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 7	**BSTI Job No.:** 868	**Date:** 11/14/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work: PHA area		**Fax #:**	
Description: Fusion of 3" & 4" expansion loops to the above ground pipe			
Weather: Mostly Sunny		**Heat Index:**	
Precip: No	**High Temp:** 44	**Low Temp:** 32	**WINDS:** 10-12 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number	Man Hours	Number	Man Hours	Number	Man Hours
		1	8.00	1	8.00	2	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI
Date: 11/14/2018

Daily Report Number: 7

3. Work Performed Today:

- Conducted health and safety meeting.
- Completed fusions of 3" expansion loops to above ground pipe
- Completed 90% fusions of 4" expansion loops to above ground pipe

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 11/14/2018

Daily Report Number: 7

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI Date: 11/14/2018

Daily Report Number: 7

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:

This Week: - No additional site work

Following Weeks: Connect above ground pipe to trench

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 11/14/2018

November 16, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/16/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 18	Total Days:

Weather Conditions			
AM Conditions	Sunny/Windy	Temp Min. (°F): 36	Temp Max. (°F): 41
PM Conditions	Sunny	Temp Min. (°F): 41	Temp Max. (°F): 43

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Laborer		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8 8
	F-150 Excavator Skid Steer	Field Vehicles 305 Excavator with auger 259 Skid Steer	2 1 1	Yes No No	8 0 0

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/016/2018		Project #: 756-10		Inspector: [redacted]	
Day of Week: Friday		Contract Day: 18		Total Days:	

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, and Arcadis Personnel on Site. Carlo DiTullio arrives and holds daily safety briefing.	None	None
0730	Pars crew heads to PHA Site.	None	None
0740	Set up welder and weld extensions on tubing for ditch crossing structure.	None	None
1230	Start drilling holes un square tubing.	None	None
1330	Stop drilling to excavate/box out area for shed location.	None	None
1400	Start cutting unistrut in 3' lengths that get mounted to base plates.	None	None
1500	Leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/16/2018
Date

November 19, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/19/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 19	Total Days:

Weather Conditions			
AM Conditions	Cloudy	Temp Min. (°F): 36	Temp Max. (°F): 47
PM Conditions	Mostly Cloudy	Temp Min. (°F): 47	Temp Max. (°F): 49

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	9	Foreman	1	9	Skilled	1	9
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Laborer		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8 8
	F-150 Excavator Skid Steer	Field Vehicles 305 Excavator with auger 259 Skid Steer	2 1 1	Yes Yes Yes	8 1 1
	Welder	Tims Welder	1	Yes	2.5

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/019/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 19	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, and Arcadis Personnel on Site. [redacted] [redacted] arrives and holds daily safety briefing.	None	None
0730	Pars crew heads to PHA Site.	None	None
0740	Place and compact DGA in shed location.	None	None
0810	Shed arrives and shed is set on Compacted DGA.	None	None
0830	Start cutting unistrut in 3' lengths and grinding edges. Set unistrut at each pier location. Will be bolted to base plates at a later time.	None	None
1200	[redacted] starts drilling holes in square tube crossing ditch to bolt to base plates.	None	None
1215	[redacted] and [redacted] start bolting unistrut to all piers along fenceline.	None	None
1430	All unistrut bolted to piers along fenceline. [redacted] finished drilling and bolting base plates to square tube.	None	None
1445	Set up welder and weld unistrut base plates to square tube.	None	None
1600	Finished welding. Put all tools away and leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/19/2018
Date

November 26, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/26/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 20	Total Days:

Weather Conditions			
AM Conditions	Cloudy	Temp Min. (°F): 44	Temp Max. (°F): 50
PM Conditions	Rainy	Temp Min. (°F): 50	Temp Max. (°F): 52

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman		0	Skilled	2	16
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	2	6.5	Laborer	2	6.5
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	NO	0 0
	F-150 Excavator Skid Steer	Field Vehicles 305 Excavator with auger 259 Skid Steer	1 1 1	Yes Yes Yes	8 8 8
ECDI	Drill Rig	Truck Mounted	1	Yes	6.5
	Geo Probe	Track Mounted	1	Yes	6.5
	Truck	Stake Body	2	Yes	6.5

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/26/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 20	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, and Arcadis Personnel on Site. Chris arrives and holds daily safety briefing.	None	None
0730	Pars & ECDI crews heads to PHA Site.	None	None
0740	Clear all PHA owned piping, trash and fencing from areas where wells are to be installed. Mark out well locations for today's drilling.	None	None
0930 1230	Start setting wells in two locations. Geo probe crew finished installing well and move to next location.	None	None
1245 1300	Geo probe crew starts setting well in the next location. Truck mount crew finished installing well and tears down rig for the day.	None	None
1330	ECDI crews leave for the day due to heavy rains. 2 wells completed. PARS crew heads to the motor control bldg.	None	None
1530	PARS crew leaves site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/26/2018
Date

November 27, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/27/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 21	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 38	Temp Max. (°F): 43
PM Conditions	Partly Sunny	Temp Min. (°F): 41	Temp Max. (°F): 43

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	2	16	Laborer	2	16
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1		Foreman	1	8	Skilled	2	16
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	NO	0
	Field Vehicle	F-150	1	Yes	8
	F-150	Field Vehicles	1	Yes	8
	Excavator	305 Excavator with auger	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/27/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 21	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. Chris arrives and holds daily safety briefing.	None	None
0730	ECDI unloads 2nd geoprobe unit and both crews set up to install wells. [redacted] Thom oversees drillers. BSTI sets up to perform 2 Butt Fusions. [redacted] White & [redacted] identify existing product line with Chris from Arcadis.	None	None
0830	USACE & Arcadis Teams arrive for inspections.	None	None
0945	BSTI finished fusions. Ready to pull lines and fasten to ditch crossing and fence line support structures.	None	None
1130	Two more wells installed. All Crews break for lunch.	None	None
1200	Setting up on next two locations and continue drilling.	None	None
1520	ECDI and BSTI start wrapping up tolls & equipment.	None	None
1530	All crews leave site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/27/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 8	**BSTI Job No.:** 868	**Date:** 11/27/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Finalized 4" pipe welding, completed pipe mounting on pipe stands			
Weather: Mostly Sunny		**Heat Index:**	
Precip: No	**High Temp:** 42	**Low Temp:** 32	**WINDS:** 10-20 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	8.00	1	8.00	1	8.00	3	24.00

Cumulative Total: **24.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **24.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **24.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI
Date: 11/27/2018

Daily Report Number: 8

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Finalized 4" pipe welding, completed pipe mounting on pipe stands

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 11/27/2018

Daily Report Number: 8

6. Manpower Hours by Personnel

Project Manager:	8.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/27/2018

Daily Report Number: 8

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: Wednesday 11/27/18
- Mount 3" pipe on pipe stands
- Connect 3 & 4" pipe from vault to above ground pipe on PHA side

This Week: - Complete connection on treatment system from vault to above ground pipe

Following Weeks: Pressure testing

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

Nate Oropollo

BSTI Site Manager

Date: 11/27/2018

November 28, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/28/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Wednesday	Contract Day: 22	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 35	Temp Max. (°F): 39
PM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	3	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	2	16	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1		Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator with auger	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/28/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Wednesday	Contract Day: 22	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. Chris arrives and holds daily safety briefing.	None	None
0730	ECDI crews set up and continue installing wells. [redacted] Thom oversees drillers. BSTI sets up to perform 2 Butt Fusions. [redacted] & Falcon cut and install unistrut on bridge structure.	None	None
1000	BSTI Starts hanging 3" HDPE pipe on structure. PARS team start excavating trench from end of structure along. fence line to the shed.	None	None
1030	Discover 3 lines in trench. Called [redacted] and he came and identified that all three were old and out of service. See pictures. (1) old product line. (1) old vapor line and (1) old electrical conduit with wire removed.	Yes	See Remark
1050	Resume excavating trench.	None	None
1500	Drillers leave Site for the day. BSTI has all pipe hung. Only 2 fusions left to do on the crossing.	None	None
1530	PARS & BSTI crews leave site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/28/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 9	**BSTI Job No.:** 868	**Date:** 11/28/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Fused 3" & 4" above ground pipe to trench pipe, set 3" above ground pipe & completed 4" bridge pipe			
Weather: Cloudy / Sunny		**Heat Index:**	
Precip: No	**High Temp:** 44	**Low Temp:** 32	**WINDS:** 15-30 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	6.50	1	8.00	1	8.00	3	22.50

Cumulative Total: **22.50** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **22.50** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **22.50** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI
Date: 11/28/2018

Daily Report Number: 9

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Completed all 4" fusions on PHA side
- Fused 3" above ground piping to trench piping & set 3" above ground piping to strut

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 11/28/2018

Daily Report Number: 9

6. Manpower Hours by Personnel

Project Manager:	6.50
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/28/2018

Daily Report Number: 9

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: Thursday 11/28/18
- Finish 3" bridge strut connection
- Began 1" HDPE fusions

This Week:

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

Nate Oropollo

BSTI Site Manager

Date: 11/28/2018

November 29, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/29/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Thursday	Contract Day: 23	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 36	Temp Max. (°F): 39
PM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
[redacted]	Coventry Environmental	☐Yes X☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	3	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1	4	Foreman	1	4	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator with auger	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/29/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Thursday	Contract Day: 23	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. Chris arrives and holds daily safety briefing.	None	None
0710 0725	Tony Alessandrini from Coventry Environmental arrives to collect Waste Class Samples from roll-off containers. Tony leaves Site.	None	None
0730	ECDI crews set up and continue installing wells. [redacted] Thom oversees drillers. BSTI sets up to perform 2 Butt Fusions at bridge structure. [redacted] & Falcon continue excavating trench for 3" & 4" HDPE	None	None
1000	BSTI finished Fusions. @ men leave Site for the day. 3rd man heads over to Motor Control Bldg (MCB) to fuse fillings for tomorrow.	None	None
1030	PARS crew caught up to drillers near shed. Start laying 3" & 4" HDPE in trench and covering with pipe bedding material.	None	None
1230	BSTI last crew member leaves Site for the day.	None	None
1430	PARS crew finished backfilling for the day. Walk excavator over to the MCB for tomorrows work.	None	None
1500	Drillers start wrapping up for the day.	None	None
1530	PARS and Drilling crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/29/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 10	**BSTI Job No.:** 868	**Date:** 11/29/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Complete 3" bridge, prep. for DLA vault to trench to above ground pipe transition			
Weather: Cloudy / Sunny		**Heat Index:**	
Precip: No	**High Temp:** 50	**Low Temp:** 34	**WINDS:** 5-7 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	3.50	1	4.50	1	8.00	3	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	4		X	
	10/29/2018	Electrofusion Welding Mach	4		X	

BSTI
Date: 11/29/2018

Daily Report Number: 10

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Completed all 3" bridge fusion work
- Prepared pipe for vault to trench to above ground pipe on treatment system side

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI
Date: 11/29/2018

Daily Report Number: 10

6. Manpower Hours by Personnel

Project Manager:	3.50
Site Manager:	4.50
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI Date: 11/29/2018

Daily Report Number: 10

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: - Friday 11/29/18
- Complete vault to trench to above ground pipe 3" & 4" on treatment system side

This Week: -
-

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

Nate Oropollo

BSTI Site Manager

Date: 11/29/2018

November 30, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/30/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 24	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 36	Temp Max. (°F): 39
PM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
[redacted]	Coventry Environmental	☐Yes X☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	3	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1	4	Foreman	1	4	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
BC Landscapes	Dump Truck	6 CY	1	Yes	8
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/30/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 24	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. Chuck12130 arrives at MCB and holds daily safety briefing then heads over to PHA Site for Tailgate with drillers.	None	None
0715 0730	PARS crew starts removing fence and guiderail to excavate trench for BSTI to install HDPE lines into vault. Drillers continue drilling wells at the PHA Site.	None	None
0815	PARS starts removing asphalt and excavating trench. BSTI starts fusing 90 degree sweeps on pipes.	None	None
0930	Discover railroad tracks and 18" thick concrete under asphalt near vault. Head to Home Depot to rent jack hammer.	None	None
1000 1115	Start jack hammering concrete. Finished removing concrete and continue excavating trench.	None	None
1230	Finish excavating trench. BSTI starts fusing fittings and pipe into vault.	None	None
1450	Start placing and compacting pipe bedding below & above piping to 12' below grade.	None	None
1530	Drilling crew leave Site for the day.	None	None
1700	Trench backfilled and compacted to grade with DGA. Start replacing fence and Guiderail.	None	None
1730	PARS & BSTI crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/29/2018
Date

December 03, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/03/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 25	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 49	Temp Max. (°F): 52
PM Conditions	Partly Sunny	Temp Min. (°F): 48	Temp Max. (°F): 52

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	6	Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	1	Yes	8
	Truck	Stake Body	1	Yes	8
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	6
	Generator	2000 Watt Generator	1	No	0
	Field Vehicle	PU Truck	1	No	0

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/03/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 25	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing at PHA Site.	None	None
0715 0730	PARS crew starts backfilling to grade up to first well location. Drillers continue drilling wells and (1) guy starts purging wells.	None	None
0900	Nate from BSTI arrives and sets up for fusing piping for 2" wells while waiting for material delivery.	None	None
1100	BSTI materials arrive.	None	None
1330	[redacted] finish backfilling to grade up to the concrete structures before the first well. Head to Home Depot to get materials to set the 4"x 6" timber for the compressor in the Motor Control Bldg. (MCB) tomorrow.	None	None
1430	Drop off materials at the MCB and cut timbers to size.	None	None
1530	All crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/03/2018
Date

December 04, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/04/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 26	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41
PM Conditions	Partly Sunny	Temp Min. (°F): 38	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	4	32
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	1	Yes	8
	Truck	Stake Body	1	Yes	8
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	No	0
	Generator	2000 Watt Generator	1	No	0
	Field Vehicle	PU Truck	1	No	0

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/04/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 26	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	[redacted] head to PHA Site and excavate trenches for well piping to manifold shed. The rest of PARS Team oversees drillers and gauges wells. Drillers start drilling last 2 wells and purge all wells.	None	None
0815	Drillers discover broken well. Need to re-drill. [redacted] can't excavate so head to the MCB to build forms for well manholes and heat exchangers.	None	None
1200	All forms built and staged at MCB. Break for lunch.	None	None
1230	[redacted] start excavating trenches at PHA.	None	None
1530	[redacted] and drillers leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/04/2018
Date

December 05, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/05/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Wednesday	Contract Day: 27	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 27	Temp Max. (°F): 34
PM Conditions	Cloudy	Temp Min. (°F): 28	Temp Max. (°F): 34

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	2	16
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
ECDI	Geo Probe	Track Mounted	1	Yes	8
	Truck	Stake Body	1	Yes	8
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/05/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Wednesday	Contract Day: 27	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	PARS & BSTI start excavating trenches and install piping from wells to manifold shed. Drillers continue drilling & purging wells.	None	None
1200	Break for lunch.	None	None
1230	Back to work	None	None
1240	ECDI crew finishes all wells and leaves Site. All wells installed and purged. Equipment demobilized.	None	None
1530	PARS and ECDI crews leave site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/05/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 13	**BSTI Job No.:** 868	**Date:** 12/5/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Bio sparge and vent pipe installation			
Weather: Cloudy		**Heat Index:**	
Precip: Yes	**High Temp:** 38	**Low Temp:** 29	**WINDS:** 0 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	0.00	1	8.00	1	8.00	3	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator	8	X		
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI Date: 12/5/2018

Daily Report Number: 13

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Began 1" & 2" sparge and vent pipe installation
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 12/5/2018

Daily Report Number: 13

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/5/2018

Daily Report Number: 13

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:
- Wednesday 12/5/18
- Continue 1" and 2" sparge and vent pipe installation
-

This Week:
-
-

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 12/5/2018

December 06, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/06/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Thursday	Contract Day: 28	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 27	Temp Max. (°F): 36
PM Conditions	Cloudy	Temp Min. (°F): 28	Temp Max. (°F): 34

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	8	Laborer	1	16
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/06/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Thursday	Contract Day: 28	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, BSTI and Arcadis Personnel arrive and Chris holds daily safety briefing.	None	None
0730	PARS & BSTI crews head over to PHA Site and resume installing piping from wells to manifold shed.	None	None
1530	Well piping approximately 80% complete. PARS & BSTI crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/06/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 14	**BSTI Job No.:** 868	**Date:** 12/6/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Bio sparge and vent pipe installation			
Weather: Cloudy		**Heat Index:**	
Precip: No	**High Temp:** 38	**Low Temp:** 25	**WINDS:** 0 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	0.00	1	8.00	1	8.00	3	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI Date: 12/6/2018

Daily Report Number: 14

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Continue bio-sparge and vent installation
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 12/6/2018

Daily Report Number: 14

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/6/2018

Daily Report Number: 14

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:
- Friday 12/7/18
- Complete 1" and 2" sparge and vent pipe installation
-

This Week:
-
-

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

Nate Oropollo

BSTI Site Manager

Date: 12/6/2018

December 07, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/07/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 29	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 37	Temp Max. (°F): 41
PM Conditions	Cloudy	Temp Min. (°F): 35	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	8	Laborer	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/07/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 29	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, BSTI and Arcadis Personnel arrive and Chris holds daily safety briefing.	None	None
0730	PARS & BSTI crews head over to PHA Site. BSTI crew resumes installing piping from wells to manifold shed. PARS crew starts placing pipe bedding material and metallic warning tape in trenches.	None	None
1200	PARS crew starts backfilling trenches east of shed to grade with overburden soils to grade.	Hit monitoring well with skidsteer	Plan to uncover and repair if possible on monday
1530	BSTI completes well piping installation from all wells to the unistrut bracket at the manifold shed. Finish backfilling and grading.	None	None
1600	PARS & BSTI crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/07/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 15	**BSTI Job No.:** 868	**Date:** 12/7/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Bio sparge and vent pipe installation			
Weather: Cloudy		**Heat Index:**	
Precip: No	**High Temp:** 38	**Low Temp:** 25	**WINDS:** 0 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	9.00	1	0.00	1	9.00	3	18.00

Cumulative Total: **18.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **18.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **18.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI Date: 12/7/2018

Daily Report Number: 15

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Completed bio-sparge and vent pipe installation
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 12/7/2018

Daily Report Number: 15

6. Manpower Hours by Personnel

Project Manager:	9.00
Site Manager:	0.00
Remediation Specialist:	9.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/7/2018

Daily Report Number: 15

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:
- Monday 12/10/18
- Weld transition fittings onto 3" & 4" lines pre heat exchange
.

This Week:
-
-

Following Weeks: Pressure testing when weather is appropriate

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 12/7/2018

December 10, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/10/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 30	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 28	Temp Max. (°F): 39
PM Conditions	Cloudy	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman			Laborer	1	4
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
BSTI	Job Trailer		1	Yes	4
	Generator	2000 Watt Generator	1	Yes	4
	Field Vehicle	PU Truck	1	Yes	4

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/10/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 30	Total Days:

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS and Arcadis Personnel arrive and [redacted] holds daily safety briefing.	None	None
0730	PARS crew heads over to PHA and starts backfilling.	None	None
1200	Chris from BSTI arrives to weld sweeps on pipe behind the Motor Control Bldg (MCB).	None	None
1215	Material delivery from Furgeson Supply arrives. Unload manifold materials in shed.	None	None
1235	Continue backfilling and placing DGA around shed and piping rack.	None	None
1345	Remove asphalt and overburden soils from vault trench location.	None	None
1500	Leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/10/2018
Date

December 11, 2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/11/2018	Project #: 756-10	Inspector: [redacted]
Day of Week:Tuesday	Contract Day: 31	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 28	Temp Max. (°F): 37
PM Conditions	Cloudy	Temp Min. (°F): 37	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman			Laborer		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
BSTI	Job Trailer		1	No	0
	Generator	2000 Watt Generator	1	No	0
	Field Vehicle	PU Truck	1	No	0

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/11/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Tuesday	**Contract Day: 31**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS and Arcadis Personnel arrive and [redacted] holds daily safety briefing.	None	None
0730	Continue removing asphalt and overburden soils from vault trench location.	None	None
0900	Make 2 additional forms for well covers and lay out manifold rack in shed. Also cut stakes for forms	None	None
1200	Start setting forms and well covers to grade starting on west end of Site.	None	None
1500	Six wells formed up. Leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/11/2018
Date

December 18, 2018

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 16	**BSTI Job No.:** 868	**Date:** 12/18/2018	
Project Title: Former DSCP System Installation		**Phone #:** (610) 639-8088	
Location of Work:		**PHA side**	
Description: Pressure test			
Weather: Cloudy		**Heat Index:**	
Precip: No	**High Temp:** 43	**Low Temp:** 29	**WINDS:** 5-10 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	0.00	1	0.00	2	13.50	4	13.50

Cumulative Total: **13.50** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **13.50** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **13.50** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer				
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator				
	10/29/2018	Butt Fusion Welding Mach				
	10/29/2018	Electrofusion Welding Mach	4		X	

BSTI Date: 12/18/2018

Daily Report Number: 16

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Conducted pressure test for both 3" & 4" lines with a wetting period, expansion period and testing period
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI Date: 12/18/2018

Daily Report Number: 16

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	0.00
Remediation Specialist:	13.50
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/18/2018

Daily Report Number: 16

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:
- Wednesday 12/19/18
- Drain lines in vaults and fill in 3"& 4" holes in vaults
.

This Week:
- Use vac truck to pull any excess water lines
-

Following Weeks:

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

Nate Oropollo

BSTI Site Manager

Date: 12/18/2018

Factory Acceptance Test Electrical Form (Instrumentation and Switches)		
Date: 3-13-19	Test Section: 6.2	Equipment ID: BV/BS MCP
	Electrical Tests for Pumps and Compressor	**Circle/Notes**
01	Confirm Wires coming from the control panel are going to the correct instrument or switch. Comments: See Presidio Acceptance Test Sheets	(Y)/N
02	Confirm correct power is being supplied to the instrument or switch. Comments:	(Y)/N
03	Confirm that the instrument or switch is wired correctly. Comments:	(Y)/N
04	For switches, confirm that the PLC is reading that the switch is activated. Comments:	(Y)/N
05	For instrumentation, simulate a 4-20 ma signal back to the PLC and confirm that the PLC is seeing the signal correctly. Comments:	(Y)/N
06	For instrumentation, during testing operations, confirm that the reading at the instrument is communicating back to the PLC and that the correct response is occurring due to the reading with-in the system. Comments:	(Y)/N
07	For Instruments, provide copies of calibration certifications from the manufacturer to this form. Comments:	Y/N NA

Test Section: 6.2 **Equipment ID:** BV/BS MCP **(Pass)** / **Fail**

Notes: Presidio completed all tests above to the Instrumentation and Control panel of BV/BS System. All alams, switches, instruments and controls were demonstrated to function correctly.
- See attached test sheets from presidio for MCP and Remote panels.

I certify that all equipment/material information included on this Equipment/Material Testing Form has been collected and observed in accordance to both the engineer's and contractor's approval.

Print: Carlo DiTullio Sign: [signature] Date: 5-8-19

Arcadis: Print:_____ Sign:_____ Date:_____

Factor Acceptance Test Electrical Testing Form (Motors)

Date: 3-17-19 **Test Section:** 6.2 **Equipment ID:** B-201

Test Start Time: 1100

Pressure/Flow Testing: Fluid or Air

Max Equipment/Material Operating Pressure/Flow: 8.4psi / 128 cfm

Max Operating Pressure/flow * 1.33= 11.1 **=Max Testing PSI/GPM**

Notes: Do Not operate above 10 psi - per engineer (Lyn Frac Formation). 9.8 psi was max tested

	Electrical Tests for Motors	Circle/Notes	
01	Confirm that pump has been wired correctly. What is the power requirement?	Y/N 480 v 3Ø	14A
02	What are the Mega Ohms of the power cable from the MCC to the Pump? Is the reading per Arcadis Specifications?	no spec Y/N NA	
03	What is the Pre-Start-Up Electrical Power Reading? What is the power requirement?	445 V	
04	What is the Pre-Start-Up Mega Ohm Reading? What is the manufacturer requirement?	no spec NA	see notes
05	Engineer approval prior to start up.	~~Y/N~~ Yes	
06	Is the pump direction correct?	Y/N	see notes
07	Is VFD controller working correctly?	Y/N	
08	Conduct VFD operation in "hand" check. Is it working correctly?	Y/N	
09	Conduct VFD operation in "auto" check. Is it working correctly?	Y/N	
10	Confirm "remote run switch" is working correctly.	Y/N	
11	Confirm "HOA" is working correctly.	Y/N	

Test Section: 6.2 **Equipment ID:** B-201 **Pass / Fail**

Notes: No spec in design for Mega Ohms. Design Requires Amp testing. 14A max per sheet E3. 9.7 A was max observed. 9.9A @ 41.9 Hz is continous operation Amps.

- Blower was also wired backwards originally and fixed during shake down.

I certify that all equipment/material information included on this Equipment/Material Testing Form has been collected and observed in accordance to both the engineer's and contractor's approval.

Print: Carla Di Tullio Sign: [signature] Date: 05-07-19

Arcadis: Print:_____ Sign:_____ Date:_____

Factor Acceptance Test Electrical Testing Form (Motors)

Date: 3-13-19 **Test Section:** 6.2 **Equipment ID:** B-101

Test Start Time: 0900

Pressure/Flow Testing: Fluid or (Air)

Max Equipment/Material Operating Pressure/Flow: 8.3 psi / 260 GPM

Max Operating Pressure/flow * 1.33= 11 **=Max Testing (PSI)/GPM**

Notes: ~~Cannot operate~~ Do Not operate above 10 psi per engineer (can fracture formation). 8.3 was max tested

	Electrical Tests for Motors	Circle/Notes
01	Confirm that pump has been wired correctly. What is the power requirement?	(Y)N 480v 3Ø NA
02	What are the Mega Ohms of the power cable from the MCC to the Pump? Is the reading per Arcadis Specifications?	no spec Y/N NA
03	What is the Pre-Start-Up Electrical Power Reading? What is the power requirement?	495 V
04	What is the Pre-Start-Up Mega Ohm Reading? What is the manufacturer requirement?	no spec NA see note
05	Engineer approval prior to start up.	YES
06	Is the pump direction correct?	(Y)N see notes
07	Is VFD controller working correctly?	(Y)N
08	Conduct VFD operation in "hand" check. Is it working correctly?	(Y)N
09	Conduct VFD operation in "auto" check. Is it working correctly?	(Y)N
10	Confirm "remote run switch" is working correctly.	(Y)N
11	Confirm "HOA" is working correctly.	(Y)N

Test Section: 6.2 **Equipment ID:** B-101 **(Pass) / Fail**

Notes: No spec in design for Mega Ohms. Design requires Amp testing. 11A max per Sheet E3. 9.6A was max observed. 8.4A @ 32.9 Hz is continuous operation observed Amps.

- Blower wiring was reversed, fixed during shakedown testing.

I certify that all equipment/material information included on this Equipment/Material Testing Form has been collected and observed in accordance to both the engineer's and contractor's approval.

Arcadis: Print: Carlo Di Tella Sign: [signature] Date: 05-07-19

Print: _____ Sign: _____ Date: _____

Table 6-1
Suggested Pre-commissioning Checklist

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
SUBSURFACE							
IAS/SVE Wells							
Soil physical and chemical characteristics established		✓					
IAS wells/trenches installed per specification (e.g., screen length, size, diameter, depth, filter pack, grout, seal, riser)		✓					
SVE wells/trenches installed per specification (e.g., screen length, size, diameter, depth, filter pack, grout, seal, riser)[1]	✓						
IAS wells purged/cleaned/developed		✓					
Monitoring locations established (e.g., neutron access tubes, ERT boreholes, groundwater monitoring wells, piezometers, and soil gas probes)		✓					
IAS well and monitoring locations surveyed and located on layout plan		·	✓	COMPLETE SURVEY	CMD	DEC 2019	SCHEDULED FOR 2019
SVE well and monitoring locations surveyed and located on layout plan	✓						
Groundwater access ports installed at each IAS well		✓					
SVE sample ports installed at each well	✓						
IAS airflow control provided at each well head		✓					
SVE airflow control provided at each well head	✓						
Baseline monitoring data collected (e.g., dissolved oxygen, Eh, VOCs)							

Table 6-1
Suggested Pre-commissioning Checklist (Continued)

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
IAS/SVE Piping							
IAS underground piping to pumps installed per specifications (e.g., size, material type, location, depth, etc.)		✓					
SVE underground piping to pumps installed per specifications (e.g., size, material type, location, depth, etc.)	✓						
Piping insulation/heat tape installed	✓						
Piping flushed/cleaned/pressure tested		✓					
Subsurface as-built equipment schematic provided			✓	COMPLETE AS-BUILTS	CMD	JUNE 2019	
SURFACE							
IAS/SVE Mechanical/Civil							
IAS surface equipment schematic shown (including pressure tanks and compressor)			✓	COMPLETE AS-BUILTS	CMD	JUNE 2019	
SVE surface equipment schematic shown (including blower)	✓						
IAS foundations complete		✓					
SVE foundations complete	✓						
IAS compressor provided and installed per specifications		✓					
SVE blower provided and installed per specifications	✓						
SVE sample ports installed upstream and downstream of blower	✓						
IAS compressor(s) grouted in place	✓						INSTALLED ON STEEL SKID
SVE blower(s) grouted in place	✓						
IAS vibration dampers installed		✓					
SVE vibration dampers installed	✓						
IAS coupling alignment/level to specifications		✓					

Table 6-1
Suggested Pre-commissioning Checklist (Continued)

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
SVE coupling alignment/level to specifications	✓						
IAS compressor/pipe connections installed/tested		✓					
SVE blower/pipe connections installed/tested	✓						
IAS compressor and seal integrity verified		✓					
SVE blower and seal integrity verified	✓						
Silencers installed before and/or after IAS compressor		✓					
Silencers installed before and/or after SVE blower	✓						
SVE air/water separator provided	✓						
IAS air filtered for oil and particulates		✓					
IAS piping layout provided (as practical and economical)			✓	COMPLETE AS-BUILT	CMD	JUNE 2019	
SVE offgas treatment installed and functional (if needed)	✓						
Auxiliary fuel operational (if needed)	✓						
Aftercooler system functional (if needed)		✓					
IAS/SVE Electrical							
System grounding installed/checked		✓					
Enclosure lighting/HVAC functional		✓					
Pump rotation verified		✓					
Disconnects in sight of units being controlled		✓					
Power connected to monitoring instruments		✓					

Table 6-1
Suggested Pre-commissioning Checklist (Continued)

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
Instrument/Controls							
Valves (including air bleed, dilution, and check valves) installed and operation verified		✓					
Temperature, pressure and flow gauges installed in piping upstream (if necessary) and downstream of compressor/blower		✓					
Gauges calibrated, tested, and readings in range		✓					
Control/alarms and interlocks functional		✓					

Notes: [1]Italicized text identify components associated with SVE systems.
N/A Indicates not applicable
MR Meets requirements
AN Action needed

Project: ARCADIS- DSCP Philadelphia
Date: 3/6/2019

Table 1: ALARM FUNCTION TESTING DOCUMENTATION

Input Type	INPUT	Alarm	DESCRIPTION	INITIAL LIMITS	ALARM DELAY (sec)	System Shutdown (y/n)	HMI Display	Email Notification (y/n)	Comments	Pass / Fail
MSG	B3:15	Permissive	Permissive Bit from Main System signaling blower is on		5	y	y	y		Pass (jk)
MSG	N7:10/15	Comm Fail	Communiation with Main System PLC failed		30	y	y	y		Pass (jk)
DI	I:0/1	Estop Alarm	Estop Signal OK		0	y	y	y		Pass (jk)
DI	I:0/2	Power Fail	Power Fail Alarm		3	y	y	y		Pass (jk)
DI	I:0/3	UPS Fail	UPS output fail		3	n	y	y		Pass (jk)
DI	I:0/10	HX-101 Fault	HX-101 Failed to Start		1	y	y	y		Pass (jk)
DI	I:0/11	HX-201 Fault	HX-201 Failed to Start		1	y	y	y		Pass (jk)
DI	I:0/12	B-101 Fault	B-101 VFD Fault Signal		3	y	y	y		Pass (jk)
DI	I:0/13	B-201 Fault	B-201 VFD Fault Signal		3	y	y	y		Pass (jk)
AI	I:1.0	PAH-101	Biovent Blower Discharge High Pressure	7.5 psi	3	y	y	y		Pass (jk)
AI	I:1.1	PAH-201	Biosparge Blower Discharge High Pressure	12.5 psi	3	y	y	y		Pass (jk)
AI	I:1.2	TAH-101	Biovent Blower Discharge High Temperature	130 DegF	3	y	y	y		Pass (jk)
AI	I:1.3	TAH-201	Biosparge Blower Discharge High Temperature	130 DegF	3	y	y	y		Pass (jk)
AI	I:2.0	FAL-101	Biovent Blower Discharge Low Flow	10 cfm	300/10	y	y	y		Pass (jk)
AI	I:2.1	FAL-201	Biosparge Blower Discharge Low Flow	5 cfm	300/10	y	y	y		Pass (jk)
AI	I:2.0	PDIT-101 Fail	Biovent Blower Discharge Flow Meter Fail	<3.6mA/>20.5mA	3	y	y	y		Pass (jk)
AI	I:2.1	PDIT-201 Fail	Biosparge Blower Discharge Flow Meter Fail	<3.6mA/>20.5mA	3	y	y	y		Pass (jk)

Project: ARCADIS- DSCP Philadelphia
Date: 3/6/2019

Table 2: FAT I/O Testing Form

Panel	I/O Type	Panel I/O ID	Description	I/O Module	I/O#	I/O Voltage 24VDC/120VAC	Panel FAT I/O Simulate Test (Pass/Fail)	Range (if applicable)	Notes
MCP	DI	RESET	Estop Reset PB	Embedded Inputs	I:0/00	24vdc	pass		
MCP	DI	Estop	Estop Ok	Embedded Inputs	I:0/01	24vdc	pass		
MCP	DI	104CR	AC Power Ok	Embedded Inputs	I:0/02	24vdc	pass		
MCP	DI	111CR	UPS Ok	Embedded Inputs	I:0/03	24vdc	pass		
MCP	DI	B-101 HOA	B-101 in Auto	Embedded Inputs	I:0/04	24vdc	pass		
MCP	DI	B-101 HOA	B-101 in Remote	Embedded Inputs	I:0/05	24vdc	pass		
MCP	DI	B-201 HOA	B-201 in Auto	Embedded Inputs	I:0/06	24vdc	pass		
MCP	DI	B-201 HOA	B-201 in Remote	Embedded Inputs	I:0/07	24vdc	pass		
MCP	DI	VFD-1	B-101 VFD Running	Embedded Inputs	I:0/08	24vdc	pass		
MCP	DI	VFD-2	B-201 VFD Running	Embedded Inputs	I:0/09	24vdc	pass		
MCP	DI	C-1	HX-101 MS Aux	Embedded Inputs	I:0/10	24vdc	pass		
MCP	DI	C-2	HX-201 MS Aux	Embedded Inputs	I:0/11	24vdc	pass		
MCP	DI	B-101 VFD Fault	B-101 Effluent High Temp Switch	Embedded Inputs	I:0/12	24vdc	pass		
MCP	DI	B-201 VFD Fault	B-201 Effluent High Temp Switch	Embedded Inputs	I:0/13	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/14	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/15	24vdc	pass		
MCP	DI		HX-101 Effluent High Temp Switch	Embedded Inputs	I:0/16	24vdc	pass		
MCP	DI		HX-201 Effluent High Temp Switch	Embedded Inputs	I:0/17	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/18	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/19	24vdc	pass		
MCP	DO	C-1	HX-101 MS Call	Embedded Outputs	O:0/0	24vdc/120vac	pass		
MCP	DO	C-2	HX-201 MS Call	Embedded Outputs	O:0/1	24vdc/120vac	pass		
MCP	DO	VFD-1	B-101 VFD Call	Embedded Outputs	O:0/2	24vdc	pass		
MCP	DO	VFD-2	B-201 VFD Call	Embedded Outputs	O:0/3	24vdc	pass		
MCP	DO		Spare	Embedded Outputs	O:0/4				
MCP	DO		Spare	Embedded Outputs	O:0/5				
MCP	DO		Spare	Embedded Outputs	O:0/6				
MCP	DO		Spare	Embedded Outputs	O:0/7				
MCP	DO		Spare	Embedded Outputs	O:0/8				
MCP	DO		Spare	Embedded Outputs	O:0/9				
MCP	DO		Spare	Embedded Outputs	O:0/10				
MCP	DO		Spare	Embedded Outputs	O:0/11				
MCP-MCE	AI	PIT-101	Biovent Pressure Transmitter	Slot 3, 1762SC-IF8U	I:1.0	24vdc	pass	0-145 psi	
MCP-MCE	AI	PIT-201	Biosparge Pressure Transmitter	Slot 3, 1762SC-IF8U	I:1.1	24vdc	pass	0-145 psi	
MCP-MCE	AI	TIT-101	Biovent Temperature Transmitter	Slot 3, 1762SC-IF8U	I:1.2	24vdc	pass	0-300 DegF	
MCP-MCE	AI	TIT-201	Biosparge Temperature Transmitter	Slot 3, 1762SC-IF8U	I:1.3	24vdc	pass	0-300 DegF	
MCP-MCE	AI	FIT-201	Biovent Flow Transmitter	Slot 3, 1762SC-IF8U	I:2.0	24vdc	pass	0-2 "H2O	
MCP-MCE	AI	FIT-201	Biosparge Flow Transmitter	Slot 3, 1762SC-IF8U	I:2.1	24vdc	pass	0-6 " H2O	
MCP-MCE	AI		Spare	Slot 3, 1762SC-IF8U	I:2.2				
MCP-MCE	AI		Spare	Slot 3, 1762SC-IF8U	I:2.3				
MCP-MCE	AI	VFD-1	B-101 Speed Freq Feedback	Slot 4, 1762-IF2OF2	I:3.0	24vdc	pass	0-100%	
MCP-MCE	AI	VFD-2	B-201 Speed Freq Feedback	Slot 4, 1762-IF2OF2	I:3.1	24vdc	pass	0-100%	
MCP-MCE	AO	VFD-1	B-101 Speed Command	Slot 4, 1762-IF2OF2	O:3.0	24vdc	pass	0-100%	
MCP-MCE	AO	VFD-2	B-201 Speed Command	Slot 4, 1762-IF2OF2	O:3.1	24vdc	pass	0-100%	

Table3: Southern Skimmer I/O Testing Form

Panel	I/O Type	Panel I/O ID	Description	I/O Module	I/O#	I/O Voltage 24VDC/120VAC	Panel FAT I/O Simulate Test (Pass/Fail)	PLC ALARM / Function TEST	HMI ALARM TEST	NOTIFICATION ALARM TEST
RCP-1	DI	RESET	Estop Reset PB	Embedded Inputs	I:0/00	24vdc	pass	pass	pass	pass
RCP-1	DI	Estop	Estop Ok	Embedded Inputs	I:0/01	24vdc	pass	pass	pass	pass
RCP-1	DI	104CR	AC Power Ok	Embedded Inputs	I:0/02	24vdc	pass	pass	pass	pass
RCP-1	DI	111CR	UPS Ok	Embedded Inputs	I:0/03	24vdc	pass	pass	pass	pass
RCP-1	DI			Embedded Inputs	I:0/04					
RCP-1	DI			Embedded Inputs	I:0/05					
RCP-1	DI			Embedded Inputs	I:0/06					
RCP-1	DI			Embedded Inputs	I:0/07					
RCP-1	DI			Embedded Inputs	I:0/08					
RCP-1	DI			Embedded Inputs	I:0/09					
RCP-1	DI			Embedded Inputs	I:0/10					
RCP-1	DI			Embedded Inputs	I:0/11					
RCP-1	DI			Embedded Inputs	I:0/12					
RCP-1	DI			Embedded Inputs	I:0/13					
RCP-1	DI			Embedded Inputs	I:0/14					
RCP-1	DI			Embedded Inputs	I:0/15					
RCP-1	DI			Embedded Inputs	I:0/16					
RCP-1	DI			Embedded Inputs	I:0/17					
RCP-1	DI			Embedded Inputs	I:0/18					
RCP-1	DI			Embedded Inputs	I:0/19					
RCP-1	DO			Embedded Outputs	O:0/0					
RCP-1	DO			Embedded Outputs	O:0/1					
RCP-1	DO			Embedded Outputs	O:0/2					
RCP-1	DO			Embedded Outputs	O:0/3					
RCP-1	DO			Embedded Outputs	O:0/4					
RCP-1	DO			Embedded Outputs	O:0/5					
RCP-1	DO			Embedded Outputs	O:0/6					
RCP-1	DO			Embedded Outputs	O:0/7					
RCP-1	DO			Embedded Outputs	O:0/8					
RCP-1	DO			Embedded Outputs	O:0/9					
RCP-1	DO			Embedded Outputs	O:0/10					
RCP-1	DO			Embedded Outputs	O:0/11					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.0					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.1					
RCP-1	AI		Product Tank Level	Slot 1, 1762-IF4	I:1.2	24vdc	pass	pass	pass	pass
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.3					

Range (if applicable)	Notes

Table3: Northern Skimmer I/O Testing Form

Panel	I/O Type	Panel I/O ID	Description	I/O Module	I/O#	I/O Voltage 24VDC/120VAC	Panel FAT I/O Simulate Test (Pass/Fail)	PLC ALARM / Function TEST	HMI ALARM TEST	NOTIFICATION ALARM TEST
RCP-1	DI	RESET	Estop Reset PB	Embedded Inputs	I:0/00	24vdc	pass	pass	pass	pass
RCP-1	DI	Estop	Estop Ok	Embedded Inputs	I:0/01	24vdc	pass	pass	pass	pass
RCP-1	DI	104CR	AC Power Ok	Embedded Inputs	I:0/02	24vdc	pass	pass	pass	pass
RCP-1	DI	111CR	UPS Ok	Embedded Inputs	I:0/03	24vdc	pass	pass	pass	pass
RCP-1	DI			Embedded Inputs	I:0/04					
RCP-1	DI			Embedded Inputs	I:0/05					
RCP-1	DI			Embedded Inputs	I:0/06					
RCP-1	DI	AC-1 Starter	Air Compressor 1 enabled	Embedded Inputs	I:0/07	24vdc	pass	pass	pass	pass
RCP-1	DI	LSH	Product Tank Alarm	Embedded Inputs	I:0/08					
RCP-1	DI			Embedded Inputs	I:0/09					
RCP-1	DI			Embedded Inputs	I:0/10					
RCP-1	DI			Embedded Inputs	I:0/11					
RCP-1	DI			Embedded Inputs	I:0/12					
RCP-1	DI			Embedded Inputs	I:0/13					
RCP-1	DI	AC-1 OL	Air Compressor 1 overload	Embedded Inputs	I:0/14	24vdc	pass	pass	pass	pass
RCP-1	DI			Embedded Inputs	I:0/15					
RCP-1	DI			Embedded Inputs	I:0/16					
RCP-1	DI			Embedded Inputs	I:0/17					
RCP-1	DI			Embedded Inputs	I:0/18					
RCP-1	DI		Smoke Detector Alarmed	Embedded Inputs	I:0/19	24vdc	pass	pass	pass	pass
RCP-1	DO	AC-1 Call	AC-1 Call	Embedded Outputs	O:0/0					
RCP-1	DO			Embedded Outputs	O:0/1					
RCP-1	DO			Embedded Outputs	O:0/2					
RCP-1	DO			Embedded Outputs	O:0/3					
RCP-1	DO			Embedded Outputs	O:0/4					
RCP-1	DO			Embedded Outputs	O:0/5					
RCP-1	DO			Embedded Outputs	O:0/6					
RCP-1	DO			Embedded Outputs	O:0/7					
RCP-1	DO			Embedded Outputs	O:0/8					
RCP-1	DO			Embedded Outputs	O:0/9					
RCP-1	DO			Embedded Outputs	O:0/10					
RCP-1	DO		Smoke Detector Reset	Embedded Outputs	O:0/11	24vdc	pass	pass	pass	pass
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.0					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.1					
RCP-1	AI		Product Tank Level	Slot 1, 1762-IF4	I:1.2					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.3					

Range (if applicable)	Notes
	Probe not working, could not test
	Probe not working, could not test

APPENDIX B – Monitoring Well Construction Logs

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1A

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Dark brown topsoil, loose silt, some coarse sand. (ML)	
					2	Brown to light brown to orange brown loose to dense silt, little fine sand, trace fine to coarse subrounded to subangular gravel. (ML)	
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					10		
					11		Intense vibration, slow drilling from 11 to 11.5 ft bgs.
					12		Strong vibration at 12.5 ft bgs.
					13		
					14		
					15		
					16		
					17		
					18		
					19		
					20		
					21		
					22		
					23		Saturated at 23 ft bgs.
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		

Comments:

Well BS-1A completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1B

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–17	Brown-light brown silt, little fine sand, trace fine gravel. (ML)	Moderately cohesive soils from 0 to 10 ft bgs. Strong vibrations at 11 ft bgs. Moderately cohesive soils. Moderately cohesive soils from 11 to 18 ft bgs.
					18–35	Light brown-tan fine sand, some silt, little gravel. (SM)	Wet at 23 feet bgs.

Comments:

Well MW-1B completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL BS-1C

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–8	Grey-brown silt, some fine sand. (ML)	
					8–11	Grey-brown silt, some small rounded gravel. (ML)	Vibration and cobbles at 10 ft bgs.
					11–14	Brown silt, Trenton gravel. (ML)	Vibration and cobbles from 11 to 16 ft bgs.
					14–16	Grey-brown silt, large angular gravel. (ML)	
					16–23	Grey silt. (ML)	
					23–28	Grey sand. (SM)	Saturated, product odor from 23 to 28 ft bgs.
					28–35	Brown sand. (SM)	Saturated from 28 to 35 ft bgs.

Comments:

Well BS-1C completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1D

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Topsoil, dark brown sandy silt. (ML)	
					2	Brown sandy silt. (ML)	
					3		
					4		
					5		
					6		
					7		
					8	Grey-brown sandy silt, some rounded small gravel. (ML)	
					9		
					10		
					11	Brown silt, some fine sand, some small rounded gravel. (ML)	
					12		
					13		
					14		
					15		
					16		Vibration and cobbles from 10 to 20 ft bgs.
					17		
					18		
					19		
					20		
					21	Brown silt, large angular gravel, Trenton gravel stone-concrete fill. (ML)	
					22		
					23		
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31	Dark brown sand, trace angular gravel, some silt.	
					32		
					33		
					34		Saturated from 30 to 35 ft bgs.
					35		

Comments:

Well BS-1D completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL BS-1E

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Pea and Trenton gravel. (GP)	
					2		
					3	Tan-grey silt, some fine sand. (ML)	
					4		
					5	Light brown silt, some fine sand. (ML)	
					6		
					7		
					8		
					9		
					10		
					11	Grey-brown silt, some find sand. (ML)	
					12		
					13		
					14		Vibration and cobbles from 10 to 18 ft bgs.
					15		
					16		
					17		
					18		
					19	Brown silty sand. (SM)	
					20		
					21		
					22		
					23		
					24		
					25		
					26		
					27		Moist from 18 to 35 ft bgs.
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		

Comments:

Well BS-1E completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1F

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–3	Pea gravel. (GP)	
					3–8	Brown silt, some fine sand, some gravel. (ML)	
					8–18	Grey silt, some fine sand. (ML)	Vibration and cobbles from 11 to 18 ft bgs.
					18–27	Grey silty sand and gravel. (SM)	Product odor at 25 ft bgs.
					27–35	Grey-brown fine sand. (SM)	Vibrations and cobbles from 27 to 29 ft bgs.

Comments:

Well BS-1F completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1G

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–10	Tan silt and fine sand. (ML)	
					11–12	Tan silt, some fine sand. (ML)	Vibration and possible cobbles from 11 to 15 ft bgs.
					13–14	Tan-grey silt, some fine sand. (ML)	
					15–24	Grey brown sand. (SM)	
					25–35	Grey-brown silty sand. (SM)	Strong odor from 25 to 35 ft bgs.

Comments:

Well BS-1G completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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LOG OF BIOSPARGE WELL
BS-1H

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–4	Tan pea gravel. (GP)	
					5–8	Tan-grey silt, little fine sand. (ML)	
					9–12	No cuttings except pea gravel and silt. Cuttings likely fell back in boring hole.	Strong vibrations from 8.5 to 13 ft bgs.
					13–18	Brown sand, some gravel. (SW-SM)	
					19–20	Reddish brown silty sand and gravel. (SW)	
					21–35	Reddish brown silty sand. (ML)	Saturated, strong odor from 21 to 35 ft bgs.

Comments:

Well BS-1H completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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LOG OF BIOSPARGE WELL
BS-2A

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–9	Light brown silt, little fine sand. (ML)	Moist, moderate cohesiveness from 0 to 9 ft bgs.
					9–35	Light brown-brown red fine sand, some silt, little fine-medium gravel.	Moist at 16 ft bgs.

Comments:

Well BS-2A completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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LOG OF BIOSPARGE WELL
BS-2B

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	



Depth (ft bgs)	Description	Remarks
1–2	Topsoil, brown silty sand. (SM)	
2–9	Brown sandy silt, trace rounded small gravel. (ML)	
9–13	Grey-brown sandy silt. (ML)	Vibrations and cobbles at 10 ft bgs.
13–22	Grey-brown sandy silt, some coarse angular gravel. (ML)	Vibrations and cobbles from 13 to 22 ft bgs.
22–27	Dark brown silty sand. (SM)	Product odor from 22 to 27 ft bgs.
27–35	Dark brown sand. (SM)	Saturated from 27 to 35 ft bgs.

Comments:

Well BS-2B completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-2C

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–8	Brown silt, some fine sand, some gravel. (ML)	Concrete fill at 1 ft bgs.
					8–14	Grey-brown silt, some fine sand, some gravel. (ML)	Vibrations and cobbles from 11 to 14 ft bgs.
					14–16	Brown silty sand, some gravel. (SM)	Cobbles from 14 to 16 ft bgs.
					16–25	Brown silt, some gravel, some Trenton gravel. (ML)	
					25–35	Grey-brown sandy silt. (ML)	Saturated at 30 ft bgs.

Comments:

Well BS-2C completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-2D

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/3/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–10	Grey-brown silt with sand. (ML)	
					10–16	Dark brown silt with sand, some angular gravel. (ML)	Vibrations and cobbles from 10 to 20 ft bgs.
					16–20	Dark brown silt with Trenton gravel. (ML)	
					20–23	Brown sandy silt, trace rounded gravel, some Trenton gravel. (ML)	
					23–30	Brown silt. (ML)	Saturated from 23 to 35 ft bgs, product odor from 28 to 35 ft bgs.
					30–35	Grey-brown fine-medium sand. (SM)	

Comments:

Well BS-2D completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL BS-2E

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/4/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–12	Brown-light brown-grey silt with trace fine sand. (ML)	
					12–17	Brown-light brown sandy silt, some fine-coarse sand, trace fine rounded gravel. (ML)	Vibrations at 13 ft bgs.
					17–24	Brown-grey poorly graded gravel with silt, coarse rounded-subrounded medium-coarse gravel. (GP-GM)	
					24–27	Brown-red brown poorly graded medium sand with few silts. (SP-SM)	Wet, strong odor from 23.5 to 27 feet bgs.
					27–35	Brown-red brown sandy silt, some fine-coarse sand, trace fine rounded gravel. (ML)	Saturated at 33 ft bgs.

Comments:

Well BS-2E completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-2F

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–4	Brown silt, some fine sand. (ML)	
					4–10	Grey silt, some fine sand, gravel. (ML)	
					10–13	Dark grey silt, some fine sand. (ML)	Vibrations and cobbles from 10 to 13 ft bgs.
					13–18	Brown silt, some fine sand, large subround gravel. (ML)	
					18–25	Brown sand. (SM)	
					25–35	Grey-brown sand. (SM)	Saturated from 18 to 35 ft bgs, product odor from 25 to 35 ft bgs.

Comments:

Well BS-2F completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

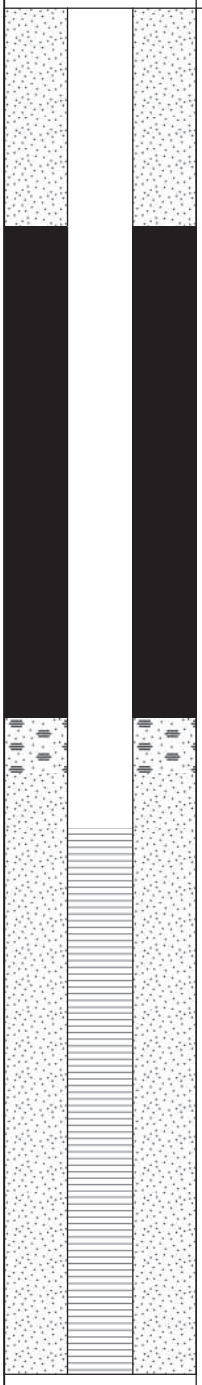
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-1A

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/3/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Dark brown topsoil, sandy silt, rounded gravel. (ML)	
					2	Trenton and pea gravel, some brown silt. (GP)	
					3	Bown silt, some fine sand, some small angular gravel. (ML)	
					4		
					5		
					6		
					7	Tan-light grey silt, some fine sand, some angular gravel. (ML)	
					8		
					9		
					10	Brown-grey silt, some fine sand. (ML)	
					11		Vibration and cobbles from 10 to 15 ft bgs.
					12		
					13		
					14		
					15		
					16		
					17	Brown sandy silt, trace angular gravel. (ML)	
					18		
					19		
					20		
					21		Cobbles from 20 to 24 ft bgs.
					22		
					23		
					24		Saturated from 23 to 25 ft bgs.
					25		

Comments:

Well BV-1A completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

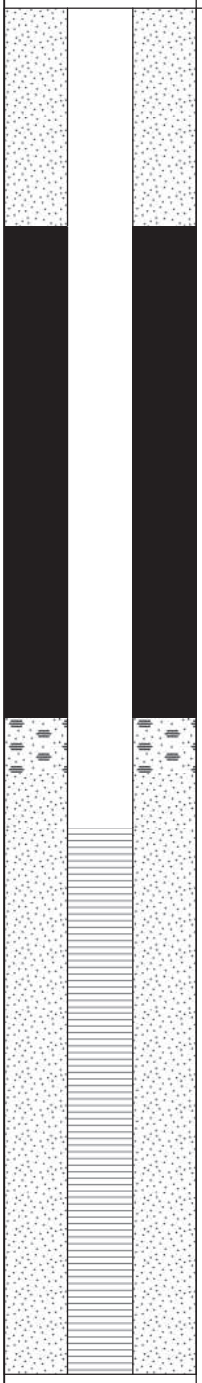
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-1C

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/4/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–25	Brown-light brown-grey silt with fine sand, trace fine subrounded gravel. (ML) Brown-grey silt with little fine sand, few fine-coarse subround-subangular gravel pieces. (ML) Brown-grey sandy silt, little medium-coarse sand, few fine-coarse subround-subangular gravel pieces. (ML) Brown-orange sandy silt, little medium-coarse sand and fine-coarse subround-subangular gravel. (ML)	Strong vibration at 11 ft bgs. Moist from 17 to 25 ft bgs.

Comments:

Well BV-1C completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

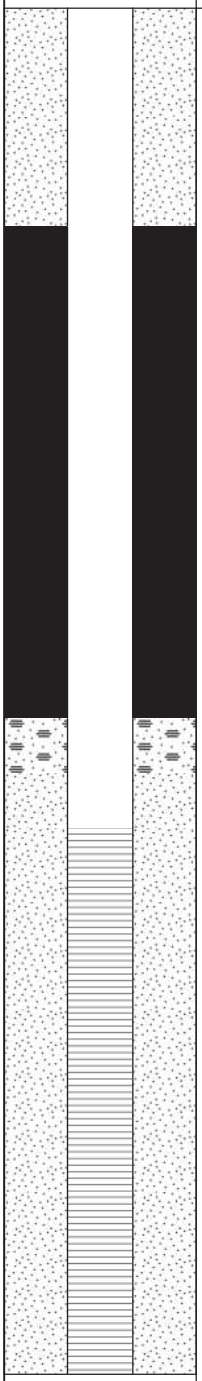
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-1E

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Black-brown sand, fine rounded gravel. (SM)	
					2	Brown silt, some fine sand. (ML)	
					3		
					4		
					5		
					6		
					7		
					8	Grey-brown silt, some gravel. (ML)	
					9		
					10		
					11	Brown silt, some fine sand. (ML)	
					12		
					13		
					14		
					15		Vibration and cobbles from 11 to 18 ft bgs.
					16		
					17		
					18	Brown silty sand, fine angular gravel. (SM)	
					19		
					20	Brown silt, some fine sand. (ML)	
					21		Cobbles from 20 to 22 ft bgs.
					22	Dark brown silt, some fine sand. (ML)	
					23		Moist, strong product odor from 22 to 25 ft bgs.
					24		
					25		

Comments:

Well BV-1E completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

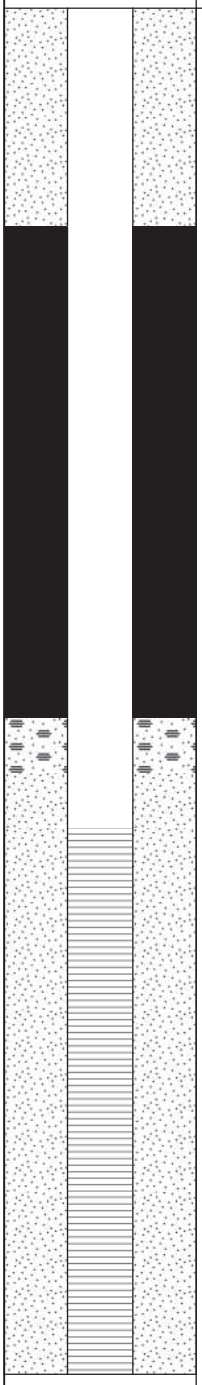
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-1G

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Brown silt, some fine sand, some gravel. (ML)	
					2		
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					10		
					11		
					12		
					13	Brown silt, some gravel. (ML)	Vibration and cobbles from 13 to 20 ft bgs.
					14		
					15		
					16		
					17		
					18		
					19		
					20	Brown silty sand. (SM)	Product odor from 20 to 25 ft bgs.
					21		
					22		
					23		
					24		
					25		

Comments:

Well BV-1G completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

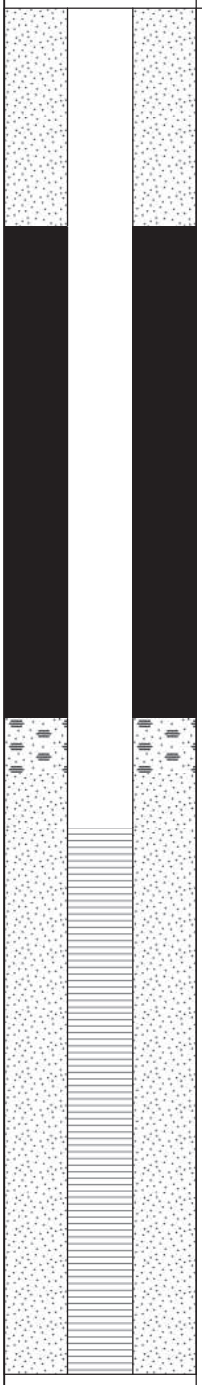
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-2A

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Topsoil, pea gravel. (GP)	
					2		
					3	Dark brown silt, concrete-glass fill material. (ML)	
					4	Black fine sand with coarse rounded gravel. (SM)	
					5		
					6	Brown sandy silt, some large rounded gravel. (ML)	
					7		
					8	Grey sandy silt, large rounded gravel, Trenton gravel. (ML)	
					9		
					10		
					11	Brown silt, some fine sand. (ML)	
					12		
					13		
					14		Vibration and cobbles from 10 to 18 ft bgs.
					15		
					16		
					17		
					18		
					19	Brown silt, Trenton gravel. (ML)	
					20		
					21	Brown coarse sand, some rounded gravel. (ML)	
					22		
					23	Dark brown silt, Trenton gravel. (ML)	
					24		
					25		Saturated, product odor at 25 ft bgs.

Comments:

Well BV-2A completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

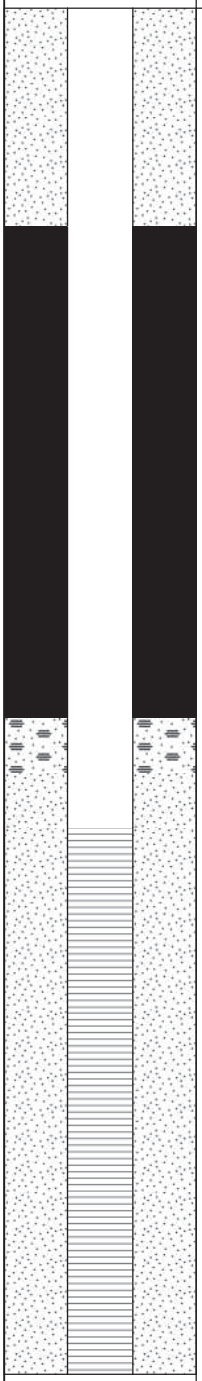
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-2C

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Topsoil, brown silty sand, some small angular gravel, brick fill. (SM)	Perched water from 5 to 7 ft bgs.
					2		
					3	Grey silt, some fine sand, trace fine-coarse gravel. (ML)	
					4	Brown silt, some fine sand. (ML)	
					5		
					6		
					7		
					8		
					9		
					10		
					11	Brown silt, some fine sand, some Trenton gravel. (ML)	Vibrations and cobbles from 11 to 19 ft bgs.
					12		
					13		
					14		
					15		
					16		
					17		
					18		
					19	Brown silty sand, large angular gravel, some Trenton gravel. (SM)	
					20		
					21		
					22		
					23		
					24		
					25		

Comments:

Well BV-2C completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

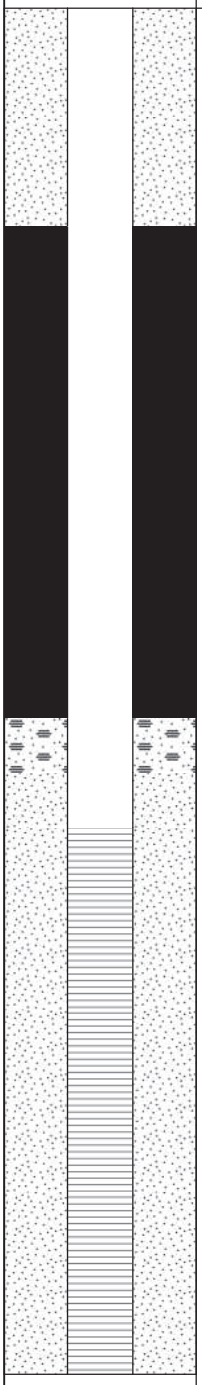
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-2E

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/5/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–25	Dark brown-grey-light brown-orange silt with some to little fine sand. (ML) Light brown-orange sandy silt with some little medium-coarse sand, little to few subrounded fine gravel. (ML) Light brown-orange silty medium-coarse sand with some silt and little medium-coarse round-subround gravel. (SM) Light brown-orange-grey poorly graded medium-coarse round-subround gravel with silt. (GP-GM) Light brown silty coarse sand, rounded-subrounded gravel. (SM) Light brown silt, fine-medium sand, little to few medium-coarse round-subround gravel. (SM)	Vibration at 11 ft bgs. Wet at 23 ft bgs.

Comments:

Well BV-2EV completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF MONITORING WELL
PH-MW-66

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–33	Dark brown-brow-light grey silt, little fine sand, trace fine gravel. (ML) Dark brown-reddish brown sandy silt with gravel. (ML)	Strong vibrations from 11 to 15 ft bgs. Strong vibrations from 25 to 27 ft bgs.

Comments:

Well PH-MW-66 completed to 33 ft bgs with 10 ft of 0.02" slotted 2" sch 40 PVC screen from 13 to 33 ft bgs. #1 quartz sand emplaced from 12 to 33 ft bgs and #00 quartz sand emplaced from 10 to 12 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

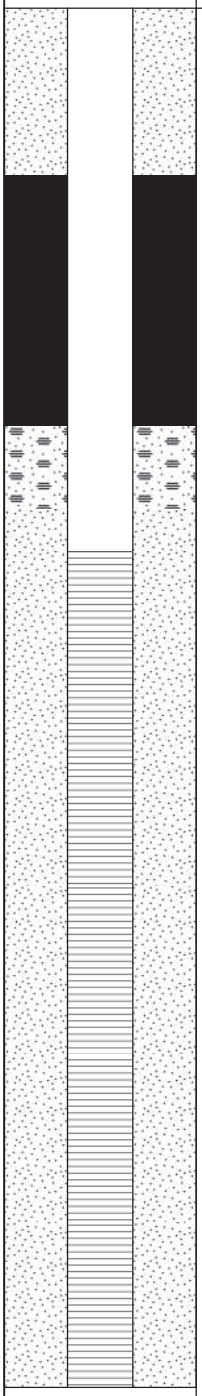
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF MONITORING WELL
PH-MW-67

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/26/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–8	Brown-tan silt, little sand. (ML)	
					9–18	Brown-tan sand, some gravel 1" to 0.25" grading up, little silt. (SW-SM)	
					18–33	Reddish-brown sand, gravel, some silt. (SM)	Wet, strong odor at 26 ft bgs. Saturated from 30 to 31 ft bgs.

Comments:

Well PH-MW-67 completed to 33 ft bgs with 10 ft of 0.02" slotted 2" sch 40 PVC screen from 13 to 33 ft bgs. #1 quartz sand emplaced from 12 to 33 ft bgs and #00 quartz sand emplaced from 10 to 12 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF MONITORING WELL
PH-MW-67

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/26/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					35		
					36		
					37		
					38		
					39		
					40		
					41		
					42		
					43		
					44		
					45		
					46		
					47		
					48		
					49		
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					61		
					62		
					63		
					64		
					65		
					66		
					67		

Comments:

Well PH-MW-67 completed to 33 ft bgs with 10 ft of 0.02" slotted 2" sch 40 PVC screen from 13 to 33 ft bgs. #1 quartz sand emplaced from 12 to 33 ft bgs and #00 quartz sand emplaced from 10 to 12 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

APPENDIX C
C1 – Construction Change Detail
C2 – Construction As-Built Drawings

DSCP Biovent/Biosparge Pilot Test
PARS Environmental Contractor Change Request (CCR) Tracking Log

Change Request No.	Description of Change	Submitted to	Schedule Impact	Design Drawings Affected	Date Submitted	Engineer's Comments	Engineer Approval Date	Approval Status
001	Modifies the design of the conveyance support structure on the south (PHA) side of the DSCP Biovent/Biosparge Pilot System to be positioned vertically on supports instead of horizontally on grade as shown in Design Drawing C-7 Detail D-1. Also changes western portion to be buried IAW drawing C-3, detail T1, T2 (shallow buried portion) and T5, T6 (lower buried portion).	ARCADIS Project Engineer	N/A	C-2, C-7	10/26/18	ARCADIS design Eng. responded with request to honor expansion loop dimensions.	11/6/18	Approved
002	Modifies the configuration of BV/BS manifold header pipes to accommodate limited height for BV/BS valving/instrumentation assemblies. Raises lower header and shifts assemblies in lower header to the left, shifts assemblies in upper header to the right. Places biovent manifold on the west wall and the biosparge manifold on the east wall. Re-routes the flexible tubing connections along the wall near the floor level from the west biovent manifold to the east wall where they enter the shed.	ARCADIS Project Engineer	N/A	M-3, M-4	12/21/18	Maintain All shut-off valve functionality	12/21/18	Approved
003	Changes Shed type from Grainger Model # 2RMZ2 to 8' x 12' Mini Barn	ARCADIS Project Engineer	N/A	C-6	11/12/18	Approved proposed shed change	11/19/18	Approved
004	Home run piping from well field (biovent and biosparge wells) was changed from entering the shed vertially through the floor to entering through the eastern wall of the Shed. Exposed pipes were covered within a framed wooden enclosure completed with a shingled roof attached to the manifold shed.	ARCADIS Project Engineer	N/A	C-4	12/6/18	Requested that the exposed PVC piping be covered within an enclosure to prevent degradation and damage to the PVC due to UV light exposure and physical impacts.	12/7/18	Approved
005	Blower and Skid Package reconfiguration inside the VES control room was changed from as shown on C-4 to a skid mounted design that is oriented 90-degrees and geneally in the location where the air compressor was to be moved to. The air compressor remained in its original location along the south wall.	ARCADIS Project Engineer	N/A	C-4	12/6/18	Several design revisions were made in order to make the skid package fit appropriately in the VES room. Early designs were too long (north-south) for the Team's preferences.	12/26/18	Approved

Design Change Photo Log



Change Request No. 001: Modification of layout of aboveground piping and supports in PHA swale; Progress of attaching pipes to vertical supports shown, facing Northwest



Change Request No. 002: Modification of manifold configuration inside shed; Final layout pictured, facing North-Northeast



Change Request No. 003: Modified model of shed housing manifold; Installed model pictured, facing North.



Change Request No. 004: Modified configuration of well field piping at connection to manifold shed; Final layout pictured, facing Northwest.



Change Request No. 004: Enclosure constructed to protect final pipe layout where above ground; Completed enclosure pictured, facing Northwest.



Change Request No. 005: Blower and Skid Package locations reconfigured; Final layout pictured, facing South-Southwest.

CITY: Milwaukee, WI DIVISION/GROUP: ENVICAD DB: C. McKeough LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
C:\Users\mckeough\Documents\ACCURL Files\D0262046.0010.PHILADELPHIA.DISTRICT.USACE Workplan for Biovent\Biosparge\20180626\20046.0010\Revised Work Plan\01-DWG\09262046-Cover.dwg LAYOUT: C-COVER SAVED: 6/13/2018 12:06 PM ACADVER: 21.0S (LMS TECH) PAGESETUP: PDF-LB
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XREFS: IMAGES: PROJECTNAME: ---
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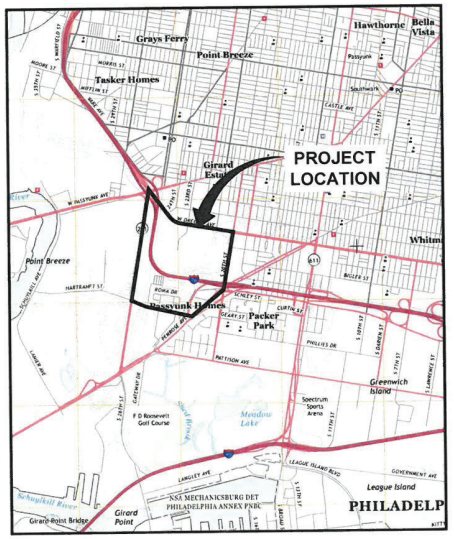
secondary_color.png

CONSTRUCTION DRAWINGS

SYSTEM UPGRADES, PILOT DESIGN AND STUDY
FORMER DEFENSE SUPPLY CENTER (DSCP) - PHILADELPHIA
PHILADELPHIA, PENNSYLVANIA
CONTRACT NUMBER: W912BU-13-D-0002



REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: PHILADELPHIA, PA, DATED 2013.

ORIGINAL DATE ISSUED:
NOVEMBER 18, 2016

REVISED WORK PLAN ISSUED:
JUNE 13, 2018

2990 SOUTH 20th STREET
PHILADELPHIA, PA 19145

PREPARED FOR:
UNITED STATES ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

ARCADIS

ARCADIS U.S., INC.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED
MATTHEW J. SWENSSON
ENGINEER
PE077587

INDEX TO DRAWINGS

COVER PAGE

GENERAL
G-1 CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2 CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3 MAJOR EQUIPMENT AND INSTRUMENT LIST

CIVIL
C-1 SITE PLAN
C-2 PILOT TEST SYSTEM LAYOUT
C-3 TRENCHING DETAILS
C-4 PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)
C-5 EXISTING REMEDIATION BUILDING: SOUTH EXTERIOR WALL
C-6 PILOT SYSTEM MANIFOLD ENCLOSURE
C-7 ABOVEGROUND PIPE DETAILS AND CROSSINGS

MECHANICAL
M-1 BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS
M-2 PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS
M-3 PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4 PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5 NORTH EXIT VAULT DETAILS
M-6 SOUTH EXIT VAULT DETAILS
M-7 BIOSPARGE/BIOVENT BLOWER PACKAGE

PID
PID-1 BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM
PID-2 BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM
PID-3 PIPING AND INSTRUMENTATION DIAGRAM LEGEND

INSTRUMENTATION
I-L PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT
I-B PILOT TREATMENT SYSTEM CONTROL PANEL BILL OF MATERIALS
I-1 PILOT TREATMENT SYSTEM CONTROL PANEL POWER DISTRIBUTION WIRING DIAGRAM
I-2 PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 DISCRETE INPUTS
I-3 PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX RELAY OUTPUTS
I-4 PILOT TREATMENT SYSTEM CONTROL PANEL SLOTS 1 AND 2 ANALOG INPUTS
I-5 PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 3 ANALOG INPUTS AND OUTPUTS

INSTRUMENTATION, CONTINUED
I-6 PILOT TREATMENT SYSTEM CONTROL PANEL - THIS PAGE LEFT INTENTIONALLY BLANK
I-7 PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 1 OF 2)
I-8 PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 2 OF 2)
I-N0 NORTHERN SKIMMER SYSTEM PANEL LAYOUT
I-N1 NORTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-N2 NORTHER SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-N3 NORTHERN SKIMMER SYSTEM MICROLOGIX RELAY OUTPUTS
I-N4 NORTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-N5 NORTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S0 SOUTHERN SKIMMER SYSTEM PANEL LAYOUT
I-S1 SOUTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-S2 SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-S3 SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS
I-S4 SOUTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-S5 SOUTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S6 SOUTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-S7 COMPRESSOR CONTROL ENCLOSURE (CCE) PANEL LAYOUT
I-S8 SOUTHERN SKIMMER SYSTEM MOTOR CONTROL PANEL WIRING DETAILS

ELECTRICAL
E-1 ELECTRICAL SYMBOL LEGEND AND SPECIFICATIONS
E-2 PILOT TREATMENT SYSTEM ELECTRICAL SINGLE LINE DIAGRAM (SHEET 1 OF 2)
E-3 PILOT TREATMENT SYSTEM ELECTRICAL SINGLE LINE DIAGRAM (SHEET 2 OF 2)
E-4 PILOT TREATMENT SYSTEM ELECTRICAL LAYOUT DIAGRAM
E-5 SOUTHERN SKIMMER SYSTEM ELECTRICAL SINGLE LINE DIAGRAM
E-6 NORTHERN SKIMMER SYSTEM ELECTRICAL SINGLE LINE DIAGRAM

1.0 INTRODUCTION

1.1 GENERAL

THE ENCLOSED DRAWINGS AND SPECIFICATIONS CONTAIN INFORMATION FOR THE CONSTRUCTION AND INSTALLATION OF A PILOT BIOSPARGE AND BIOVENT TREATMENT REMEDIATION SYSTEM TO BE INSTALLED AT THE FORMER DEFENSE SUPPLY CENTER PHILADELPHIA (DSCP) SITE. THE FOLLOWING DRAWINGS DEPICTING THE REMEDIATION SYSTEM ARE REQUIRED FOR CONSTRUCTION AND INSTALLATION:

DRAWING NO. TITLE

G-1	CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2	CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3	MAJOR EQUIPMENT AND INSTRUMENT LIST
C-1	SITE PLAN
C-2	PILOT TEST SYSTEM LAYOUT
C-3	TRENCHING DETAILS
C-4	PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)
C-5	EXISTING REMEDIATION BUILDING: SOUTH EXTERIOR WALL
C-6	PILOT SYSTEM MANIFOLD ENCLOSURE
C-7	ABOVEGROUND PIPE DETAILS AND CROSSINGS
M-1	BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS
M-2	PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS
M-3	PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4	PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5	NORTH EXIT VAULT DETAILS
M-6	SOUTH EXIT VAULT DETAILS
M-7	BIOSPARGE/BIOVENT BLOWER PACKAGE
PID-1	BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM
PID-2	BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM
PID-3	PIPING AND INSTRUMENTATION DIAGRAM LEGEND

1.2 DEFINITIONS

ENGINEER'S PROJECT MANAGER: MATTHEW LESLEY (ARCADIS)
ENGINEER: ARCADIS
OWNER: UNITED STATES DEFENCE LOGISTICS AGENCY
OWNER'S AGENT: UNITED STATES ARMY CORPS OF ENGINEERS
PROPERTY OWNER: CITY OF PHILADELPHIA HOUSING AUTHORITY

2.0 HEALTH AND SAFETY

1. THE CONTRACTOR (INCLUDING WORKERS AND SUBCONTRACTORS) SHALL
PREPARE AN ACCIDENT PREVENTION PLAN (APP) AND APPROPRIATE ACTIVITY HAZARD ANALYSIS (AHA) AS REQUIRED BY THE ARMY CORPS SAFETY AND HEALTH MANUAL EM385 PRIOR TO BEGINNING ANY WORK, AND SHALL ABIDE BY THE APP AND APPROPRIATE AHA DURING ALL SITE WORK. A COPY OF THE APP SHALL BE PROVIDED TO THE ENGINEER PRIOR TO BEGINNING ANY SITE WORK.

2. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL, AND OWNER-SPECIFIED HEALTH AND SAFETY REQUIREMENTS.

3. THE CONTRACTOR SHALL ESTABLISH AN EXCLUSION ZONE AROUND ALL WORK AREAS TO RESTRICT ACCESS AND PROVIDE APPROPRIATE PROTECTIONS DURING BOTH WORKING AND NON-WORKING HOURS.

4. DURING EXCAVATION WORK THE CONTRACTOR SHALL SURROUND THE WORK AREA WITH TEMPORARY CHAIN-LINK CONSTRUCTION FENCING TO RESTRICT ACCESS AND PROVIDE A SAFE WORK ENVIRONMENT. TEMPORARY FENCE SHALL BE INSTALLED AT A MINIMUM 10 FT SETBACK DISTANCE FROM EXCAVATIONS. THE CONTRACTOR SHALL USE TEMPORARY FENCE OR OTHER APPROVED SAFETY MARKERS SUCH AS BARRICADES, CONES, CAUTION TAPE AND ORANGE SNOW FENCE TO FURTHER DELINEATE, AND RESTRICT ACCESS TO THE WORK AREA AS APPROPRIATE DURING OTHER PHASES OF CONSTRUCTION. AT THE END OF EACH WORK DAY, ALL EXCAVATIONS SHALL EITHER BE BACKFILLED TO GRADE, OR SURROUNDED COMPLETELY BY TEMPORARY FENCING. DURING SPRING, SUMMER AND FALL EXCAVATIONS MAY ALSO BE COVERED BY STEEL ROAD PLATES (TRENCH PLATES) AFTER WORKING HOURS, ANCHORED TO THE GROUND CAPABLE OF SUPPORTING VEHICULAR TRAFFIC. IF TRENCH PLATES ARE USED, CONTRACTOR SHALL MAKE SURE THE TRENCH PLATES ARE CLEARLY MARKED AND VISIBLE. USE OF TRENCH PLATES DURING WINTERTIME SHALL ONLY BE PERMITTED AT THE APPROVAL OF THE ENGINEER AND OWNER DUE TO THE POTENTIAL IMPACT ON SNOW REMOVAL OPERATIONS.

5. IN ADDITION TO PROVIDING TEMPORARY FENCING SURROUNDING WORK AREA, CONTRACTOR WOULD ALSO NEED TO MAINTAIN A FENCED STAGING AREA FOR STAGING EQUIPMENT, ROLL-OFFS FOR HOLDING SOIL/DEBRIS FROM EXCAVATION, ETC. DURING THE ENTIRE CONSTRUCTION PERIOD. THE CONTRACTOR SHALL CONTAIN LOOSE DEBRIS AND SECURE CONSTRUCTION MATERIALS ON A DAILY BASIS PRIOR TO DEPARTURE FROM THE SITE TO PROVIDE A CLEAN AND ORDERLY WORK AREA.

6. ALL EMPLOYEES OF THE CONTRACTOR AND THEIR SUBCONTRACTORS SHALL BE CURRENT WITH THEIR 40-HOUR HAZWOPER TRAINING AND 8-HOUR REFRESHER. PROOF OF SAID TRAINING DOCUMENTATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF WORK AND SHALL BE KEPT ONSITE DURING CONSTRUCTION.

7. CONTRACTOR SHALL MARK ALL POTENTIAL OVERHEAD AND/OR TRIP HAZARDS IN YELLOW.

8. CONTRACTOR SHALL MAKE SURE THAT ALL CONSTRUCTION EQUIPMENT AND FIELD PERSONNEL VEHICLES SHALL HAVE FIRE EXTINGUISHER IN THEM. THE FIRE EXTINGUISHERS SHALL BE FREELY ACCESSIBLE DURING ALL CONSTRUCTION ACTIVITIES.

3.0 SPECIFICATIONS

THE FOLLOWING SPECIFICATIONS OUTLINE THE REQUIREMENTS FOR CONSTRUCTION AND INSTALLATION OF THE PILOT REMEDIATION SYSTEM.

3.1 GENERAL

1. THE CONTRACTOR SHALL PERFORM ALL WORK IN ACCORDANCE WITH THE COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION (PENNDOT) PUBLICATION 408/2016 CONSTRUCTION SPECIFICATIONS, THE INTERNATIONAL BUILDING CODES, THE NATIONAL ELECTRIC CODE, AND ALL OTHER APPLICABLE FEDERAL, STATE AND LOCAL CODES.

2. ALL NECESSARY CONSTRUCTION PERMITS, APPROVALS AND INSPECTIONS SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR. PERMITS REQUIRED FOR CONSTRUCTION WILL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING.

- BUILDING/CONSTRUCTION PERMIT
- ZONING PERMIT (IF DETERMINED TO BE NECESSARY BY PHILADELPHIA DEPARTMENT OF LICENSES AND INSPECTIONS)
- ELECTRICAL PERMIT
- WELL INSTALLATION PERMIT

3. A PRE-CONSTRUCTION MEETING BETWEEN OWNER, THE CONTRACTOR, AND ENGINEER WILL BE REQUIRED BEFORE ANY WORK BEGINS. THE MEETING WILL BE HELD AT THE SITE.

4. THE SELECTED CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER'S PROJECT MANAGER SHALL BE NOTIFIED OF ANY DISCREPANCY. ANY DEVIATIONS FROM DESIGN CONSTITUTE A STOP WORK. ENGINEER SHALL BE NOTIFIED, AND VERIFICATION OF ENGINEERING CALCULATIONS MUST BE COMPLETED PRIOR TO MAKING FIELD CHANGES. ALL CHANGES ARE TO BE DOCUMENTED VIA THE ENGINEER'S FORMAL SUBMITTAL PROCESS.

5. ALL MATERIALS USED FOR CONSTRUCTION OF THE SYSTEM SHALL BE NEW UNLESS OTHERWISE NOTED.

6. EQUIPMENT AND INSTRUMENTS THAT ARE SPECIFIED TO BE SUPPLIED OR EXISTING ONSITE WILL BE PROVIDED FOR INSTALLATION BY THE CONTRACTOR UNLESS OTHERWISE NOTED.

7. WHERE MATERIALS OR PRODUCTS CALLED FOR UNDER THIS CONTRACT ARE INSTALLED BEFORE THE INSTALLATION OR ERECTION OF ADEQUATE PROTECTIVE STRUCTURES, THE CONTRACTOR, WITHOUT ADDITIONAL COMPENSATION, SHALL PROVIDE APPROVED, EFFECTIVE AND DURABLE MEASURES TO PROTECT SUCH MATERIALS OR PRODUCTS AGAINST DAMAGE FROM THE ELEMENTS OR FROM ANY OTHER CAUSES.

8. ALL MACHINERY, EQUIPMENT, PIPING, ACCESSORIES, AND APPURTENANCES SHALL BE ADEQUATELY SUPPORTED AND SAFEGUARDED AGAINST ALL DAMAGE OR INJURY DURING PERFORMANCE OF WORK UNDER THIS CONTRACT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE OR INJURY RESULTING FROM HIS OPERATIONS AND SHALL REPAIR SUCH DAMAGE IMMEDIATELY AND TO THE SATISFACTION OF THE ENGINEER.

9. UNDER THE PUBLIC UTILITIES ACT NO. 187, THE CONTRACTOR SHALL COMPLY WITH THE ACT OF DECEMBER 10, 1974 (PUBLIC LAW 852, NO. 287), AS AMENDED, WHICH PROVIDES FOR NOTIFICATION TO PUBLIC UTILITIES PRIOR TO EXCAVATION, DRILLING OR DEMOLITION WORK USING POWER EQUIPMENT OR EXPLOSIVES. THE CONTRACTOR SHALL CONTACT CONTRACTOR SHALL CONTACT THE PENNSYLVANIA ONE-CALL SYSTEM AT 1-800-242-1776 TO LOCATE UTILITIES WITHIN THE WORK AREA AT LEAST THREE (3) BUT NOT MORE THAN TEN (10) DAYS BEFORE THE START OF EXCAVATION, DRILL OR SIMILAR INTRUSIVE ACTIVITIES. ONE-CALL TICKET INFORMATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.

10. THE CONTRACTOR SHALL ALSO CONTRACT A UTILITY LOCATION AND IDENTIFICATION SERVICE PROVIDER TO PERFORM A PRIVATE UTILITY LOCATION SURVEY OF THE ENTIRE WORK AREA PRIOR TO THE START OF INTRUSIVE WORK. A REPRESENTATIVE OF THE CONTRACTOR WHO IS FAMILIAR WITH THIS SCOPE OF WORK SHALL BE PRESENT ONSITE TO SUPERVISE DURING THE DRILL OR SIMILAR INTRUSIVE ACTIVITIES. ONE-CALL TICKET INFORMATION SHALL BE PROVIDED TO THE ENGINEER PRIOR TO THE START OF CONSTRUCTION. DETAILS OF THE UTILITY SURVEY SHALL BE PROVIDED TO AND REVIEWED WITH THE ENGINEER PRIOR TO THE START OF CONSTRUCTION TO DETERMINE WHETHER ANY ADJUSTMENTS TO PROPOSED ROUTES, WELL LOCATIONS OR SIMILAR ARE NECESSARY. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING ANY MARKS INDICATING BURIED INFRASTRUCTURE. IF MARKS FADE OR CONCERNS ABOUT THE LOCATION OF BURIED INFRASTRUCTURE OCCURS, THE CONTRACTOR WILL BE RESPONSIBLE FOR PERFORMING ADDITIONAL PRIVATE UTILITY LOCATION SURVEY.

11. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO UNDERGROUND UTILITIES, PIPING AND ADJOINING STRUCTURES. IF SUBSURFACE WORK MUST TAKE PLACE WITHIN 30 INCHES OF A UTILITY LINE MARKING, THE UTILITY MUST BE EXPOSED (POTHOLED) BY SOFT DIG / CLEARANCE METHODS PRIOR TO STARTING SUBSURFACE INTRUSIVE WORK. HEAVY CONSTRUCTION EQUIPMENT IS PERMITTED FOR THE EXPOSING OF THE UTILITY. WHEN TRENCHES MUST CROSS A UTILITY, THE UTILITY MUST BE EXPOSED 30 INCHES FROM THE OUTER EDGE IN A 360° DIRECTION. THE CONTRACTOR SHALL ENSURE ALL UNCOVERED UTILITIES ARE SUPPORTED, BEDDED, AND BACKFILLED IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS AND SPECIFICATIONS.

12. THE CONTRACTOR SHALL WARRANTY ALL MATERIALS, CONSTRUCTION AND WORKMANSHIP FOR A PERIOD OF ONE YEAR. ALL DEFECTS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.

13. THE CONTRACTOR SHALL MAKE SURE THAT THE WORK AREA IS CLEAN AND ORDERLY BOTH DURING CONSTRUCTION AND UPON COMPLETION PRIOR TO DEMOBILIZING FROM THE SITE. THE CONTRACTOR SHALL CONTAIN LOOSE DEBRIS AND STORE CONSTRUCTION MATERIALS ON A DAILY BASIS PRIOR TO DEPARTURE FROM THE SITE.

3.2 WELL INSTALLATION

1. ALL WELLS SHALL BE CONSTRUCTED AS INDICATED ON THE CONTRACT DRAWINGS AND UTILIZING PVC PIPING - ASTM F 480, TYPE 1, GRADE 1, PVC 12454, NSF WC OR NSF PW, SCHEDULE (40), WITH FLUSH THREADED JOINT FITTINGS, UNLESS OTHERWISE SPECIFIED. THREADED JOINTS SHALL BE WRAPPED WITH FLUOROPOLYMER TAPE AND PROVIDED WITH NITRILE O-RING GASKETS.

2. WELL SCREENS SHALL BE LOCATED AS INDICATED ON THE CONTRACT DRAWINGS. SLOT SIZE SHALL BE AS INDICATED. SLOTTED OPENINGS SHALL BE DISTRIBUTED UNIFORMLY AROUND THE CIRCUMFERENCE OF THE SCREEN. OPEN AREA SHALL APPROACH THE FORMATION'S NATURAL POROSITY.

3. PROVIDE FILTERPACK AND VERY FINE CHOKER SAND SEPARATION LAYER AS INDICATED ON THE CONTRACT DRAWINGS.

4. NEAT CEMENT GROUT - PROVIDE NEAT CEMENT GROUT IN ACCORDANCE WITH ASTM D 5092. CEMENT SHALL BE IN ACCORDANCE WITH ASTM C 150. QUICK SETTING ADMIXTURES SHALL NOT BE ALLOWED. DRILLING MUD OR CUTTINGS SHALL NOT BE USED AS A SEALING MATERIAL.

5. PROVIDE FLUSH THREADED SOLID PLUG AT THE BOTTOM OF THE WELL. PLUG SHALL BE THE SAME MATERIAL AS THE WELL CASING OR SCREEN TO WHICH IT IS ATTACHED. JOINTS SHALL BE WRAPPED WITH FLUOROPOLYMER TAPE AND PROVIDED WITH NITRILE O-RING GASKETS.

6. BOREHOLE SHALL BE ADVANCED USING CONVENTIONAL HOLLOW-STEM AUGER DRILLING METHODS. IF IT IS THE OPINION OF THE CONTRACTOR THAT AN ALTERNATE DRILLING METHOD IS REQUIRED, JUSTIFICATION FOR ALTERNATE METHOD CHANGE SHALL BE SUBMITTED TO THE ENGINEER, AND APPROVAL FOR THE CHANGE GRANTED PRIOR TO DRILLING. DRILL CREW SHALL BE EXPERIENCED AND TRAINED IN DRILLING AND SAFETY REQUIREMENTS FOR CONTAMINATED SITES, AND LICENSED IN THE STATE OF PENNSYLVANIA.

7. IF DRILLING IS SEQUENCED TO COINCIDE WITH PIPING TRENCH EXCAVATION WORK THE CONTRACTOR MAY STOCKPILE SOIL CUTTINGS FROM THE BOREHOLES WITH SOIL EXCAVATED FROM THE PIPING TRENCHES AS DESCRIBED UNDER SECTION 3.3 BELOW. IF DRILLING ACTIVITIES DO NOT COINCIDE WITH TRENCHING WORK, THEN THE SOIL CUTTINGS SHALL BE PLACED IN 55-GALLON DOT APPROVED HAZARDOUS DRUMS WHICH WILL BE STAGED ONSITE PROXIMAL TO THE WORK AREA. THE CONTRACTOR SHALL SCREEN SOIL CUTTINGS AND CORES FROM BOREHOLES FOR HYDROCARBON IMPACTS USING A HAND-HELD PHOTOIONIZATION DETECTOR (PID). IT IS EXPECTED THAT IMPACTED SOIL WILL BE ENCOUNTERED AT SOME DRILLING LOCATIONS. IF SOIL CUTTINGS ARE BEING STOCKPILED, AND SOILS ARE ENCOUNTERED EXHIBITING A PID READING OF GREATER THAN 50 PPM OR SIMILAR EVIDENCE OF IMPACTS SUCH AS STAINING OR ODORS, THE CONTRACTOR SHALL SEGREGATE THESE SOILS BY EITHER PLACING THEM IN SEPARATE STOCKPILES AND MANAGING AS DISCUSSED IN SECTION 3.3 BELOW, OR PLACING THEM IN 55-GALLON DOT APPROVED HAZARDOUS DRUMS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRANSPORT AND DISPOSAL OF ALL SOIL (CLEAN OR IMPACTED), DEVELOPMENT/DECONTAMINATION WATER, AND OTHER CONSTRUCTION DEBRIS GENERATED DURING DRILLING, ALONG WITH ANY WASTE CHARACTERIZATION SAMPLING REQUIRED. THE CONTRACTOR SHALL ASSUME ALL SOIL IS NON-HAZARDOUS WHEN DEVELOPING COSTING.

8. WELL CASINGS, SCREENS, PLUGS, AND CAPS SHALL BE CERTIFIED CLEAN BY THE MANUFACTURER UPON DELIVERY. THESE MATERIALS SHALL BE DELIVERED, STORED, AND HANDLED IN SUCH MANNER AS TO ENSURE THAT GREASE, OIL, OR OTHER CONTAMINANTS DO NOT CONTACT ANY PORTION OF THE WELL SCREEN AND CASING ASSEMBLY PRIOR TO INSTALLATION. IF DIRECTED BY THE ENGINEER, THE WELL SCREEN AND CASING ASSEMBLY SHALL BE CLEANED WITH HIGH PRESSURE WATER PRIOR TO INSTALLATION. CENTRALIZERS SHALL BE USED TO ENSURE THAT THE WELL SCREEN AND CASING ASSEMBLY IS INSTALLED CONCENTRICALLY IN THE BOREHOLE. WHEN THE ASSEMBLY HAS BEEN INSTALLED AT THE APPROPRIATE ELEVATION, IT SHALL BE ADEQUATELY SECURED TO PRECLUDE MOVEMENT DURING PLACEMENT OF THE FILTER PACKS AND ANNULAR SEALS. THE TOP OF THE WELL CASING SHALL BE CAPPED DURING FILTER PACK PLACEMENT.

9. FILTER PACK AND CHOKER SAND SEPARATION LAYER - FILTER PACK AND VERY FINE CHOKER SAND SEPARATION LAYER SHALL BE PLACED AS INDICATED ON THE APPROVED WELL CONSTRUCTION DRAWINGS TO FILL THE ENTIRE ANNULAR SPACE BETWEEN THE SCREEN AND CASING ASSEMBLY AND THE OUTSIDE WALL OF THE BOREHOLE. PLACE USING A TREMIE PIPE IN ACCORDANCE WITH EPA 600-4-89-034 AND ASTM D 5092. PLACEMENT BY GRAVITY OR FREE FALL METHODS IS NOT ALLOWED. CONTROL SPEED OF SAND PLACEMENT TO PREVENT BRIDGING AND TO ALLOW FOR SETTLEMENT. PRIOR TO COMMENCEMENT OF WORK, EQUIPMENT AND METHODS REQUIRED TO PLACE FILTERS SHALL BE APPROVED BY THE ENGINEER.

10. NEAT CEMENT GROUT - NEAT CEMENT GROUT SHALL BE PLACED IN THE ANNULAR SPACE ABOVE THE VERY FINE CHOKER SAND SEPARATION LAYER AS INDICATED ON THE WELL CONSTRUCTION DRAWINGS. GROUT SHALL BE PLACED AS A SLURRY THROUGH A TREMIE PIPE, AND INJECTED UNDER PRESSURE TO REDUCE CHANCE OF VOIDS. GROUT SHALL BE INJECTED IN ONE CONTINUOUS OPERATION UNTIL FULL STRENGTH GROUT FLOWS OUT AT THE GROUND SURFACE WITHOUT EVIDENCE OF DRILLING CUTTINGS OR FLUID. CEMENT GROUT SHALL CURE A MINIMUM OF 48 HOURS BEFORE BEGINNING WELL DEVELOPMENT OPERATIONS.

11. WELLS SHALL BE INSTALLED WITHIN 8-INCH DIAMETER, FLUSH-MOUNTED, H-20 TRAFFIC LOAD RATED VAULTS CONSTRUCTED TO THE SPECIFICATIONS SHOWN ON DRAWING M-1. IF DRILLING WORK IS SEQUENCED TO COINCIDE WITH PIPING TRENCH INSTALLATION THE CONTRACTOR MAY POSTPONE INSTALLING THE WELL VAULTS UNTIL AFTER SUBSURFACE CONVEYANCE PIPING RUNS ARE CONNECTED, PROVIDED THAT THE WELL LOCATIONS ARE SECURED WITHIN THE WORK AREA PERIMETER FENCE AND PROPERLY PROTECTED AGAINST ACCIDENTAL DAMAGE IN THE INTERIM.

12. CONTRACTOR SHALL DEVELOP BIOSPARGE WELLS. PERFORMANCE MONITORING WELLS AND ANY BIOVENTING WELLS WITH GREATER THAN 4 FEET OF STANDING WATER DEPTH. WELLS SHALL BE DEVELOPED BY BAILING, SURGING, AND PUMPING/OVERPUMPING/BACKWASHING METHODS. AIR SURGING AND JETTING ARE PROHIBITED. METHOD OF DEVELOPMENT SHALL BE APPROVED BY THE ENGINEER. WELL DEVELOPMENT SHALL NOT BEGIN UNTIL THE WELL INSTALLATION IS COMPLETE AND ACCEPTED BY THE ENGINEER. WELL DEVELOPMENT OPERATIONS SHALL BE CONDUCTED CONTINUOUSLY UNTIL DEVELOPMENT WATER FLOWS CLEAR AND FREE OF SEDIMENT WITH A TURBIDITY OF LESS THAN 50 NTU. WELL DEVELOPMENT SHALL CONTINUE FOR A MINIMUM OF AT LEAST 30 MINUTES AND A MAXIMUM OF 60 MINUTES. WATER FROM THE WELL DEVELOPMENT OPERATIONS SHALL BE DISPOSED OF BY THE CONTRACTOR AS DISCUSSED ABOVE.

13. A BOREHOLE LOG SHALL BE COMPLETED FOR EACH BORING DRILLED. BOREHOLE LOGS SHALL BE PREPARED BY THE CONTRACTOR DURING ALL WELL DRILLING AND INSTALLATION ACTIVITIES. INFORMATION PROVIDED ON THE LOGS SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

a. NAME OF THE PROJECT AND SITE.

b. BORING/WELL IDENTIFICATION NUMBER.

c. LOCATION OF BORING (COORDINATES, IF AVAILABLE).

d. MAKE AND MANUFACTURER'S MODEL DESIGNATION OF DRILLING EQUIPMENT AND NAME OF DRILLING FIRM.

e. DATE BORING WAS DRILLED.

f. REFERENCE DATA FOR ALL DEPTH MEASUREMENTS.

g. NAME OF DRILLER AND NAME AND SIGNATURE OF GEOLOGIST PREPARING LOG.

h. NOMINAL HOLE DIAMETER AND DEPTH AT WHICH HOLE DIAMETER CHANGES.

i. TOTAL DEPTH OF BORING.

j. METHOD OF DRILLING, INCLUDING SAMPLING METHODS AND SAMPLE DEPTHS, INCLUDING THOSE ATTEMPTED WITH NO RECOVERY. INDICATION OF PENETRATION RESISTANCE SUCH AS DRIVE HAMMER BLOWS GIVEN IN BLOWS PER 6 INCHES OF DRIVEN SAMPLE TUBES. INFORMATION SHALL INCLUDE HAMMER WEIGHT AND DROP DISTANCE. INFORMATION SUCH AS ROD SIZE, BIT TYPE, PUMP TYPE, ETC., SHALL BE RECORDED. A DESCRIPTION OF ANY TEMPORARY CASING USED, DRILL FLUIDS AND FLUID ADDITIVES USED, IF ANY, INCLUDING BRAND NAME AND AMOUNT USED, ALONG WITH THE REASON FOR AND START (BY DEPTH) OF ITS USE SHALL BE INCLUDED. IF MEASURED, MUD VISCOSITIES AND WEIGHT SHALL BE RECORDED.

k. DESCRIPTION OF THE MATERIAL OF WHICH EACH STRATUM IS COMPOSED, IN ACCORDANCE WITH ASTM D 2488, AND/OR STANDARD ROCK NOMENCLATURE, AS NECESSARY. SOIL PARAMETERS FOR LOGGING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, CLASSIFICATION, DEPOSITIONAL ENVIRONMENT AND FORMATION, IF KNOWN, UNIFIED SOIL CLASSIFICATION SYMBOL, SECONDARY COMPONENTS AND ESTIMATED PERCENTAGES, COLOR (USING FSUP SOIL COLOR CHART OR GSA RCC-001), PLASTICITY, CONSISTENCY (COHESIVE SOIL), DENSITY (NON-COHESIVE SOIL), MOISTURE CONTENT, STRUCTURE AND ORIENTATION, AND GRAIN ANGULARITY. ROCK CORE PARAMETERS FOR LOGGING SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, ROCK TYPE, FORMATION, MODIFIER DENOTING VARIETY (SHALY, CALCAREOUS, SILICEOUS, ETC.), COLOR (USING GSA RCC-001), HARDNESS, DEGREE OF CEMENTATION, TEXTURE, CRYSTALLINE STRUCTURE OR ORIENTATION, DEGREE OF WEATHERING, SOLUTION OR VOID CONDITIONS, PRIMARY AND SECONDARY PERMEABILITY, AND LOST CORE. THE RESULTS OF ANY CHEMICAL FIELD SCREENING SHALL ALSO BE INCLUDED ON THE BORING LOG. CLASSIFICATION SHALL BE PREPARED IN THE FIELD AT THE TIME OF SAMPLING. THE RESULTS OF VISUAL OBSERVATION OF THE MATERIAL ENCOUNTERED, AND ANY UNUSUAL ODOR DETECTED SHALL ALSO BE DULY NOTED AND RECORDED. DEPTH OF ANY OBSERVED FRACTURES, WEATHERED ZONES, OR ANY ABNORMALITIES ENCOUNTERED, DEPTH TO WATER, AND ANY NON-AQUEOUS PHASE LIQUIDS (NAPLS) AND DATE MEASURED BEFORE, DURING, AND AFTER EACH DRILLING SHIFT, AND PRIOR TO WELL INSTALLATION.

14. A WELL DEVELOPMENT RECORD SHALL BE PREPARED FOR EACH WELL INSTALLED. INFORMATION PROVIDED ON THE WELL DEVELOPMENT RECORD SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

a. DATE, TIME, AND ELEVATION OF WATER LEVEL IN THE WELL, BEFORE DEVELOPMENT.

b. DEPTH TO BOTTOM OF WELL, NAME OF PROJECT AND SITE, WELL IDENTIFICATION NUMBER, AND DATE OF DEVELOPMENT.

c. METHOD USED FOR DEVELOPMENT, TO INCLUDE SIZE, TYPE AND MAKE OF EQUIPMENT, BAILER, AND/OR PUMP USED DURING DEVELOPMENT.

d. TIME SPENT DEVELOPING THE WELL BY EACH METHOD, TO INCLUDE TYPICAL PUMPING RATE, IF PUMP IS USED IN DEVELOPMENT.

e. VOLUME AND PHYSICAL CHARACTERISTICS OF WATER REMOVED, TO INCLUDE CHANGES DURING DEVELOPMENT IN CLARITY, COLOR, PARTICULATES, AND ODOR.

f. CLARITY OF WATER BEFORE, DURING, AND AFTER DEVELOPMENT, NEPHELOMETRIC TURBIDITY UNIT (NTU) MEASUREMENTS.

g. TOTAL DEPTH OF WELL AND THE STATIC WATER LEVEL AS PER ASTM D 4750 FROM TOP OF THE CASING, IMMEDIATELY AFTER PUMPING/DEVELOPMENT, AND 24 CONSECUTIVE HOURS AFTER DEVELOPMENT.

h. READINGS OF PH, SPECIFIC CONDUCTANCE, DO, ORP, AND TEMPERATURE TAKEN BEFORE, DURING, AND AFTER DEVELOPMENT.

i. NAME AND JOB TITLE OF INDIVIDUAL DEVELOPING WELL.

j. DESCRIPTION OF DEVELOPMENT WATER DISPOSAL.

15. ALL AUGERS, TOOLING AND OTHER DOWN-HOLE EQUIPMENT THAT HAS CONTACTED SUBSURFACE SOIL SHALL BE DECONTAMINATED BETWEEN DRILLING LOCATIONS BY HOT WATER PRESSURE WASHER (STEAM CLEANING). CONTRACTOR SHALL CONSTRUCT A TEMPORARY DECONTAMINATION PAD ONSITE FOR THIS PURPOSE. CONTRACTOR SHALL ASSUME THAT POTABLE WATER IS NOT AVAILABLE AT THE SITE AND SHALL PROVIDE A DECONTAMINATION WATER SOURCE. CONTRACTOR SHALL DISPOSE OF DECONTAMINATION WATER, RESIDUAL SOIL AND DECONTAMINATION PAD MATERIALS UPON COMPLETION OF WORK AS DESCRIBED ABOVE.

3.3 EXCAVATION/RESTORATION

1. WHERE PROCESS PIPING IS INSTALLED BELOW GROUND, THE PIPE SHALL BE BURIED IN A TRENCH EXCAVATED TO THE DIMENSIONS SHOWN ON DRAWING C-3. MINIMUM PIPING BURIAL DEPTH IS 21 INCHES MEASURED FROM GROUND SURFACE TO THE TOP OF THE PIPE UNLESS OTHERWISE STATED.

2. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO UNDERGROUND UTILITIES, PIPING, AND ADJOINING STRUCTURES DURING EXCAVATION WORK.

3. EXCAVATIONS SHALL EITHER BE BACKFILLED TO GRADE AT THE END OF EACH WORK DAY PRIOR TO DEPARTING THE SITE, OR SURROUNDED COMPLETELY BY TEMPORARY CHAIN-LINK CONSTRUCTION FENCING OR COVERED BY TRENCH PLATES TO PREVENT ACCESS. ADDITIONAL DETAILS ON PROTECTION OF EXCAVATIONS ARE PROVIDED UNDER THE GENERAL SPECIFICATIONS ABOVE.

4. EXCAVATIONS THROUGH CONCRETE OR ASPHALT PAVEMENT SHALL BE SAWCUT TO PROVIDE A SQUARE VERTICAL JOINT FOR REPAVING.

5. FOLLOWING REMOVAL OF ASPHALT FROM THE PROPOSED TRENCH, THE CONTRACTOR SHALL SCAN THE ENTIRE PERIMETER OF THE TRENCH WITH A COMMERCIAL GRADE METAL DETECTOR. LOCATIONS OF METALLIC ANOMALIES ALONG THE TRENCH SHALL BE MARKED WITH ORANGE PAINT AND THEN HAND CLEARED DURING EXCAVATION.

6. EXCAVATED SOIL SHALL BE STOCKPILED WITHIN A BERMED AREA INSIDE THE FENCED WORK ZONE. SOIL STOCKPILES SHALL BE PLACED ON 10-MIL PLASTIC VISQUEEN AND COVERED WITH A MINIMUM OF 6-MIL PLASTIC VISQUEEN. EARTHEN MATERIALS SHALL NOT BE USED TO SECURE THE PLASTIC LINERS OR COVERS.

7. THE CONTRACTOR SHALL SCREEN EXCAVATED SOIL FOR HYDROCARBON IMPACTS USING A HAND-HELD PHOTOIONIZATION DETECTOR (PID). PETROLEUM HYDROCARBON IMPACTED SOIL IS NOT ANTICIPATED DUE TO THE SHALLOW DEPTH OF EXCAVATION; HOWEVER, IF SOIL IS ENCOUNTERED EXHIBITING A PID READING OF GREATER THAN 50 PPM OR SIMILAR EVIDENCE OF IMPACTS SUCH AS STAINING OR ODORS, IT SHALL BE SEGREGATED AND STOCKPILED IN AN AREA DESIGNATED BY THE ENGINEER. THE CONTRACTOR WILL THEN SAMPLE THE SOIL FOR PETROLEUM HYDROCARBON CONTENT AND WASTE CHARACTERIZATION PARAMETERS FOLLOWING CONSULTATION WITH THE ENGINEER.

8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE WASTE CHARACTERIZATION SAMPLING, TRANSPORTATION AND DISPOSAL OF ALL SOIL (CLEAN OR IMPACTED), ASPHALT AND OTHER CONSTRUCTION DEBRIS GENERATED UNDER THIS SCOPE OF WORK. THE CONTRACTOR SHALL ASSUME ALL SOIL IS NON-HAZARDOUS WHEN DEVELOPING COSTING. THE SITE OWNER SHALL BE RESPONSIBLE FOR SIGNING WASTE DISPOSAL MANIFESTS. CONTRACTOR SHALL ONLY CHARGE FOR DISPOSAL OF MATERIALS SENT TO OFFSITE DISPOSAL FACILITIES. CONTRACTOR SHALL BE REQUIRED TO SUBMIT WEIGH TICKETS FOR PAYMENT.

9. THE CONTRACTOR SHALL RESTORE ALL EXCAVATED AREAS TO MATCH EXISTING SURFACE COMPLETION. FOR COSTING PURPOSES CONTRACTOR SHALL ASSUME A TOTAL TRENCHING LENGTH OF 520 LF WITH 70 LF ACROSS ASPHALT PAVEMENT AND 450 LF ACROSS GRASS/UNPAVED SURFACE.

10. PIPING TRENCH RESTORATION DETAILS ARE PROVIDED ON DRAWING C-3. PIPING TRENCHES INSTALLED IN PAVED AREAS SHALL BE BACKFILLED WITH IMPORTED CLEAN PIPE BEDDING SAND FROM THE BOTTOM OF THE TRENCH TO THE BASE OF THE PAVEMENT FOUNDATION LAYER.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — MATTHEW T. SWENSSON — ENGINEER — PE077587

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF* C:\Users\cmckeough\OneDrive - ARCADIS\2018 3500 PM: BY: MCKEOUGH, CAROL PLOTSTYLETABLE: ARCADIS.ctb PLOTTED: 6/13/2018 8:46 AM BY: MCKEOUGH, CAROL
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11. THE PAVEMENT FOUNDATION LAYER SHALL BE CONSTRUCTED OF PENNDOT NO. 2A OR NO. OGS COARSE AGGREGATE AS SPECIFIED IN PENNDOT PUBLICATION 408/2016 CONSTRUCTION SPECIFICATIONS RECYCLED CONCRETE AGGREGATE (RCA) MAY ALSO BE USED PROVIDED IT MEETS THE GRAIN SIZE DISTRIBUTION AND SPECIFICATIONS FOR COARSE AGGREGATE PAVEMENT SUBBASE OUTLINED IN PENNDOT PUBLICATION 408/2016. AGGREGATE SHALL BE PLACED IN A SINGLE 8-INCH LIFT SO THAT THE FINAL COMPACTED THICKNESS IS 6-INCHES. THE AGGREGATE SHALL BE COMPACTED USING A VIBRATORY PLATE COMPACTOR UNTIL THE MATERIAL DOES NOT MOVE UNDER THE COMPACTION EQUIPMENT. A NON-WOVEN CLASS 1 TYPE GEOTEXTILE FABRIC SHALL BE INSTALLED BETWEEN THE SAND AND PAVEMENT FOUNDATION MATERIAL AS A SEPARATION LAYER TO PROVIDE SUPPORT DURING INSTALLATION AND COMPACTION.

12. PAVEMENT SHALL BE HOT MIX ASPHALT MEETING THE APPLICABLE DESIGN AND INSTALLATION SPECIFICATIONS OUTLINED IN PENNDOT PUBLICATION 408/2016. ASPHALT PAVEMENT WILL CONSIST OF 1.5 INCHES OF WEAR COURSE MATERIAL (SUPER PAVE MIXTURE 9.5MM) PLACED OVER 4 INCHES OF BINDER COURSE MATERIAL (SUPERPAVE MIX 25MM) AS SHOWN ON DRAWING C-3. THE ASPHALT MIX SHALL BE COMPACTED USING TANDEM ROLLERS UNTIL NO FURTHER COMPRESSION CAN BE OBTAINED AND ROLLING MARKS ARE ELIMINATED. IN AREAS TOO SMALL FOR THE ROLLER, A VIBRATING PLATE COMPACTOR SHALL BE USED TO ACHIEVE THOROUGH COMPACTION.

13. A BITUMINOUS TACK COAT OF EMULSIFIED ASPHALT (CLASS AT-E) SHALL BE APPLIED AT A RATE OF BETWEEN 0.02 - 0.07 GAL/YD2 TO THE PAVEMENT FOUNDATION LAYER PRIOR TO PLACING THE PAVEMENT BINDER COURSE, AND TO THE SURFACES OF ALL TRANSVERSE AND LONGITUDINAL JOINTS TO ENSURE PROPER BONDING BETWEEN SURFACES. TACK COAT SHALL BE APPLIED AS SPECIFIED IN PENNDOT PUBLICATION 408/2016.

14. THE CONTRACTOR SHALL RETURN TO THE SITE ONE WEEK AFTER ASPHALT PLACEMENT AND APPLY ASPHALT JOINT SEALER ALONG THE ENTIRE PERIMETER OF ALL NEWLY INSTALLED ASPHALT PAVEMENT AND TO ANY OTHER JOINTS WITHIN THE PAVEMENT AS SPECIFIED IN PENNDOT PUBLICATION 408/2016.

15. AS SHOWN ON DRAWING C-3, TRENCHES INSTALLED IN UNPAVED AREAS SHALL BE BACKFILLED WITH CLEAN PIPE BEDDING SAND TO A MINIMUM OF 4 INCHES ABOVE THE PIPING, FOLLOWED BY CLEAN NATIVE SOIL EXCAVATED FROM THE TRENCH. CONTRACTOR SHALL ASSUME FOR COSTING PURPOSES THAT SOIL EXCAVATED DURING TRENCHING IS SUITABLE FOR USE AS CLEAN BACKFILL (I.E., NO PETRLEUM HYDROCARBON IMPACTS, SUFFICIENT FINES TO ACHIEVE PROPER COMPACTION AND FREE OF ROCKS, ROOTS OR OTHER DEBRIS), BUT THIS SHALL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER DURING CONSTRUCTION. IF NATIVE SOIL IS DETERMINED TO BE UNSUITABLE FOR USE AS BACKFILL DURING CONSTRUCTION, CLEAN IMPORTED FILL OR PIPE BEDDING SAND WILL BE USED AS BACKFILL INSTEAD. SOIL SHALL BE PLACED AND COMPACTED IN 6-INCH LOOSE LIFTS DURING BACKFILLING USING A VIBRATORY PLATE COMPACTOR (**JUMPING JACK OR SIMILAR IMPACT COMPACTOR NOT PERMITTED**). TRENCHES SHALL BE RESTORED AT THE SURFACE WITH A MINIMUM 6-INCHES OF TOPSOIL.

16. TRENCHING INSTALLED IN UNPAVED AREAS AND ALL PORTIONS OF THE WORK AREA WHERE EXISTING VEGETATION WAS DISTURBED BY CONSTRUCTION ACTIVITES, SHALL BE HYDROSEEDED UPON COMPLETION USING A SEED MIX APPROPRIATE FOR THE LOCATION TO RESTORE THE EXISTING GRASS COVER. IF NOT PRESENT IN HYDOSEED MIX, CONTRACTOR SHALL APPLY STARTER FERTILIZER TO THE SOIL WHERE SEED WILL BE APPLIED OF THE COMPOSITION AT THE APPLICATION RATE RECOMMENDED BY THE GRASS SEED MANUFACTURER. CONTRACTOR SHALL APPLY STRAW MULCH OVER ALL SEEDED SURFACES FOLLOWING APPLICATION.

3.4 EROSION AND SEDIMENTATION CONTROLS

1. CONTRACTOR SHALL INSTALL MEASURES TO DIVERT STORMWATER SHEET FLOW AROUND THE WORK AREA AND AWAY FROM OPEN EXCAVATIONS (E.G. TRENCHING BEING EXCAVATED USING HAYBALES OR SIMILAR) IN PAVED AREAS OR ELSEWHERE AS NECESSARY DURING CONSTRUCTION.

2. CONTRACTOR SHALL INSTALL SEDIMENT FILTERS IN STORM DRAINS LOCATED WITHIN OR ADJACENT TO TRENCHING WORK AREAS THAT RECEIVE SURFACE WATER RUNOFF FLOWS FROM THE WORK AREA.

3. CONTRACTOR SHALL CONTROL FUGITIVE DUST GENERATED DURING CONSTRUCTION AS NECESSARY BY APPLYING A LIGHT SPRAY OF WATER OR OTHER APPROVED DUST CONTROL MEASURES.

4. CONTRACTOR SHALL EMPLOY CONTROLS TO PREVENT CONSTRUCTION VEHICLES FROM TRACKING EXCAVATED SOIL OUT OF THE WORK AREA, AND SHALL DESIGN THE WORK AREA LAYOUT TO LIMIT THE POTENTIAL FOR TRAKCING OF SOIL OFFSITE. THE CONTRACTOR SHALL ALSO EMPLOY GOOD HOUSEKEEPING PRACTICES DURING CONSTRUCTION. RESIDUAL EXACATED SOIL SHALL BE CLEANED FROM PAVED SURFACES TO THE EXTENT PRACTICAL, TO PREVENT THIS MATERIAL FROM BECOMING ENTRAINED IN SURFACE WATER RUNOFF.

3.5 PROCESS PIPING

1. ALL UNDERGROUND PROCESS PIPING SHALL BE SCH. 40 PVC OR SDR-11 HIGH DENSITY POLYETHYLENE (HDPE) (UNLESS OTHERWISE INDICATED) AS SPECIFIED ON THE DRAWINGS.

2. ALL ABOVEGROUND COMPRESSED AIR PIPING SHALL BE GALVANIZED STEEL WITH THREADED FITTINGS, PRESSURE-RATED RUBBER AIR HOSE OR UV RESISTANT SDR11 HDPE. STEEL TO PVC TRANSITION FITTINGS SHALL BE USED WHERE INDICATED ON DRAWINGS M-1 AND M-4 AND COMPLETED BELOW GRADE.

3. HDPE PIPING JOINTS WILL BE FUSION WELDED.

4. FUSION WELDS OR SLIP WELDS SHALL MEET MANUFACTURER'S SPECIFICATIONS.

5. PVC PIPING JOINTS WILL BE GLUED USING LOW VOLATILE ORGANIC COMPOUND (VOC) MATERIALS.

6. INDIVIDUAL PIPING RUNS (HOME RUNS) SHALL BE INSTALLED TO EACH BIOVENTING AND BIOSPARGING WELL. PIPING SHALL CONNECT TO THE WELLHEADS AND REMEDIATION SYSTEM AS SHOWN ON DRAWINGS M-1, M-3 AND M-4

7. ALL ABOVEGROUND PIPING SHALL BE PERMANENTLY LABELED WITH DIRECTIONAL FLOW ARROWS AND LINE CONTENTS AT 5' INTERVALS. OUTDOOR ABOVE GRADE CONVEYANCE PIPING SHOULD BE SIMILARLY LABELED, BUT AT 30' INTERVALS

8. ALL 90° BENDS INSTALLED UNDERGROUND OR WHERE OTHERWISE INDICATED ON THE DRAWINGS SHALL BE CONSTRUCTED USING LONG-SWEEP 90° ELBOWS.

9. WHEN CONNECTING TO OR BYPASSING EXISTING UNDERGROUND PIPING, THE CONTRACTOR SHALL FIRST VERIFY THE EXISTING PIPING PATH.

10. CONVEYANCE PIPING RUNS FROM THE BIOSPARGE/BIOVENT WELLS SHALL BE PRESSURE TESTED USING HYDROSTATIC MEANS UPON COMPLETION OF BOTH ABOVE-GRADE AND BELOW-GRADE PIPE INSTALLATION. ABOVE-GRADE AND BELOW-GRADE PIPING RUNS SHALL BE TESTED SEPARATELY. TESTING OF THE EXISTING CONDUIT RUNS BETWEEN EXIST PITS BENEATH THE HIGHWAY IS NOT REQUIRED.

11. PRESSURE TESTING SHALL BE WITNESSED BY AN ENGINEER'S REPRESENTATIVE. CONTRACTOR SHALL KEEP A WRITTEN RECORD OF PRESSURE TESTING RESULTS AND TAKE PHOTOS OF THE INITIAL AND FINAL PRESSURE READINGS ON EACH OF THE LINES AND PROVIDE THESE RECORDS TO THE ENGINEER TO DOCUMENT THE TESTING.

12. TESTING OF PVC PIPE SHALL BE PERFORMED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN SECTION 7 OF ANSI/AWWA STANDARD C605. TESTING OF HDPE PIPE SHALL BE PERFORMED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN ASTM F2164. HYDROSTATIC TESTING SHALL BE PERFORMED AS FOLLOWS.

a. FILL PIPELINE SLOWLY TO MINIMIZE AIR ENTRAPMENT AND SURGE PRESSURES. FILL RATE SHALL NOT EXCEED ONE FOOT OF PIPE LENGTH PER SECOND IN THE PIPE BEING TESTED
b. EXPELL AIR FROM PIPE AS REQUIRED. OBTAIN APPROVAL OF ENGINEER PRIOR TO TAPPING PIPE FOR EXPELLING AIR.
c. EXAMINE JOINTS AND VALVES, AND MAKE REPAIRS TO ELIMINATE VISIBLE LEAKAGE.
d. FOR PVC PIPE, AFTER SPECIFIED WETTING PERIOD, ADD FLUID AS REQUIRED TO PRESSURIZE LINE TO REQUIRED TEST PRESSURE. MAINTAIN TEST PRESSURE FOR A STABILIZATION PERIOD OF TEN MINUTES BEFORE BEGINNING TEST.
e. FOR HDPE PIPE, AFTER FILLING PIPE, GRADUALLY PRESSURIZE PIPE TO TEST PRESSURE AND MAINTAIN REQUIRED TEST PRESSURE FOR THREE HOURS FOR PIPE TO EXPAND. DURING EXPANSION, ADD FLUID TO MAINTAIN REQUIRED TEST PRESSURE. BEGIN TIMED TEST PERIOD AFTER EXPANSION PERIOD AND OTHER REQUIREMENTS ARE MET.
f. TEST PRESSURE IS 8 PSI FOR BIOVENTING CONVEYANCE PIPING AND 14 PSI FOR BIOSPARGING CONVEYANCE PIPING (110% OF THE MAXIMUM EXPECTED LINE PRESSURE).
g. TIMED TEST PERIOD SHALL NOT BEGIN UNTIL AFTER THE PIPE HAS BEEN FILLED, EXPOSED TO THE REQUIRED WETTING PERIOD, AIR HAS BEEN EXPELLED AND PRESSURE STABILIZED.
h. TIMED TEST PERIOD SHALL NOT BEGIN UNTIL AFTER THE PIPE HAS BEEN FILLED, EXPOSED TO THE REQUIRED WETTING PERIOD, AIR HAS BEEN EXPELLED AND PRESSURE STABILIZED.
i. TIMED TEST PERIOD: AFTER THE STABILIZATION PERIOD, MAINTAIN TEST PRESSURE FOR AT LEAST 2 HOURS. DURING TIMED TESTING PERIOD, ADD FLUID AS REQUIRED TO MAINTAIN PRESSURE WITHIN 1 PSIG OF REQUIRED PRESSURE. FOR HDPE PIPE, AFTER THREE HOUR EXPANSION PHASE, DO NOT ADD ADDITIONAL FLUID. THE TEST PRESSURE SHALL THEN REMAIN STEADY FOR ONE HOUR INDICATING NO LEAKAGE.
j. PUMP FROM A TEST CONTAINER TO MAINTAIN TEST PRESSURE. MEASURE VOLUME OF FLUID PUMPED FROM TEST CONTAINER AND RECORD ON TEST REPORT. RECORD PRESSURE AT TEST PUMP AT 15 MINUTE INTERVALS FOR DURATION OF TEST.
k. TEST IS CONSIDERED PASSING IF PRESSURE DROP IS LESS THAN 5% OF TEST PRESSURE DURING THE COURSE OF THE TEST PERIOD.

13. CONTRACTOR IS REQUIRED TO SUPPLY ALL WATER AND EQUIPMENT NEEDED FOR HYDROSTATIC TESTING.

14. THOUGH NOT REQUIRED, IT IS ALSO RECOMMENDED THAT THE CONTRACTOR PERFORM SIMPLE VACUUM TESTS OF PIPING AT VARIOUS POINTS DURING INSTALLATION IN ORDER TO SIMPLIFY THE PROCESS OF IDENTIFYING AND REPAIRING ANY LEAKS DISCOVERED.

15. THE CONTRACTOR IS REQUIRED TO PROVIDE A PLAN TO THE ENGINEER TO COMPLETE HYDROSTATIC PRESSURE TESTING. A TESTING PROCEDURE MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL THE PRIOR TO THE START OF WORK.

16. ANY WATER THAT IS INTRODUCED INTO THE PIPING DURING PRESSURE TESTING OR THAT HAS OTHERWISE ACCUMULATED IN THE BELOW-GRADE PIPING DURING INSTALLATION SHALL BE REMOVED UPON COMPLETION OF THE WORK AND PRESSURE TESTING.

17. AS SHOWN ON DRAWING C-3, ALL UNDERGROUND PIPING TRENCHES WILL INCLUDE TRACER TAPE/WIRE FOR UTILITY LOCATING.

18. INSTALL EXPANSION LOOPS, OFFSETS AND ELBOWS ALONG ABOVE GRADE HDPE PIPING RUNS AS INDICATED ON DRAWINGS C-2 AND C-7.

19. ABOVE GRADE PIPING SHALL BE SUPPORTED AND SECURED AS SPECIFIED ON DRAWING C-7.

20. CONTRACTOR SHALL CONNECT BIOVENTING AND BIOSPARGING HEADER PIPES TO EXISTING HDPE PIPING CONDUITS EXTENDING BENEATH THE HIGHWAY AT EXISTING EXIT PITS ON THE NORTH AND SOUTH SIDES OF THE HIGHWAY AS SHOWN ON DRAWINGS M-5 AND M-6.

3.6 ELECTRICAL

THE ELECTRICAL SCOPE OF WORK INCLUDES THE FOLLOWING:

1. INSTALLATION OF A PROGRAMMABLE LOGIC CONTROLLER (PLC) TO CONTROL SYSTEM OPERATIONS, INCLUDING CONNECTION TO THE MAIN PLC ON THE VES SYSTEM, I-L, I-B, AND I-1 THROUGH I-8

2. THE EXISTING SCADA SYSTEM SHALL BE UPGRADED TO CONNECT TO THE PROPOSED PILOT BIOSPARGE/BIOVENT SYSTEM.

3. AS PART OF THE ELECTRICAL UPGRADE SCOPE OF THIS DESIGN, THE NEW PLC FOR CONTROL OF THE PROPOSED PILOT BIOSPAGE/BIOVENT SYSTEM, WILL BE CONNECTED TO THE MAIN SCADA SYSTEM VIA ETHERNET CABLE.

4. ELECTRICAL POWER FOR THE PILOT SYSTEM ENCLOSURE WILL BE INSTALLED AS SHOWN ON FIGURES E-1, THROUGH E-6. THE ELECTRICAL DESIGN HAS DETERMINED THAT THE CURRENT DISTRIBUTION PROVIDED TO THE MOTOR CONTROL CENTER LOCATED IN THE VES SYSTEM BUILDING SHOULD BE SUFFICIENT AT THE ANTICIPATED ELECTRICAL LOAD, AND HAS SPARE DISCONNECTS AVAILABLE.

5. ADDITIONAL DETAILS FOUND ON ELECTRICAL DRAWINGS.

3.7 REMEDIATION SYSTEM CONSTRUCTION AND STARTUP

1. THE CONTRACTOR SHALL INSTALL A NEW BIOSPARGING/BIOVENTING PIPING MANIFOLD ENCLOSURE AT THE LOCATION SHOWN ON DRAWING C-2.

2. SYSTEM MANIFOLD WILL BE INSTALLED WITHIN A PREFABRICATED 8'X10' WINDOWLESS METAL SHED WITH LOCKABLE DOORS, PURCHASED BY THE CONTRACTOR, AS SHOWN ON DRAWING C-6. THE SHED FOUNDATION WILL BE A 6" LAYER OF COMPACTED NO. 2A OR NO. OGS COARSE AGGREGATE EXTENDING 1 FOOT OUT FROM THE SHED'S FOOTPRINT. BIOSPARGING AND BIOVENTING MANIFOLD CONFIGURATIONS AND CONNECTION DETAILS ARE ILLUSTRATED ON DRAWINGS M-3 AND M-4. PROCESS AND INSTRUMENTATION DIAGRAMS FOR THE BIOSPARGING AND BIOVENTING SYSTEMS ARE PROVIDED ON DRAWINGS PID-1 AND PID-2.

3. THE CONTRACTOR SHALL INSTALL THE BIOVENTING AND BIOSPARGING SYSTEM EQUIPMENT AT THE EXISTING SITE REMEDIATION BUILDING COMPOUND, USING COMBINATION OF EXISTING EQUIPMENT THAT WILL BE REPURPOSED FROM ANOTHER FORMER REMEDIATION SYSTEM STAGED AT THE SITE, AND EQUIPMENT PURCHASED NEW. THE LAYOUT OF THE BIOVENTING/BIOSPARGING SYSTEM EQUIPMENT AT THE EXISTING REMEDIATION BUILDING IS ILLUSTRATED ON DRAWINGS C-4 AND C-5. A SYSTEM EQUIPMENT AND INSTRUMENTATION CONSTRUCTION LIST IS PROVIDED ON DRAWING G-3.

4. EXISTING EQUIPMENT WILL BE PROVIDED BY THE ENGINEER/OWNER'S AGENT AND AVAILABLE ONSITE PRIOR TO THE START OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PURCHASING ALL NEW EQUIPMENT AND MATERIALS REQUIRED TO CONSTRUCT THE SYSTEM.

5. CONTRACTOR TO SUPPLY AND INSTALL A 20 POUND ABC FIRE EXTINGUISHER INSIDE THE SYSTEM MANIFOLD ENCLOSURE IN ACCORDANCE WITH LOCAL FIRE CODES.

6. THE CONTRACTOR SHALL EXTEND THE CURRENT CONCRETE PAD IN THE UTILITY ROOM IN THE EXISTING REMEDIATION BUILDING AS DETAILED ON DRAWING C-4, TO PROVIDE A STABLE AND LEVEL PLATFORM ON WHICH TO PLACE THE BIOVENTING AND BIOSPARGING BLOWERS.

CONCRETE NOTES:
a. CONCRETE PAD SHALL HAVE THE FOLLOWING PROPERTIES
   1. MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: 3,200 POUNDS PER SQUARE INCH (PSI).
   2. WATER / CEMENT RATIO MAXIMUM OF 0.50.
   3. 6% +/- 1% AIR ENTRAINMENT.
b. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH "SPECIFICATIONS FOR STRUCTURAL CONCRETE" ACI 301.
c. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
d. CALCIUM CHLORIDE SHALL NOT BE PERMITTED NOR SHALL ANY ADMIXTURE CONTAINING CHLORIDE BE PERMITTED THAT RESULTS IN A TOTAL CONCRETE MIX IN WHICH THE PRESENCE OF CHLORIDE IONS EXCEED 0.15 PERCENT BY WEIGHT OF CEMENT.
e. CONCRETE FINISHING
   UNFORMED SURFACES: ACI 301, 5.3.4.2.C BROOM FINISH.
f. CURING MATERIALS
   MEMBRANE CURING COMPOUND: ASTM C309, TYPE I-D, CLASS B, CLEAR WITH FUGITIVE DYE WHICH DISAPPEARS APPROXIMATELY 24 HOURS AFTER EXPOSURE TO SUNLIGHT.

7. CONTRACTOR SHALL RELOCATE THE EXISTING AIR COMPRESSOR AND CHILLER UNITS ON THE EXISTING CONCRETE PAD IN THE UTILITY ROOM AS DETAILED ON DRAWING C-4, TO ACCOMMODATE EXPANSION OF THE CONCRETE PAD AND INSTALLATION OF THE BIOVENTING AND BIOSPARGING BLOWERS.

8. UPON COMPLETION OF CONSTRUCTION THE CONTRACTOR SHALL TEST THE REMEDIATION SYSTEM EQUIPMENT TO CONFIRM THAT IT IS ALL WORKING PROPERLY. THE CONTRACTOR SHALL THEN PROVIDE A TECHNICIAN FAMILIAR WITH THE SYSTEM AND ITS OPERATION TO WORK WITH THE ENGINEER FOR A 2 DAY PERIOD OF SYSTEM STARTUP AND OPERATIONAL TESTING

3.8 AS-BUILT SURVEY/DOCUMENTATION

1. UPON COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE AS-BUILT RECORD DRAWINGS (RED LINES) SHOWING ACTUAL DETAILS, DIMENSIONS, SURVEYED LOCATIONS/ELEVATIONS AND OTHER PERTINENT FEATURES, AND IDENTIFY ANY DEVIATIONS FROM THE ORIGINAL DESIGN.

2. THE AS-BUILT DRAWINGS SHALL BE BASED UPON AN ACTUAL LAND SURVEY OF FINAL POST-CONSTRUCTION CONDITIONS COMPLETED BY A PENNSYLVANIA LICENSED SURVEYOR. THE SURVEY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING SITE FEATURES: ALL NEW AND WELLS WITHIN THE CONSTRUCTION AREA (INCLUDING GROUND SURFACE AND TOP OF CASING ELEVATIONS); BELOW-GRADE PIPING TRENCHES AND ABOVE-GRADE CONVEYANCE PIPING RUNS; AND SYSTEM MANIFOLD ENCLOSURE. WELL TOP OF CASING AND GROUND SURFACE ELEVATIONS SHALL BE SURVEYED TO AN ACCURACY OF 0.01-FOOT. THE ENGINEER SHALL PROVIDE AN AUTOCAD FILE OF EXISTING SITE PLAN TO BE USED AS A BASE MAP FOR THE AS-BUILT SURVEY DRAWING.

4.0 OPTIONAL WORK

1. REPLACEMENT OF BOTH THE SOUTH AND NORTH SKIMMER SYSTEM CONTROL PANELS TO ALLOW COMMUNICATION WITH THE EXISTING SCADA SYSTEM AS SHOWN ON SHEETS I-N0 THROUGH I-N5 AND SHEETS I-S0 THROUGH I-S8.

2. INTEGRATING THE SOUTH AND NORTH SIDE SKIMMING SYSTEMS WITH THE EXISTING SCADA SYSTEM.

3. A RADIO WILL BE INSTALLED IN THE MAIN CONTROL PANEL (MCP) INSIDE OF THE VES CONTROL ROOM. THIS HARDWARE ALONG WITH THE NECESSARY ANTENNAS WILL ALLOW FOR THESE OPTIONAL SYSTEMS TO COMMUNICATE WITH EACH OTHER.

4. INSTALLATION OF SOUND-DEADENING WALLS AND/OR PANELS IN THE UTILITY ROOM AROUND THE BIOVENT/BIOSPARGE BLOWERS, IF DEEMED NECESSARY BASED ON SUSTAINED SOUND LEVELS ABOVE 85 DECIBELS.

5.0 CONSTRUCTION SCHEDULE

1. THE CONTRACTOR SHALL CONFIRM A CONSTRUCTION SCHEDULE WITH THE ENGINEER'S PROJECT MANAGER AT LEAST 14 DAYS PRIOR TO START OF WORK.

2. THE PROPOSED CONSTRUCTION SCHEDULE SHALL BE PRESENTED IN A TIMELINE FORMAT/GANTT CHART SHOWING ESTIMATED START DATE, DURATION, AND, COMPLETION TIMES FOR EACH ACTIVITY. ANY DEVIATION FROM THE ORIGINALLY PROPOSED SCHEDULE MUST BE COMMUNICATED TO THE ENGINEER'S PROJECT MANAGER WITHIN 24 HOURS.

6.0. SUBMITTALS

1. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE ENGINEER FOR REVIEW AND APPROVAL A MINIMUM OF 14 DAYS PRIOR TO THE START OF CONSTRUCTION.
   a. LIST OF PROPOSED MATERIALS AND SUBCONTRACTORS.
   b. SHOP DRAWINGS AND/OR SPECIFICATIONS FOR ANY PROPOSED EQUIPMENT/MATERIALS THAT VARY FROM THOSE IDENTIFIED IN THE SPECIFICATIONS.
   c. REQUIRED HAZWOPER TRAINING RECORDS FOR ALL CONTRACTOR AND SUBCONTRACTOR EMPLOYEES.
   d. CONSTRUCTION SCHEDULE
   e. ACCIDENT PREVENTION PLAN AND ACTIVITY HAZARD ANALYSIS
2. THE CONTRACTOR SHALL SUBMIT THE FOLLOWING INFORMATION TO THE ENGINEER WITHIN 30 DAYS FROM COMPLETION OF WORK.
   a. AS BUILT RECORD DRAWINGS (RED LINES), INCLUDE ORIGINAL CADD FILES AND SURVEY DATA.
   b. MANUFACTURER DESCRIPTIONS, TECHNICAL SPECIFICATIONS, SHOP DRAWINGS, AND PRODUCT DATA FOR ANY EQUIPMENT/MATERIALS INSTALLED THAT DEVIATED FROM OR WERE NOT INCLUDED IN THE ORIGINAL SPECIFICATIONS.
   c. MANUFACTURER WARRANTIES.
   d. DATA FROM LEAKAGE TESTING OF CONVEYANCE PIPING.
   e. SOIL BORING/WELL CONSTRUCTION LOGS.
   f. SUPPORTING DATA OR CERTIFICATIONS AS APPROPRIATE.



CITY: Milwaukee, WI DIVISION/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
C:\Users\cmckeough\OneDrive - ARCADIS\BIM 360 Docs\USACE - PHILADELPHIA DISTRICT\USACE Workplan for Bioventi\Biosparge\2018\06262046.0010\Revised Work Plan\01-DWG\06262046-G01.dwg LAYOUT: G-2 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: —
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					Professional Engineer's Name		
					MATTHEW T. SWENSSON		
					Professional Engineer's No.		
					PE077587		
					State	Date Signed	Project Mgr.
1	6/13/2018	FINAL	EM	MS	PA	6/13/18	ML
No.	Date	Revisions	By	Ckd	Designed by	Drawn by	Checked by
					EM	CCM	CD/MS

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ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)

PROCESS

ARCADIS Project No.
06262046.0005.00004
Date
JUNE 13, 2018

ARCADIS
624 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

G-2

BIOVENTING SYSTEM

TUTHILL PNEUMAX COMPETITOR SL 3006-22L2, 2 LOBE MODEL WITH 7.5 HP MOTOR

RATED FOR 4.2 PSIG @ 313 SCFM

EXISTING ONSITE EQUIPMENT TO BE REPURPOSED

ITEM	ITEM DESCRIPTION
1.	VI-101 - VACUUM GAUGE (0-30 IHG), QTY. 1
2.	PDI-101 - DIFFERENTIAL PRESSURE INDICATOR, DWYER INSTRUMENTS # 2020 (0-20 WC). TO BE REUSED ON NEW INLET AIR FILTER, QTY. 1
3.	7 1/2 HP TEFC MOTOR, MARATHON ELECTRIC #213TTFC4026
4.	BLOWER, TUTHILL PNEUMATICS SL-3006-22L2
5.	PNEUMAX 300 SOUND-DEADENING ENCLOSURE, TUTHILL PNEUMATICS, INCLUDES
	a. DISCHARGE SILENCER (S-102)
	b. CHECK VALVE (CV-101)
	c. EXISTING VACUUM RELIEF VALVE - TO BE REMOVED OR DISABLED
6.	TISH-101 - NEMA 4 TEMPERATURE SWITCH, ASHCROFT #T424-TS-040-75/205° F (75 - 205 F), WITH 1/2" THERMOWELL, KOENIG-PRETEMPCO #KP140051A, QTY. 1
7.	PI-101 - BLOWER EFFLUENT PRESSURE GAUGE (0-15 PSI), QTY. 1
8.	TI-102 - BLOWER EFFLUENT TEMPERATURE GAUGE, NOSHOK #30.110.025.0-250° F, QTY. 1
9.	2" BRASS BLEED AIR VALVE, APOLLO #64-108-01, QTY. 1
10.	FI-BV-01 – FI-BV-07 - ROTAMETER FLOW METERS, KING INSTRUMENTS (4 - 48 SCFM) 7510-1-3-7A07, BRASS FITTINGS, QTY. 7
11.	PI-102 , PI-103, PI-104, AND PI BV-01 TO PI BV-07 - PRESSURE GAUGE, ASHCROFT (0-15 PSI), ¼" ID, QTY. 10

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	F-101 - 4" INLET AIR FILTER, QTY. 1
	a. MANUFACTURER: SOLBERG
	b. MODEL #: CSL-235P-400
	c. MAX FLOW RATE: 520 SCFM
	d. STYLE: MPT
	e. TEMP RATE: -15 TO 220 F
	f. MEDIA: POLYESTER
2.	NEW SHEAVING AND BELT FOR SL-3006-22L2 BLOWER
	a. MANUFACTURER: TUTHILL
	b. PART #S
	i. 23252-3 - 3" 3V SHEAVE, QTY. 1
	ii. 23252-13 - 6" 3V SHEAVE, QTY. 1
	iii. 23301-3 - JA 0.875 BUSHING, QTY. 1
	iv. 23532-7 - SH 1.375 BUSHING, QTY. 1
	v. 28210-13 - 3VX500 BELT, QTY. 2
3.	PIT-101 - PRESSURE TRANSMITTER, QTY. 1
	a. MANUFACTURER: OMEGA
	b. MODEL #: PX171-015GI
	c. PRESSURE RANGE: 15 PSIG
	d. CONNECTOR: MINI-DIN
	e. OUTPUT: 4 - 20 MA
4.	PRV-101 - 2" PRESSURE RELIEF VALVE, QTY. 1
	a. MANUFACTURER: KUNKLE
	b. MODEL #: 0337-H01ANE0007
	c. CONNECTION: 2"
	d. SET PRESSURE: 7 PSI
	e. MATERIAL: BRONZE
	f. VALVE: NON-CODE AIR/GAS
	g. SPRING: SST TYPE 17-7
5.	HEAT EXCHANGER WITH CONDENSATE DRAIN, QTY. 1
	a. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.
	b. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC. MODEL #: ACA-4361-3-G-T
	c. MATERIALS: STANDARD WITH GALVANIZED CABINET AND HERESITE COATED CORE AND FAN
	d. MOTOR: 60 HZ, 230/460 V, 3 PHASE, 1 HP
	e. OTHER: ½" FNPT 316 STAINLESS STEEL BALL VALVE ON CONDENSATE DRAIN
6.	FI-101 - FLOW METER FOR 4" PIPE (IN-LINE FLOW SENSOR), QTY. 1
	a. MANUFACTURER: DWYER INSTRUMENTATION
	b. MODEL #: DS-300 SERIES
	c. PART NUMBER: DS-300-4"
	d. DIFFERENTIAL PRESSURE RANGE: 0.28 - 34" WC
	e. TEMPERATURE: 0 TO 200F
7.	PDI-102 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 1
	a. MANUFACTURER: DWYER
	b. MODEL#: 2002
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 2" WC
	d. CONNECTIONS: 1/8" FNPT
	e. MAX PRESSURE RATING: 35 PSI
8.	PDIT-101 - DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER, QTY. 1
	a. MANUFACTURER: ASHCROFT
	b. MODEL #: IX3F0242STP2IW
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 2" WC
	d. 4 - 20 MA OUTPUT SIGNAL
9.	FI-102 - FLOW METER FOR 3" PIPE (IN-LINE FLOW SENSOR), QTY. 1
	a. MANUFACTURER: DWYER INSTRUMENTATION
	b. MODEL #: DS-300 SERIES
	c. PART NUMBER: DS-300-3"
	d. DIFFERENTIAL PRESSURE RANGE: 0.39 - 35" WC
	e. TEMPERATURE: 0 TO 200F
10.	PDI-103 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 1
	a. MANUFACTURER: DWYER
	b. MODEL#: 2003
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 3" WC
	d. CONNECTIONS: 1/8" FNPT
	e. MAX PRESSURE RATING: 35 PSI
11.	2" INLINE BLEED AIR SILENCER, QTY. 1
	a. MANUFACTURER: UNIVERSAL
	b. MODEL #: U5-2
12.	4" BRASS BALL VALVE, QTY. 1
13.	2" BRASS BALL VALVE, QTY. 11
14.	1/4" BALL VALVE, BRASS, FOR VACUUM AND PRESSURE GAUGE ISOLATION VALVES AND SAMPLE PORTS. QTY. 23
15.	2" BRASS GATE VALVE, QTY. 8
14.	4" BY 2" GCSP REDUCER, QTY. 6
15.	2" BY 1/4" GCSP REDUCER, QTY. 7
16.	4" HDPE BY 4" GCSP TRANSITION, QTY. 2

BIOSPARGING SYSTEM

TUTHILL PNEUMAX COMPETITOR SL 3003-22L2, 2 LOBE MODEL RATED FOR 120 SCFM @ 12 PSIG WITH UPGRADE TO 10 HP MOTOR

EXISTING ONSITE EQUIPMENT TO BE REPURPOSED

ITEM	ITEM DESCRIPTION
1.	VI-201 - VACUUM GAUGE (0-30 IHG), QTY. 1
2.	BLOWER, TUTHILL COMPETITOR SL 3003-22L2, 2 LOBE MODEL
3.	INLET AIR FILTER, SOLBERG MANUFACTURING - ASSEMBLY MODEL # CSL-851-250HC, REPLACEMENT ELEMENT # 851, QTY. 1
4.	PNEUMAX 300 SOUND-DEADENING ENCLOSURE, TUTHILL PNEUMATICS, INCLUDES
	a. DISCHARGE SILENCER (S-202)
	b. CHECK VALVE (CV-201)
	c. EXISTING PRESSURE RELIEF VALVE TO BE REPLACED (SEE BELOW)
5.	TI-202 - TEMPERATURE GAUGE, NOSHOK #30.110.025.0-250° F, QTY. 1
6.	PI-201 - PRESSURE GAUGE (0-15 PSI), QTY. 1
7.	TISH-203 - NEMA 4 TEMPERATURE SWITCH, ASHCROFT # T424-TS-040-75/205° F, INCLUDES 1/2" THERMOWELL, KOENIG-PRETEMPCO #KP140051A, QTY. 1
8.	2" BLEED AIR VALVE ASSEMBLY (GASHO #US-2), INCLUDES:
	a. 2" BRASS BALL VALVE, APOLLO #64-108-01
	b. 2" INLINE SILENCER, UNIVERSAL U5-2
9.	1" BRASS BALL VALVE - QTY. 10

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	PDI-201 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR - QTY. 1
	a. MANUFACTURER: DWYER INSTRUMENTS
	b. MODEL #: 2020
	c. CONNECTIONS: 1/8" FNPT
	d. RANGE: 0-20 INCHES WC
	e. MAX TEMPERATURE: 140 F
	f. OTHER: BRASS BALL VALVES ON TUBE CONNECTIONS TO LINE
2.	10 HP BLOWER MOTOR
	a. MANUFACTURER: BALDOR
	b. MODEL #: IDM3774T
	c. POWER: 460 V, 3-PHASE, 60 HZ
	d. FRAME: 215T
	e. SPEED 1,800 RPM
	f. INVERTER DUTY
3.	NEW SHEAVING AND BELT FOR SL-3006-22L2 BLOWER
	a. MANUFACTURER: TUTHILL
	b. PART #S
	c. 23532-3 - 0.875" SH BUSHING, QTY. 1
	d. 23126-6 - 1.375" SDS BUSHING, QTY. 1
	e. 28210-45 - 3VX487 BELT, QTY. 3
	f. 23106-4 - 3.5 OD 3V SHEAVE (QD), QTY. 1
	g. 23106-11 - 5.3 OD 3V SHEAVE (QD), QTY. 1
4.	PIT-201 - PRESSURE TRANSMITTER, QTY. 1
	a. MANUFACTURER: OMEGA
	b. MODEL #: PX171-015GI
	c. PRESSURE RANGE: 15 PSIG
	d. CONNECTOR: MINI-DIN
	e. OUTPUT: 4 - 20 MA
5.	PRV-201 - PRESSURE RELIEF VALVE, QTY. 1
	a. MANUFACTURER: KUNKLE
	b. MODEL #: 337-H01ANM0012
	c. CONNECTION: 2"
	d. SET PRESSURE: 12 PSI
	e. MATERIAL: BRONZE
	f. VALVE: NON-CODE AIR/GAS
	g. SPRING: SST TYPE 17-7
6.	HEAT EXCHANGER WITH CONDENSATE DRAIN, QTY. 1
	a. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.
	b. MANUFACTURER: AMERICAN INDUSTRIAL HEAT TRANSFER INC.ODEL #: ACA-3361-3-G-T
	c. MATERIALS: STANDARD WITH GALVANIZED CABINET AND HERESITE COATED CORE AND FAN
	d. MOTOR: 60 HZ, 230/460 V, 3 PHASE, 1 HP
	e. OTHER: ½" FNPT 316 STAINLESS STEEL BALL VALVE ON CONDENSATE DRAIN
7.	FI-201 & FI-202 - FLOW METER FOR 2" PIPE (IN-LINE FLOW SENSOR), QTY. 2
	a. MANUFACTURER: DWYER INSTRUMENTATION
	b. MODEL #: DS-300 SERIES
	c. PART NUMBER: DS-300-2"
	d. DIFFERENTIAL PRESSURE RANGE: 0.75 - 75" WC
	e. TEMPERATURE: 0 TO 200F
8.	PDI-202 & PDI-203 - MAGNEHELIC DIFFERENTIAL PRESSURE INDICATOR, QTY. 2
	a. MANUFACTURER: DWYER
	b. MODEL#: 2002
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 4" WC
	d. CONNECTIONS: 1/8" FNPT
	e. MAX PRESSURE RATING: 35 PSI
	f. OTHER: BRASS BALL VALVES ON TUBING CONNECTIONS TO FLOW METER
9.	PDIT-201 - PRESSURE INDICATOR TRANSMITTER, QTY. 1
	a. MANUFACTURER: ASHCROFT
	b. MODEL #: IX3F0242STP5IW
	c. DIFFERENTIAL PRESSURE RANGE: 0 - 5" WC
	d. 4 - 20 MA OUTPUT SIGNAL
10.	TI-203 - TEMPERATURE GAUGE (0 - 250 F), QTY. 1
	a. MANUFACTURER: PYROMATION
	b. MODEL #: SERIES 440
	c. SHEATH: 1/4 INCH
	d. THERMOWELL: 3/4 INCH
	e. MATERIAL: 316 SS
	f. ELEMENT CONNECTION: 3 WIRE
	g. TEMP: 0-250 F
11.	PI-202, 203, 204, PI-BS-01 – PI-BS-14 - PRESSURE GAUGE, 0-20 PSI, QTY. 17
	a. MANUFACTURER: ASHCROFT
	b. MODEL #: 302Z251
	c. CONNECTION: ¼" NPT
	d. GAUGE TYPE: PROCESS
	e. DIAL SIZE: 4-1/2"
	f. MATERIAL: 316 SS
	g. RANGE: 0-30 PSI
12.	ROTAMETER FLOW METERS, KING INSTRUMENTS (0 - 14 SCFM) - QTY. 14
	a. MANUFACTURER: KING INSTRUMENTS
	b. MODEL #: 7510-2-3-7A-03
	c. CONNECTION: ¾" FNPT
	d. FLOW RATE: 0-14 SCFM
	e. MATERIAL: BRASS
13.	2" BRASS BALL VALVE, QTY. 4
14.	1/4"BRASS BALL VALVE, QTY. 37
15.	1" BRASS GATE VALVE, QTY. 15
16.	2" GCSP BY 2" HDPE TRANSITION, QTY. 2
17.	2" HDPE BY 3" HDPE EXPANSION, QTY. 1
18.	3" HDPE BY 2" HDPE REDUCER, QTY. 1
19.	2" BY 1" GCSP REDUCER, QTY. 16
20.	1" BY 1/4" GCSP REDUCER, QTY. 14

MANIFOLD ENCLOSURE

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	WINDOWLESS STEEL FRAMED SHED OR OUTBUILDING, MEASURING 9' X 12' WITH FLOOR, WEATHER RESISTANT SKIDS, AND A LOCKABLE DOOR. STEEL SHED- QTY. 1
	a. SELLER: GRAINGER
	b. ITEM/MODEL #: 2RMZ2 (OR SIMILAR)
	c. INSIDE DIMENSIONS: 78 INCHES HIGH X 106 INCHES WIDE X 148 INCHES DEEP
	d. SINGLE SWING-OUT DOOR, LOCKABLE
	e. MATERIAL: CORRUGATED GALVANIZED STEEL PANEL
	f. FLOOR: WOOD
	g. BASE: STONE, COMPACTED NO. 2A OR NO. OGS COARSE AGGREGATE, 6 INCHES THICK
2.	SOLAR POWERED MOTION SENSING INTERIOR LED LIGHT.
3.	20 POUND ABC-RATED FIRE EXTINGUISHER IN AN ALL-WEATHER CABINET.

MISCELLANEOUS EQUIPMENT

EXISTING EQUIPMENT

ITEM	ITEM DESCRIPTION
1.	TEMPORARY FENCE PANEL, QTY. 11

NEW EQUIPMENT TO BE PROCURED

ITEM	ITEM DESCRIPTION
1.	1" SDR-11 HDPE TO GALVANIZED STEEL TRANSITION FITTING FOR BIOSPARGE SUBSURFACE CONVEYANCE PIPING STUB-UPS AT MANIFOLD, QTY. 14
	a. MANUFACTURER: CONTINENTAL (AVAILABLE FROM - HDPE SUPPLY), OR APPROVED EQUIVALENT
	b. PART #: C4949-00 1914-00
	c. SIZE # 1" BY 1"
	d. 1" BUTT FUSION X 1" MNPT THREAD
2.	1" SCH 40 PVC TO SDR-11 HDPE TRANSITION FITTING FOR SUBSURFACE CONVEYANCE PIPING CONNECTIONS TO BIOSPARGE WELLHEADS, QTY. 14
	a. MANUFACTURER: POLY-CAM
	b. MODEL #: SERIES 737 ID CONTROLLED PVC/HDPE TRANSITION FITTING
	c. SIZE: 1" NOMINAL

NOTES

1. SEE ELECTRICAL AND INSTRUMENTATION DRAWINGS FOR EQUIPMENT LIST/SPECIFICATIONS FOR ELECTRICAL AND CONTROL WIRING AND INSTALLATION
2. ALL EQUIPMENT INSTALLED AND WIRED PER N.E.C. NEMA 4 NON-HAZARDOUS LOCATION AND U

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — MATTHEW T. SWENSSON — 6/13/18 — ENGINEER — PE077587

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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XREFS: — PROJECTNAME: —
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No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

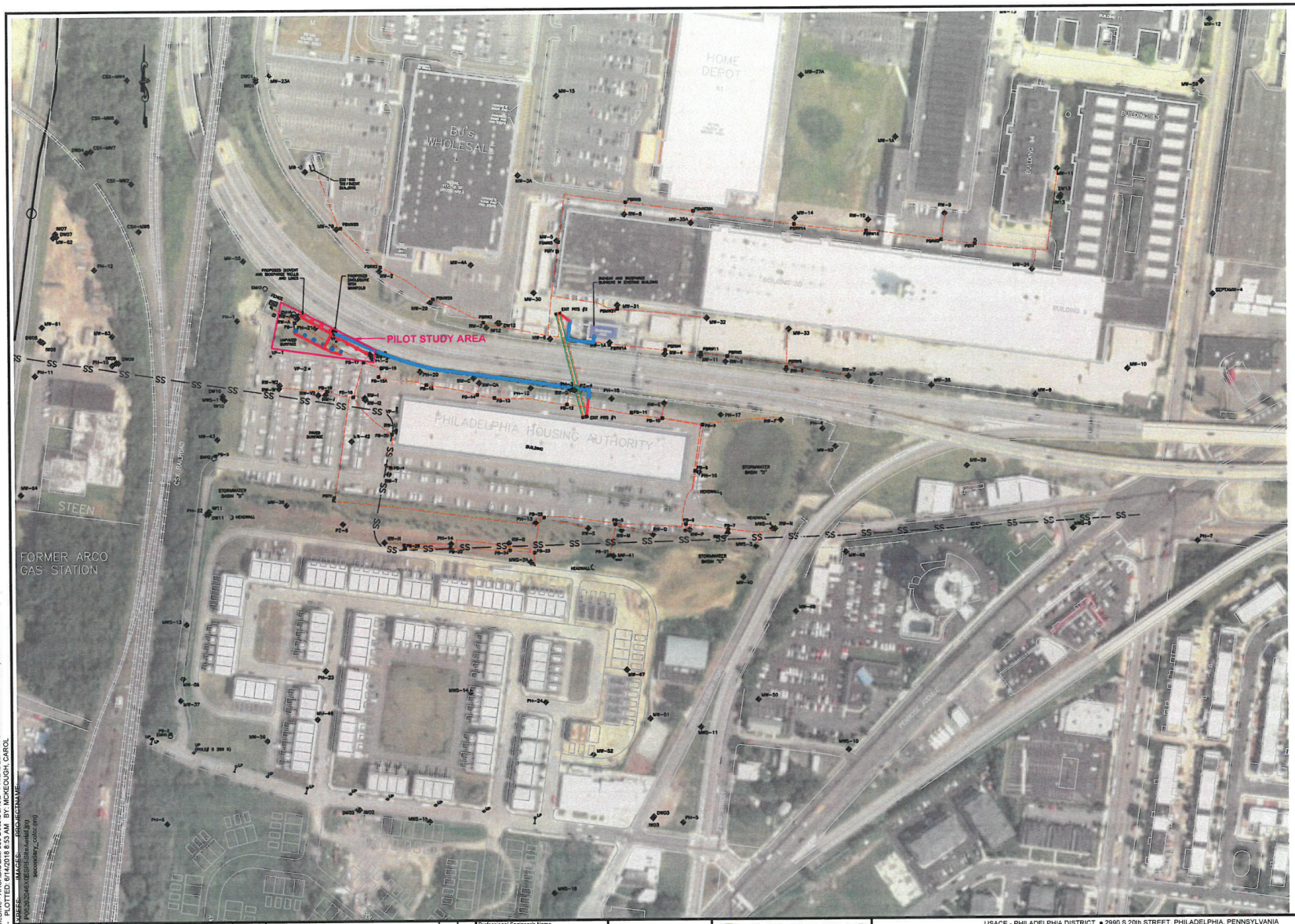
MAJOR EQUIPMENT AND INSTRUMENT LIST

PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

G-3



LEGEND:

- FENCE
- UTILITY POLE
- LIGHT POLE
- SHALLOW OR INTERMEDIATE WELL
- DEEP WELL
- VAPOR POINTS
- PB-10 ELECTRICAL PULL BOX
- WELL VAULT
- TERMINATION VAULT
- REMEDIATION SYSTEM TRENCH ROUTE
- ABANDONED ELECTRICAL CONDUIT
- ELECTRIC/COMMUNICATIONS LINE
- SS SEWER LINE (LOCATION APPROXIMATE)
- SD STORM DRAIN LINE (LOCATION APPROXIMATE)
- ELECTRICAL TRANSFORMER
- EM44 ELECTRICAL MANHOLE
- PROPOSED ABOVE GRADE PIPING ON UNISTRUT RACK
- PROPOSED BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
- EXISTING BURIED CONDUIT

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTES:

CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC. DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."
2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.
5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 10, 2007. DWG: SK041007.
6) UTILITY PLAN, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.
7) PIPING TRENCH SURVEY, DENNIS W. SIGLAR, INC.--PROFESSIONAL LAND SURVEYING, BENSALEM, PA, JUNE 5, 2018.
8) AERIAL PHOTO SOURCED FROM ESRI ARCMAP.

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No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name	MATTHEW T. SWENSSON
Professional Engineer's No.	PE077587
State	PA
Date Signed	6/13/18
Project Mgr.	ML
Designed by	EM
Drawn by	CCM
Checked by	CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

SITE PLAN

PROCESS

ARCADIS Project No. 06262046.0005.00004

Date JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

C-1

CITY: Milwaukee, WI DIVISION/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF* G:\Environmental\Projects\Active\USACE - PHILADELPHIA DISTRICT\USACE Workplan for Bowmit\Biosparge\20180605\262046.0010\Revised Work Plan\01-DWG\06262046-Site Plan.dwg LAYOUT: C-1 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLOTTED: 6/14/2018 8:53 AM BY: MCKEOUGH, CAROL
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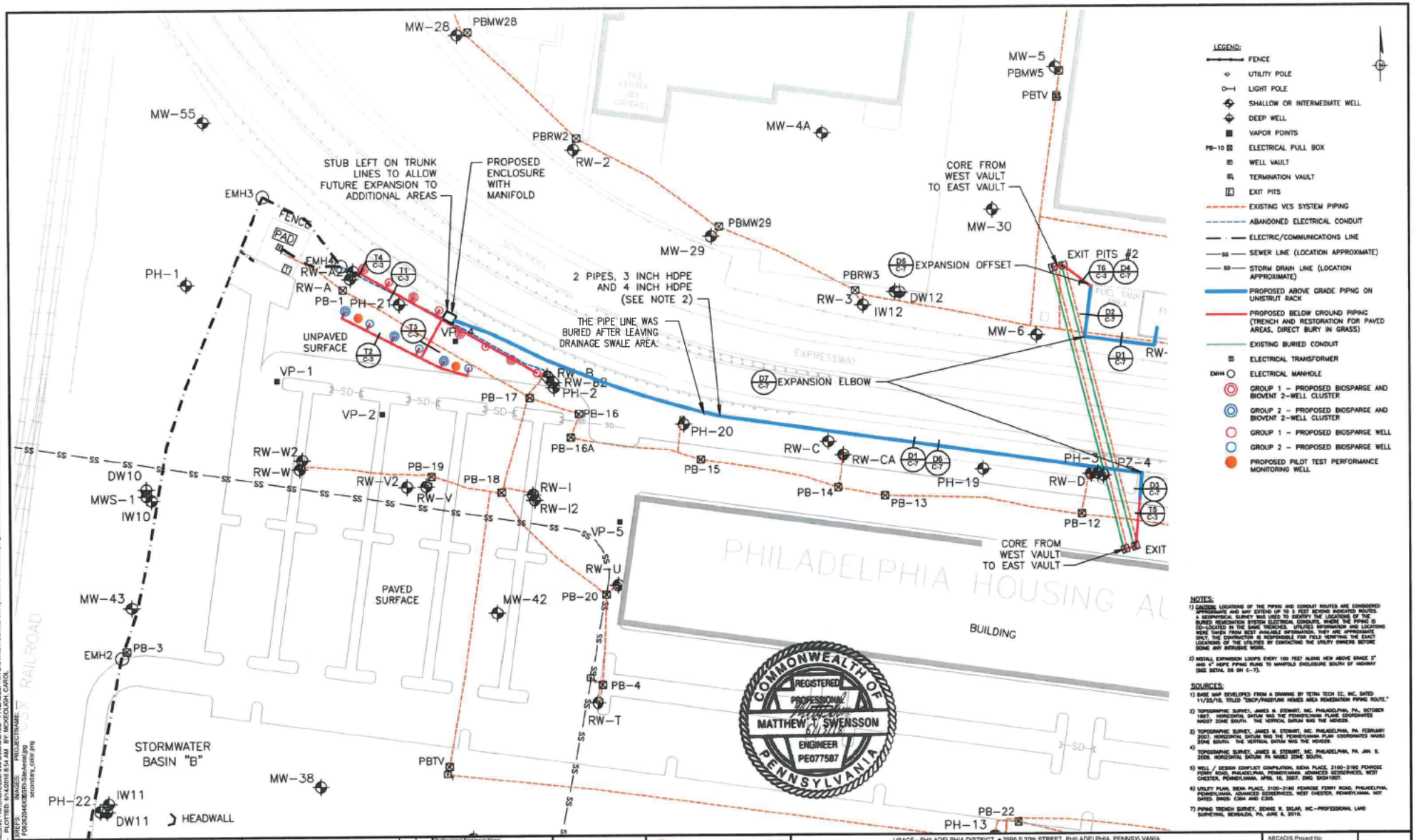
MW-28
PBMW28
MW-5
PBMW5
PBTV
MW-55
MW-4A
PBRW2
RW-2
STUB LEFT ON TRUNK LINES TO ALLOW FUTURE EXPANSION TO ADDITIONAL AREAS
PROPOSED ENCLOSURE WITH MANIFOLD
CORE FROM WEST VAULT TO EAST VAULT
MW-30
EMH3
FENCE
PAD
PBMW29
MW-29
EXIT PITS #2
PH-1
EMH4
RW-A2
RW-A
PB-1
PH-21
2 PIPES, 3 INCH HDPE AND 4 INCH HDPE (SEE NOTE 2)
PBRW3
RW-3
DW12
IW12
EXPANSION OFFSET
MW-6
THE PIPE LINE WAS BURIED AFTER LEAVING DRAINAGE SWALE AREA.
UNPAVED SURFACE
VP-4
VP-1
RW-B
RW-B2
PH-2
EXPANSION ELBOW
PB-17
PB-16
VP-2
PH-20
PB-16A
PB-15
RW-C
RW-CA
PH-3
PZ-4
RW-D
PH-19
PB-14
PB-13
PB-12
RW-W2
RW-W
PB-19
RW-V2
RW-V
PB-18
RW-I
RW-I2
DW10
MWS-1
IW10
VP-5
RW-U
CORE FROM WEST VAULT TO EAST VAULT
EXIT
PHILADELPHIA HOUSING AU
BUILDING
MW-43
PAVED SURFACE
MW-42
PB-20
EMH2
PB-3
PB-4
RW-T
STORMWATER BASIN "B"
MW-38
PBTV
PH-22
IW11
DW11
HEADWALL
PB-22
PH-13
RAILROAD
EXPRESSWAY
SCHUYLKILL
FUEL TANK
LEGEND:
FENCE
UTILITY POLE
LIGHT POLE
SHALLOW OR INTERMEDIATE WELL
DEEP WELL
VAPOR POINTS
PB-10 ELECTRICAL PULL BOX
WELL VAULT
TERMINATION VAULT
EXIT PITS
EXISTING VES SYSTEM PIPING
ABANDONED ELECTRICAL CONDUIT
ELECTRIC/COMMUNICATIONS LINE
SS SEWER LINE (LOCATION APPROXIMATE)
SD STORM DRAIN LINE (LOCATION APPROXIMATE)
PROPOSED ABOVE GRADE PIPING ON UNISTRUT RACK
PROPOSED BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
EXISTING BURIED CONDUIT
ELECTRICAL TRANSFORMER
EMH ELECTRICAL MANHOLE
GROUP 1 – PROPOSED BIOSPARGE AND BIOVENT 2-WELL CLUSTER
GROUP 2 – PROPOSED BIOSPARGE AND BIOVENT 2-WELL CLUSTER
GROUP 1 – PROPOSED BIOSPARGE WELL
GROUP 2 – PROPOSED BIOSPARGE WELL
PROPOSED PILOT TEST PERFORMANCE MONITORING WELL
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587
NOTES:
1) CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 3 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO DETERMINE THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.
2) INSTALL EXPANSION LOOPS EVERY 100 FEET ALONG HDPE ABOVE GRADE 3" AND 4" HDPE PIPING RUNS TO MANIFOLD ENCLOSURE SOUTH OF HIGHWAY (SEE DETAIL D6 ON C-7).
SOURCES:
1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC. DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."
2) TOPOGRAPHIC SURVEY, JAMES H. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
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6) UTILITY PLAN, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.
7) PIPING TRENCH SURVEY, DENNIS W. SOLAR, INC.–PROFESSIONAL LAND SURVEYING, BENSALEM, PA, JUNE 6, 2010.
0 40 80
1 5/13/2018 FINAL EM MS
No. Date Revisions By Chkd
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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr.: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS
ARCADIS
ARCADIS U.S., INC.
USACE - PHILADELPHIA DISTRICT • 2999 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES
PILOT TEST SYSTEM LAYOUT
PROCESS
ARCADIS Project No: 06262046.0005.00004
Date: JUNE 13, 2018
ARCADIS 824 MARKET STREET SUITE 820 WILMINGTON, DE 19801 TEL. 302.658.1718
C-2
CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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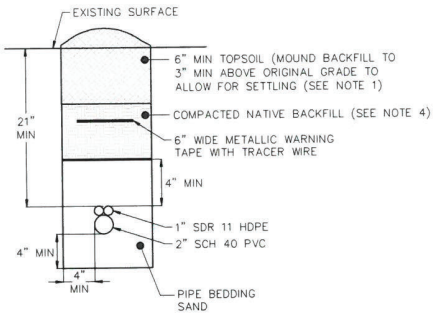
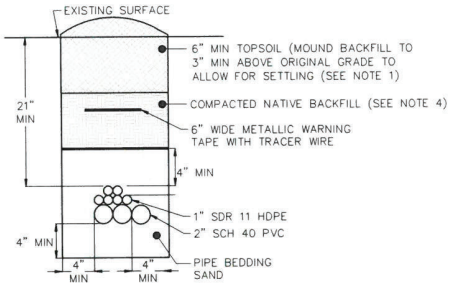


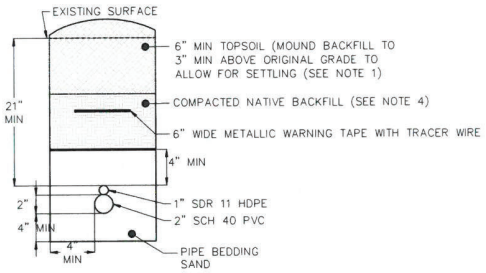
T1, T2 CROSS SECTION - UNPAVED SURFACE (T1 C-2) (T2 C-2)

NOT TO SCALE



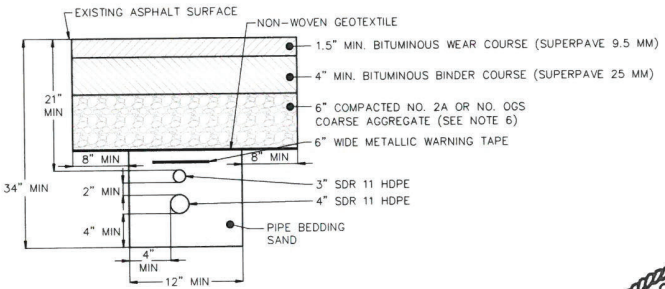
T3 CROSS SECTION - UNPAVED SURFACE (T3 C-2)

NOT TO SCALE



T4 TYPICAL CROSS SECTION - TO WELL CLUSTER (T4 C-2)

NOT TO SCALE



T5, T6 CROSS SECTION - ASPHALT SURFACE (T5 C-2) (T6 C-2)

NOT TO SCALE

TABLE 1: PIPE RUN DETAILS

TYPE	CONSTRUCTION	DIAMETER	DESCRIPTION	ASSOCIATED WELL TYPE
BIOSPARGING	SRD 11 HDPE	1"	COMPRESSED AIR DELIVERY LINE FROM MANIFOLD ENCLOSURE TO BIOSPARGING WELL	BS
BIOVENTING	SCH 40 PVC	2"	COMPRESSED AIR DELIVERY LINE FROM MANIFOLD ENCLOSURE TO BIOVENTING WELL	BV
BIOSPARGE HEADER	SRD 11 HDPE	3"	COMPRESSED AIR DELIVERY LINE FROM SYSTEM TO MANIFOLD ENCLOSURE	BS
BIOVENT HEADER	SRD 11 HDPE	4"	COMPRESSED AIR DELIVERY LINE FROM SYSTEM TO MANIFOLD ENCLOSURE	BV

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587
6/13/18

NOTES:

1. ONSITE TRENCHES WILL BE RESTORED TO MATCH EXISTING SURFACE COMPLETION. AREAS OF EXISTING ASPHALT SURFACE COMPLETION SHALL BE RESTORED TO THE MINIMUM SPECIFICATIONS SHOWN HERE AND AS DESCRIBED IN DRAWING G-1. CONTRACTOR TO RESEED IN VEGETATED AREAS WITH APPROPRIATE SEED MIX TO MATCH PRE-EXISTING GRASS COVER.
2. ARRANGEMENT OF PIPES SHOWN IN TRENCH CROSS SECTIONS IS FOR DEMONSTRATIVE PURPOSES ONLY AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND APPROVAL OF THE ENGINEER.
3. TRENCH BACKFILL AND PAVEMENT SUB-BASE MATERIAL SHALL BE PLACED AND COMPACTED IN 6" LIFTS AS SPECIFIED IN DRAWING G-1. DO NOT COMPACT TOPSOIL.
4. FOR TRENCHES IN UNPAVED AREAS, NATIVE EXCAVATION SPOIL WILL BE INSTALLED AS TRENCH BACKFILL FROM THE TOP OF THE PIPE BEDDING SAND TO A COMPACTED DEPTH OF 6" BELOW GRADE. IF NATIVE EXCAVATION SPOIL IS NOT SUITABLE FOR REUSE AS TRENCH BACKFILL (AS DEFINED IN DRAWING G-1), THEN USE SAND PIPE BEDDING INSTEAD.
5. ALL TRENCHES WILL BE EXCAVATED TO DEPTHS SHOWN ON THE CROSS-SECTIONS. NO TRENCHES WILL BE EXCAVATED TO GREATER DEPTH WITHOUT APPROVAL FROM THE ENGINEER. TRENCHES WILL NOT EXCEED 48" IN DEPTH WITHOUT ENGINEERING APPROVAL AND APPROPRIATE SAFETY MEASURES IN PLACE (E.G. TRENCH BOX).
6. RECYCLED CONCRETE AGGREGATE (RCA) MEETING REQUIRED SPECIFICATIONS IS AN ACCEPTABLE ALTERNATIVE FOR COARSE AGGREGATE (SEE DRAWING G-1).
7. ALL LOCATIONS WHERE TRENCHES CROSS EXISTING SUBGRADE PIPING MUST BE HAND CLEARED OR USE SOFT DIG TECHNOLOGY TO PREVENT DAMAGE.

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

TRENCHING DETAILS

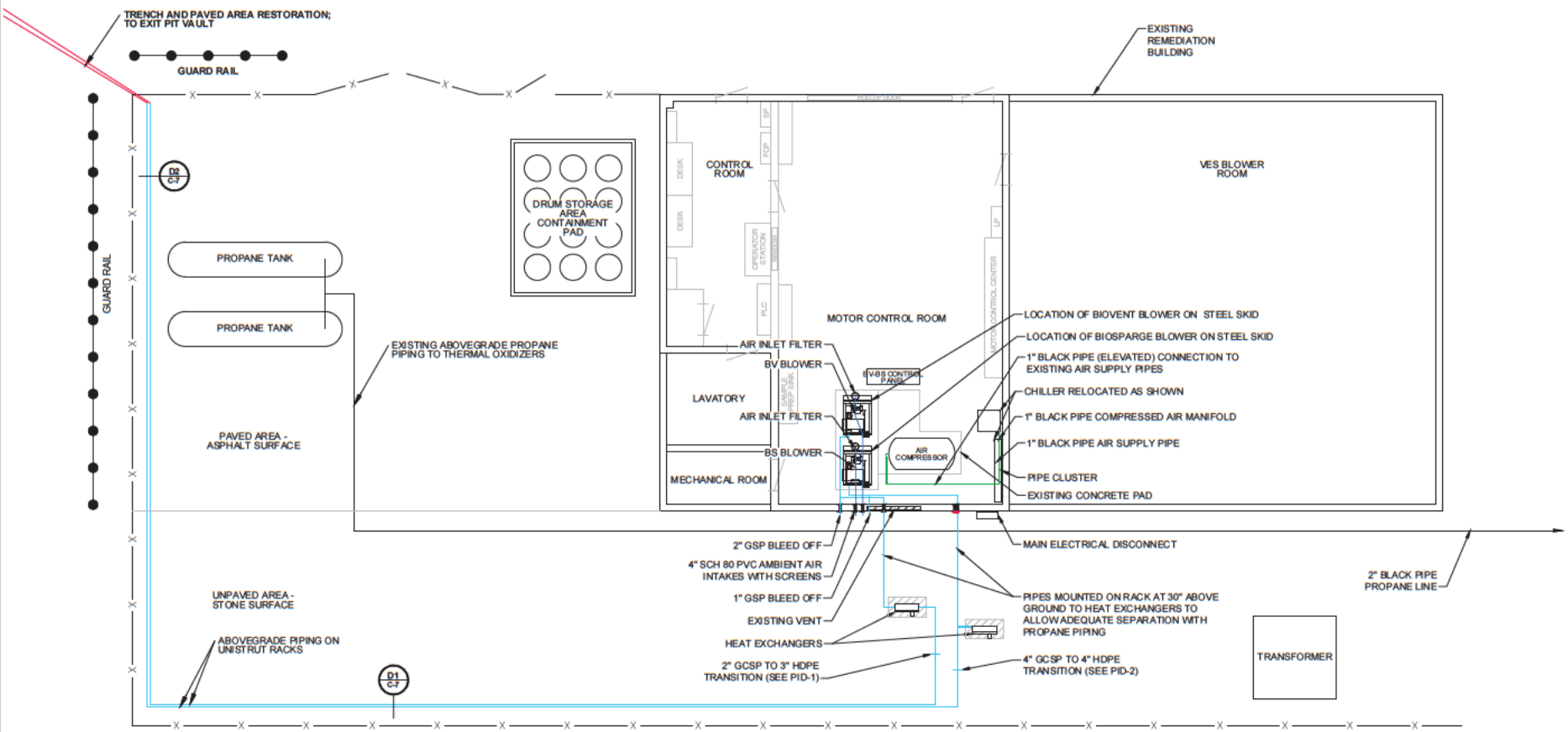
PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

C-3

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF* C:\Users\cmckeough\OneDrive - ARCADIS\BIM 360 Docs\USACE - PHILADELPHIA DISTRICT\USACE Workplan for Biovent\biosparge\2018\06262046 0010\Revised Work Plan\01-DWG\06262046-C03 C04 C07.dwg LAYOUT: C-3 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 6/14/2018 8:55 AM BY: CHRISTOPHER MCKEOUGH, CAROL XREFS: PIC0262046X1Secondary_color.png PIC0262046X1Secondary_color.png IMAGES: ---- ASD_RCTNAME: ----



LEGEND:

- ABOVE GRADE BV-BS PIPING ON UNISTRUT RACK
- BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
- COMPRESSED AIR PIPING
- FENCE LINE
- NEW CONCRETE PAD WITH HEAT EXCHANGER
- LIQUID TIGHT ELECTRIC CONDUIT
- SERVICE DISCONNECT

NOTE:
SOUND-DEADENING WALLS AND/OR PANELS IN THE UTILITY ROOM AROUND THE BIOVENT/BIOSPARGE BLOWERS TO BE INSTALLED IF DEEMED NECESSARY BASED ON SUSTAINED SOUND LEVELS MEASURED ABOVE 85 DECIBELS.

0 3' 6'
SCALE IN FEET

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA | Date Signed: | Project Mgr.: ML
Designed by: CD | Drawn by: COM | Checked by: CD

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FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date: FEBRUARY 13, 2020
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL [redacted]

C-4A

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: MLESLEY PM: MLESLEY TM: LYRON=*;OFF=*REF*
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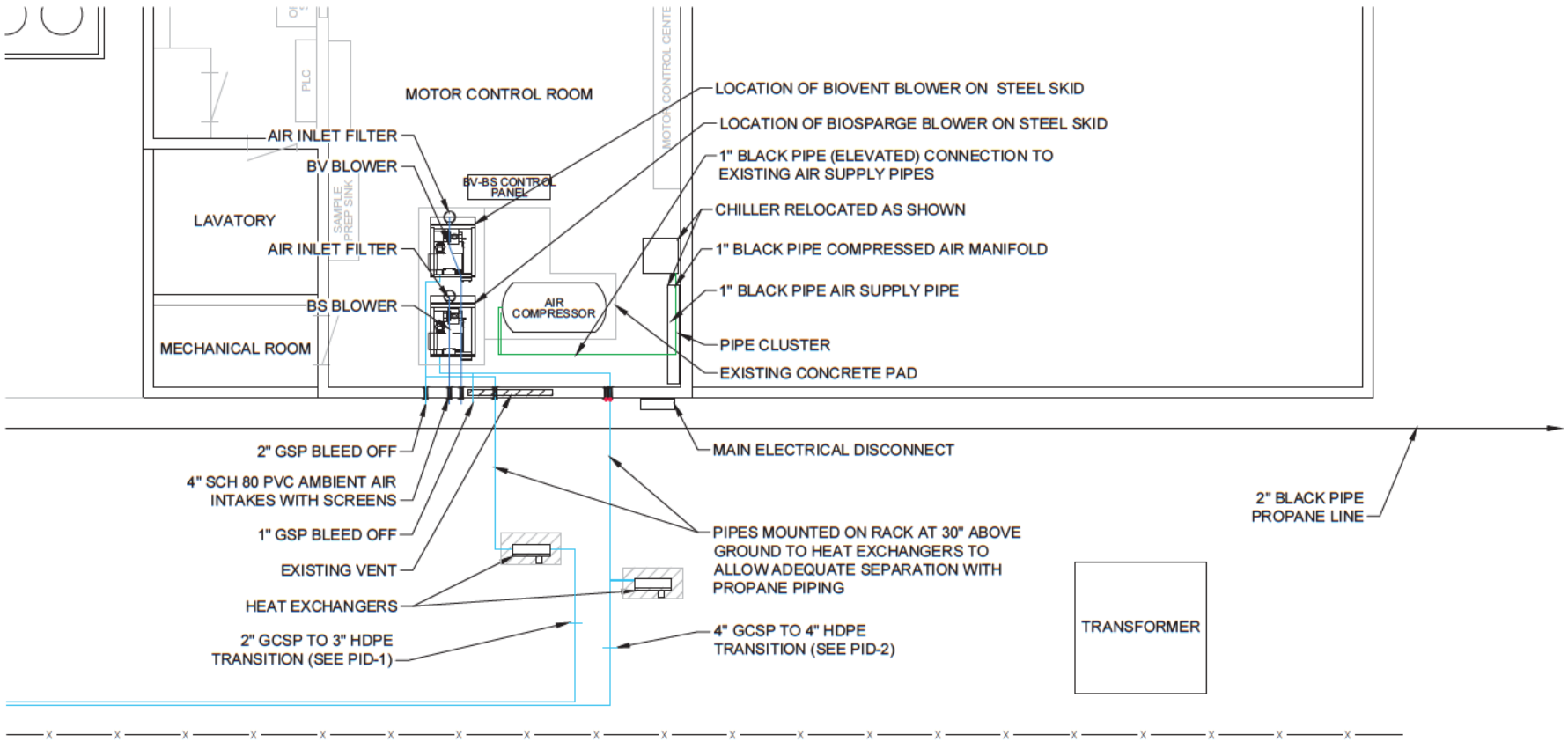

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Professional Engineer's Name: MATTHEW T. SWENSON
Professional Engineer's No.: PE077587
State: PA | Date Signed: | Project Mgr.: ML
Designed by: CD | Drawn by: COM | Checked by: CD

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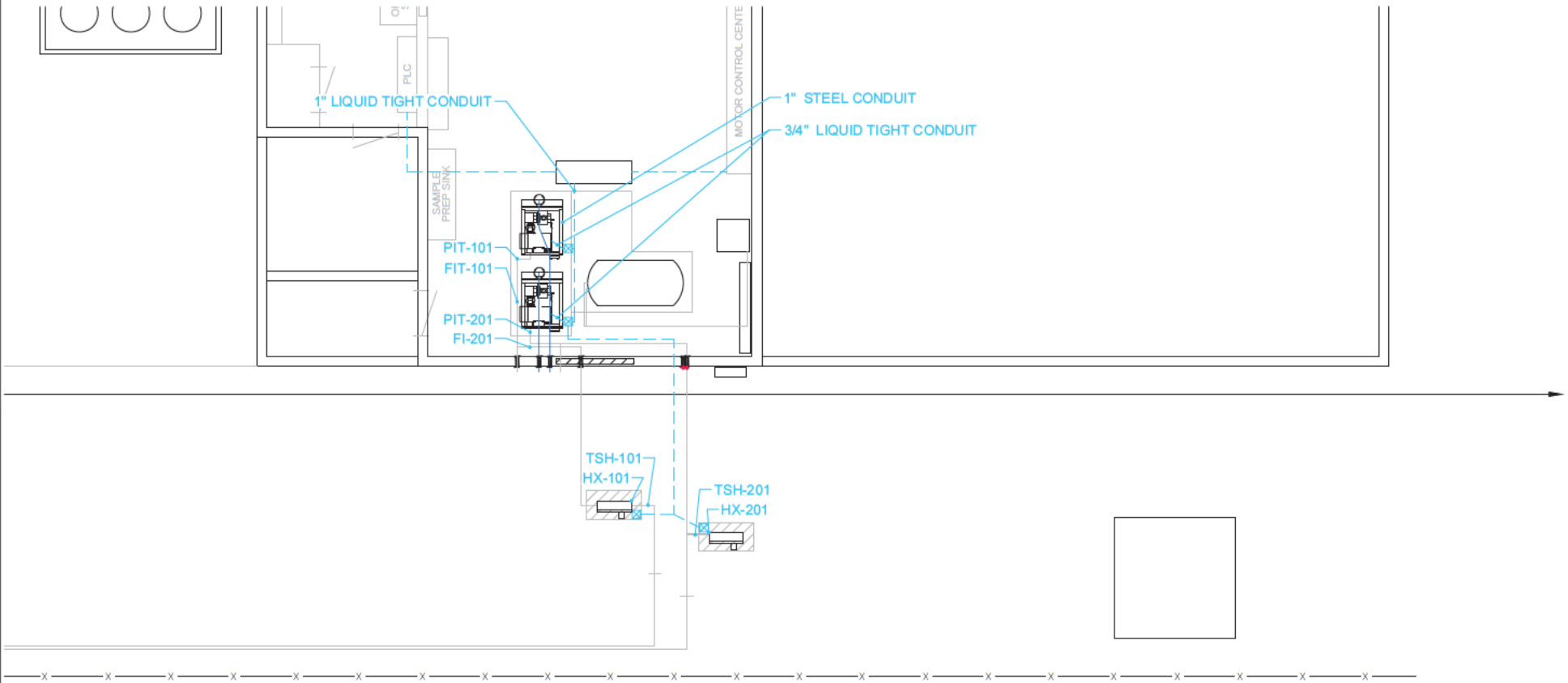
USACE - PHILADELPHIA DISTRICT • 2990 S 20 h STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date: FEBRUARY 13, 2020
ARCADIS
624 MARKET STREET
SUITE 620
WILMINGTON, DE 19801
TEL: [redacted]

C-4B



LEGEND:

- ABOVE GRADE BV-BS PIPING ON UNISTRUT RACK
- BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
- COMPRESSED AIR PIPING
- FENCE LINE
- NEW CONCRETE PAD WITH HEAT EXCHANGER
- LIQUID TIGHT ELECTRIC CONDUIT
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NOTE:
SOUND-DEADENING WALLS AND/OR PANELS IN THE UTILITY ROOM AROUND THE BIOVENTBIO SPARGE BLOWERS TO BE INSTALLED IF DEEMED NECESSARY BASED ON SUSTAINED SOUND LEVELS MEASURED ABOVE 85 DECIBELS.

0 2' 4'
SCALE IN FEET

CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYRCON=*;OFF=*REF*
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Professional Engineer's No.: PE077587
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Designed by: CD | Drawn by: COM | Checked by: CD

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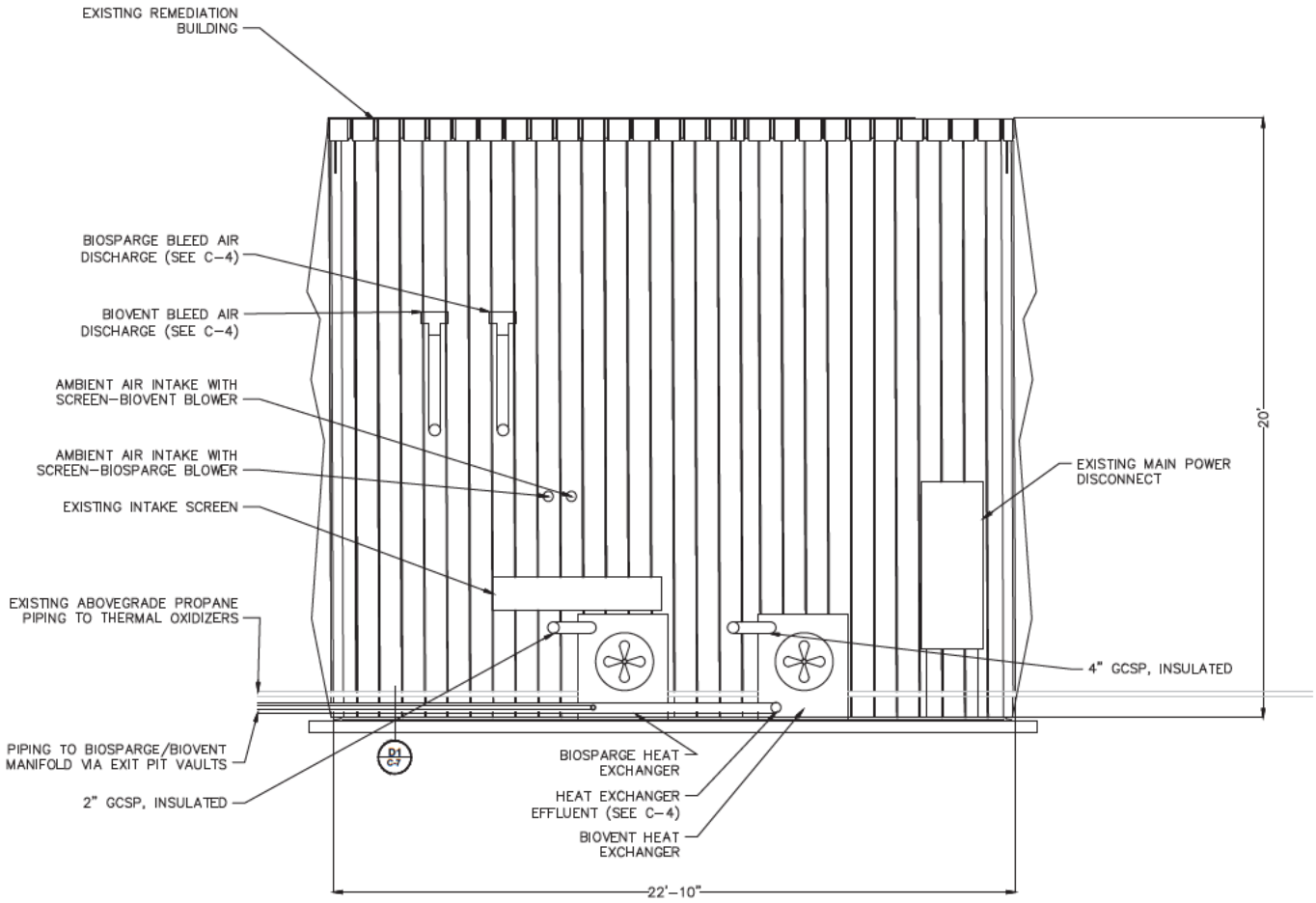
Date: FEBRUARY 13, 2020
ARCADIS
824 MARKET STREET
SUITE 820
WL[redacted]E 19801
TEL[redacted]

C-4C



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GRAPHIC SCALE

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Professional Engineer's No.: PE077587
State: PA | Date Signed: | Project Mgr.: ML
Designed by: CD | Drawn by: COM | Checked by: CD

DRAFT

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FORMER DSCP SYSTEM UPGRADES

REMEDIATION BUILDING: SOUTH EXTERIOR WALL

CONSTRUCTION

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ARCADIS
824 MARKET STREET
SUITE 820
WI[redacted]E 19801
TE[redacted]

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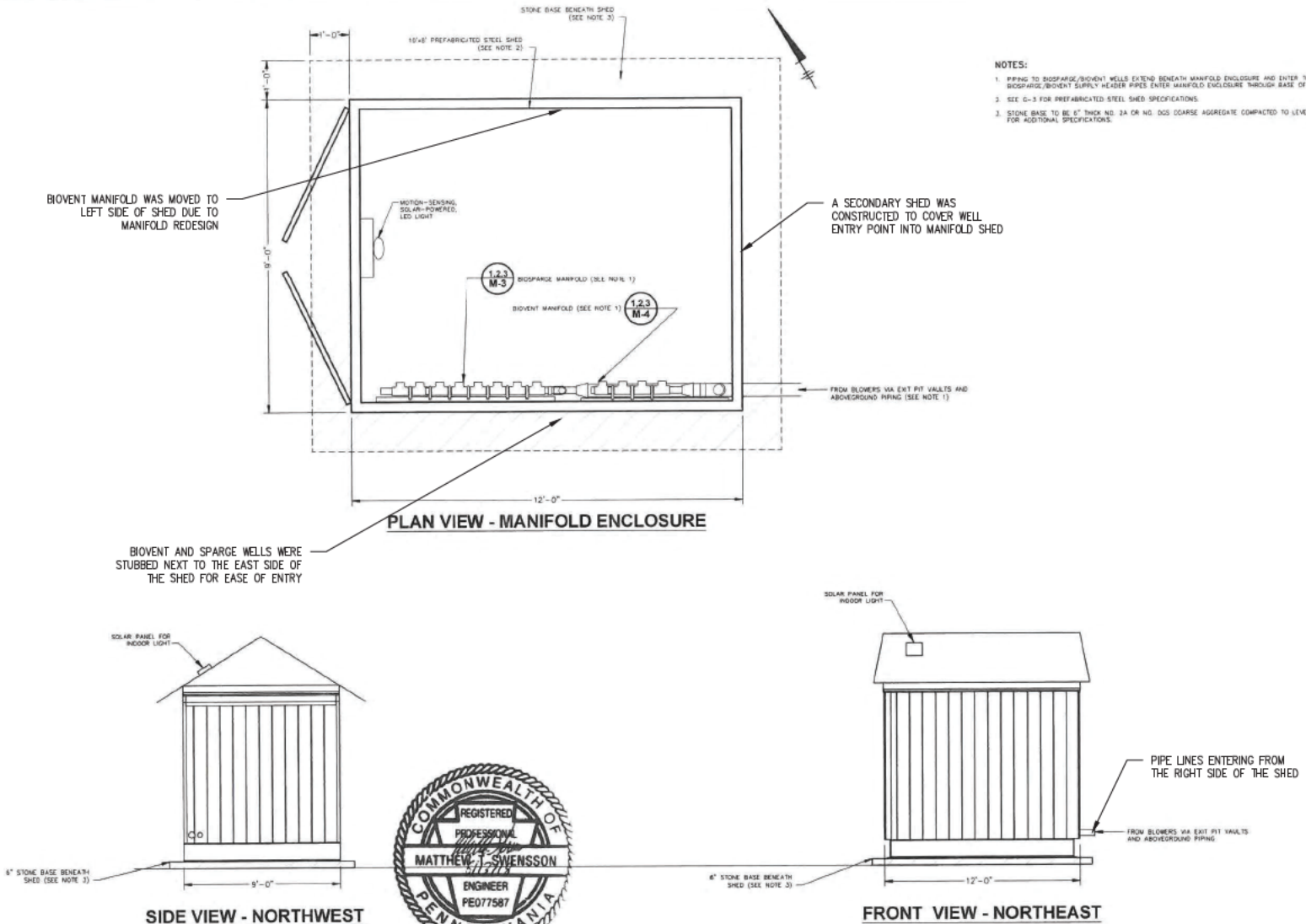

PLAN VIEW - MANIFOLD ENCLOSURE

SIDE VIEW - NORTHWEST

FRONT VIEW - NORTHEAST

NOTES:

1. PIPING TO BIOSPARGE/BIOVENT WELLS EXTEND BENEATH MANIFOLD ENCLOSURE AND ENTER THROUGH FLOOR. BIOSPARGE/BIOVENT SUPPLY HEADER PIPES ENTER MANIFOLD ENCLOSURE THROUGH BASE OF SIDEWALL AT GRADE.
2. SEE G-3 FOR PREFABRICATED STEEL SHED SPECIFICATIONS.
3. STONE BASE TO BE 6" THICK NO. 2A OR NO. DGS COARSE AGGREGATE COMPACTED TO LEVEL SURFACE. SEE G-2 FOR ADDITIONAL SPECIFICATIONS.

0 1' 2'
GRAPHIC SCALE

No.	Date	Revisions	By	Chkd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

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FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM MANIFOLD ENCLOSURE

CONSTRUCTION

ARCADIS Project No. 06262046.0005.00004
Date: JUNE 13, 2018
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WILMINGTON, DE 19801
TEL. 302.658.1718

C-6

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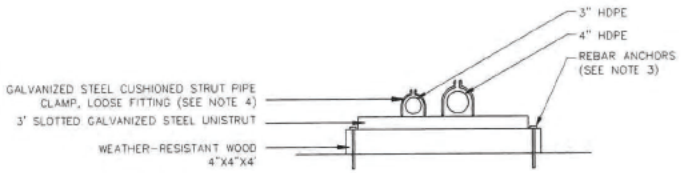
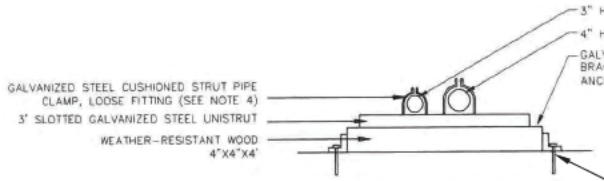
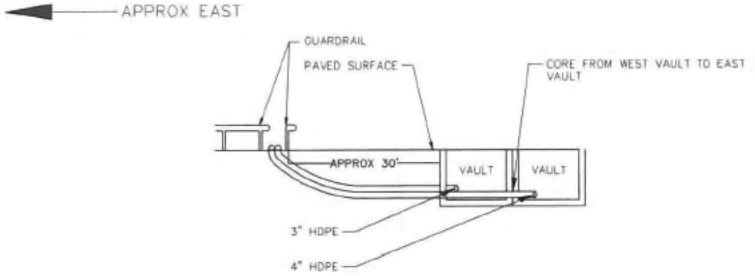


ABOVEGROUND PIPING SUPPORT (D1/C2)
NOT TO SCALE

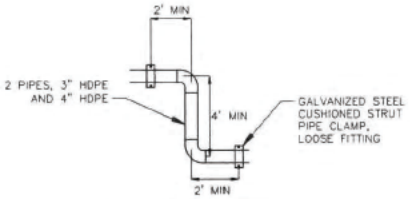


ABOVEGROUND PIPING SUPPORT IN PAVED AREA (D2/C2)
NOT TO SCALE

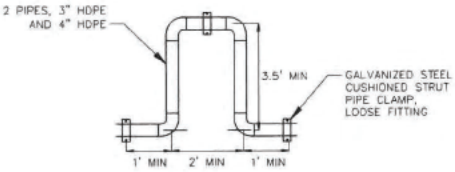
THE PIPE LINE WAS CHANGED TO A VERTICAL CONFIGURATION USING SONOTUBE AND UNISTRUT. EXTRA SUPPORTS WERE INSTALLED FOR THE EXPANSION LOOP EVERY 100'



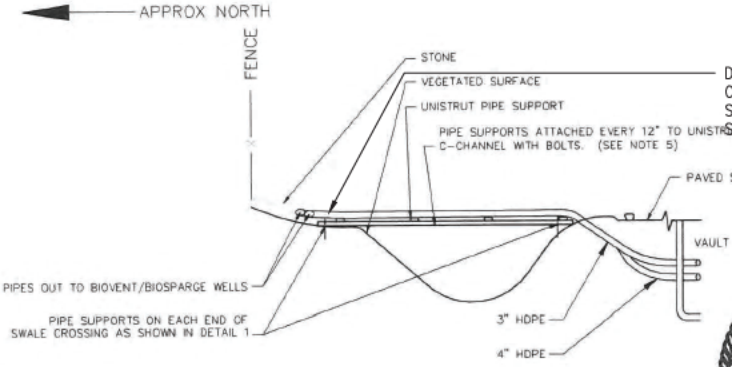
NORTH SIDE PAVEMENT CROSSING FROM COMPOUND TO NORTH SIDE EXIT PITS (D4/C2)
NOT TO SCALE



ABOVEGROUND PIPING EXPANSION OFFSET (D5/C2)
NOT TO SCALE

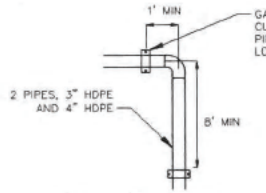


ABOVEGROUND PIPING EXPANSION LOOP (D6/C2)
NOT TO SCALE



DRAINAGE SWALE CROSSING WAS DONE BY CONSTRUCTING A BRIDGE USING SQUARE TUBE STEEL UNISTRUT AND CONCRETE FILLED SONOTUBE

SOUTH SIDE SWALE CROSSING DETAIL (D3/C2)
NOT TO SCALE



ABOVEGROUND PIPING EXPANSION ELBOW (D7/C2)
NOT TO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTES:

1. STONE SHALL BE PLACED BENEATH ENTIRE LENGTH OF PIPE RUNS AT LEAST 6 INCHES ON EITHER SIDE OF PIPES.
2. SUPPORTS SHALL BE PLACED FOR EVERY 10 FEET OF LINEAR PIPE.
3. PIPE SUPPORTS IN UNPAVED AREAS SHALL BE ANCHORED WITH REBAR IN EACH CORNER, ADVANCED AT LEAST 1 FOOT INTO GROUND.
4. PIPE SUPPORTS IN PAVED AREAS SHALL BE ANCHORED WITH 5/8"x 6" LONG ASPHALT ANCHORS, BOLTHOLD SP10-38 WITH BOLTHOLD EPX2 GROUT, OR APPROVED EQUIVALENT.
5. PIPE SUPPORTS FOR SWALE CROSSING TO BE 1/2" STEEL GRADE 8 BOLTS, NUTS, AND LOCKWASHERS.

No.	Date	Revisions	EM By	MS Chd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr: ML
Designed by: EM
Drawn by: CGM
Checked by: CD/MS

ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2800 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

ABOVEGROUND PIPE DETAILS AND CROSSINGS

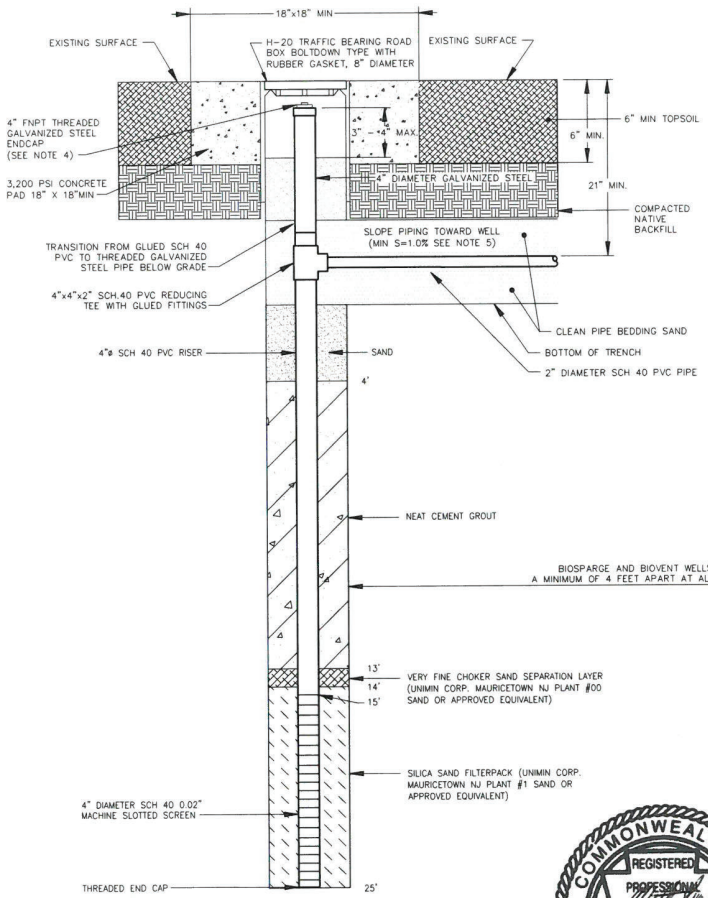
PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

C-7

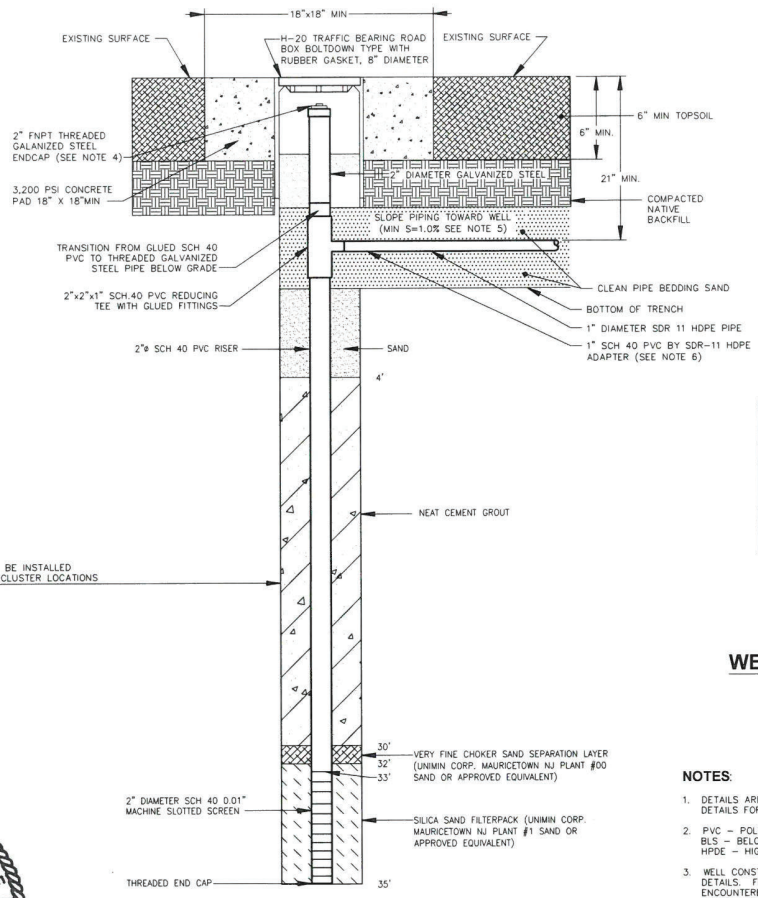
CITY: Milwaukee, WI DIV/GROUP: ENV DB: C. McKeough LD: C.DiTullio PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF* C:\Users\cmckeough\Desktop\2018\06262046.0005\Revised Work Plan\01-DWG\06262046.0005Revised Work Plan01-DWG06262046.003.C04.C07.dwg, LAYOUT: C-7 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: --- C:\Users\cmckeough\Desktop\2018\06262046.0005\Revised Work Plan\01-DWG\06262046.0005Revised Work Plan01-DWG06262046.003.C04.C07.dwg, LAYOUT: C-7 PLOTTED: 6/14/2018 8:55 AM BY: MCKEOUGH, CAROL PLOTSTYLETABLE: --- XREFS: IMAGES: PROJECTNAME: P:\06262046\000\dwg\000-dwg\images\06262046.0005_north.png



BIOVENT WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

1 / M-1

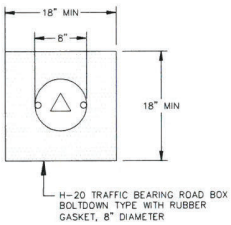
NOT TO SCALE



BIOSPARGE WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

2 / M-1

NOT TO SCALE



WELLHEAD MONUMENT DETAIL

NOTES:

1. DETAILS ARE APPROXIMATE AND NOT TO SCALE. REFER TO TRENCH CROSS SECTION DETAILS FOR TRENCH BACKFILL DESIGN SPECIFICATIONS.
2. PVC – POLYVINYL CHLORIDE
   BLS – BELOW LAND SURFACE
   HPDE – HIGH DENSITY POLYETHYLENE
3. WELL CONSTRUCTION DEPTHS ARE APROXIMATE. SEE DRAWINGS G-1 AND G-2 FOR DETAILS. FINAL DEPTHS TO BE DETERMINED BASED ON ACTUAL SUBSURFACE LITHOLOGY ENCOUNTERED IN THE FIELD DURING INSTALLATION.
4. THREADED GALVANIZED STEEL CAPS ON BIOSPARGE/BIOVENT WELLS SHALL BE EQUIPPED WITH A THREADED BRASS BALL VALVE WITH 1/8" NIPPLE FITTING FOR MEASURING OF WELLHEAD PRESSURE READINGS.
5. SUBSURFACE PIPING WILL BE SLOPED TOWARD INDIVIDUAL BIOSPARGE AND BIOVENT WELLS AND AWAY FROM MANIFOLD.
6. SCH 40 PVC TO SDR-11 HDPE ADAPTER FITTING WITH GLUED PVC TO PVC CONNECTION AS SPECIFIED ON DRAWING G-3.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name	MATTHEW T. SWENSSON
Professional Engineer's No.	PE077587
State	PA
Date Signed	6/13/18
Project Mgr.	ML
Designed by	EM
Drawn by	CCM
Checked by	CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS

PROCESS

ARCADIS Project No.	06262046.0005.00004
Date	JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

M-1

CITY: Milwaukee; WI DIVGROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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CITY: Milwaukee, WI DIVISION/GROUP: ENV DB: C.McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
CTB: Milwaukee.ctb STYLES: ARCADIS.stb VIEWS: ARCADIS.vws DATE/TIME: 6/14/2018 8:46 AM DWG: \\USACE_PHILADELPHIA DISTRICT\USACE Workplan for Bowen\Biosparge\20180625\20046.0010\Revised Work Plan\01-DWG\06262046-M01 and M02.dwg LAYOUT: M-2 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ----
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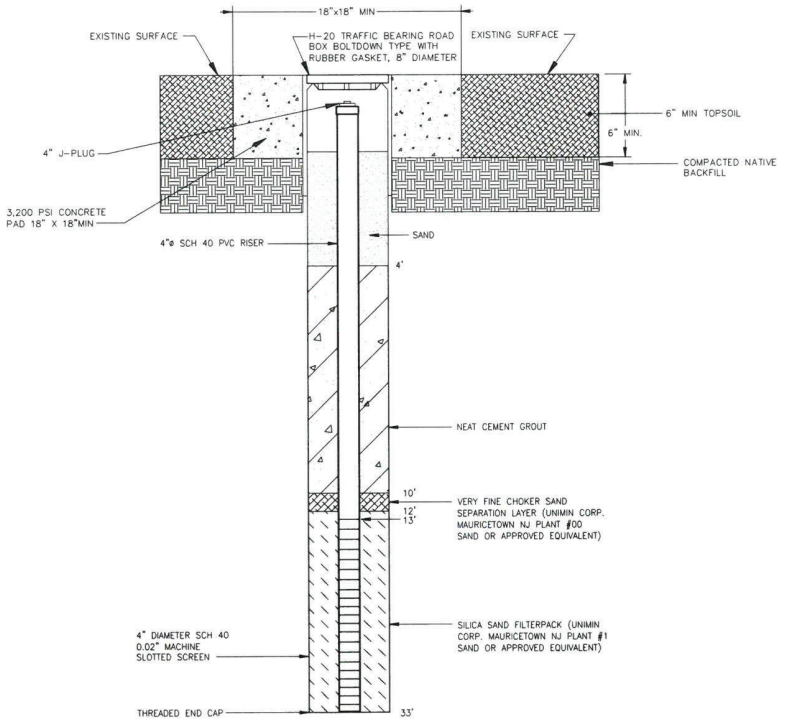

PERFORMANCE MONITORING WELL CONSTRUCTION/SURFACE COMPLETION DETAIL

1 / M-2

NOT TO SCALE

NOTES:

1. DETAILS ARE APPROXIMATE AND NOT TO SCALE. REFER TO TRENCH CROSS SECTION DETAILS FOR TRENCH BACKFILL DESIGN SPECIFICATIONS.
2. PVC – POLYVINYL CHLORIDE
   BLS – BELOW LAND SURFACE
   HPDE – HIGH DENSITY POLYETHYLENE
3. WELL CONSTRUCTION DEPTHS ARE APROXIMATE. SEE DRAWINGS G-1 AND G-2 FOR DETAILS. FINAL DEPTHS TO BE DETERMINED BASED ON ACTUAL SURFACE LITHOLOGY ENCOUNTERED IN THE FIELD DURING INSTALLATION.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name	MATTHEW T. SWENSSON
Professional Engineer's No.	PE077587
State	PA
Date Signed	6/13/18
Project Mgr.	ML
Designed by	EM
Drawn by	CCM
Checked by	CD/MS

ARCADIS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS

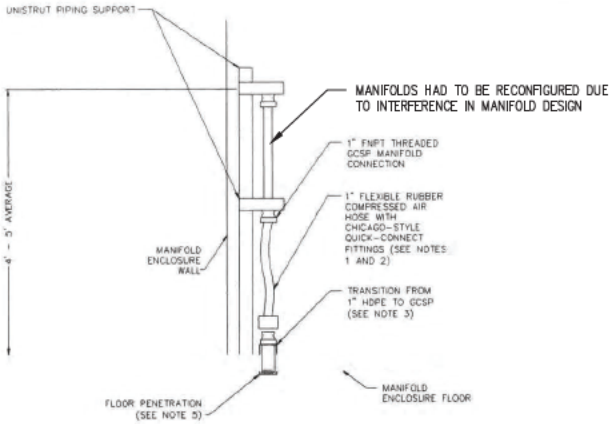
PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 13, 2018

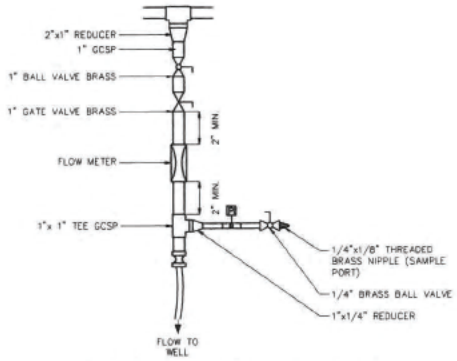
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

M-2



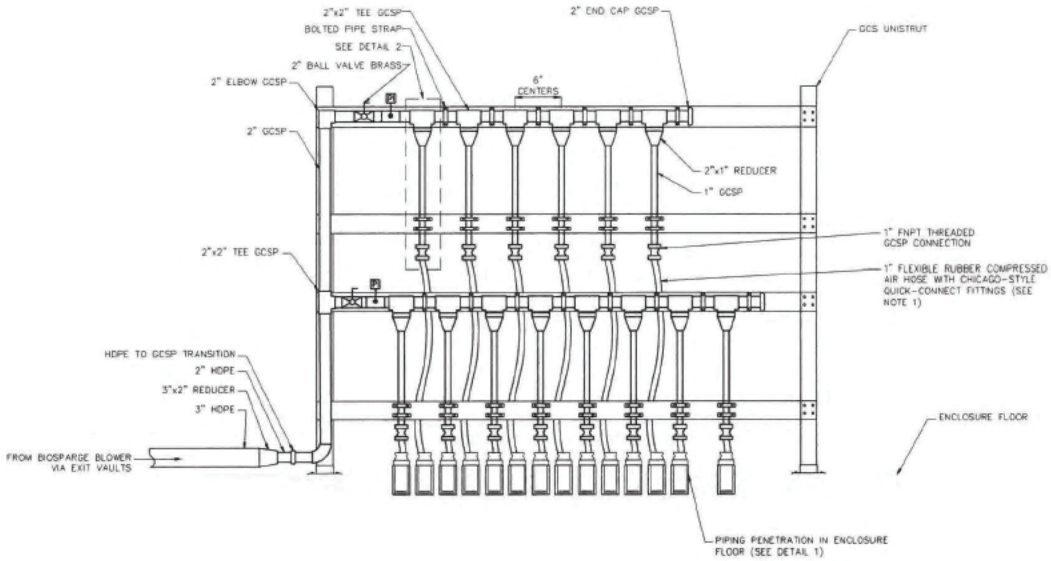
BIOSPARGE MANIFOLD PIPING CONNECTION DETAIL (1 / M-3)

NOT TO SCALE



BIOSPARGE MANIFOLD VALVING/INSTRUMENTATION (TYP. OF 14) (2 / M-3)

NOT TO SCALE



BIOSPARGE MANIFOLD DETAIL (3 / M-3)

NOT TO SCALE

NOTES:

1. FLEXIBLE COMPRESSED AIR HOSES TO BE ANCHORED TO UNISTRUT SUPPORT AND/OR WALL BY WHIP-CHECKS.
2. FLEXIBLE RUBBER HOSE SHALL BE 200 PSI PRESSURE AND 200F TEMPERATURE RATED, UV RESISTANT, AND WITH CHICAGO-STYLE QUICK-CONNECT FITTINGS.
3. TRANSITION FROM SDR-11 HDPE TO GALVANIZED STEEL WITH MNPT THREADED END CONNECTION AS SPECIFIED ON DRAWING G-3.
4. GCSP – GALVANIZED CARBON STEEL PIPE
   PI – PRESSURE INDICATOR
5. CONTRACTOR TO CUT FLOOR TO ACCOMMODATE PIPING PENETRATIONS. SEAL GAPS BETWEEN PIPING PENETRATIONS AND SURROUNDING FLOOR UPON COMPLETION.



UNISTRUT PIPING SUPPORT

No.	Date	Revisions	EM	MS
1	6/13/2018	FINAL	EM	Ckd

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS

ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2800 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS

PROCESS

ARCADIS Project No.: 05262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

M-3

CITY: Milwaukee, WI GROUP: ENV | DB: C. McDonough LD: C.DOTULIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:On=*;Off=*REF*
CTB: Arcadis_Full_Size_Color_Styles.ctb | Screening: 100% | Plot Style: PLOT.CTB | Plotted by: MCDONOUGH, CAROL
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IMAGES: PROJECTNAME: —
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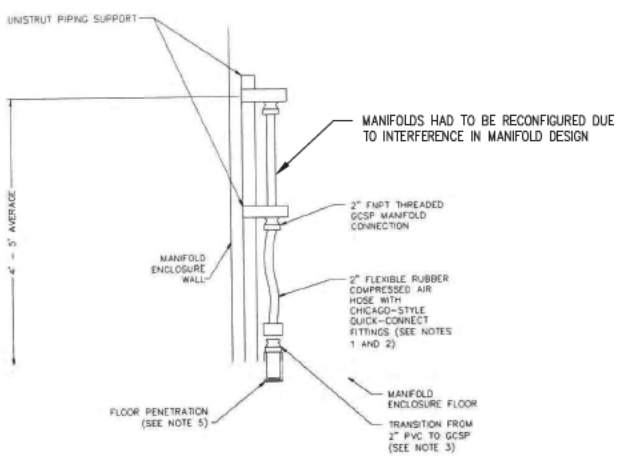
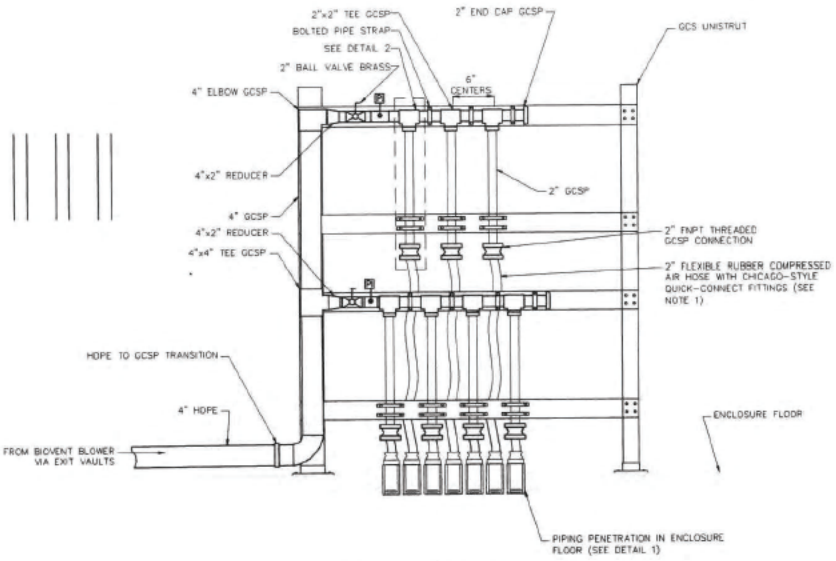


BIOVENT MANIFOLD PIPING CONNECTION DETAIL

1 / M-4

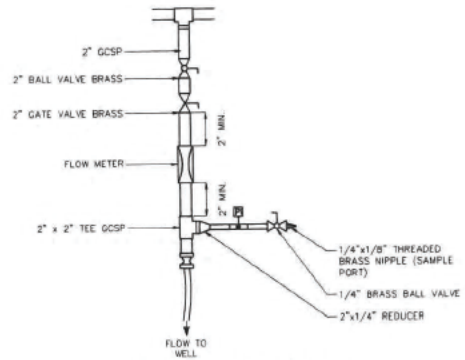
NOT TO SCALE



BIOVENT MANIFOLD DETAIL

3 / M-4

NOT TO SCALE



BIOVENT MANIFOLD VALVING/INSTRUMENTATION (TYP. OF 7)

2 / M-4

NOT TO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTES:

1. FLEXIBLE COMPRESSED AIR HOSES TO BE ANCHORED TO UNISTRUT SUPPORT AND/OR WALL BY WHIP-CHECKS.
2. FLEXIBLE RUBBER HOSE SHALL BE 200 PSI PRESSURE AND 200F TEMPERATURE RATED, UV RESISTANT, AND WITH CHICAGO-STYLE QUICK-CONNECT FITTINGS.
3. TRANSITION BELOW GRADE FROM PVC TO GCSP USING 2" SCH 40 PVC SLIP TO GCSP THREADED ADAPTER FITTING.
4. GCSP - GALVANIZED CARBON STEEL PIPE
   PI - PRESSURE INDICATOR
5. CONTRACTOR TO CUT FLOOR TO ACCOMMODATE PIPING PENETRATIONS. SEAL GAPS BETWEEN PIPING PENETRATIONS AND SURROUNDING FLOOR UPON COMPLETION.

No.	Date	Revisions	By	Chkd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr.: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT SYSTEM BIOVENT MANIFOLD DETAILS

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date: JUNE 13, 2018
ARCADIS
624 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.656.1718

M-4

CITY: Milwaukee VN DIV/GROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
C:\Users\cmckeough\OneDrive - ARCADIS\BIM 360 Docs\USACE - PHILADELPHIA DISTRICT\USACE Workplan for Biovent\Biosparge\2018\06262046.0010\Revised Work Plan\01-DWG\06262046-M03 and M04.dwg LAYOUT: M-4 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ----
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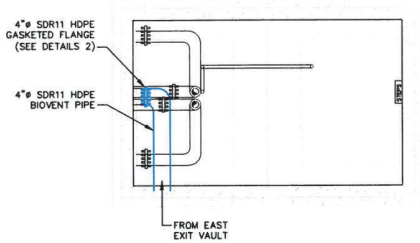
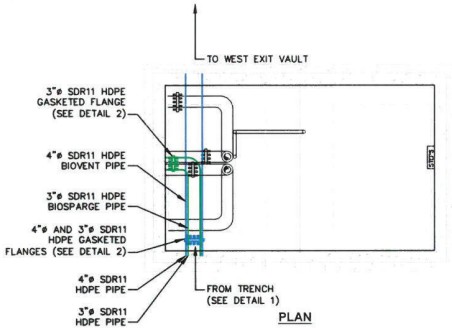


PLAN



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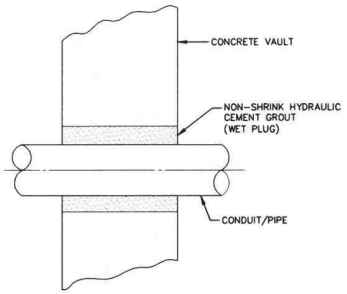
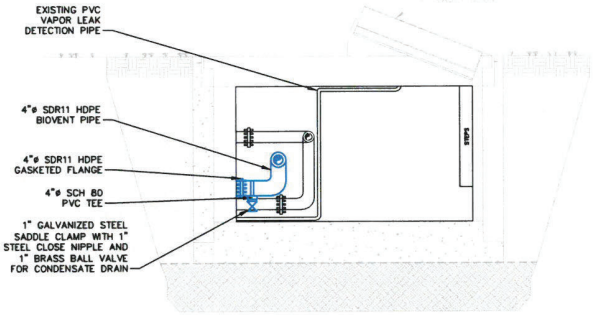


TYPICAL CONCRETE VAULT WALL PENETRATION DETAIL

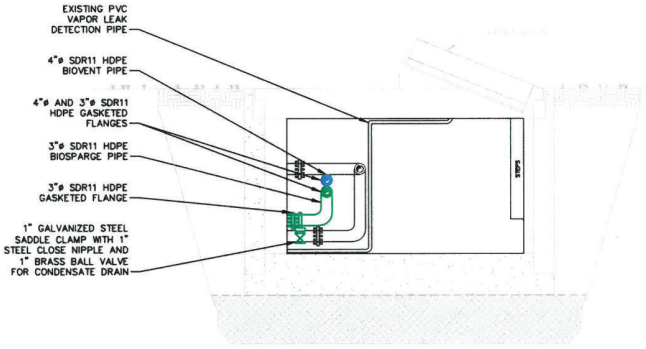
1 M-5 1 M-6

NOT TO SCALE



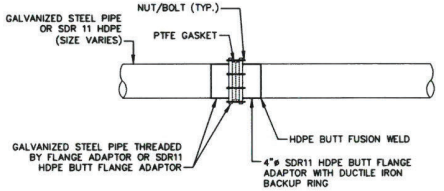
PROFILE

WEST EXIT VAULT



PROFILE

EAST EXIT VAULT



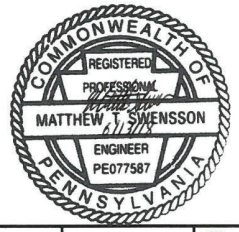
NOTE:

BUTT FUSION FITTINGS MAY BE CUT TO LENGTH TO ALLOW FOR GREATER CLEARANCE DURING INSTALLATION.

PIPE MATERIAL TRANSITION AND FLANGE DETAIL (TYP.)

2 M-5 2 M-6

NOT TO SCALE



NOTE:

NEW PIPING TO BE INSTALLED IN EXIT VAULTS IS SHOWN IN BLUE AND GREEN.
EXISTING PIPING IN EXIT VAULTS IS SHOWN IN BLACK.

No.	Date	Revisions	By	Chd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr.: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

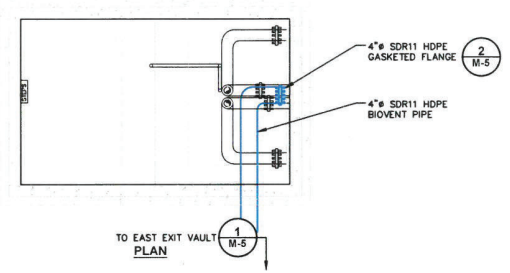
NORTH EXIT VAULT DETAILS

PROCESS

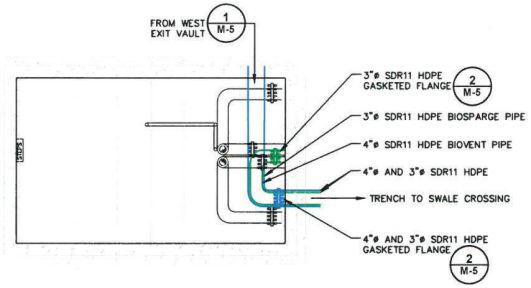
ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

M-5



PLAN



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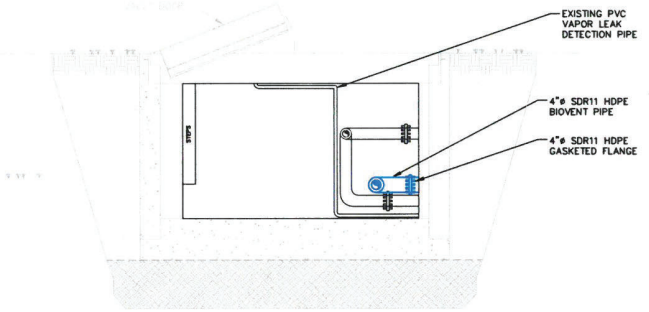
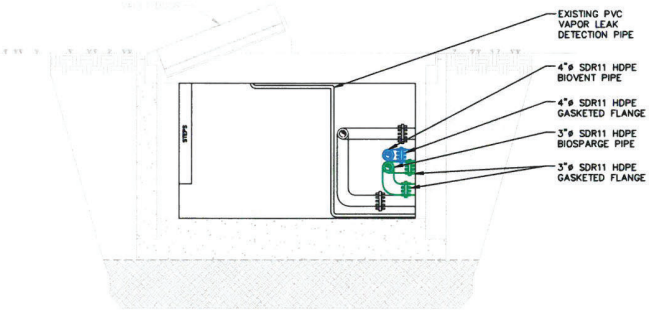


PROFILE

WEST EXIT VAULT



PROFILE

EAST EXIT VAULT



NOTE:

NEW PIPING TO BE INSTALLED IN EXIT VAULTS IS SHOWN IN BLUE AND GREEN.
EXISTING PIPING IN EXIT VAULTS IS SHOWN IN BLACK.

			Professional Engineer's Name	MATTHEW T. SWENSSON
			Professional Engineer's No.	PE077587
1	6/13/2018	FINAL	State: PA	Date Signed: 6/13/18
No.	Date	Revisions	Designed by: EM	Drawn by: CCM
			Project Mgr: ML	Checked by: CD/MS

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ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

SOUTH EXIT VAULT DETAILS

PROCESS

ARCADIS Project No.
062620460005.00004

Date
JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL: 302.658.1718

M-6

CITY: Milwaukee, WI DIV/GROUP: ENV DB: G.McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:On=*;OFF=*REF*
C:\Users\cmckeough\OneDrive - ARCADIS\BIM 360 Docs\USACE- PHILADELPHIA DISTRICT\USACE Workplan for Biovent\Biosparge\2018\062620460010\Revised Work Plan\01-DWG\062620460-M05 and M06.dwg LAYOUT: M-6 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ----
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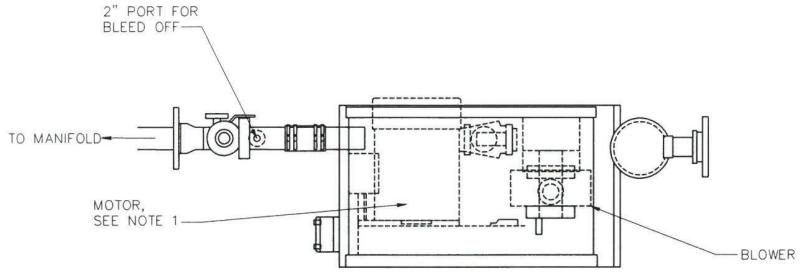
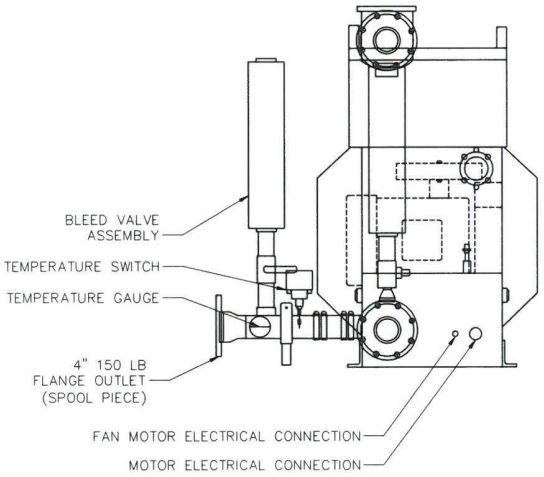


LIMITS OF BLOWER PACKAGE - TOP VIEW

NOT TO SCALE

NOTES

1. 7.5 HP MOTOR TO BE UPGRADED TO 10 HP MOTOR FOR BIOSPARGE BY CONTRACTOR. 7.5 HP MOTOR FOR BIOVENT.
2. SEE DRAWING G-3 FOR MAJOR EQUIPMENT LIST.



LEFT SIDE VIEW

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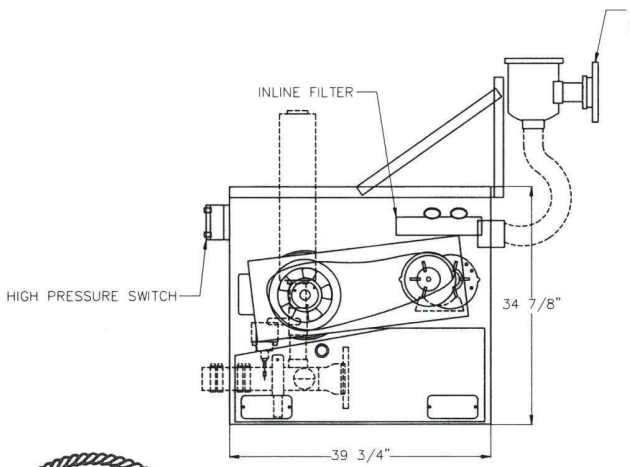

FRONT VIEW

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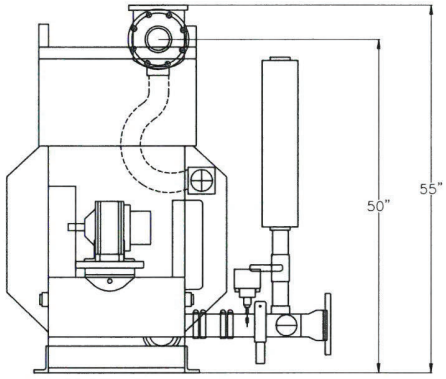

RIGHT SIDE VIEW

NOT TO SCALE

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

CITY: Milwaukee, WI DIVGROUP: ENV DB: C. McKeough LD: C.DITULLIO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
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Professional Engineer's Name	MATTHEW T. SWENSSON
Professional Engineer's No.	PE077587
State	PA
Date Signed	6/13/18
Project Mgr.	ML
Designed by	EM
Drawn by	CCM
Checked by	CD/MS

ARCADIS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

BIOSPARGE/BIOVENT BLOWER PACKAGE

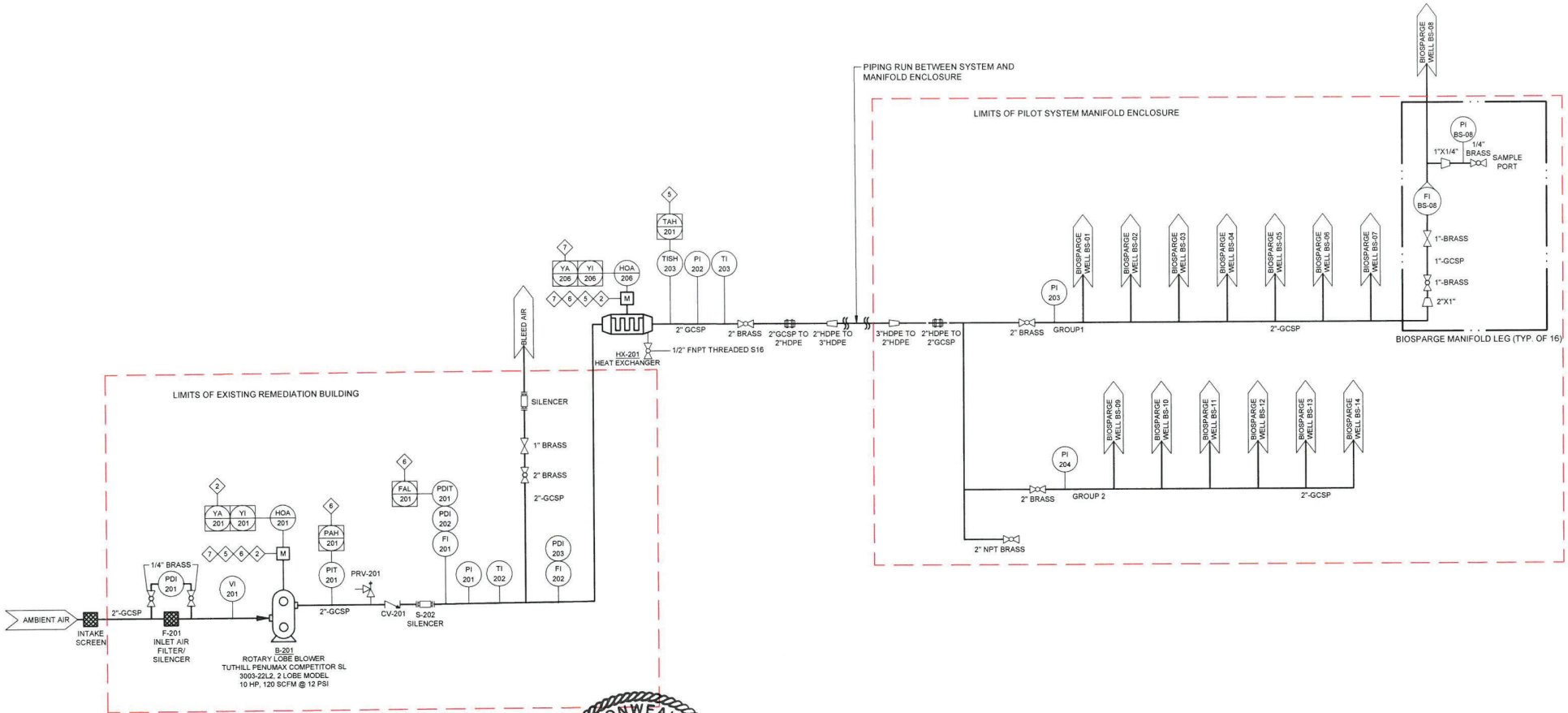
PROCESS

ARCADIS Project No.
06262046.0005.00004

Date
JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL: 302.658.1718

M-7



NOTES:

1. ROTAMETERS SHALL BE INSTALLED A MINIMUM OF 1.5 STRAIGHT PIPE DIAMETERS FROM VALVES, BENDS, OR SIMILAR SOURCES OF FLOW TURBULENCE.
2. OTHER FLOW MEASURING INSTRUMENTS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS REGARDING DISTANCE FROM SOURCES OF FLOW TURBULENCE TO ENSURE ACCURACY OF READINGS.
3. WHERE APPLICABLE INSTRUMENTATION SHALL BE INSTALLED USING PIPING TEES AND REDUCERS IN LIEU OF PIPE TAPPING.
4. SEE DRAWING PID-3 FOR SCHEDULE OF ALARMS/INTERLOCKS AND SET POINTS.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
6/13/18
ENGINEER
PE077587

No.	Date	Revisions	By	Ckd
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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr.: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

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FORMER DSCP SYSTEM UPGRADES

BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM

PROCESS

ARCADIS Project No. 06262046.0005.00004
Date JUNE 13, 2018
ARCADIS
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SUITE 820
WILMINGTON, DE 19801
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PID-1

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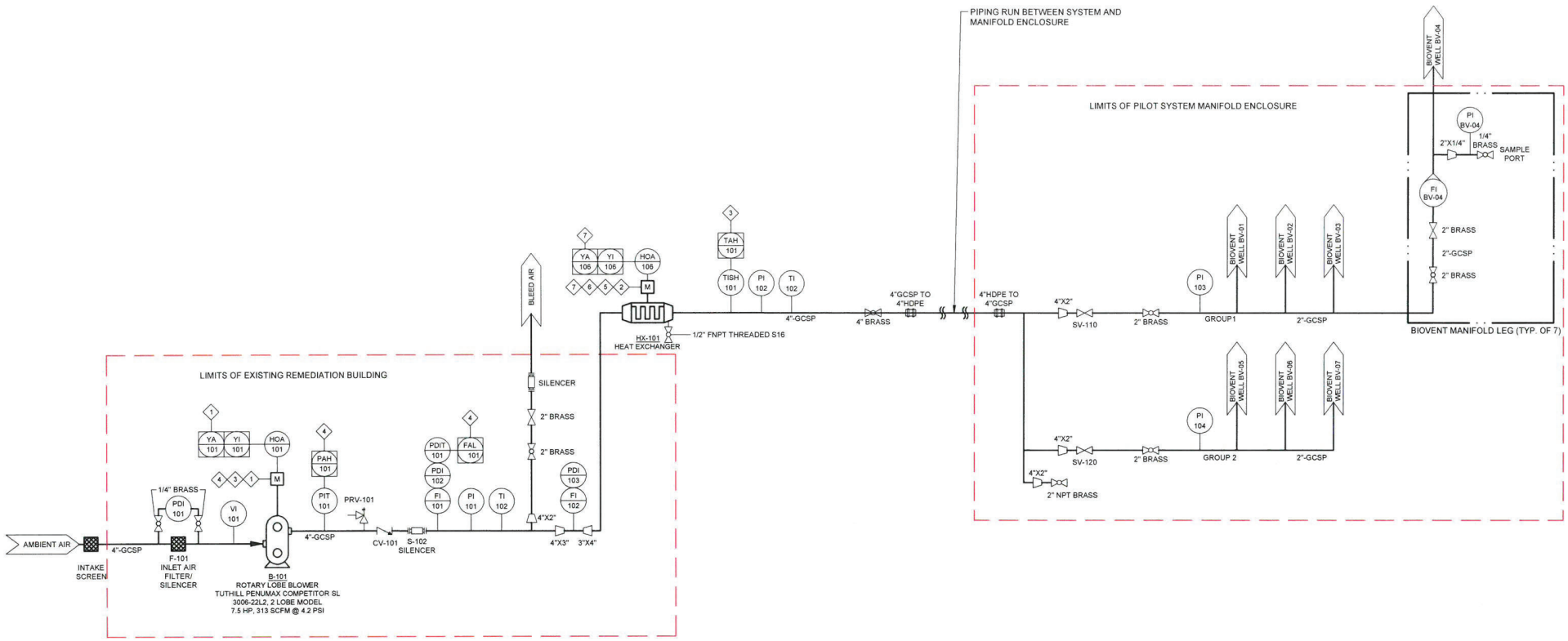

NOTES:

1. ROTAMETERS SHALL BE INSTALLED A MINIMUM OF 1.5 STRAIGHT PIPE DIAMETERS FROM VALVES, BENDS, OR SIMILAR SOURCES OF FLOW TURBULENCE.
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4. SEE DRAWING PID-3 FOR SCHEDULE OF ALARMS/INTERLOCKS AND SET POINTS.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587
6/13/18

No.	Date	Revisions	By	Ckd
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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA | Date Signed: 6/13/18 | Project Mgr.: ML
Designed by: EM | Drawn by: CCM | Checked by: CD/MS

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BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM

PROCESS

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PID-2

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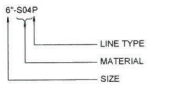
LEGEND:

- PROCESS PIPING
- SKID MOUNTED EQUIPMENT
- INSTRUMENT SIGNAL
- TRUE UNION BALL VALVE
- GATE VALVE
- CHECK VALVE
- SOLENOID VALVE (NORMALLY CLOSED)
- PRESSURE RELIEF VALVE
- REDUCER
- TRANSITION FITTING
- FLANGED CONNECTION
- SILENCER
- AIR FILTER
- HEAT EXCHANGER
- BLOWER
- ROTAMETER

PIPELINE DESIGNATION:



TYPE:

D = DUCT
H = HOSE
C = DOUBLE WALL CONTAINMENT PIPE
P = PIPE
T = TUBE

MATERIAL:

BRZ - BRASS/BRONZE
CIR - CAST IRON
CST - CARBON STEEL
CPR - COPPER
CVC - CHLORINATED POLYVINYL CHLORIDE
DIR - DUCTILE IRON
FRP - FIBERGLASS
GCS - GALVANIZED CARBON STEEL
LCS - LINED CARBON STEEL
PET - POLYETHYLENE
POP - POLYPROPYLENE
PVC - POLYVINYL CHLORIDE
RUB - RUBBER
S04 - 304 STAINLESS STEEL
S4L - 304L STAINLESS STEEL
S16 - 316 STAINLESS STEEL
S6L - 316L STAINLESS STEEL
TEF - TEFLON
VIT - VITON
TYG - TYGON

ABBREVIATIONS:

%	PERCENT
AC	AIR COMPRESSOR
AD	AIR DRYER
AR	AIR RECEIVER TANK
CFM	CUBIC FEET PER MINUTE
E	ELECTRIC ACTUATOR
F	MULTIMEDIA FILTER
FAH	FLOW ALARM HIGH
FAL	FLOW ALARM LOW
FC	FLOW CONTROL
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIC	FLOW INDICATING CONTROL
FIR	FLOW INDICATE RECORDER
FIT	FLOW INDICATING TRANSMITTER
FM	FLOW METER
FQ	FLOW TOTALIZER
FQI	FLOW QUANTITY INDICATOR
FQIR	FLOW QUANTITY INDICATOR RECORDER
FQR	FLOW QUANTITY RECORDER
FQS	FLOW QUANTITY SWITCH
FT	FLOW TRANSMITTER
FV	FLOW VALVE
GAL	GALLON(S)
GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
HAZ	HAZARDOUS
HDPE	HIGH DENSITY POLYETHYLENE
HIM	HUMAN INTERFACE MACHINE
HOA	HAND/OFF/AUTO
HR	HOUR
HS	HAND SWITCH
INCH H2O	INCHES WATER COLUMN
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH HIGH
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW LOW
LB	POUND(S)
LC	LEVEL CONTROLLER
LE	LEVEL ELEMENT
LG	LEVEL GAUGE
LI	LEVEL INDICATOR
LIC	LEVEL INDICATING CONTROL
LIR	LEVEL INDICATE RECORDER
LIT	LEVEL INDICATING TRANSMITTER
LPGAC	LIQUID PHASE GRANULAR ACTIVATED CARBON
LS	LEVEL SWITCH
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LT	LEVEL TRANSMITTER
M	MOTOR
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NPT	NATIONAL PIPE THREAD
PAH	PRESSURE ALARM HIGH
PAHH	PRESSURE ALARM HIGH HIGH
PAL	PRESSURE ALARM LOW
PDAH	PRESSURE DIFFERENTIAL ALARM HIGH
PDAHH	PRESSURE DIFFERENTIAL ALARM HIGH HIGH
PDE	PRESSURE DIFFERENTIAL ELEMENT
PDI	PRESSURE DIFFERENTIAL INDICATOR
PDIR	PRESSURE DIFFERENTIAL INDICATE RECORDER
PDIT	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER
PDITSH	PRESSURE DIFFERENTIAL INDICATING TRANSMITTER SWITCH HIGH
PDSH	PRESSURE DIFFERENTIAL SWITCH HIGH
PE	PRESSURE ELEMENT
PI	PRESSURE INDICATOR
PIR	PRESSURE INDICATE RECORDER
PISH	PRESSURE INDICATING SWITCH HIGH
PISL	PRESSURE INDICATING SWITCH LOW
PIT	PRESSURE INDICATING TRANSMITTER
PRV	PRESSURE RELIEF VALVE
PSIG	PRESSURE PER SQUARE INCH GAUGE
PSL	PRESSURE SWITCH LOW
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
SC	SPEED CONTROL
SI	SPEED INDICATOR
SIC	SPEED INDICATING CONTROL
ST	SPEED TRANSMITTER
T	TANK
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH HIGH
TAL	TEMPERATURE ALARM LOW
TC	TEMPERATURE CONTROL
TET	TEMPERATURE ELEMENT TRANSMITTER
TI	TEMPERATURE INDICATOR
TIR	TEMPERATURE INDICATE RECORDER
TISH	TEMPERATURE INDICATE SWITCH HIGH
TOC	TOP OF CASING
TSH	TEMPERATURE SWITCH HIGH
TW	THERMAL WELL
TYP	TYPICAL
V	VALVE
VFD	VARIABLE FREQUENCY DRIVE
VPGAC	VAPOR PHASE GRANULAR ACTIVATED CARBON
YA	STATUS ALARM
YI	STATUS INDICATOR
ZA	POSITION INDICATING ALARM
ZAC	POSITION ALARM VALVE FAILED TO CLOSE
ZAO	POSITION ALARM VALVE FAILED TO OPEN
ZSC	POSITION SWITCH CLOSED
ZSO	POSITION SWITCH OPENED

Schedule of Alarms/Interlocks

Alarm	Description	Interlock	
Shut Down	Notification of system shutdown not associated with the other alarm conditions	--	
E-Stop	System emergency stop button depressed	--	
Power Failure	System power failure	--	
B-101 OLD	Biovent blower (B-101) motor overload	1	Disable B-101
B-201 OLD	Biovent blower (B-101) motor overload	2	Disable B-201 and Heat Exchanger (HX-201)
TAH-101	Biovent heat exchanger (HX-101) high effluent temperature	3	Disable B-101 and HX-101
PAH-101	Biovent blower (B-101) high effluent pressure	4	Disable B-101
FAL-101	Biovent blower (B-101) low flow or differential pressure indicator transmitter PDIT-101 failure		
TAH-201	Biosparge heat exchanger (HX-201) high effluent temperature	5	Disable B-201 and HX-201
PAH-201	Biosparge blower (B-201) high effluent pressure	6	Disable B-201 and HX-201
FAL-201	Biosparge blower (B-201) low flow or differential pressure indicator transmitter PDIT-201 failure		
HX Fail	Heat Exchanger HX-201 failure	7	Disable B-201

* PLC sends out email/text notification for all alarms

Process Safety Devices/Controls and Set Points

Process Safety Device/Control	Set Point
Control panel emergency stop	--
Biovent blower motor overload	--
Biovent heat exchanger (HX-101) high effluent temperature switch/alarm (TISH-101/TAH-101)	130 F
Biovent blower (B-101) high effluent pressure switch/alarm (PIT-101/PAH-101)	7.5 psi
Biovent blower (B-101) low flow alarm (FAL-101)	10 cfm*
Biovent blower pressure relief valve (PRV-101)	7 psi
Biosparge heat exchanger high effluent temperature switch/alarm (TISH-203/TAH-201)	130 F
Biosparge blower (B-201) high effluent pressure switch/alarm (PIT-201/PAH-201)	12.5 psi
Biosparge blower (B-201) low flow alarm (FAL-201)	5 cfm*
Biosparge blower pressure relief valve (PRV-201)	12 psi

* 5 minute delay on low flow alarm upon blower startup.

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D =	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = PULSE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTEGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VACUUM, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS	UNCLASSIFIED	DRIVE, ACTUATOR, FINAL CONTROL ELEMENT	

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS			
SHARED DISPLAY, SHARED CONTROL			
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.			
PROGRAMMABLE LOGIC CONTROLLER FUNCTION			

LEGENDS NOTES:

1. ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARATE MEASURED VARIABLE. EXAMPLES: PD = DIFFERENTIAL PRESSURE FQ = TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: PH
3. MEANING OF A "USER'S CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
4. UNCLASSIFED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT, THE MEANING SHALL BE SPECIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
5. THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

GENERAL NOTES:

1. ALL ANALOG SETPOINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE SCREEN.
2. ALARMS THAT SHUT DOWN EXTRACTION WELLS AND TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
3. THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
4. WHERE APPLICABLE, TEES AND REDUCERS SHALL BE INSTALL IN LIEU OF PIPE TAPPING.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — MATTHEW T. SWENSSON — 6/13/18 — ENGINEER — PE077587

No.	Date	Revisions	By	Ckd
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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State: PA
Date Signed: 6/13/18
Project Mgr.: ML
Designed by: EM
Drawn by: CCM
Checked by: CD/MS

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PIPING AND INSTRUMENTATION DIAGRAM LEGEND

PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

PID-3

CITY: Milwaukee, WI DIVGROUP: ENV DEL: C. McKeough LD: C.CITULLO PIC: M.LESLEY PM: M.LESLEY TM: LYR:ON=*;OFF=*REF*
CONN: Milwaukee, WI USER: C. McKeough DIV/GROUP: ENV/ENVIRONMENTAL DB: MKE_PW_Documents
LOC: PHILADELPHIA DISTRICT/USACE Workplan for Biovent\Biosparge\06262046.0010\Revised Work Plan\01-DWG\06262046-PID Diagrams.dwg LAYOUT: PID-3 SAVED: 6/14/2018 8:46 AM ACADVER: 21.0S (LMS TECH) PAGESETUP: ----
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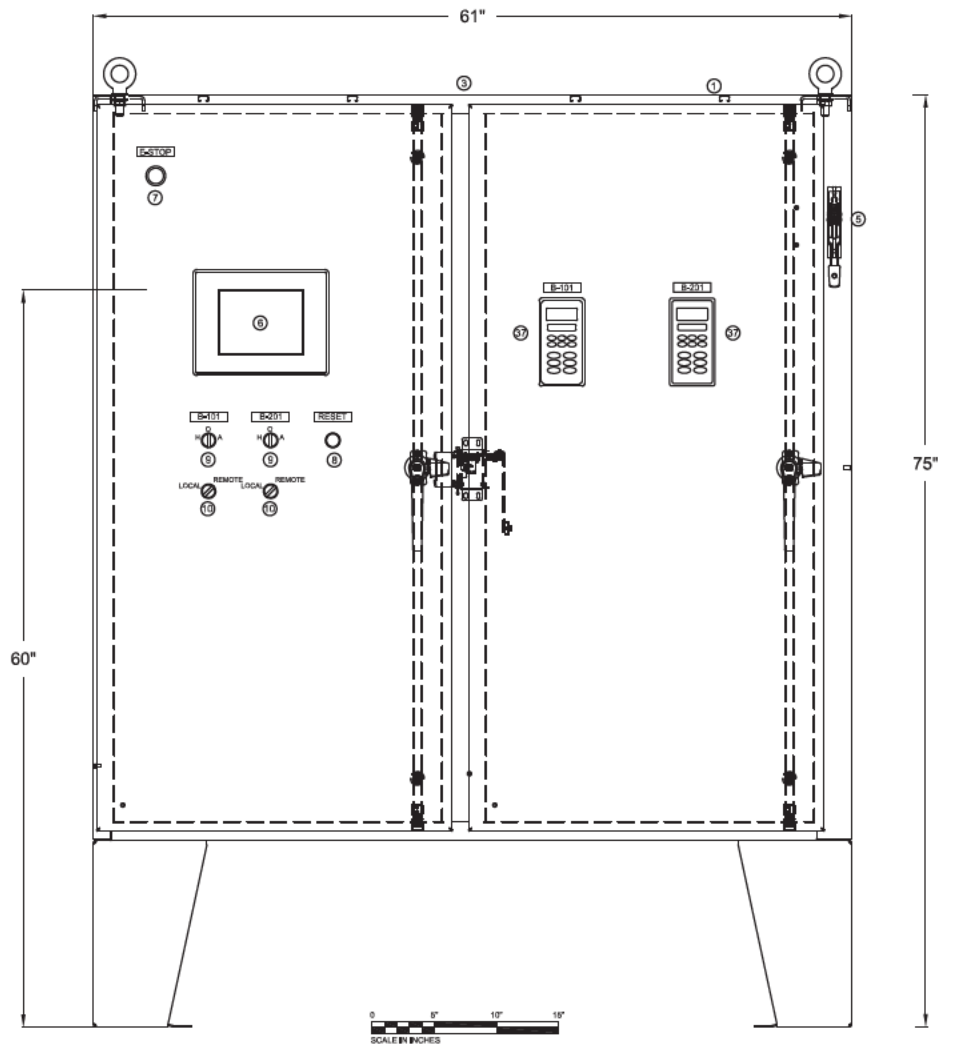

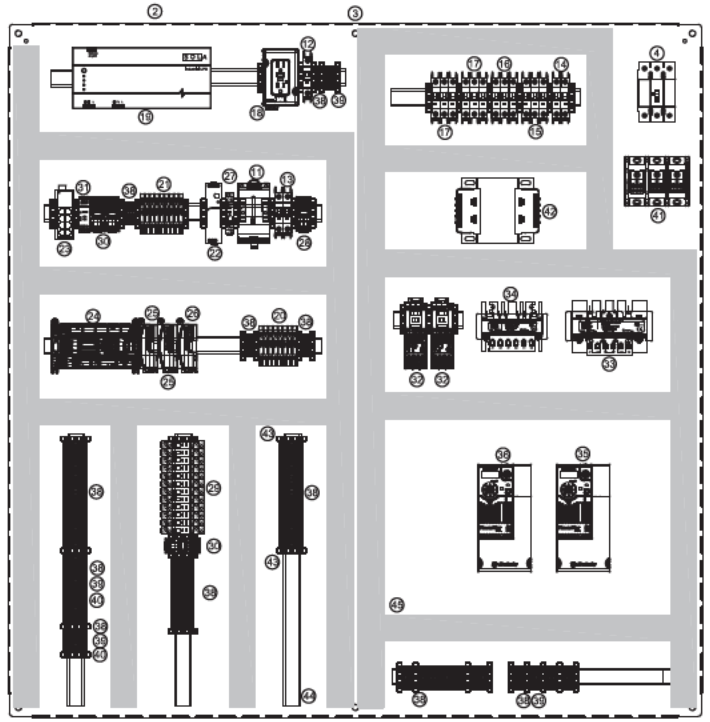

NOTES:

1. ALL VFDS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER VERTICAL STACKING STANDARDS. A MINIMUM OF 2 INCHES OF FREE SPACE MUST EXIST AROUND ALL SIDES OF THE VFD.
2. ALL TERMINATIONS MUST BE A MINIMUM OF 2 INCHES FROM THE NEAREST WIRE TROUGH.
3. THE TOP OF ALL DISPLAYS (HIM OR VFD CONTROLLERS) SHALL BE NO HIGHER THAN 66" FROM THE FLOOR.
4. WHERE POSSIBLE MAINTAIN SEPARATION OF CONDUCTORS CARRYING DIFFERENT VOLTAGES IN WIRE TROUGHS.
5. ALL WIRES SHALL BE LABELED ACCORDING TO THESE SCHEMATICS AT EVERY TERMINATION POINT.

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					Professional Engineer's Name		
					DAVE M. OBERLE		
					Professional Engineer's No.		
					PE076383		
1	6/11/2018	FINAL	KE	DL	State	Date Signed	Project Mgr.
No.	Date	Revisions	By	Ckd	PA	6/11/2018	ML
					Designed by	Drawn by	Checked by
					DL	KE	DL

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ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.
36262348.0005.00004

Date
JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-L

TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG #
1	1	2 DOOR STEEL ENCLOSURE FOR FLANGE DISCONNECT 60X81X18	SCE	60XEL6112LP
2	1	BACK PANEL FOR ENCLOSURE	SCE	60P60
3	1	BARRIER PLATE FOR ENCLOSRE	SCE	
4	1	AB MOLDED CASE CIRCUIT BREAKER (T/M), 25 KA, 60 A	AB	140G-G2C3-C60
5	1	AB FLEX CABLE OPERATOR (NON METALIC HANDLE)	AB	140G-GFCX04
6	1	8" C-MORE HMI PANEL	C-MORE	EA9-8CL
7	1	RED MUSHROOM HEAD E-STOP (NC) TWIST RELEASE	AB	800FP-MT44PX01S
8	1	BLACK, 22 MM, MOMENTARY PUSH BUTTON	AB	800FP-F2PX10
9	2	BLACK, 22 MM, 3 POSITION MAINTAINED SELECTOR SWITCH (2 NO)	AB	800FP-SM32PX09
10	2	BLACK, 22 MM, 2 POSITION MAINTAINED SELECTOR SWITCH (1 NO)	AB	800FP-SM22PX10
	2	22MM SCREW CONTACT BLOCK FOR ABOVE (1 NO)	AB	800F-X10
11	1	SURGE AND FILTER PROTECTION DEVICE (10A)	AB	4983-DC120-10
12	1	MINIATURE CIRCUIT BREAKER, 1 P, 8 A	AB	1489-M1C080
13	2	MINIATURE CIRCUIT BREAKER 1 P, 5 A	AB	1489-M1C050
14	1	MINIATURE CIRCUIT BREAKER 2 P, 3 A	AB	1489-M2C030
15	1	MINIATURE CIRCUIT BREAKER 3 P, 30 A	AB	1489-M3C300
16	1	MINIATURE CIRCUIT BREAKER 3 P, 20 A	AB	1489-M3C200
17	2	MINIATURE CIRCUIT BREAKER 3 P, 15 A	AB	1489-M3C150
18	1	DIN RAIL MOUNTED RECEPTACLE	AB	1492-REC15
19	1	UL UNINTERUPTABLE POWER SUPPLY (520 VA)	SOLA	S1K520
	1	UL UNINTERUPTABLE POWER SUPPLY MOUNTING BRACKET	SOLA	S1K-PMBRK
20	8	5X20 MM 120 VAC FUSE HOLDER WITH INDICATOR	AB	1492-WFB4250
	8	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
21	9	5x20 MM 24 VDC FUSE HOLDER WITH INDICATOR	AB	1492-WFB4424
	1	5X20 MM TIME DELAY CERAMIC FUSES (5 A)	BUSSMAN	S505-5-R
	8	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
22	1	24 VDC POWER SUPPLY (120 W)	AB	1606-XLE120E
23	1	8 PORT INDUSTRIAL ETHERNET SWITCH	N-TRON	108TX
24	1	MICROLOGIX 1400 PLC	AB	1766-L32BWA
25	2	4 CHANNEL ANALOG INPUT MODULE	AB	1762-IF4
26	1	4 CHANNEL (2 INPUT, 2 OUTPUT) ANALOG MODULE	AB	1762-IF2OF2
27	1	GENERAL PURPOSE SPDT RELAYS (120 VAC COIL), 16 A	AB	700-HK35A1
	1	8 PIN RELAY SOCKETS	AB	700-HN221
28	1	MCS MINI CONTACTOR, 2 NO, 2 NC (120 VAC COIL)	AB	700-K22Z-D
29	12	GENERAL PURPOSE SPDT RELAYS (24 VDC COIL), 16 A	AB	700-HK35A24
	12	8 PIN RELAY SOCKETS	AB	700-HN221
30	3	4PDT GENERAL PURPOSE RELAYS (24 VDC COIL), 7 A	AB	700-HC24A24
	3	14 PIN RELAY SOCKET	AB	700-HN104
31	1	DUAL CHANNEL 24 VDC SAFETY RELAY AUTO/MANUAL RESET	AB	440R-N23117
32	2	E-COMBO STARTER, 480 VAC, 120 VAC COIL, 5.4-27A OVERLOAD	AB	309-AOD-EEE
33	1	3% LINE REACTOR FOR 10 HP MOTOR	AB	1321-3R15-B
34	1	3% LINE REACTOR FOR 7.5 HP MOTOR	AB	1321-3R12-B
35	1	10 HP COMPACT VARIABLE FREQUENCY DRIVE	AB	25B-D017N114
36	1	7.5 HP COMPACT VARIABLE FREQUENCY DRIVE	AB	25B-D013N114
37	2	REMOTE DSI LCD HUMAN INTERFACE MODULE (NEMA 4X/12)	AB	22-HIM-C2S
38	TBD	IEC TERMINAL BLOCK (30 A)	AB	1492-J3
39	TBD	IEC GROUND TERMINAL BLOCK	AB	1492-J3G
40	TBD	LED PLUG IN DEVICE TERMINAL BLOCK	AB	1492-JIP
	TBD	FUSE PLUG WITH BLOWN FUSE INDICATION (10-38 V)	AB	1492-FPG224
	TBD	5X20 MM TIME DELAY CERAMIC FUSES (500 MA)	AB	5505-500-R
41	1	POWER DISTRIBUTION BLOCK, 3P (16)	AB	TBD
42	1	480 X 240/120 VAC CONTROL TRANSFORMER, 1 KVA	HAMMOND	PH1000MQMJ
43	TBD	END ANCHORS	TBD	
44	TBD	DIN RAIL	TBD	
45	TBD	WIRING DUCT	TBD	

LEGEND

- DENOTES TERMINAL BLOCK CONNECTION
- DASHED LINES DENOTES WIRING TO FIELD DEVICES
- DASHED WITH PATTERN DENOTES DEVICES IN REMOTE LOCATIONS

LINE NUMBER DESCRIPTION

0000
- WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS)
- LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000
- WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS)
- WIRE NUMBER (ALWAYS 1 DIGIT)
- LINE NUMBER (ALWAYS 2 DIGITS)

TB TERMINAL BLOCK

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XREFS: IMAGES: PROJECTNAME: —
ERICKSON-MBOX

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USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Chkd
1	6/11/2018	FINAL	KE	DL

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

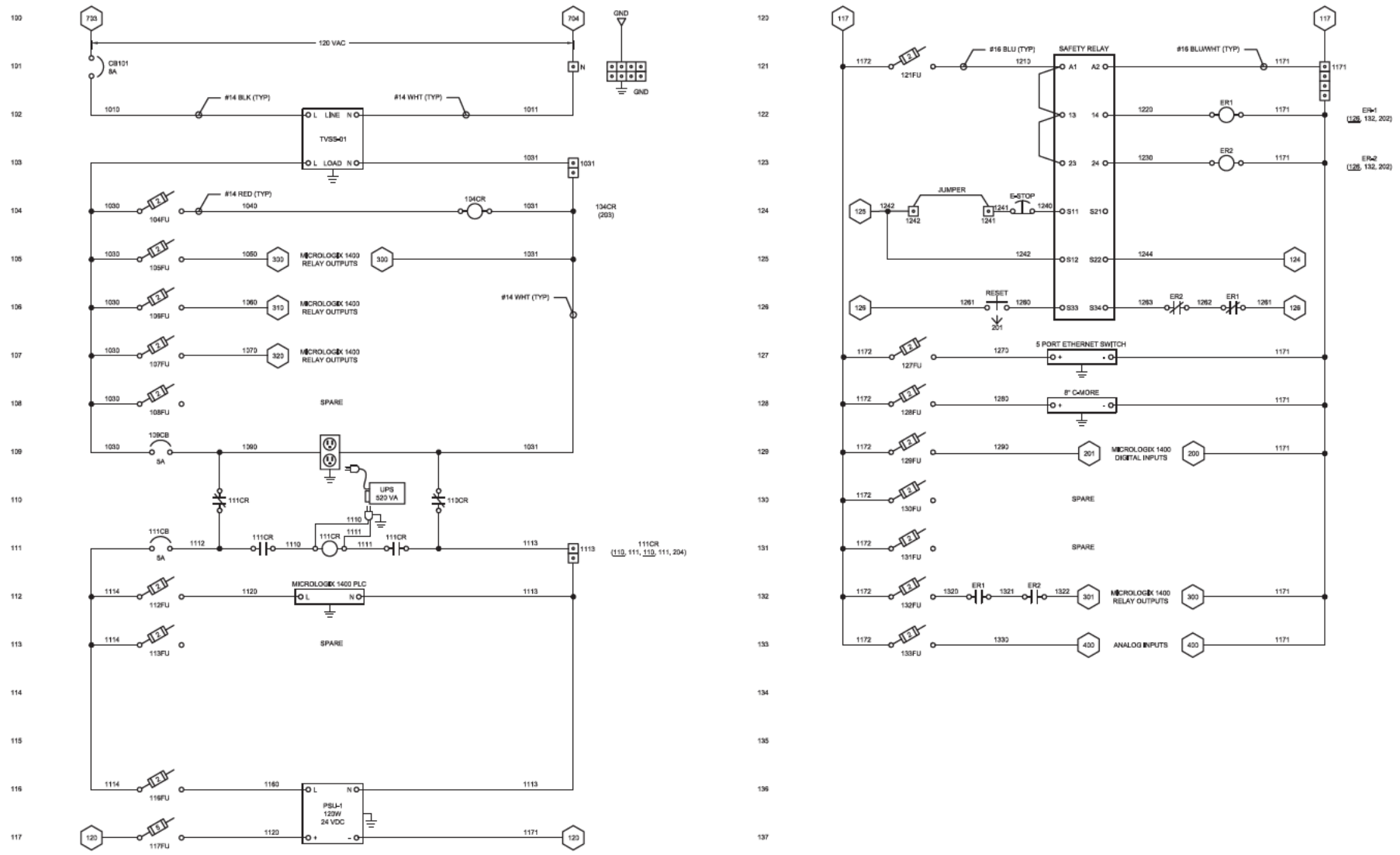
PILOT TREATMENT SYSTEM CONTROL PANEL BILL OF MATERIALS

ELECTRICAL

ARCADIS Project No.: 36262348.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL: 302.658.1718

I-B



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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383
State: PA
Date Signed: 6/11/2018
Project Mgr.: ML
Designed by: DL
Drawn by: KE
Checked by: DL

No.	Date	Revisions	By	Chkd
1	6/11/2018	FINAL	KE	DL

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USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

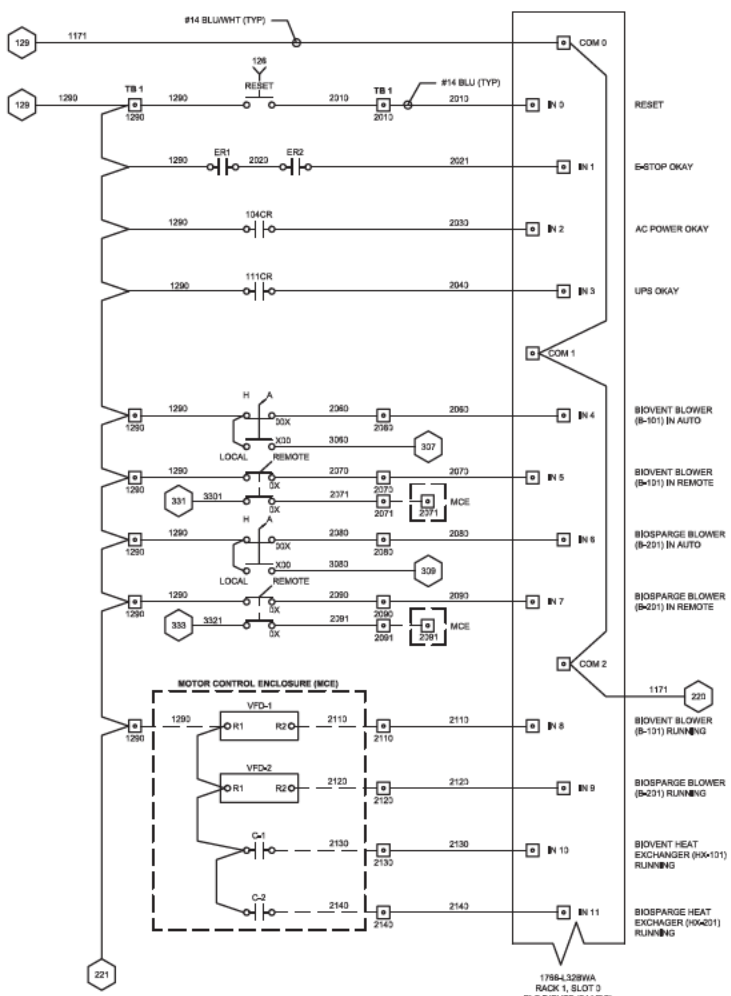
PILOT TREATMENT SYSTEM CONTROL PANEL POWER DISTRIBUTION WIRING DIAGRAM

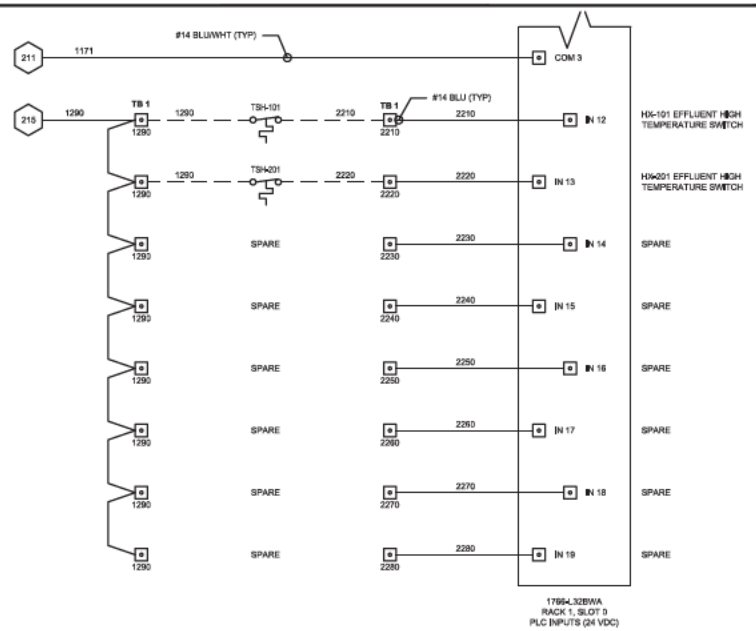
ELECTRICAL

ARCADIS Project No.: 36262046.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-1





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		No.	Date	Revisions	By	Chkd	Professional Engineer's No.: PE076383	
		THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.					State: PA; Date Signed: 6/11/2018; Project Mgr.: ML; Designed by: DL; Drawn by: KE; Checked by: DL	ARCADIS U.S., INC.

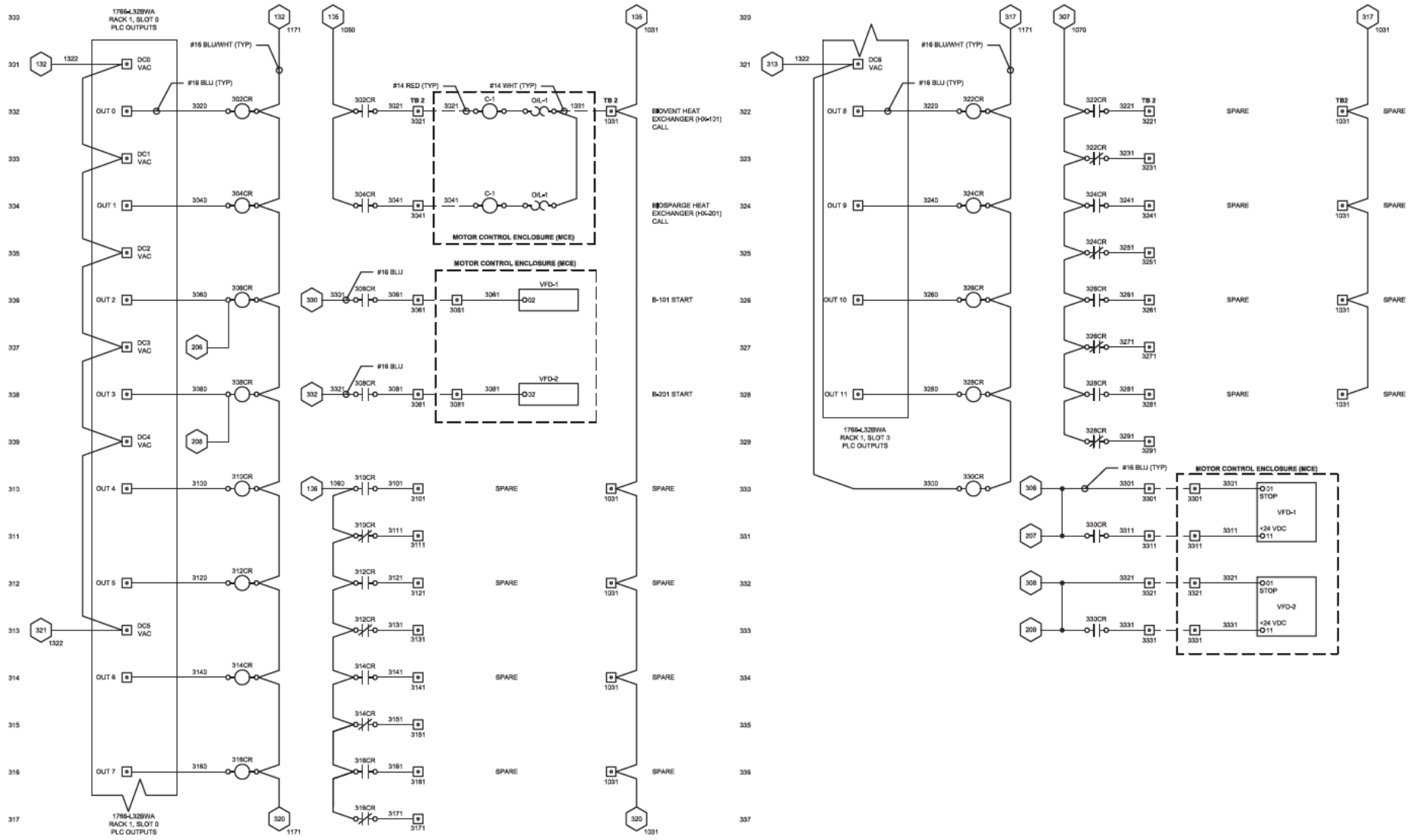
USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 DISCRETE INPUTS

ELECTRICAL

ARCADIS Project No.: 36262348.0005.00004
Date: JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-2



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ENGINEERING

Professional Engineer's Name: DAVE M. OBERLE							
Professional Engineer's No.: PE076383							
1	6/11/2018	FINAL	KE	DL	State: PA	Date Signed: 6/11/2018	Project Mgr.: ML
No.	Date	Revisions	By	Chkd	Designed by: DL	Drawn by: KE	Checked by: DL

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FORMER DSCP SYSTEM UPGRADES

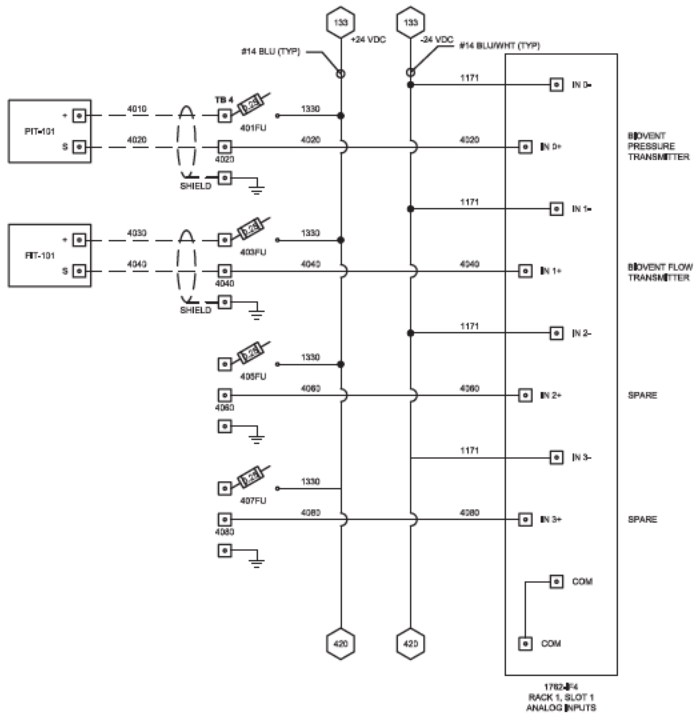
PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 RELAY OUTPUTS

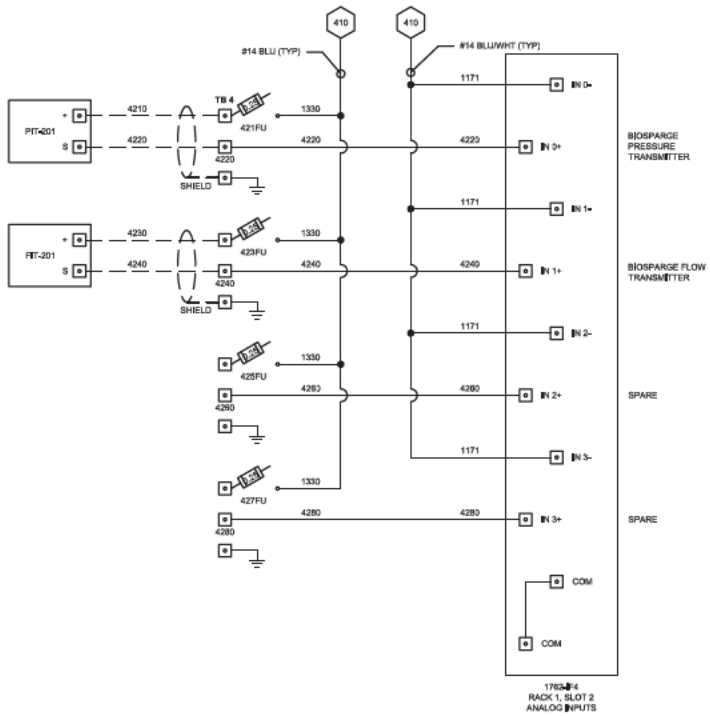
ELECTRICAL

ARCADIS Project No.: 36262346.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL: 302.658.1718

I-3





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		No.	Date	Revisions	By	Ckd	Professional Engineer's No.: PE076383	
							State: PA	Date Signed: 6/11/2018
							Designed by: DL	Drawn by: KE
							Project Mgr.: ML	Checked by: DL

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COMMONWEALTH OF PENNSYLVANIA — DAVID M. OBERLE — ENGINEER — PE076383

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USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

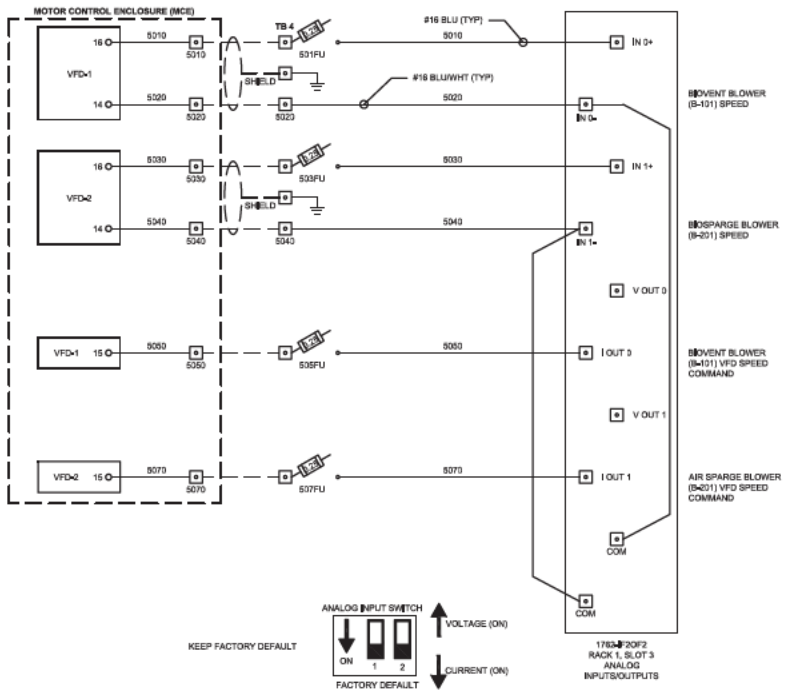
PILOT TREATMENT SYSTEM CONTROL PANEL SLOTS 1 AND 2 ANALOG INPUTS

ELECTRICAL

ARCADIS Project No.: 36262346.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-4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VFD-1
VFD-2
16
14
15
5010
5020
5030
5040
5050
5070
TB 4
5FU
501FU
503FU
505FU
507FU
SHIELD
#16 BLU (TYP)
#16 BLU/WHT (TYP)
IN 0+
IN 0-
IN 1+
IN 1-
V OUT 0
I OUT 0
V OUT 1
I OUT 1
COM
BIOVENT BLOWER (B-101) SPEED
BIOSPARGE BLOWER (B-201) SPEED
BIOVENT BLOWER (B-101) VFD SPEED COMMAND
AIR SPARGE BLOWER (B-201) VFD SPEED COMMAND
ANALOG INPUT SWITCH
ON
1
2
VOLTAGE (ON)
CURRENT (ON)
FACTORY DEFAULT
KEEP FACTORY DEFAULT
1763-IF2OF2
RACK 1, SLOT 3
ANALOG
INPUTS/OUTPUTS

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No.	Date	Revisions	By	Ckd
1	6/11/2018	FINAL	KE	DL

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USE TO VERIFY FIGURE REPRODUCTION SCALE

Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS

ARCADIS U.S., INC.

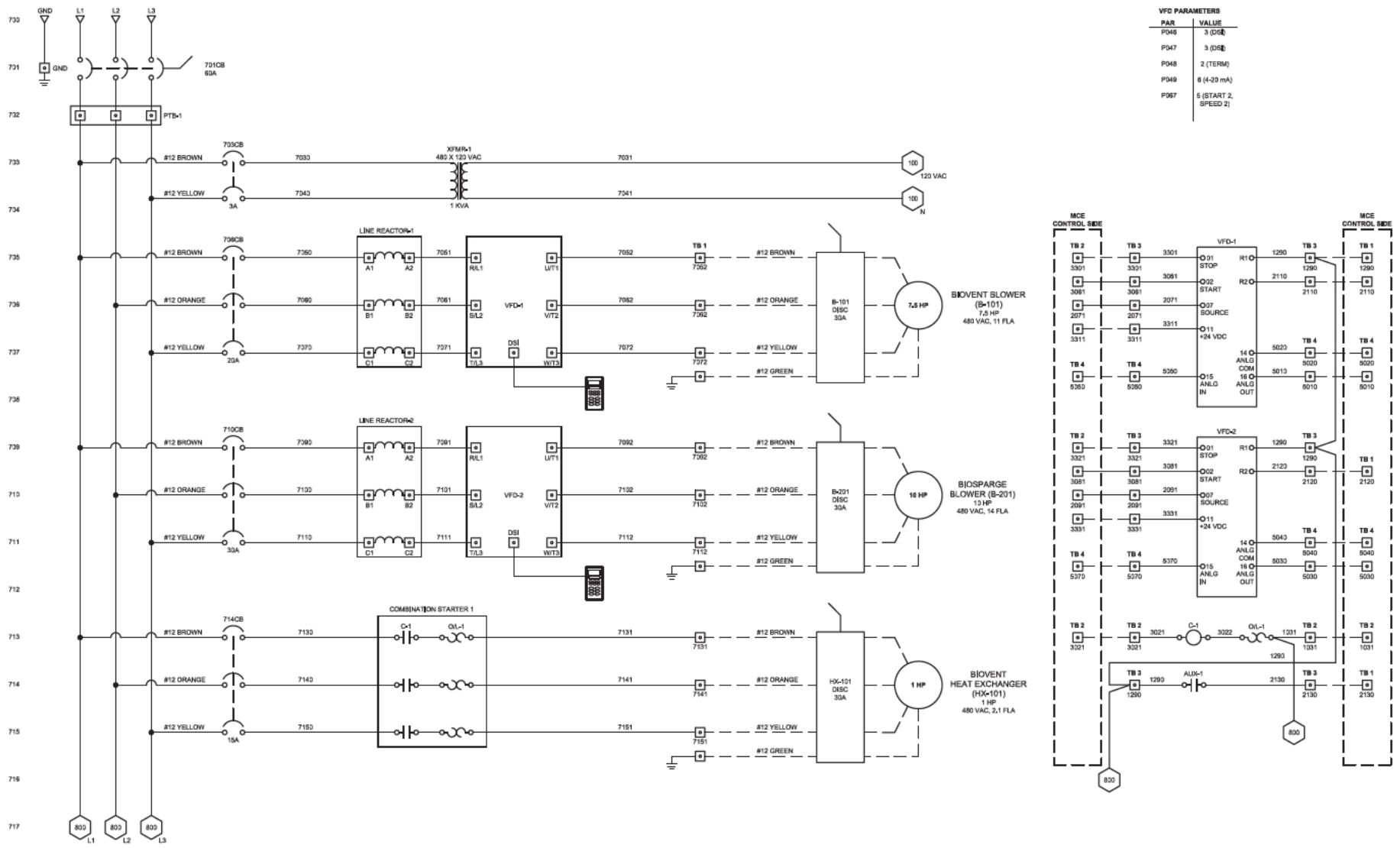
USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TREATMENT SYSTEM CONTROL PANEL

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-6



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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383
State: PA
Date Signed: 6/11/2018
Project Mgr.: ML
Designed by: DL
Drawn by: KE
Checked by: DL

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

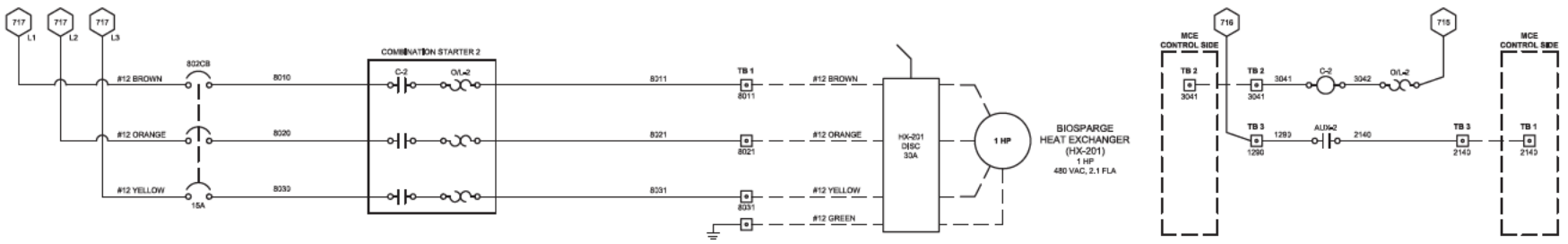
PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 1 OF 2)

ELECTRICAL

ARCADIS Project No.: 36262346.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-7



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XREFs:
ERICKSON-MBDS
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PROJECTNAME: —

				Professional Engineer's Name	DAVE M. OBERLE		
				Professional Engineer's No.	PE076383		
				State	Date Signed	Project Mgr.	
				PA	6/11/2018	ML	
				Designed by	Drawn by	Checked by	
				DL	KE	DL	
1	6/11/2018	FINAL	KE	DL			
No.	Date	Revisions	By	Ckd			

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USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA

FORMER DSCP SYSTEM UPGRADES

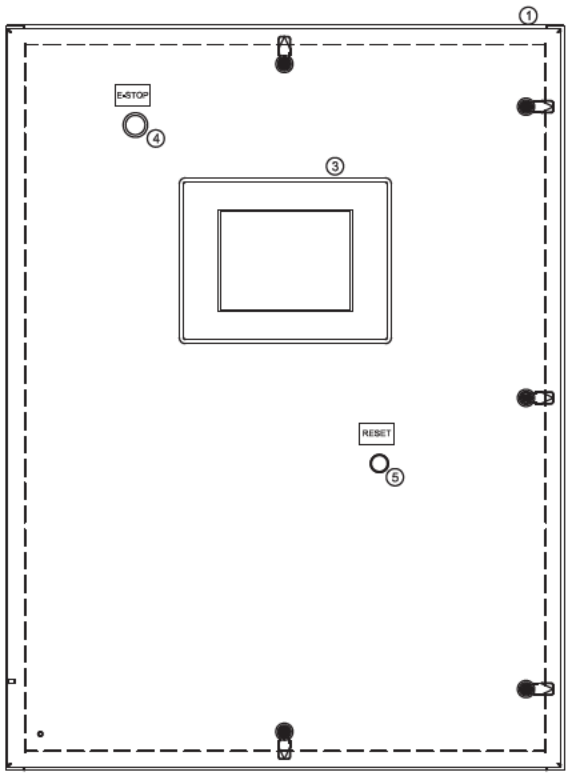
PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 2 OF 2)

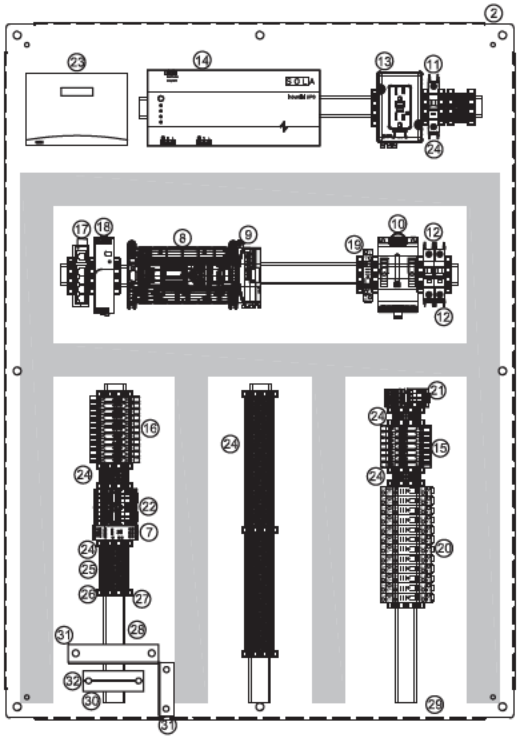
ELECTRICAL

ARCADIS Project No.	60239346.0005.00004
Date	JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-8





TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG #
1	1	STEEL ENCLOSURE 48X36X12	SCE	48EL3612LP
2	1	BACK PANEL FOR ENCLOSURE	SCE	48P36
3	1	6" C-MORE HMI PANEL	C-MORE	EA9-10CL
4	1	RED MUSHROOM HEAD E-STOP (NC) TWIST RELEASE	AB	800FP-MT44PX01S
5	1	BLACK, 22 MM, MOMENTARY PUSH BUTTON	AB	800FP-F2PK10
7	1	DUAL CHANNEL, 24 VDC SAFETY RELAY AUTO/MANUAL RESET	AB	440R-N23117
8	1	MICROLOGIX 1400 PLC	AB	1766-L32BWA
9	1	4 CHANNEL ANALOG INPUT MODULE	AB	1762-IF4
10	1	SURGE AND FILTER PROTECTION DEVICE (10A)	AB	4983-DC12D-10
11	1	MINATURE CIRCUIT BREAKER, 1 P, 5 A	AB	1489-M1C050
12	2	MINATURE CIRCUIT BREAKER 1 P, 5 A	AB	1489-M1C050
13	1	DIN RAIL MOUNTED GFCI RECEPTACLE	AB	1492-REC15G
14	1	UL UNINTERUPTABLE POWER SUPPLY (520 VA)	SOLA	S1K520
	1	UL UNINTERUPTABLE POWER SUPPLY MOUNTING BRACKET	SOLA	S1K-PMBRK
15	7	5X20 MM 120 VAC FUSE HOLDER WITH INDICATOR	AB	1492-WFB4250
	7	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
16	11	5x20 MM 24 VDC FUSE HOLDER WITH INDICATOR	AB	1492-WFB424
	1	5X20 MM TIME DELAY CERAMIC FUSES (5 A)	BUSSMAN	S505-5-R
	10	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
17	1	5 PORT INDUSTRIAL ETHERNET SWITCH	N-TRON	105TX
18	1	24 VDC POWER SUPPLY (120 W)	AB	1606-XLE120E
19	1	GENERAL PURPOSE SPDT RELAYS (120 VAC COIL), 16 A	AB	700-HK36A1
20	16	GENERAL PURPOSE SPDT RELAYS (24 VDC COIL), 16 A	AB	700-HK36A24
	17	5 PIN RELAY SOCKETS	AB	700-HN221
21	1	4PDT GENERAL PURPOSE RELAYS (120 VAC COIL), 7 A	AB	700-HC24A1
22	2	4PDT GENERAL PURPOSE RELAYS (24 VDC COIL), 7 A	AB	700-HC24A24
	3	14 PIN RELAY SOCKET	AB	700-HN104
23	1	ETHERNET RADIO	SCHNIEDER	JR900
24	TBD	IEC TERMINAL BLOCK (30 A)	AB	1492-J3
25	TBD	IEC GROUND TERMINAL BLOCK	AB	1492-J3G
26	TBD	IEC PLUG IN DEVICE TERMINAL BLOCK	AB	1492-J3P
	TBD	FUSE PLUG WITH BLOWN FUSE INDICATION (10-30 V)	AB	1492-FPK224
	TBD	5X20 MM TIME DELAY CERAMIC FUSES (500 MA)	AB	S505-500-R
27	TBD	END ANCHORS	TBD	
28	TBD	DIN RAIL	TBD	
29	TBD	WIRING DUCT	TBD	
30	1	ANALOG IS BARRIER	WEIDMULLER	9918010000
31	1	SAFETY BARRIER		
32	2	DIGITAL IS BARRIER	WEIDMULLER	9916280000

0 4" 8" 12"
SCALE IN INCHES

NOTES:

1. INTRINSICALLY SAFE CONDUCTORS MUST BE SEPARATED FROM ALL OTHER CONDUCTORS BY A MINIMUM OF 2 INCHES. BARRIERS SHALL BE INSTALLED AROUND THE INTRINSICALLY SAFE BARRIERS AND CONDUCTORS TO MAINTAIN THIS SEPARATION.
2. ALL TERMINATIONS MUST BE A MINIMUM OF 2 INCHES FROM THE NEAREST WIRE TROUGH.
3. THE TOP OF ALL DISPLAYS (HIM) SHALL BE NO HIGHER THAN 66" FROM THE FLOOR.
4. WHERE POSSIBLE MAINTAIN SEPARATION OF CONDUCTORS CARRYING DIFFERENT VOLTAGES IN WIRE TROUGHS.
5. ALL WIRES SHALL BE LABELED ACCORDING TO THESE SCHEMATICS AT EVERY TERMINATION POINT.

LEGEND

- DENOTES TERMINAL BLOCK CONNECTION
- DASHED LINES DENOTES WIRING TO FIELD DEVICES
- DASHED WITH PATTERN DENOTES DEVICES IN REMOTE LOCATIONS

LINE NUMBER DESCRIPTION

0000
WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS) — LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000
WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS) — WIRE NUMBER (ALWAYS 1 DIGIT); LINE NUMBER (ALWAYS 2 DIGITS)

TB TERMINAL BLOCK

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: KLENDIKSON LDC: DLARSON PIC: MLESLEY PM: MLESLEY TM: LYRDA
I:\ENV\WILMINGTON\DE DSCP\PROJECTS\DSCP\SCADA\SUMMER PANELS - NORTH\dwg LAYOUT1.MOD SAVED: 6/7/2018 9:19 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: — PLOTTED: 6/7/2018 9:20 AM BY: ERICKSON, KEVIN
XREFS: IMAGES: PROJECTNAME: —
E0026204K00

1	6/11/2018	FINAL	KE	DL
No.	Date	Revisions	By	Chkd

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING. USE TO VERIFY FIGURE REPRODUCTION SCALE.

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

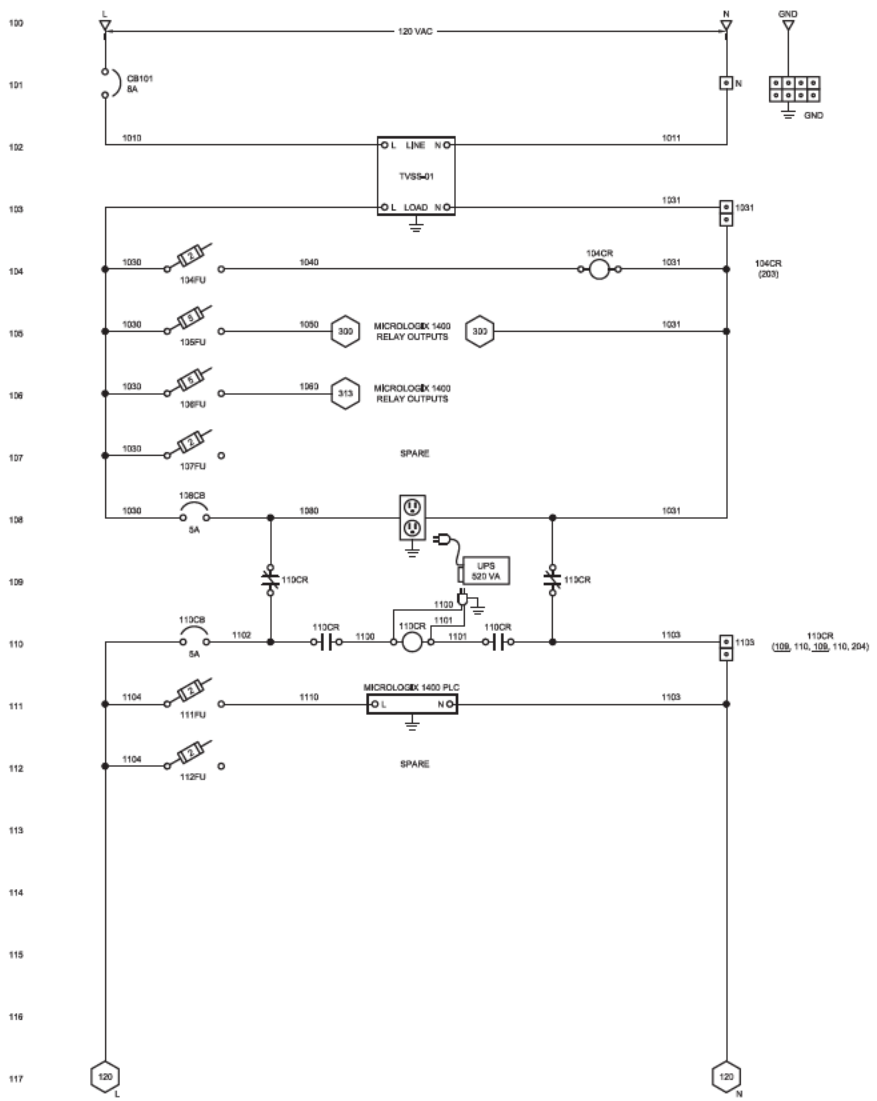
USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

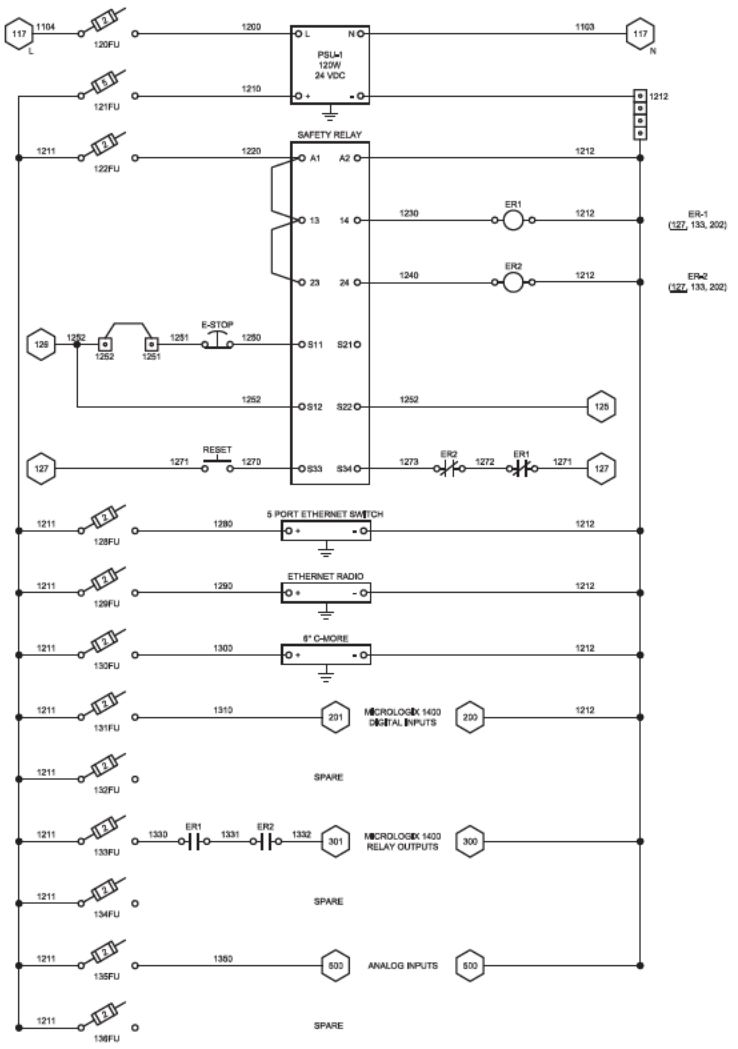
NORTHERN SKIMMER SYSTEM PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.: 36262048.0005.00004
Date: JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL: 302.658.1718

I-N0





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1	6/11/2018	FINAL	KE	DL	
No.	Date	Revisions	By	Chkd	

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383
State: PA | Date Signed: 6/11/2018 | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

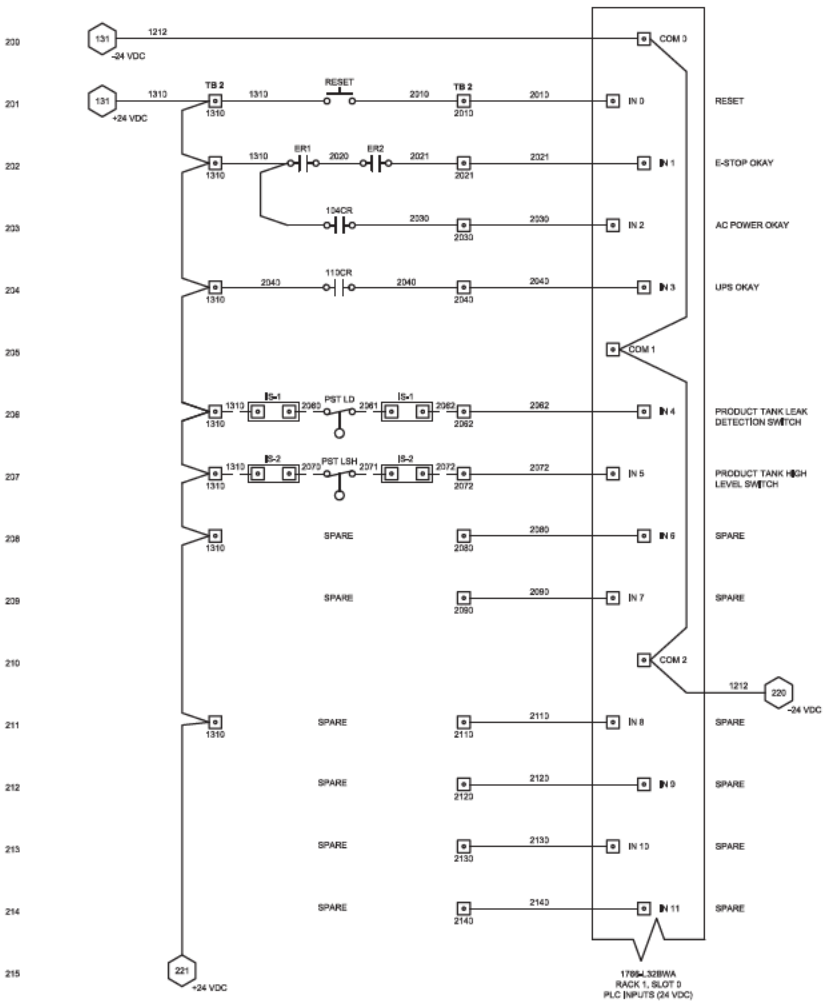
NORTHERN SKIMMER SYSTEM POWER DISTRIBUTION

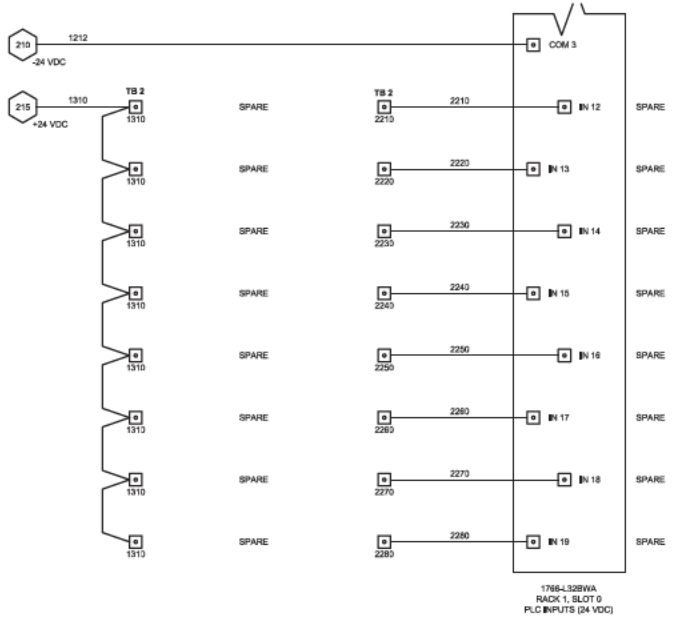
ELECTRICAL

ARCADIS Project No.: 98262348.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL: 302.658.1718

I-N1





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1	6/11/2018	FINAL	KE	DL			
No.	Date	Revisions	By	Chkd			

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383
State: PA | Date Signed: 6/11/2018 | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

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FORMER DSCP SYSTEM UPGRADES

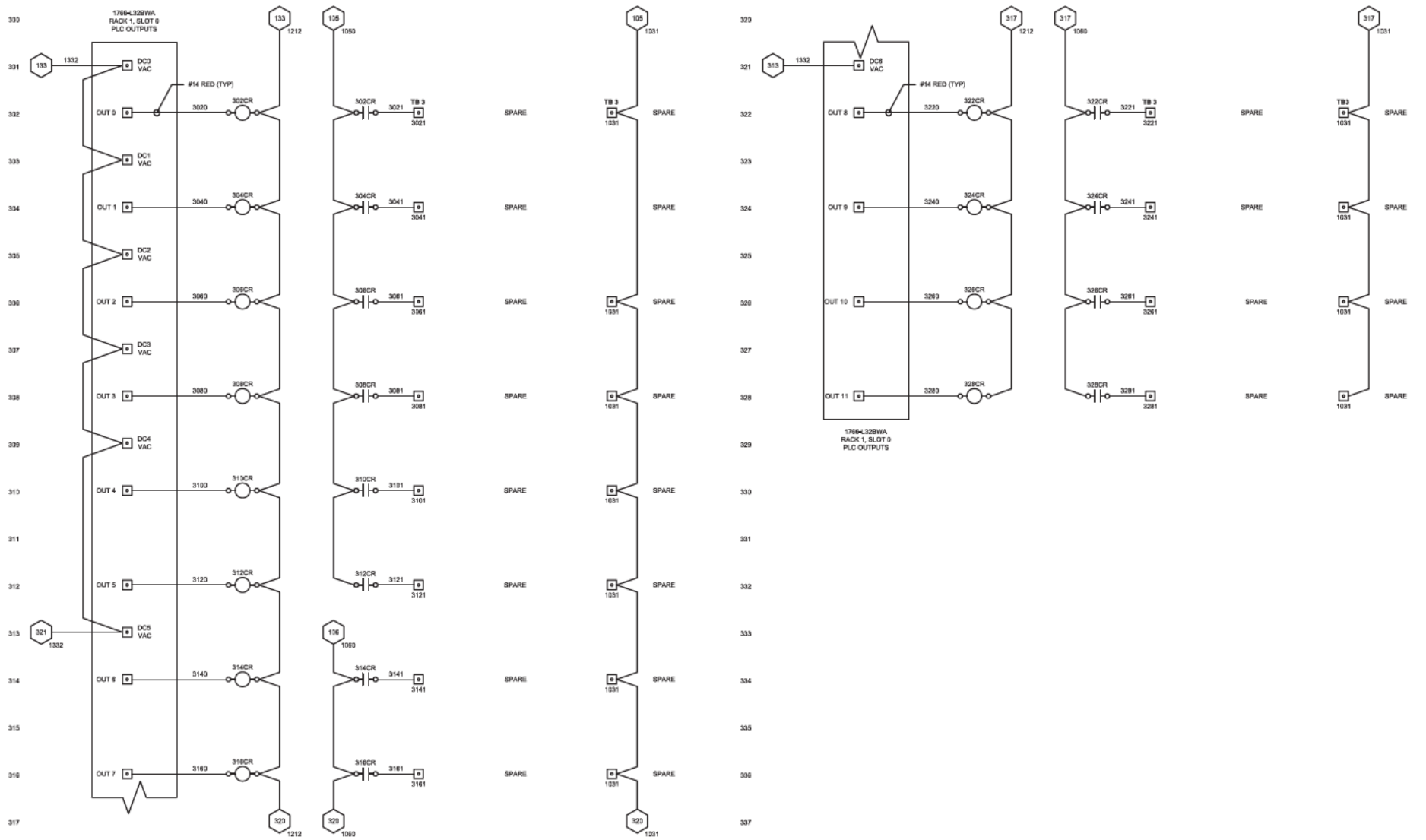
NORTHERN SKIMMER SYSTEM
MICROLOGIX 1400 24 VDC DISCRETE INPUTS

ELECTRICAL

ARCADIS Project No.: 96262348.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-N2



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XREFS: IMAGES: PROJECTNAME: —
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Professional Engineer's Name: DAVE M. OBERLE							
Professional Engineer's No.: PE076383							
1	6/11/2018	FINAL	KE	DL	State: PA	Date Signed: 6/11/2018	Project Mgr.: ML
No.	Date	Revisions	By	Chkd	Designed by: DL	Drawn by: KE	Checked by: DL

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FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS

ELECTRICAL

ARCADIS Project No.: 96262348.0005.00004
Date: JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-N3

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CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: D.LARSON PIC: M.LESLEY PM: M.LESLEY TM: LYRCON=*OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ----
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1	6/11/2018	FINAL	KE	DL	
No.	Date	Revisions	By	Ckd	

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USE TO VERIFY FIGURE REPRODUCTION SCALE

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER DAVID M. OBERLE PE076383 6-11-18

ARCADIS

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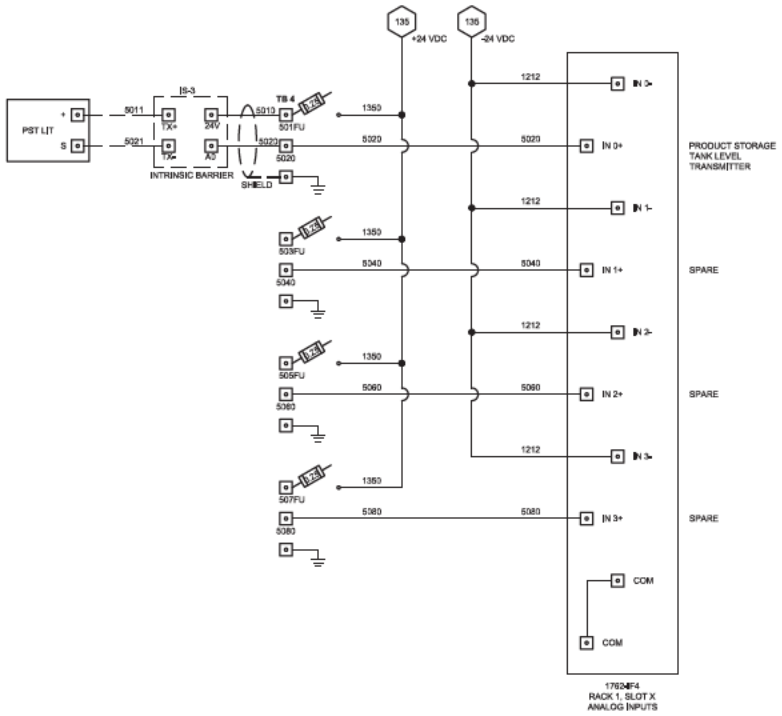
FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-N4



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THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING	USE TO VERIFY FIGURE REPRODUCTION SCALE	1	6/11/2018	FINAL	KE	DL	Professional Engineer's Name: DAVE M. OBERLE; Professional Engineer's No.: PE076383
		No.	Date	Revisions	By	Chkd	State: PA; Date Signed: 6/11/2018; Project Mgr.: ML; Designed by: DL; Drawn by: KE; Checked by: DL

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FORMER DSCP SYSTEM UPGRADES

NORTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS

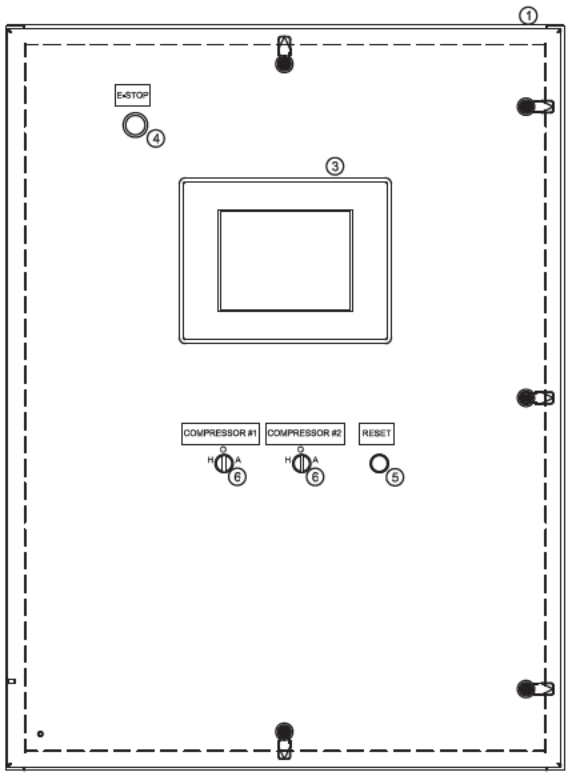
ELECTRICAL

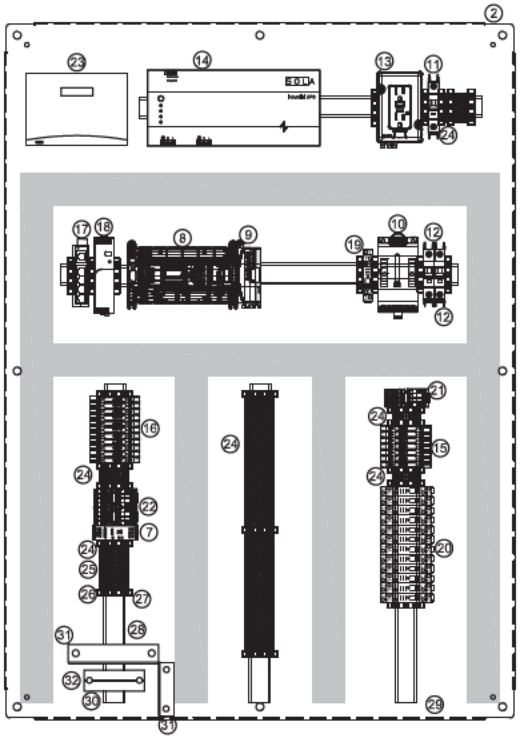
ARCADIS Project No.: 98262348.0005.00004

Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-N5





TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG #
1	1	STEEL ENCLOSURE 48X36X12	SCE	48EL3812LP
2	1	BACK PANEL FOR ENCLOSURE	SCE	48P36
3	1	6" C-MORE HMI PANEL	C-MORE	EA9-10CL
4	1	RED MUSHROOM HEAD E-STOP (NC) TWIST RELEASE	AB	800FP-MT44PX01S
5	1	BLACK, 22 MM, 3 POSITION MAINTAINED SELECTOR SWITCH (2 NO)	AB	800FP-SM32PX20
6	1	BLACK, 22 MM, MOMENTARY PUSH BUTTON	AB	800F P-F 2PX10
7	1	DUAL CHANNEL, 24 VDC SAFETY RELAY AUTO/MANUAL RESET	AB	440R-N23117
8	1	MICROLOGIX 1400 PLC	AB	1766-L32BWA
9	1	4 CHANNEL ANALOG INPUT MODULE	AB	1762- F4
10	1	SURGE AND FILTER PROTECTION DEVICE (10A)	AB	4983-DC120-10
11	1	MINATURE CIRCUIT BREAKER, 1 P, 8 A	AB	1489-M1C080
12	2	MINATURE CIRCUIT BREAKER, 1 P, 5 A	AB	1489-M1C050
13	1	DIN RAIL MOUNTED GFCI RECEPTACLE	AB	1492-REC15G
14	1	UL UNINTERUPTABLE POWER SUPPLY (520 VA)	SOLA	S1K520
	1	UL UNINTERUPTABLE POWER SUPPLY MOUNTING BRACKET	SOLA	S1K-PMBRK
15	7	5X20 MM 120 VAC FUSE HOLDER WITH INDICATOR	AB	1492-WFB4250
	7	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
16	11	5x20 MM 24 VDC FUSE HOLDER WITH INDICATOR	AB	1492-WFB424
	1	5X20 MM TIME DELAY CERAMIC FUSES (5 A)	BUSSMAN	S505-5-R
	10	5X20 MM TIME DELAY CERAMIC FUSES (2 A)	BUSSMAN	S505-2-R
17	1	5 PORT INDUSTRIAL ETHERNET SWITCH	IN-TRON	105TX
18	1	24 VDC POWER SUPPLY (120 W)	AB	1606-XLE120E
19	1	GENERAL PURPOSE SPDT RELAYS (120 VAC COIL), 16 A	AB	700-HK36A1
20	16	GENERAL PURPOSE SPDT RELAYS (24 VDC COIL), 16 A	AB	700-HK35A24
	17	5 PIN RELAY SOCKETS	AB	700-HN221
21	1	4PDT GENERAL PURPOSE RELAYS (120 VAC COIL), 7 A	AB	700-HC24A1
22	2	4PDT GENERAL PURPOSE RELAYS (24 VDC COIL), 7 A	AB	700-HC24A24
	3	14 PIN RELAY SOCKET	AB	700-HN104
23	1	ETHERNET RADIO	SCHNEIDER	JR900
24	TBD	IEC TERMINAL BLOCK (30 A)	AB	1492-J3
25	TBD	IEC GROUND TERMINAL BLOCK	AB	1492-J3G
26	TBD	IEC PLUG IN DEVICE TERMINAL BLOCK	AB	1492-J3P
	TBD	FUSE PLUG WITH BLOWN FUSE INDICATION (10-36 V)	AB	1492-FPK224
	TBD	5X20 MM TIME DELAY CERAMIC FUSES (500 MA)	AB	S505-500-R
27	TBD	END ANCHORS	TBD	
28	TBD	DIN RAIL	TBD	
29	TBD	WIRING DUCT	TBD	
30	1	ANALOG INPUT IS BARRIER	AB	9818010000
31	1	SAFETY BARRIER		
32	2	DIGITAL INPUT IS BARRIER (8 CH)	WEIDMULLER	9916290000

SCALE IN INCHES

NOTES:

1. INTRINSICALLY SAFE CONDUCTORS MUST BE SEPARATED FROM ALL OTHER CONDUCTORS BY A MINIMUM OF 2 INCHES. BARRIERS SHALL BE INSTALLED AROUND THE INTRINSICALLY SAFE BARRIERS AND CONDUCTORS TO MAINTAIN THIS SEPARATION.
2. ALL TERMINATIONS MUST BE A MINIMUM OF 2 INCHES FROM THE NEAREST WIRE TROUGH.
3. THE TOP OF ALL DISPLAYS (HIM) SHALL BE NO HIGHER THAN 66" FROM THE FLOOR.
4. WHERE POSSIBLE MAINTAIN SEPARATION OF CONDUCTORS CARRYING DIFFERENT VOLTAGES IN WIRE TROUGHS.
5. ALL WIRES SHALL BE LABELED ACCORDING TO THESE SCHEMATICS AT EVERY TERMINATION POINT.

LEGEND

- DENOTES TERMINAL BLOCK CONNECTION
- DASHED LINES DENOTES WIRING TO FIELD DEVICES
- DASHED WITH PATTERN DENOTES DEVICES IN REMOTE LOCATIONS

LINE NUMBER DESCRIPTION

0000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); LINE NUMBER (ALWAYS 2 DIGITS)

WIRE NUMBER DESCRIPTION

00000 — WIRING DIAGRAM SHEET NUMBER (1 OR 2 DIGITS); WIRE NUMBER (ALWAYS 1 DIGIT); LINE NUMBER (ALWAYS 2 DIGITS)

TB TERMINAL BLOCK

CITY: WILMINGTON, DE DIV/GROUP: ENV DB: KLENDIXON LD: DLARSON PIC: NLESLEY PM: NLESLEY TM: LYRDAM *OPP=REF* M:\ENL_ENV\PROJECTS\SCDP\WORKING\SKIMMER PANELS - SOUTH.dwg LAYOUT: I-S01 SAVED: 6/12/2018 8:24 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: — PLOTSTYLETABLE: — PLOTTED: 6/12/2018 9:03 AM BY: ERICKSON, KEVIN
XREFS: IMAGES: PROJECTNAME: —
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No.	Date	Revisions	By	Chd
1	6/11/2018	FINAL	KE	DL

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

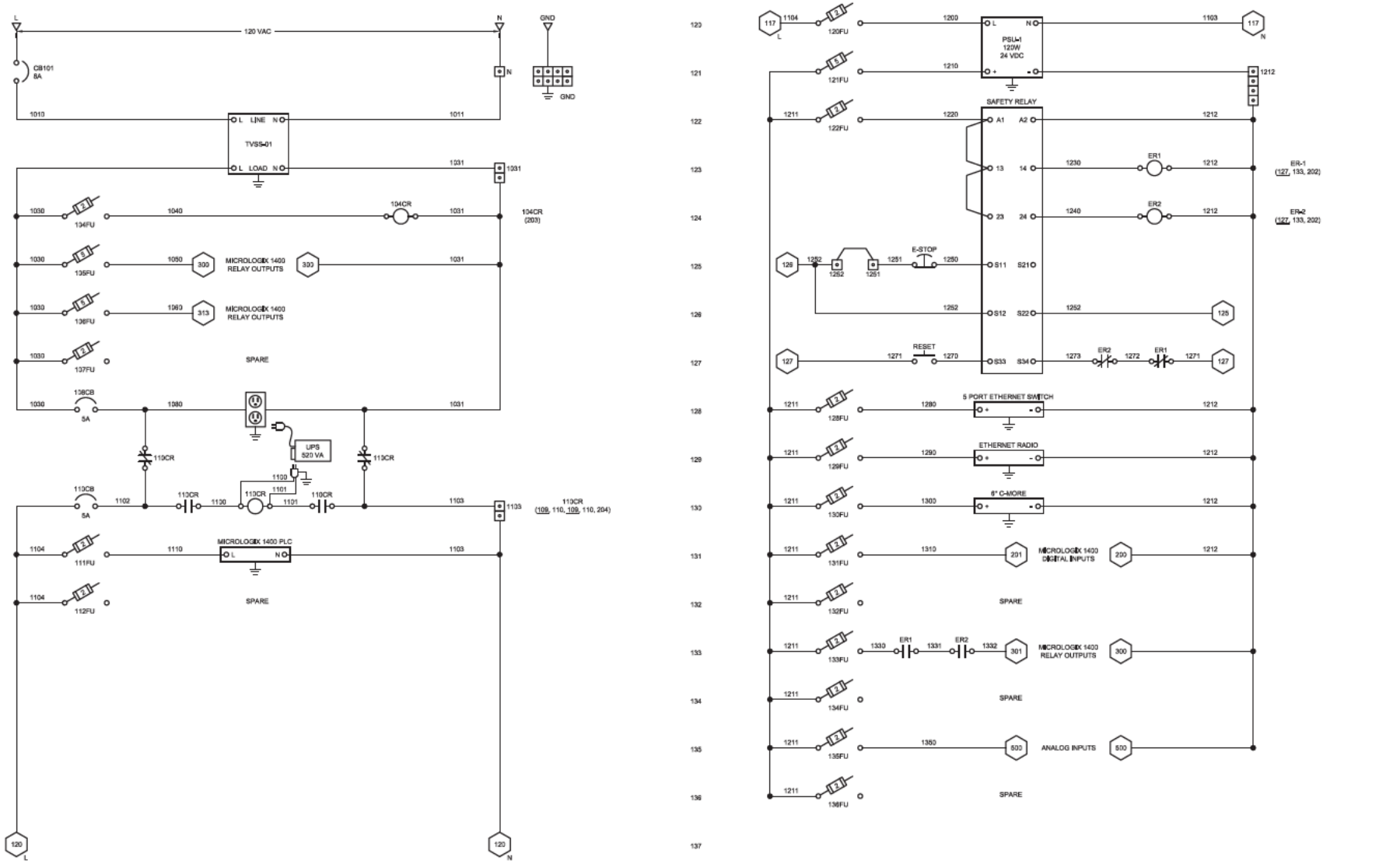
SOUTHERN SKIMMER SYSTEM PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.: 36262048.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL: 302.658.1718

I-S0



CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LOC: DLARSON PIC: M.LESLEY PM: M.LESLEY TM: LYRDA
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XREFS: IMAGES: PROJECTNAME: —
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THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING	USE TO VERIFY FIGURE REPRODUCTION SCALE				
				Professional Engineer's Name	DAVE M. OBERLE
				Professional Engineer's No.	PE076383
1	6/11/2018	FINAL	KE	DL	
No.	Date	Revisions	By	Ckd	
			State	Date Signed	Project Mgr.
			PA	6/11/2018	ML
			Designed by	Drawn by	Checked by
			DL	KE	DL

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ARCADIS U.S., INC.

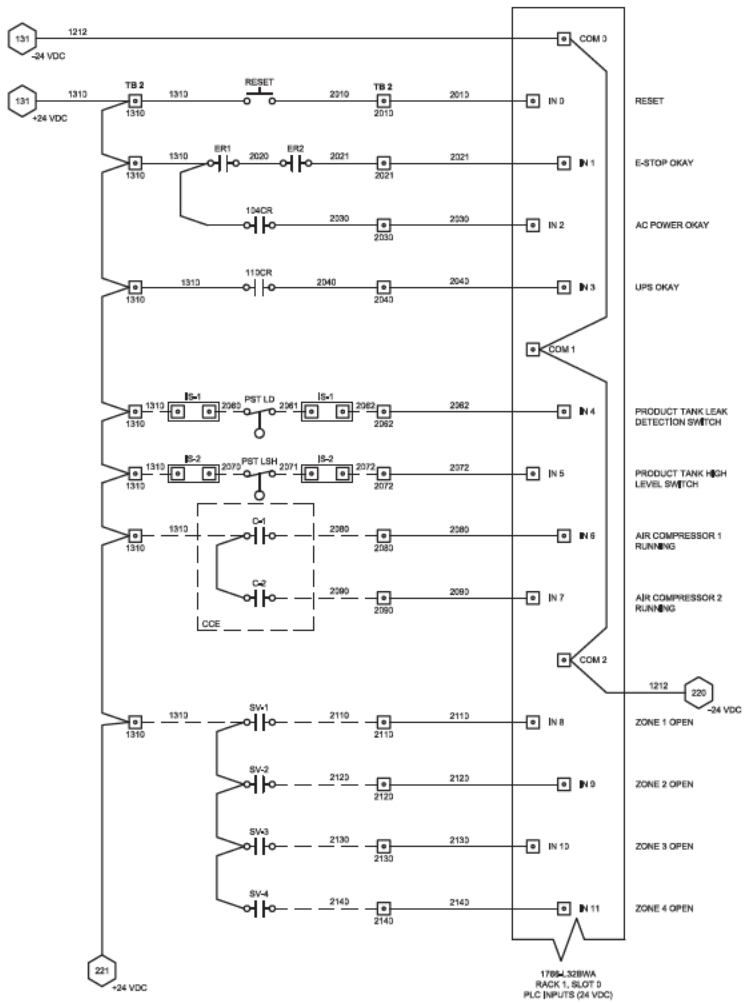
USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

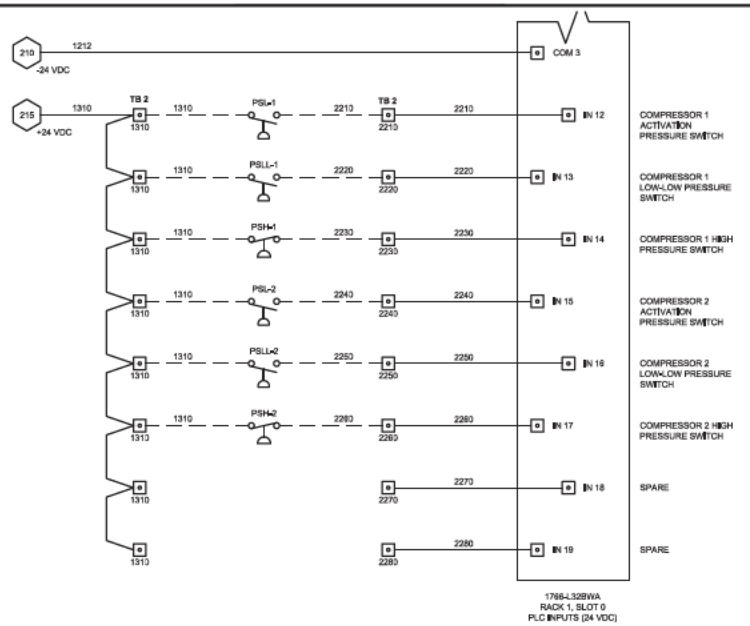
SOUTHERN SKIMMER SYSTEM POWER DISTRIBUTION

ELECTRICAL

ARCADIS Project No.
98262048.0005.00004
Date
JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S1





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1	6/11/2018	FINAL	KE	DL			
No.	Date	Revisions	By	Chkd			

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383
State: PA | Date Signed: 6/11/2018 | Project Mgr.: ML
Designed by: DL | Drawn by: KE | Checked by: DL

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

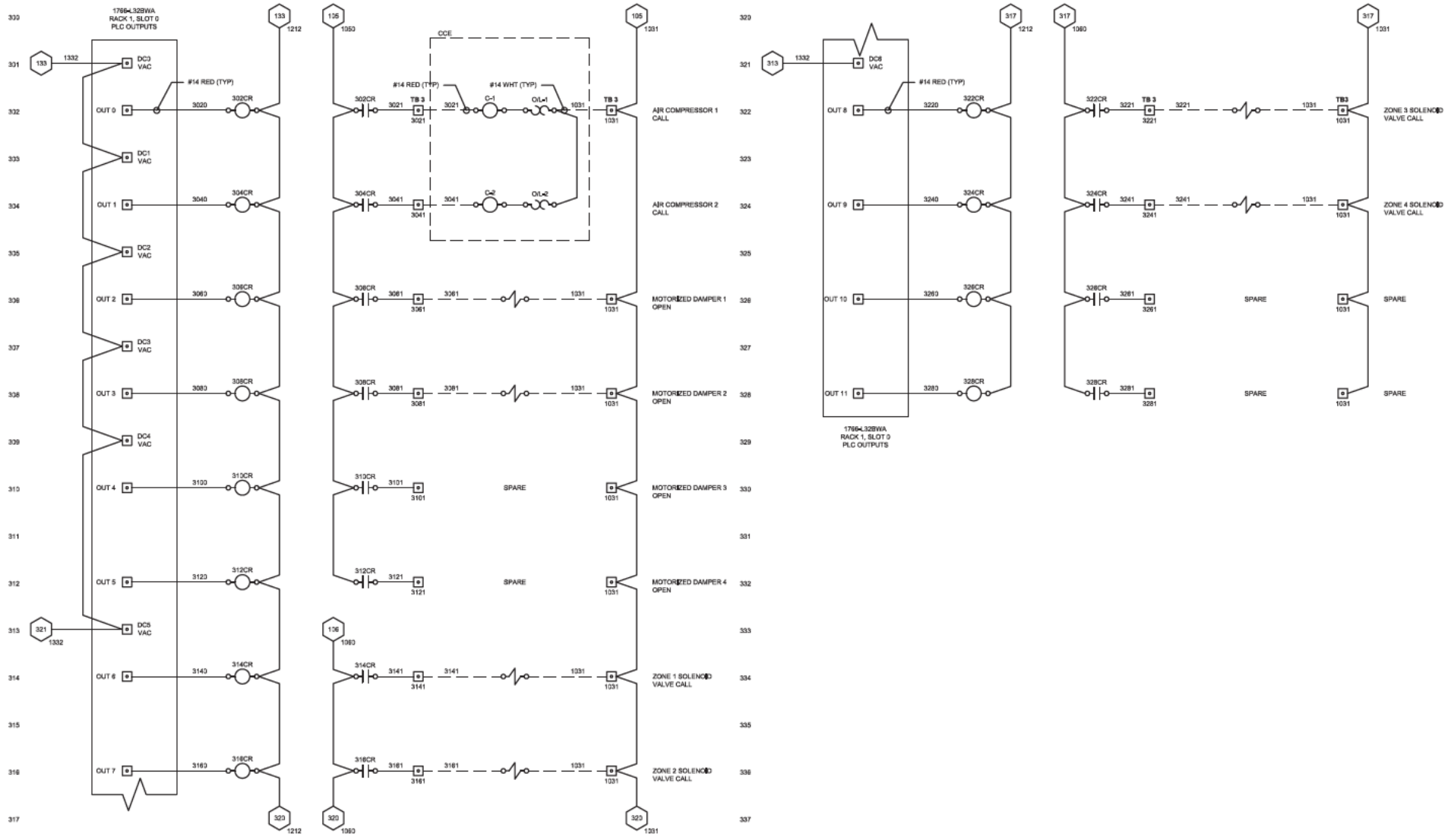
SOUTHERN SKIMMER SYSTEM
MICROLOGIX 1400 24 VDC DISCRETE INPUTS

ELECTRICAL

ARCADIS Project No.: 96262048.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S2



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XREFS: IMAGES: PROJECTNAME: —
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				Professional Engineer's Name	DAVE M. OBERLE			
				Professional Engineer's No.	PE076383			
1	6/11/2018	FINAL	KE	DL	State	Date Signed	Project Mgr.	
No.	Date	Revisions	By	Chkd	PA	6/11/2018	ML	
					Designed by	Drawn by	Checked by	
					DL	KE	DL	

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USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS

ELECTRICAL

ARCADIS Project No.
98262048.0005.00004
Date
JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S3

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1	6/11/2018	FINAL	KE	DL			
No.	Date	Revisions	By	Ckd			

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL DAVID M. OBERLE ENGINEER PE076383 6-11-18

ARCADIS

ARCADIS U.S., INC.

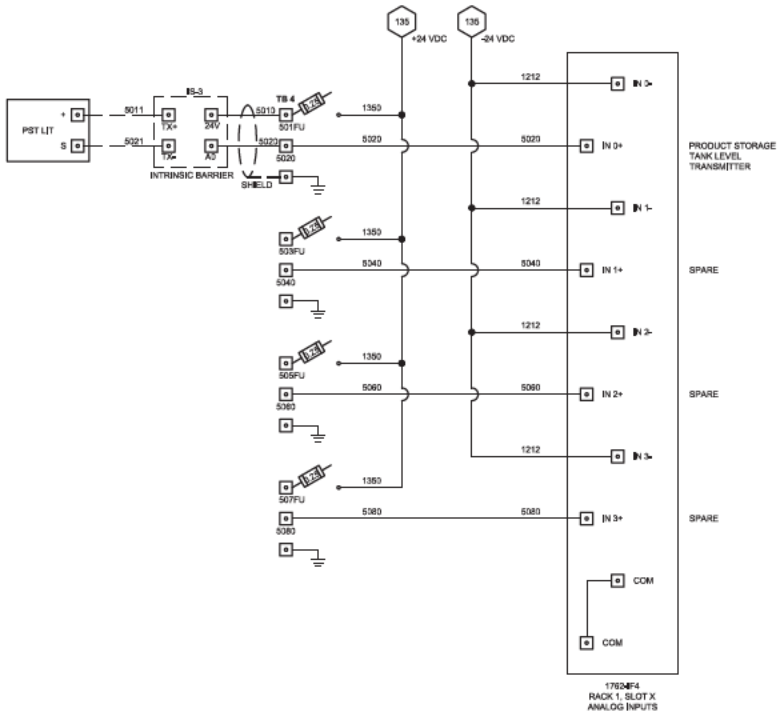
USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S4



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	No.	Date	Revisions	By	Chkd

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

COMMONWEALTH OF PENNSYLVANIA REGISTERED DAVID M. OBERLE ENGINEER PE076383

ARCADIS

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS

ELECTRICAL

ARCADIS Project No.: 96262048.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S5

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CITY: WILMINGTON, DE DIV/GROUP: ENV DB: K.ERICKSON LD: D.LARSON PIC: M.LESLEY PM: M.LESLEY TM: LYRCON*OFF*REF*
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No.	Date	Revisions	By	Ckd
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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER DAVID M. OBERLE PE076383 6-11-18

ARCADIS

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM

ELECTRICAL

ARCADIS Project No. 06262046.0005.00004
Date JUNE 2018
ARCADIS 824 MARKET STREET SUITE 820 WILMINGTON, DE 19801 TEL. 302.658.1718

I-S6

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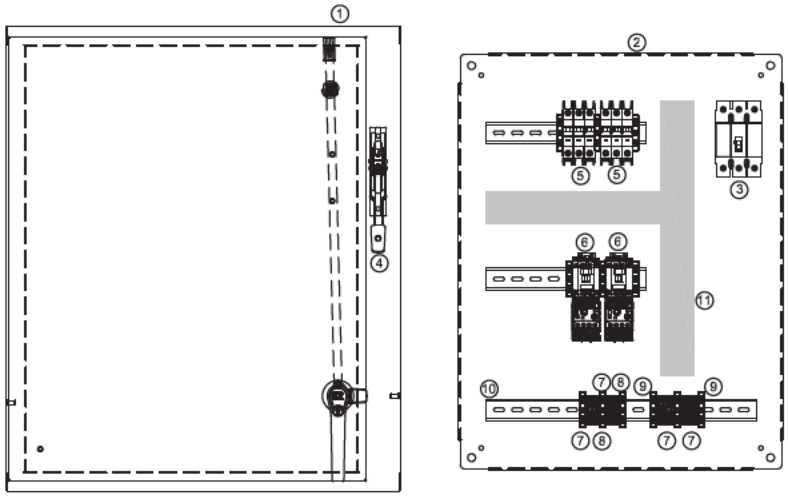

TAG	QTY	DESCRIPTION	MANUFACTURER	CATALOG #
1	1	STEEL DISCONNECT ENCLOSURE 30X25X10	SCE	30X25X10
2	1	BACK PANEL FOR ENCLOSURE	SCE	30P24
3	1	AB MOLDED CASE CIRCUIT BREAKER (TIM), 25 KA, 30 A	AB	1400-QC3-C30
4	1	AB FLEX CABLE OPERATOR (NON-METALIC HANDLE)	AB	1400-QFCX-04
5	2	MINIATURE CIRCUIT BREAKER 3P, 15A	AB	1489-M3C150
6	2	NEMA NON-REVERSING E-COMBO STARTER 7.5 HP, 480 VAC, 120 VAC COIL	AB	309-ACD-EE
7	TBD	EC TERMINAL BLOCK (30 A)	AB	1492-J3
8	TBD	EC GROUND TERMINAL BLOCK	AB	1492-J3-G
9	TBD	END ANCHOR	TBD	
10	TBD	DIN RAIL	TBD	
11	TBD	WIRING DUCT	TBD	



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1	6/11/2018	FINAL	KE	DL

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Professional Engineer's Name: DAVE M. OBERLE
Professional Engineer's No.: PE076383

State	Date Signed	Project Mgr.
PA	6/11/2018	ML
Designed by	Drawn by	Checked by
DL	KE	DL

ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

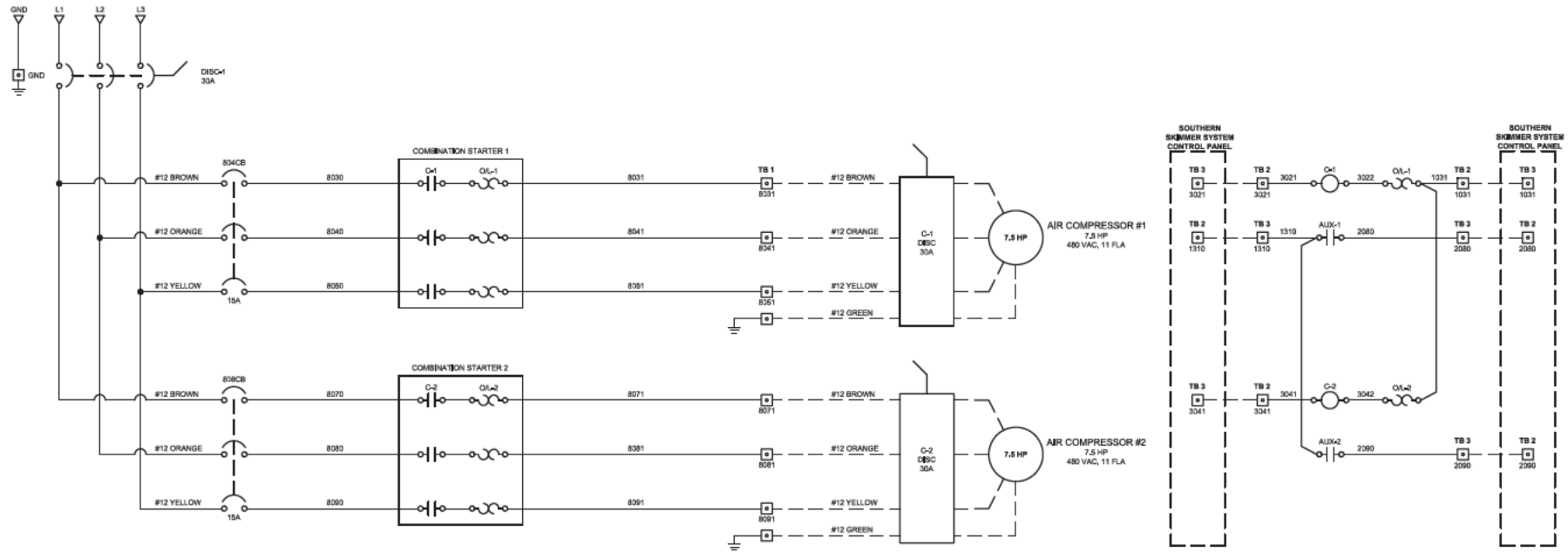
COMPRESSOR CONTROL ENCLOSURE (CCE) PANEL LAYOUT

ELECTRICAL

ARCADIS Project No.: 96262348.0005.00004
Date: JUNE 2018

ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S7



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XREFS: IMAGES: PROJECTNAME: —
E18S02M01

				Professional Engineer's Name	DAVE M. OBERLE		
				Professional Engineer's No.	PE076383		
				State	Date Signed	Project Mgr.	
				PA	6/11/2018	ML	
				Designed by	Drawn by	Checked by	
				DL	KE	DL	
1	6/11/2018	FINAL	KE	DL			
No.	Date	Revisions	By	Chkd			

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ARCADIS U.S., INC.

USACE • PHILADELPHIA DISTRICT • 2280 OREGON AVE, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

SOUTHERN SKIMMER SYSTEM
MOTOR CONTROL PANEL WIRING DETAILS

ELECTRICAL

ARCADIS Project No.
98262348.0005.00004
Date
JUNE 2018
ARCADIS
824 MARKET STREET
SUITE 920
WILMINGTON, DE 19801
TEL. 302.658.1718

I-S8

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 6	**BSTI Job No.**: 868	**Date**: 11/12/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work: PHA side of 76		**Fax #**:	
Description: HDPE fusion of pipe for trenched area			
Weather: Mostly Sunny		**Heat Index**:	
Precip: No	**High Temp**: 53	**Low Temp: 34**	**WINDS**: 0

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number	Man Hours	Number	Man Hours	Number	Man Hours
		1	8.00	1	8.00	2	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI **Date:** 11/12/2018

Daily Report Number: 6

3. Work Performed Today:

- Conducted health and safety meeting.
- Fused 280' section of 3" & 4" for the trenched area

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 11/12/2018

Daily Report Number: 6

6. Manpower Hours by Personnel

Project Manager:
Site Manager: 8.00
Remediation Specialist: 8.00
Others:

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/12/2018

Daily Report Number: 6

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: Wednesday 11/14/18
- Complete 3" above ground pipe
- Complete 4" above ground pipe

This Week: No additional work beyond 11/14/18

Following Weeks: Continue Pipe installation

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

Nate Oropollo

BSTI Site Manager

Date: 11/12/2018

DAILY CONSTRUCTION REPORT

Date: 11/13/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Tuesday	**Contract Day: 16**	**Total Days:**

Weather Conditions			
AM Conditions	**Light Rain**	**Temp Min. (°F): 44**	**Temp Max. (°F): 47**
PM Conditions	**Cloudy**	**Temp Min. (°F): 47**	**Temp Max. (°F): 51**

Accidents		
Accident Occur? ☐Yes ☒No	**Accident Report Completed? ☐Yes ☐ No**	**Loss Time? ☐Yes ☐ No**

Visitors		
Name	**Company**	**Site Safety Awareness Given?**
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**
PARS	**Supervisor**	**1**	**8**	**Foreman**	**1**	**8**	**Skilled**	**1**	**8**
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Laborer**		
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Skilled**		
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Skilled**		
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Skilled**		
	Semi-Skilled			**Common**			**Trainee**		

Contractor Equipment (Active or Idle)					
Contractor/Sub	**Equipment**	**Description**	**# Pieces**	**# Used**	**Total Hours Used**
PARS	**F-550 & Job Trailer**	**Support Truck with Tools and Job Trailer for Power Tools & Materials Handling**	**1**	**Yes**	**8 8**
	F-150 Excavator Skid Steer	**Field Vehicles 305 Excavator with auger 259 Skid Steer**	**2 1 1**	**Yes Yes No**	**8 8 8**
BSTI		**Job Trailer**	**0**	**No**	**0**
		Confined Space Equipment	**0**	**No**	**0**
		6500 Watt Generator	**0**	**No**	**0**
		2000 Watt Generator Butt Fusion Welding Machine Electrofusion Welding Machine	**0 0 0**	**No No No**	**0 0 0**

DAILY CONSTRUCTION REPORT

Date: 10/13/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Tuesday	**Contract Day: 16**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	**PARS, and Arcadis Personnel on Site. [redacted] Rodgers arrives and holds daily safety briefing.**	**None**	**None**
0900	**Pars crew heads to PHA Site.**	**None**	**None**
0925	**Start pumping water from all sonotubes.**	**None**	**None**
0935 **1200**	**Start replacing damaged sonotube to 48" depth. Also install the last sonotube at 6' length for the expansion loops.** **Skid Steer got stuck in ditch.**	**Slippery Slope. Skid Steer got stuck**	**Dug it out. Graded DGA material on slope**
1440 **1710**	**Continue replacing damaged sonotube.** **Finish for the day.**	**None**	**None**
1720	***PARS crew leaves Site for the day.***	**None**	**None**

[redacted]
Signature

Site Manager
Position

11/13/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 7	**BSTI Job No.**: 868	**Date**: 11/14/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work: PHA area		**Fax #**:	
Description: Fusion of 3" & 4" expansion loops to the above ground pipe			
Weather: Mostly Sunny		**Heat Index**:	
Precip: No	**High Temp**: 44	**Low Temp:** 32	**WINDS**: 10-12 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number	Man Hours	Number	Man Hours	Number	Man Hours
		1	8.00	1	8.00	2	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI
Date: 11/14/2018

Daily Report Number: 7

3. Work Performed Today:

- Conducted health and safety meeting.
- Completed fusions of 3" expansion loops to above ground pipe
- Completed 90% fusions of 4" expansion loops to above ground pipe

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 11/14/2018

Daily Report Number: 7

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/14/2018

Daily Report Number: 7

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:

This Week: - No additional site work

Following Weeks: Connect above ground pipe to trench

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 11/14/2018

DAILY CONSTRUCTION REPORT

Date: 11/16/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Friday	**Contract Day: 18**	**Total Days:**

Weather Conditions			
AM Conditions	**Sunny/Windy**	**Temp Min. (°F): 36**	**Temp Max. (°F): 41**
PM Conditions	**Sunny**	**Temp Min. (°F): 41**	**Temp Max. (°F): 43**

Accidents		
Accident Occur? ☐Yes ☒No	**Accident Report Completed? ☐Yes ☐ No**	**Loss Time? ☐Yes ☐ No**

Visitors		
Name	**Company**	**Site Safety Awareness Given?**
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**
PARS	**Supervisor**	**1**	**8**	**Foreman**	**1**	**8**	**Skilled**	**1**	**8**
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Laborer**		
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Skilled**		
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Skilled**		
	Semi-Skilled			**Common**			**Trainee**		
	Supervisor			**Foreman**			**Skilled**		
	Semi-Skilled			**Common**			**Trainee**		

Contractor Equipment (Active or Idle)					
Contractor/Sub	**Equipment**	**Description**	**# Pieces**	**# Used**	**Total Hours Used**
PARS	**F-550 & Job Trailer**	**Support Truck with Tools and Job Trailer for Power Tools & Materials Handling**	**1**	**Yes**	**8 8**
	F-150 Excavator Skid Steer	**Field Vehicles 305 Excavator with auger 259 Skid Steer**	**2 1 1**	**Yes No No**	**8 0 0**

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/016/2018		Project #: 756-10		Inspector: [redacted]	
Day of Week: Friday		Contract Day: 18		Total Days:	

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, and Arcadis Personnel on Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	Pars crew heads to PHA Site.	None	None
0740	Set up welder and weld extensions on tubing for ditch crossing structure.	None	None
1230	Start drilling holes un square tubing.	None	None
1330	Stop drilling to excavate/box out area for shed location.	None	None
1400	Start cutting unistrut in 3' lengths that get mounted to base plates.	None	None
1500	Leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/16/2018
Date

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/19/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 19	Total Days:

Weather Conditions			
AM Conditions	Cloudy	Temp Min. (°F): 36	Temp Max. (°F): 47
PM Conditions	Mostly Cloudy	Temp Min. (°F): 47	Temp Max. (°F): 49

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	9	Foreman	1	9	Skilled	1	9
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Laborer		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8 8
	F-150 Excavator Skid Steer	Field Vehicles 305 Excavator with auger 259 Skid Steer	2 1 1	Yes Yes Yes	8 1 1
	Welder	[redacted] Welder	1	Yes	2.5

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/019/2018		Project #: 756-10		Inspector: [redacted]	
Day of Week: Monday		Contract Day: 19		Total Days:	

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, and Arcadis Personnel on Site. [redacted] Rodgers arrives and holds daily safety briefing.	None	None
0730	Pars crew heads to PHA Site.	None	None
0740	Place and compact DGA in shed location.	None	None
0810	Shed arrives and shed is set on Compacted DGA.	None	None
0830	Start cutting unistrut in 3' lengths and grinding edges. Set unistrut at each pier location. Will be bolted to base plates at a later time.	None	None
1200	[redacted] starts drilling holes in square tube crossing ditch to bolt to base plates.	None	None
1215	[redacted] start bolting unistrut to all piers along fenceline.	None	None
1430	All unistrut bolted to piers along fenceline. Tim finished drilling and bolting base plates to square tube.	None	None
1445	Set up welder and weld unistrut base plates to square tube.	None	None
1600	Finished welding. Put all tools away and leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/19/2018
Date

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/26/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Monday	Contract Day: 20	Total Days:

Weather Conditions			
AM Conditions	Cloudy	Temp Min. (°F): 44	Temp Max. (°F): 50
PM Conditions	Rainy	Temp Min. (°F): 50	Temp Max. (°F): 52

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman		0	Skilled	2	16
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	2	6.5	Laborer	2	6.5
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	NO	0 0
	F-150 Excavator Skid Steer	Field Vehicles 305 Excavator with auger 259 Skid Steer	1 1 1	Yes Yes Yes	8 8 8
ECDI	Drill Rig	Truck Mounted	1	Yes	6.5
	Geo Probe	Track Mounted	1	Yes	6.5
	Truck	Stake Body	2	Yes	6.5

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/26/2018		Project #: 756-10		Inspector: [redacted]	
Day of Week: Monday		Contract Day: 20		Total Days:	

Daily Log			
Time of Entry	Remarks	Problems Occurred	Solutions
0700	PARS, ECDI, and Arcadis Personnel on Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	Pars & ECDI crews heads to PHA Site.	None	None
0740	Clear all PHA owned piping, trash and fencing from areas where wells are to be installed. Mark out well locations for today's drilling.	None	None
0930 1230	Start setting wells in two locations. Geo probe crew finished installing well and move to next location.	None	None
1245 1300	Geo probe crew starts setting well in the next location. Truck mount crew finished installing well and tears down rig for the day.	None	None
1330	ECDI crews leave for the day due to heavy rains. 2 wells completed. PARS crew heads to the motor control bldg.	None	None
1530	PARS crew leaves site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/26/2018
Date

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/27/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 21	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 38	Temp Max. (°F): 43
PM Conditions	Partly Sunny	Temp Min. (°F): 41	Temp Max. (°F): 43

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	2	16	Laborer	2	16
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1		Foreman	1	8	Skilled	2	16
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	NO	0
	Field Vehicle	F-150	1	Yes	8
	F-150	Field Vehicles	1	Yes	8
	Excavator	305 Excavator with auger	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/27/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Tuesday	**Contract Day: 21**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	ECDI unloads 2nd geoprobe unit and both crews set up to install wells. Eric Thom oversees drillers. BSTI sets up to perform 2 Butt Fusions. Eric White & Allen identify existing product line with [redacted] from Arcadis.	None	None
0830	USACE & Arcadis Teams arrive for inspections.	None	None
0945	BSTI finished fusions. Ready to pull lines and fasten to ditch crossing and fence line support structures.	None	None
1130	Two more wells installed. All Crews break for lunch.	None	None
1200	Setting up on next two locations and continue drilling.	None	None
1520	ECDI and BSTI start wrapping up tolls & equipment.	None	None
1530	All crews leave site for the day.	None	None

[redacted] Site Manager 11/27/2018

Signature Position Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 8	**BSTI Job No.**: 868	**Date**: 11/27/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Finalized 4" pipe welding, completed pipe mounting on pipe stands			
Weather: Mostly Sunny		**Heat Index**:	
Precip: No	**High Temp**: 42	**Low Temp:** 32	**WINDS**: 10-20 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	8.00	1	8.00	1	8.00	3	24.00

Cumulative Total: **24.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **24.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **24.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI **Date:** 11/27/2018

Daily Report Number: 8

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Finalized 4" pipe welding, completed pipe mounting on pipe stands

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 11/27/2018

Daily Report Number: 8

6. Manpower Hours by Personnel

Project Manager:	8.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/27/2018

Daily Report Number: 8

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: Wednesday 11/27/18
- Mount 3" pipe on pipe stands
- Connect 3 & 4" pipe from vault to above ground pipe on PHA side

This Week: - Complete connection on treatment system from vault to above ground pipe

Following Weeks: Pressure testing

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 11/27/2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/28/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Wednesday	Contract Day: 22	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 35	Temp Max. (°F): 39
PM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	3	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	2	16	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1		Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator with auger	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/28/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Wednesday	**Contract Day: 22**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	ECDI crews set up and continue installing wells. Eric Thom oversees drillers. BSTI sets up to perform 2 Butt Fusions. [redacted] cut and install unistrut on bridge structure.	None	None
1000	BSTI Starts hanging 3" HDPE pipe on structure. PARS team start excavating trench from end of structure along. fence line to the shed.	None	None
1030	Discover 3 lines in trench. Called [redacted] and he came and identified that all three were old and out of service. See pictures. (1) old product line. (1) old vapor line and (1) old electrical conduit with wire removed.	Yes	See Remark
1050	Resume excavating trench.	None	None
1500	Drillers leave Site for the day. BSTI has all pipe hung. Only 2 fusions left to do on the crossing.	None	None
1530	PARS & BSTI crews leave site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/28/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 9	**BSTI Job No.**: 868	**Date**: 11/28/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Fused 3" & 4" above ground pipe to trench pipe, set 3" above ground pipe & completed 4" bridge pipe			
Weather: Cloudy / Sunny		**Heat Index**:	
Precip: No	**High Temp**: 44	**Low Temp:** 32	**WINDS**: 15-30 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	6.50	1	8.00	1	8.00	3	22.50

Cumulative Total: **22.50** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **22.50** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **22.50** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI **Date:** 11/28/2018

Daily Report Number: 9

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Completed all 4" fusions on PHA side
- Fused 3" above ground piping to trench piping & set 3" above ground piping to strut

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 11/28/2018

Daily Report Number: 9

6. Manpower Hours by Personnel

Project Manager:	6.50
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/28/2018

Daily Report Number: 9

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: Thursday 11/28/18
- Finish 3" bridge strut connection
- Began 1" HDPE fusions

This Week:

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 11/28/2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/29/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Thursday	Contract Day: 23	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 36	Temp Max. (°F): 39
PM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
Tony Alessandrini	Coventry Environmental	☐Yes X☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	3	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1	4	Foreman	1	4	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator with auger	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/29/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Thursday	**Contract Day: 23**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0710 0725	[redacted] from Coventry Environmental arrives to collect Waste Class Samples from roll-off containers. Tony leaves Site.	None	None
0730	ECDI crews set up and continue installing wells. Eric Thom oversees drillers. BSTI sets up to perform 2 Butt Fusions at bridge structure. Tim & Falcon continue excavating trench for 3" & 4" HDPE	None	None
1000	BSTI finished Fusions. @ men leave Site for the day. 3rd man heads over to Motor Control Bldg (MCB) to fuse fillings for tomorrow.	None	None
1030	PARS crew caught up to drillers near shed. Start laying 3" & 4" HDPE in trench and covering with pipe bedding material.	None	None
1230	BSTI last crew member leaves Site for the day.	None	None
1430	PARS crew finished backfilling for the day. Walk excavator over to the MCB for tomorrows work.	None	None
1500	Drillers start wrapping up for the day.	None	None
1530	PARS and Drilling crews leave Site for the day.	None	None

[redacted] Site Manager 11/29/2018

Signature **Position** **Date**

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 10	**BSTI Job No.**: 868	**Date**: 11/29/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Complete 3" bridge, prep. for DLA vault to trench to above ground pipe transition			
Weather: Cloudy / Sunny		**Heat Index**:	
Precip: No	**High Temp**: 50	**Low Temp:** 34	**WINDS**: 5-7 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	3.50	1	4.50	1	8.00	3	16.00

Cumulative Total: 16.00 Hours

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	4		X	
	10/29/2018	Electrofusion Welding Mach	4		X	

BSTI **Date:** 11/29/2018

Daily Report Number: 10

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Completed all 3" bridge fusion work
- Prepared pipe for vault to trench to above ground pipe on treatment system side

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 11/29/2018

Daily Report Number: 10

6. Manpower Hours by Personnel

Project Manager:	3.50
Site Manager:	4.50
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 11/29/2018

Daily Report Number: 10

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: - Friday 11/29/18
- Complete vault to trench to above ground pipe 3" & 4" on treatment system side

This Week: -
-

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 11/29/2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/30/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 24	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 36	Temp Max. (°F): 39
PM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
Tony Alessandrini	Coventry Environmental	☐Yes X☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	3	24
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor	1	4	Foreman	1	4	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
BC Landscapes	Dump Truck	6 CY	1	Yes	8
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	2	Yes	16
	Truck	Stake Body	2	Yes	16
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 11/30/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Friday	**Contract Day: 24**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. Chuck12130 arrives at MCB and holds daily safety briefing then heads over to PHA Site for Tailgate with drillers.	None	None
0715 0730	PARS crew starts removing fence and guiderail to excavate trench for BSTI to install HDPE lines into vault. Drillers continue drilling wells at the PHA Site.	None	None
0815	PARS starts removing asphalt and excavating trench. BSTI starts fusing 90 degree sweeps on pipes.	None	None
0930	Discover railroad tracks and 18" thick concrete under asphalt near vault. Head to Home Depot to rent jack hammer.	None	None
1000 1115	Start jack hammering concrete. Finished removing concrete and continue excavating trench.	None	None
1230	Finish excavating trench. BSTI starts fusing fittings and pipe into vault.	None	None
1450	Start placing and compacting pipe bedding below & above piping to 12' below grade.	None	None
1530	Drilling crew leave Site for the day.	None	None
1700	Trench backfilled and compacted to grade with DGA. Start replacing fence and Guiderail.	None	None
1730	PARS & BSTI crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

11/29/2018
Date

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/03/201	Projec # 756-1	Inspector [redacted]
Da o Week Monda	Contrac Day 2	Tota Days

Weathe Condition			
A Condition	Partl Sunn	Tem Min (°F) 4	Tem Max (°F) 5
P Condition	Partl Sunn	Tem Min (°F) 4	Tem Max (°F) 5

Accident		
Acciden Occur ☐Ye ☒N	Acciden Repor Completed ☐Ye ☐ N	Los Time ☐Ye ☐ N

Visitor		
Nam	Compan	Sit Safet Awarenes Given
		☐Ye ☐N
		☐Ye ☐N
		☐Ye ☐N
		☐Ye ☐N
		☐Ye ☐N

Contractor an Personne									
Nam	Typ	Numbe	Hour	Typ	Numbe	Hour	Typ	Numbe	Hour
PAR	Superviso			Forema			Skille		2
	Semi-Skille			Commo			Traine		
ECD	Superviso			Forema			Labore		2
	Semi-Skille			Commo			Traine		
BST	Superviso			Forema			Skille		
	Semi-Skille			Commo			Traine		
	Superviso			Forema			Skille		
	Semi-Skille			Commo			Traine		
	Superviso			Forema			Skille		
	Semi-Skille			Commo			Traine		

Contracto Equipmen (Activ o Idle					
Contractor/Su	Equipmen	Descriptio	Piece	Use	Tota Hour Use
PAR	F-55 Jo Traile	Suppor Truc wit Tool an Jo Traile fo Powe Tool Material Handlin		Ye	
	Fiel Vehicl	F-15		Ye	3
	Excavato	30 Excavato		Ye	
	Ski Stee	25 Ski Stee		Ye	
ECD	Ge Prob	Trac Mounte		Ye	
	Truc	Stak Bod		Ye	
	Ski Stee	Joh Deer 323		Ye	
BST	Jo Traile			Ye	
	Generato	200 Wat Generato		N	
	Fiel Vehicl	P Truc		N	

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/03/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Monday	**Contract Day: 25**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing at PHA Site.	None	None
0715 0730	PARS crew starts backfilling to grade up to first well location. Drillers continue drilling wells and (1) guy starts purging wells.	None	None
0900	Nate from BSTI arrives and sets up for fusing piping for 2" wells while waiting for material delivery.	None	None
1100	BSTI materials arrive.	None	None
1330	[redacted] finish backfilling to grade up to the concrete structures before the first well. Head to Home Depot to get materials to set the 4"x 6" timber for the compressor in the Motor Control Bldg. (MCB) tomorrow.	None	None
1430	Drop off materials at the MCB and cut timbers to size.	None	None
1530	All crews leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/03/2018
Date

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/04/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Tuesday	Contract Day: 26	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 39	Temp Max. (°F): 41
PM Conditions	Partly Sunny	Temp Min. (°F): 38	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	4	32
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	3	24
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	4	Yes	32
	Excavator	305 Excavator	1	Yes	
	Skid Steer	259 Skid Steer	1	Yes	8
					8
ECDI	Geo Probe	Track Mounted	1	Yes	8
	Truck	Stake Body	1	Yes	8
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	No	0
	Generator	2000 Watt Generator	1	No	0
	Field Vehicle	PU Truck	1	No	0

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/04/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Tuesday	**Contract Day: 26**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	[redacted] head to PHA Site and excavate trenches for well piping to manifold shed. The rest of PARS Team oversees drillers and gauges wells. Drillers start drilling last 2 wells and purge all wells.	None	None
0815	Drillers discover broken well. Need to re-drill. Allen & Tim can't excavate so head to the MCB to build forms for well manholes and heat exchangers.	None	None
1200	All forms built and staged at MCB. Break for lunch.	None	None
1230	[redacted] start excavating trenches at PHA.	None	None
1530	[redacted] and drillers leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/04/2018
Date

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/05/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Wednesday	Contract Day: 27	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 27	Temp Max. (°F): 34
PM Conditions	Cloudy	Temp Min. (°F): 28	Temp Max. (°F): 34

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
ECDI	Supervisor			Foreman	1	8	Laborer	2	16
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
ECDI	Geo Probe	Track Mounted	1	Yes	8
	Truck	Stake Body	1	Yes	8
	Skid Steer	John Deere 323E	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/05/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Wednesday	**Contract Day: 27**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS, ECDI, BSTI and Arcadis Personnel on PHA Site. [redacted] arrives and holds daily safety briefing.	None	None
0730	PARS & BSTI start excavating trenches and install piping from wells to manifold shed. Drillers continue drilling & purging wells.	None	None
1200	Break for lunch.	None	None
1230	Back to work	None	None
1240	ECDI crew finishes all wells and leaves Site. All wells installed and purged. Equipment demobilized.	None	None
1530	PARS and ECDI crews leave site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/05/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 13	**BSTI Job No.**: 868	**Date**: 12/5/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Bio sparge and vent pipe installation			
Weather: Cloudy		**Heat Index**:	
Precip: Yes	**High Temp**: 38	**Low Temp:** 29	**WINDS**: 0 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	0.00	1	8.00	1	8.00	3	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator	8	X		
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI **Date:** 12/5/2018

Daily Report Number: 13

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Began 1" & 2" sparge and vent pipe installation
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 12/5/2018

Daily Report Number: 13

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/5/2018

Daily Report Number: 13

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:
- Wednesday 12/5/18
- Continue 1" and 2" sparge and vent pipe installation
-

This Week:
-
-

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 12/5/2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/06/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Thursday	Contract Day: 28	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 27	Temp Max. (°F): 36
PM Conditions	Cloudy	Temp Min. (°F): 28	Temp Max. (°F): 34

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	8	Laborer	1	16
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/06/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Thursday	**Contract Day: 28**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	**PARS, BSTI and Arcadis Personnel arrive and [redacted] holds daily safety briefing.**	**None**	**None**
0730	**PARS & BSTI crews head over to PHA Site and resume installing piping from wells to manifold shed.**	**None**	**None**
1530	**Well piping approximately 80% complete. PARS & BSTI crews leave Site for the day.**	**None**	**None**

[redacted]
Signature

Site Manager
Position

12/06/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 14	**BSTI Job No.**: 868	**Date**: 12/6/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Bio sparge and vent pipe installation			
Weather: Cloudy		**Heat Index**:	
Precip: No	**High Temp**: 38	**Low Temp:** 25	**WINDS**: 0 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	0.00	1	8.00	1	8.00	3	16.00

Cumulative Total: **16.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **16.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **16.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI **Date:** 12/6/2018

Daily Report Number: 14

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Continue bio-sparge and vent installation
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 12/6/2018

Daily Report Number: 14

6. Manpower Hours by Personnel

Project Manager:	0.00
Site Manager:	8.00
Remediation Specialist:	8.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/6/2018

Daily Report Number: 14

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day:
- Friday 12/7/18
- Complete 1" and 2" sparge and vent pipe installation
-

This Week:
-
-

Following Weeks: Pressure testing & 1" connections

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 12/6/2018

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/07/2018	Project #: 756-10	Inspector: [redacted]
Day of Week: Friday	Contract Day: 29	Total Days:

Weather Conditions			
AM Conditions	Partly Sunny	Temp Min. (°F): 37	Temp Max. (°F): 41
PM Conditions	Cloudy	Temp Min. (°F): 35	Temp Max. (°F): 41

Accidents		
Accident Occur? ☐Yes ☒No	Accident Report Completed? ☐Yes ☐ No	Loss Time? ☐Yes ☐ No

Visitors		
Name	Company	Site Safety Awareness Given?
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	Type	Number	Hours	Type	Number	Hours	Type	Number	Hours
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman	1	8	Laborer	1	8
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	Equipment	Description	# Pieces	# Used	Total Hours Used
PARS	F-550 & Job Trailer	Support Truck with Tools and Job Trailer for Power Tools & Materials Handling	1	Yes	8
	Field Vehicle	F-150	2	Yes	16
	Excavator	305 Excavator	1	Yes	8
	Skid Steer	259 Skid Steer	1	Yes	8
BSTI	Job Trailer		1	Yes	8
	Generator	2000 Watt Generator	1	Yes	8
	Field Vehicle	PU Truck	1	Yes	8

DAILY CONSTRUCTION REPORT

Date: 12/07/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Friday	**Contract Day: 29**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	**PARS, BSTI and Arcadis Personnel arrive and [redacted] holds daily safety briefing.**	**None**	**None**
0730	**PARS & BSTI crews head over to PHA Site. BSTI crew resumes installing piping from wells to manifold shed. PARS crew starts placing pipe bedding material and metallic warning tape in trenches.**	**None**	**None**
1200	**PARS crew starts backfilling trenches east of shed to grade with overburden soils to grade.**	**Hit monitoring well with skidsteer**	**Plan to uncover and repair if possible on monday**
1530	**BSTI completes well piping installation from all wells to the unistrut bracket at the manifold shed. Finish backfilling and grading.**	**None**	**None**
1600	**PARS & BSTI crews leave Site for the day.**	**None**	**None**

[redacted]
Signature

Site Manager
Position

12/07/2018
Date

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 15	**BSTI Job No.**: 868	**Date**: 12/7/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Bio sparge and vent pipe installation			
Weather: Cloudy		**Heat Index**:	
Precip: No	**High Temp**: 38	**Low Temp:** 25	**WINDS**: 0 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	9.00	1	0.00	1	9.00	3	18.00

Cumulative Total: **18.00** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **18.00** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **18.00** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer		X		
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator	8	X		
	10/29/2018	Butt Fusion Welding Mach	8		X	
	10/29/2018	Electrofusion Welding Mach				

BSTI **Date:** 12/7/2018

Daily Report Number: 15

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Completed bio-sparge and vent pipe installation
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 12/7/2018

Daily Report Number: 15

6. Manpower Hours by Personnel

Project Manager:	9.00
Site Manager:	0.00
Remediation Specialist:	9.00
Others:	

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/7/2018

Daily Report Number: 15

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: - Monday 12/10/18
- Weld transition fittings onto 3" & 4" lines pre heat exchange
.

This Week: -
-

Following Weeks: Pressure testing when weather is appropriate

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 12/7/2018

DAILY CONSTRUCTION REPORT

Date: 12/10/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Monday	**Contract Day: 30**	**Total Days:**

Weather Conditions			
AM Conditions	**Partly Sunny**	**Temp Min. (°F): 28**	**Temp Max. (°F): 39**
PM Conditions	**Cloudy**	**Temp Min. (°F): 39**	**Temp Max. (°F): 41**

Accidents		
Accident Occur? ☐Yes ☒No	**Accident Report Completed? ☐Yes ☐ No**	**Loss Time? ☐Yes ☐ No**

Visitors		
Name	**Company**	**Site Safety Awareness Given?**
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman			Laborer	1	4
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	**Equipment**	**Description**	**# Pieces**	**# Used**	**Total Hours Used**
PARS	**F-550 & Job Trailer**	**Support Truck with Tools and Job Trailer for Power Tools & Materials Handling**	**1**	**Yes**	**8**
	Field Vehicle	**F-150**	**2**	**Yes**	**16**
	Excavator	**305 Excavator**	**1**	**Yes**	**8**
	Skid Steer	**259 Skid Steer**	**1**	**Yes**	**8**
BSTI	**Job Trailer**		**1**	**Yes**	**4**
	Generator	**2000 Watt Generator**	**1**	**Yes**	**4**
	Field Vehicle	**PU Truck**	**1**	**Yes**	**4**

PARS ENVIRONMENTAL INC.

DAILY CONSTRUCTION REPORT

Date: 12/10/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Monday	**Contract Day: 30**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	PARS and Arcadis Personnel arrive and [redacted] holds daily safety briefing.	None	None
0730	PARS crew heads over to PHA and starts backfilling.	None	None
1200	[redacted] from BSTI arrives to weld sweeps on pipe behind the Motor Control Bldg (MCB).	None	None
1215	Material delivery from Furgeson Supply arrives. Unload manifold materials in shed.	None	None
1235	Continue backfilling and placing DGA around shed and piping rack.	None	None
1345	Remove asphalt and overburden soils from vault trench location.	None	None
1500	Leave Site for the day.	None	None

[redacted]
Signature

Site Manager
Position

12/10/2018
Date

DAILY CONSTRUCTION REPORT

Date: 12/11/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week:Tuesday	**Contract Day: 31**	**Total Days:**

Weather Conditions			
AM Conditions	**Partly Sunny**	**Temp Min. (°F): 28**	**Temp Max. (°F): 37**
PM Conditions	**Cloudy**	**Temp Min. (°F): 37**	**Temp Max. (°F): 41**

Accidents		
Accident Occur? ☐Yes ☒No	**Accident Report Completed? ☐Yes ☐ No**	**Loss Time? ☐Yes ☐ No**

Visitors		
Name	**Company**	**Site Safety Awareness Given?**
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No
		☐Yes ☐No

Contractors and Personnel									
Name	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**	**Type**	**Number**	**Hours**
PARS	Supervisor	1	8	Foreman	1	8	Skilled	1	8
	Semi-Skilled			Common			Trainee		
BSTI	Supervisor			Foreman			Laborer		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		
	Supervisor			Foreman			Skilled		
	Semi-Skilled			Common			Trainee		

Contractor Equipment (Active or Idle)					
Contractor/Sub	**Equipment**	**Description**	**# Pieces**	**# Used**	**Total Hours Used**
PARS	**F-550 & Job Trailer**	**Support Truck with Tools and Job Trailer for Power Tools & Materials Handling**	**1**	**Yes**	**8**
	Field Vehicle	**F-150**	**2**	**Yes**	**16**
	Excavator	**305 Excavator**	**1**	**Yes**	**8**
	Skid Steer	**259 Skid Steer**	**1**	**Yes**	**8**
BSTI	**Job Trailer**		**1**	**No**	**0**
	Generator	**2000 Watt Generator**	**1**	**No**	**0**
	Field Vehicle	**PU Truck**	**1**	**No**	**0**

DAILY CONSTRUCTION REPORT

Date: 12/11/2018	**Project #: 756-10**	**Inspector:** [redacted]
Day of Week: Tuesday	**Contract Day: 31**	**Total Days:**

Daily Log			
Time of Entry	**Remarks**	**Problems Occurred**	**Solutions**
0700	**PARS and Arcadis Personnel arrive and [redacted] holds daily safety briefing.**	**None**	**None**
0730	**Continue removing asphalt and overburden soils from vault trench location.**	**None**	**None**
0900	**Make 2 additional forms for well covers and lay out manifold rack in shed. Also cut stakes for forms**	**None**	**None**
1200	**Start setting forms and well covers to grade starting on west end of Site.**	**None**	**None**
1500	**Six wells formed up. Leave Site for the day.**	**None**	**None**

[redacted]
Signature

Site Manager
Position

12/11/2018
Date

December 18, 2018

A. DAILY CQC REPORT

DAILY CONSTRUCTION QUALITY ASSURANCE REPORT (CQAR)

Report No: 16	**BSTI Job No.**: 868	**Date**: 12/18/2018	
Project Title: Former DSCP System Installation		**Phone #**: (610) 639-8088	
Location of Work:		**PHA side**	
Description: Pressure test			
Weather: Cloudy		**Heat Index**:	
Precip: No	**High Temp**: 43	**Low Temp:** 29	**WINDS**: 5-10 mph

1. BSTI Personnel

Project Manager		Site Mgr./SSO		Field Staff		TOTAL	
Number	Man Hours	Number		Number	Man Hours	Number	Man Hours
1	0.00	1	0.00	2	13.50	4	13.50

Cumulative Total: **13.50** **Hours**

Subcontractors

	No.	Man-hrs

BSTI Cumulative Total: **13.50** Hours
Sub. Cumulative Total: **0** Hours
Daily Total Cumulative: **13.50** Hours

2. Major Equipment Onsite

ID-#	REC DATE	DESCRIPTION	HRS USED	OWNED	RENTED	DEMOBE DATE
	10/29/2018	Work Job Trailer				
	10/29/2018	Confined Space Equipment				
	10/29/2018	6,500 Watt Generator				
	10/29/2018	2,000 Watt Generator				
	10/29/2018	Butt Fusion Welding Mach				
	10/29/2018	Electrofusion Welding Mach	4		X	

BSTI **Date:** 12/18/2018

Daily Report Number: 16

3. Work Performed Today:

- Conducted health and safety meeting.
- Conducted internal health and safety talk specific to confined space entry
- Conducted pressure test for both 3" & 4" lines with a wetting period, expansion period and testing period
-

4. Work Performed Today by Lower-Tier Subcontractors or Others:

- No subcontractors onsite

5. List Specific Control Activities Performed and Results of These Activities (include inspections, findings, and corrective actions)

None

BSTI **Date:** 12/18/2018

Daily Report Number: 16

6. Manpower Hours by Personnel

Project Manager: 0.00
Site Manager: 0.00
Remediation Specialist: 13.50
Others:

7. Verbal Instructions Received from Client:

None

8. Submittal Actions:

9. Delivery of Materials:

Description	Quantity	Unit	Additional Information

10. Delivery of Equipment:

None

BSTI **Date:** 12/18/2018

Daily Report Number: 16

11. Additional Remarks:

- None

12. Future Work/Schedule:

Next Day: - Wednesday 12/19/18
- Drain lines in vaults and fill in 3"& 4" holes in vaults
.

This Week: - Use vac truck to pull any excess water lines
-

Following Weeks:

CERTIFICATION: I certify that the above report is complete and correct and that I, or my authorized representative, have inspected the work performed this day by the Subcontractor and each Subcontractor, and have determined that all materials, equipment, and workmanship are in strict compliance with the Drawings and Technical Specifications except as may be noted above.

[redacted]

BSTI Site Manager

Date: 12/18/2018

January 14-15, 2019

1-14-19

7Am on site Safty meeting 7:30

go to home depot Buy Pipe caps. 7:40 Call Ferguson. No Delivery till Noon. Drive To Ferguson Pick up order. wrong Pressure gauges. Vaccume gauges were Refused. Reorder Pressure gauges 0-30 PSI. 9:45 Drive Back To site 10:15. start Assembling manifold. 11:15 Parts Are in at Ferguson 2" closed nipples Weent Loaded on Truck. Return to Ferguson for Pipe supplies. Pick up supplies Return To site 12:30. Continue Assembling manifold. finish 4" ~~[illegible]~~ Connections. All 2" Ts in place. Ready for ~~[illegible]~~ Valves & flow meters. Vent & sparge. Leave Site 3:30

1-15

7Am on site Safty Meeting - 7:30

Check specs for Thickness on concrete Phone confrence with [redacted] About Replacment Heat Exchanger ~~and~~ pad Placment & Transition from Blower outlet size to 4". 8:30. Head over to PHA side grab Ts & Nipples & valves for Heat Exchangers Return To Control Room side & Install To get placment of Pads for Heat Exchanger's 10:35 ~~clean out Truck in [illegible]~~.

Call ~~office~~ ~~[illegible]~~ about Help for tomorrow Poring concrete. Corey & ~~[illegible]~~ corey Marcus Both busy. Call Cody He is Avalibl for tomorrow. mock up fittings & set forms. Install fittings Make calls ~~for~~ to find out what The new blower will measure confrence with Chuck. 12:30 finish setting fittings make New form for New Heat Exchanger. Larger Exchanger. ~~Set forms~~ ~~[illegible]~~ Dig out Rocks set forms & Level forms. 3:30 clean up put tools away. Calculate Concrete for forms. 16 Bags. go to home depot for ~~[illegible]~~ Concrete & wire mat, Trowel. Leave 4:30

18 Bags concrete

January 16-17, 2019

1-16-19 6:30 On site ~~[illegible]~~ get wheelbarrow out of trailer, Extention - Cord Hoses Drill, go to control room side Sign in safty meeting 7:30. Dan out I go to Home Depot for Cement mixer. Rent & Return 8 Am ~~Set~~ Cody set up Hoses Dan + Cody bring Bags of concrete to forms. ~~Get~~ check forms and stake into ground Cody screwed stakes to form. Mix concrete and fill forms. Screet & Mag. ~~[illegible]~~ Clean tools and mixer. Clean up Hoses and Bags from Concrete. & extenton cord. [redacted] drop mixer Back off at Homedepot. 10:45 go to sunbelt Rental purchas Concrete Blanket. Return To site 11 am. Cody ~~Left~~ left site. Concrete Not Drying to cold Device a plan use Barriers to make shift a tent cover with a tarp. 12:30 Rent a Heater from Homedepot to get concrete to kick off. Return to site 12:45 Roll out Cord fire up Heater & Keep a Eye on the concrete. ~~[illegible]~~ 3:00 finally Dry Enough to Brush. Let Heater Run till 3:15 shutdown. Cover Pads with concrete Blanket secure Blanket under Barriers Put Heater in Control Building. ~~End of Day~~ ~~[illegible]~~ Leave site 4:00 getfuel in truck & write Report 4:45

Cut Road matt & install Roll Road matt up in concrete

1-17-19 On site 7 Am - Safty meeting 7:30. Check concrete Remove Tarp. fold tarp secure Concrete Blanket. Return Heater to Homedepot 8:15. go to PHA side start working on manifold. Problem Valves to close a 6" Had to disassemble manifolds. Replace Nippels w 4" Nippels To fix problem Re Assemble manifold Install Ball & gate valves. [redacted] and ? stopped in left 1:45. finished Day 3:30

January 18-21, 2019

1-18-19

On site, 7am safty meeting 7.30
go to manifold shed start assembling pipes & fittings
Install flowmeters on sparge side. Problem. Flow meters
Are Backwards Have to Disassemble manifolds & ~~[illegible]~~ redesign
manifold. get approvals. ~~@ 1:30 call in for order to mcmaster carr~~
Check sourcing for more fittings Local no fitting Available.
call Mc master carr. Order fittings & Hose Chicago Locks.
Disassemble manifold Drive Home. 5 Pm

1/21/19
6:30 ~~6am~~ ~~7am~~ Drive to mcmaster carr pick up my
order. Drive to site 8:15. Safty meeting 8:30. Go over
skid placment with John & Noha & chuck. discuss Blowers
& Heat Exchanger 10:30. go to manifold Building start assembly
manifold Test fit. 12:30. go to control Building. go over pipe
& How to Run & Assemble. Anchors for skid. Plan tomorrow. set
Heat Exchanger. 1:30 ~~[illegible]~~ Return to manifold shed. ~~My Change~~
Problem Valve Direction Interfear's with gauge. Change
Valve placment & Direction to Rectify problem. shorten
Unistrut Rack & move Entire Rack so that manifold is
Alighned. Install strut Bracing on Pipe. Clean up
site put tools away & Lock up. 4:00
Low for Day 7° 7Am.
High for Day 18° 5Pm

Had to Bring my Heater to combat Extream Cold.

January 22, 2019

1/22/19

7Am on site. Safty meeting 7:30
go To PHA side work Assembling manifold. Take a call from Eric White Discuss Help. [redacted] Comes to site 10 ish. Helps ~~Hold~~ with Assembly of manifold. 12:30 Return to control Building. Uncrate Heat Exchangers Dispose of crate material. Take Exchangers out Back of Building & set on pads. Cut Air compressor Piping Remove chiller & move Compressor manifold. 1:30 pm Return to manifold shed ~~get fittings~~ ~~Draft~~ and finish DAy working on manifold 4:00

January 23, 2019

~~[illegible]~~ 4:10 Finish onsite

1-23-19

7Am on site safty meeting End 7:30
wait for coey to get on site with pipe cutter. 815
Off Load using Lift gate on F-550. 830. Coey & myself
go to PHA Side pick up fittings Load 2" pipe in truck
Cut 4" pipe & Load in truck. Return to control Building.
unload Pipe & fittings 9:30. Setup Lazer and shoot
Elevation of Heat Exchanger. Set Pipe position for 2" Pipe.
Call ferguson order 2½"-4" Adapter and other supplies.
11:15. Install unions & 90° on 2" Heat Exchanger.
Take Call from June ~~[illegible]~~ Prisidio. To pick up order
At Mc master Carr with my order in the morning. 200.
go to PHA side Remove pipe to Be cut & ~~[illegible]~~ Threaded
Drive to control Building set up cutter & cut & thread
Pipes. ~~[illegible]~~ Return To PHA Side Install Pipes
& Pipe Caps. Need strut Brackets. Leave site 4:00 ~~Drive~~
Drive to Fazzio for strut Brackets. Closed At 4:30.
Pulled in 4:45. Return to Hotel

7Am - 4:30

January 24, 2019

Weather Rain

1/24/19

M

7-530 7 AM on site safty meeting 7:30 go to PHA side. Clean up shed ~~Rain~~ move extra material. in trailer set up lights & generator. Install flow meters call Ferguson about gauges. Marcus picked up parts ~~at~~ Mc master carr. only come on site. 9:30 waiting on UPS for Reducers. 10:00 call for adapters. Problem UPS Dropped off. Package missing. make calls find tracking #. Hotel looking for package. send marcus to Home Depot for pipe. Install ~~[illegible]~~ unistrut & support for incoming 2" wells. Have a confrence with [redacted] About How to connect Hoses to manifold. come up with solution. Install fittings on wells. Take fittings to control Building side. Have to Reroute fittings on Exchanger Install fittings and pipe. 5:30

1230 - 100 ~~[illegible]~~ drill & tap ~~[illegible]~~ pipe plugs for sencors.

[redacted] from Prisidio Had Noha make 4" penetration in wall to Heat Exchanger in the wrong spot Had to come up with a fix Carlo suggest 45° & 90° to snake up to pipe.

[redacted] wanted to mount unit on Double sided unistrut. Not very willing to ~~fix~~ Help ~~fix~~ fix

I did not ~~[illegible]~~ measure or set A spot for The Hole

January 25, 2019

10.5

1-25 19

7 AM Control Building for safty meeting.
7:30 go to Home depot for 1" pipe for manifold.
Have cut to Legenth. 9:45. Go to PHA side Install
Pipe & flow meters. Install Elbows. Change positions of
flow meters to Level manifold As Best as possible.
Clean out shed Sweep floor. Install flow meters on
Vent side. Figure out Test port configuration. Change
T Configuration on manifolds. Change unistrut
Configuration to allow clamps on top & Bottom
of Flow meters on Both manifolds. Make Abacts
List Take a phone call w/Eric white 400-430
Put tools away Lock shed & Trailer Drive Home
5:30

Phone Call Discuss Progress up to this point.
work to Be Done. Who is to Do the work. Problems
To Be fixed. Poisidio To install Blow off Risers @ 2"
To Heat Exchanger. Tim to connect 4" to Exchanger..
finish Piping & Hoses at manifold. Pressure gauges to
Be installed Fittings Needed unistrut to secure
flow meters & top of manifolds to walls.

Forgot to discuss Air Compressor to Be Reconnected
To manifold & Chiller in control Building

January 28-30, 2019

1/28/19

6:30 Drive to McMaster Carr for order. ~~Re~~ order more supplies. Drive to site. Control Building for safty meeting. Call for 90° & 45° Go to Ferguson & pick up. 90° & Nippel. 45° mismarked. order for morning. pickup. Return to site 10:00. ~~Pull out Call for~~ Call for [redacted] to pick up order at McMaster Carr. start working on sparge wells. Measure out Wells Penitrating Into shed Install 90° & Run pipe into shed. [redacted] on site 11:30 with parts. unload parts. & Roll of Hose. Problem Plan shows pipes to close to thread an Elbow on pipe & pipes fall In the middle of 2x4. Notch & chisel 2x4 to fit pipes. Drill & ~~[illegible]~~ SAWZALL Around pipes to get Enough Room To Thread on 90° Elbows. Install supports & unistrut. Clamp pipes & install Hose Nippels. 5:30

& go over chiller placement

Jody left site 12:15

9.5

1/29/19 7AM ~~[illegible]~~ on site 7 Am safty meeting 7:30 go to PHA side fill out Report for 1/28 start working. on unistrut. go to Home Depot for Bolts & Lag Bolts. Retun To site. 8:45 work on manifold. Problem ~~[illegible]~~ flow meters keep spinning Have To use great caution Not to snap them. Install 1 3/16 unistrut Adjust & manifold for tight fit. Install Clamps To secure flow meters. mount Support for 4" pipe To floor. 4:30

8

1/30/ site visite Rattway 10 Am. Leave 800 on site 9:45. 10:10 Call [redacted] site walk Rescheduled for 2pm. walk site measure site About 7 Loads & 3 Railroad track to Dispose of. Wait on site for meeting 2 other Bidders (1 from PA) (2 Delta BJDS). walk site Talk of using dumpsters. 1 Truck use Bayshore for disposal. No Dirt at this time. only Rail Ties 1 Small Excivator Possible Skid steer to Smooth out Ruts No Top Soil or seed. Looking to Have [illegible]

January 31-February 1, 2019

1-31 7:30 AM Thursday

Temp for Day	7AM	18°
	12PM	14°
	6PM	

10.5

Go to Vacuume sales for Cam Locks for vent Manifold. Then Drive to ferguson for Pipe supplies still Not the Right Threaded 45° Elbow. Have to source from McMaster Carr. Drive to site 9:30 safty meeting go to PHA side Install Cam Locks Hose Barbs Tighten fittings. Install fittings for sparge side & Tighten. 12:30 start unrolling. 2" Hose use Heater to Thaw Hose. Install Hoses secure to wall & connect to manifold 6PM 10.5 HRS

~~5:30 Drive in~~

2-1-19 friday - on site 7Am. [redacted] site to Help. Safty meeting 7:30 go to pHA side start Heater in shed go for gas for generator. Return fill gene. finish fittings for Hose connections. Cut install & Clamp Hoses. Install gauges on vent side. & test port & Valves. Install 8 gauges on sparge side & Test valves. Clean up & leave for day. 4 pm Drive Home 5 30 + 1.5 10.5. 4pm [redacted] off site.

February 4-8, 2019

~~Friday~~ 9

2-4
2-5 [redacted]

Drive to stafford Highschool Look at fuel Tank & Look over Blueprints 3 pm. go To Home depot for Air compressor manifold parts 4pm. 8 Am - 4 Pm

2-6 Wednesday - 5:30 Drive in stop at ferguson for Test manifold Nipples. 7:15 Am - on site. Safty meeting. Work on manifold installing gauges & Risers. Clean out shed Load up supplies for control Room side. Call Sunbelt for Pipe Threader Rental. Call mcmaster carr. for 45° elbow. & order. go to control Room set up Pipes. Configure compressor manifol. 3:30 Leave site Drive to mcmaster carr for 45° elbow then drive Home 5 pm 11.5

2-7 Thursday ~~configure 4" pipe get~~ 5:30 Drive to site on site 7:10. Safty meeting 7:35 go to sunbelt Rental pickup Pipe Threader Return to site. Take measurements of 4" configure and cut & Thread pipe Install stub with union. measure angles to match pipe to Heat exchanger Call for 2.5" Nipple, go to ferguson pick up Nippel & Install pipe. 2.5" Heat Exchanger Installed - set machine up for 2" pipe No 2" Dies call sunbelt for Nessary Equipment Equipment comes 2:30 pm. set up cutter and find Die Holder missing parts call for Replacment. Best they can do is friday. Leave site 4:20 go Home 5:30 4:30 cut and install 2" pipe for Heat Exchanger. 4:20 HRS 11.5

2-8 friday 6:00 Drive To site 7:15 on site Safty meeting 7:30. make list for Home depot get pipe & conduite 90° 1" elbows. start Disassembly of Piping Hand thread 1 pipe in place. on ladder. get threader 8:30 start cutting pipe for compressor. get manifold in place make 2 Runs connected 4:00 Home 5:30 11.5

February 11, 2019

Snow

2-11 monday ~~thank~~ 5 30 Drive to site. ~~Drive~~. 6:50 AM
7 AM safty meeting. 7:30 Finish pipe Run to compress
~~Ins~~ Install unions. Drill & Install floor Anchors. for
Compressor manifold. 10 AM. ~~CHA~~ Threader off Rent
Clean Threader Drain out oil. 11 Pm. start on conduite.
for Eletrical Chuck started Install. ~~Sch~~ sunbelt picks up
cutter 12:30. Finish up conduite install u[redacted]
~~go to FHA side~~ clean up tools Load Tools Equipment
in Bay in truck. go to FHA side 1 Pm. I[redacted]
unistrut supports for Racks. Install a 4:00 Drive Home.
~~5:00~~ 11.5

2/14/19

Factory Acceptance Test Electrical Form (Instrumentation and Switches)

Date: 3-13-19 **Test Section:** 6.2 **Equipment ID:** BV/BS MCP

	Electrical Tests for Pumps and Compressor	Circle/Notes
01	Confirm Wires coming from the control panel are going to the correct instrument or switch. Comments: See Presidio Acceptance Test Sheets	(Y)/N
02	Confirm correct power is being supplied to the instrument or switch. Comments:	(Y)/N
03	Confirm that the instrument or switch is wired correctly. Comments:	(Y)/N
04	For switches, confirm that the PLC is reading that the switch is activated. Comments:	(Y)/N
05	For instrumentation, simulate a 4-20 ma signal back to the PLC and confirm that the PLC is seeing the signal correctly. Comments:	(Y)/N
06	For instrumentation, during testing operations, confirm that the reading at the instrument is communicating back to the PLC and that the correct response is occurring due to the reading with-in the system. Comments:	(Y)/N
07	For Instruments, provide copies of calibration certifications from the manufacturer to this form. Comments:	Y/N NA

Test Section: 6.2 **Equipment ID:** BV/BS MCP **(Pass) Fail**

Notes: Presidio completed all tests above to the instrumentation and control panel of BV/BS System. All alarms, switches, instruments and controls were demonstrated to function correctly.
- See attached test sheets from Presidio for MCP and Remote panels.

I certify that all equipment/material information included on this Equipment/Material Testing Form has been collected and observed in accordance to both the engineer's and contractor's approval.

Print: [redacted] Sign: [redacted] Date: 5-8-19

Arcadis: Print:_____ Sign:_____ Date:_____

Factor Acceptance Test Electrical Testing Form (Motors)

Date: 3-17-19 **Test Section:** 6.2 **Equipment ID:** B-201

Test Start Time: 1100

Pressure/Flow Testing: Fluid or ~~Air~~

Max Equipment/Material Operating Pressure/Flow: 8.4psi / 128 cfm

Max Operating Pressure/flow * 1.33= 11.1 **=Max Testing PSI/GPM**

Notes: Do Not operate above 10 psi - per engineer (Lyn Frac Formation). 9.8 psi was max tested

	Electrical Tests for Motors	Circle/Notes
01	Confirm that pump has been wired correctly. What is the power requirement?	Y/N 480 V 3Ø 14A
02	What are the Mega Ohms of the power cable from the MCC to the Pump? Is the reading per Arcadis Specifications?	no spec Y/N NA
03	What is the Pre-Start-Up Electrical Power Reading? What is the power requirement?	495 V
04	What is the Pre-Start-Up Mega Ohm Reading? What is the manufacturer requirement?	no spec NA see notes
05	Engineer approval prior to start up.	~~Y~~es
06	Is the pump direction correct?	Y/N see notes
07	Is VFD controller working correctly?	Y/N
08	Conduct VFD operation in "hand" check. Is it working correctly?	Y/N
09	Conduct VFD operation in "auto" check. Is it working correctly?	Y/N
10	Confirm "remote run switch" is working correctly.	Y/N
11	Confirm "HOA" is working correctly.	Y/N

Test Section: 6.2 **Equipment ID:** B-201 **Pass** / **Fail**

Notes: No spec in design for Mega Ohms. Design Requires Amp testing. 14A max per sheet E3. 9.7 A was max observed. 8.9A @ 41.9 Hz is continous operation Amps.

- Blower was also wired backwards originally and fixed during shake down.

I certify that all equipment/material information included on this Equipment/Material Testing Form has been collected and observed in accordance to both the engineer's and contractor's approval.

Print: [redacted] Sign: [redacted] Date: 05-07-19

Arcadis: Print:_____ Sign:_____ Date:_____

Factor Acceptance Test Electrical Testing Form (Motors)

Date: 3-13-19 Test Section: 6.2 Equipment ID: B-101

Test Start Time: 0900

Pressure/Flow Testing: Fluid or (Air)

Max Equipment/Material Operating Pressure/Flow: 8.3 psi / 260 cfm

Max Operating Pressure/flow * 1.33= 11 =Max Testing (PSI)/GPM

Notes: ~~Cannot operate~~ Do Not operate above 10 psi per engineer (can fracture formation). 8.3 was max tested

	Electrical Tests for Motors	Circle/Notes
01	Confirm that pump has been wired correctly. What is the power requirement?	(Y)N 480v 3Ø 11A
02	What are the Mega Ohms of the power cable from the MCC to the Pump? Is the reading per Arcadis Specifications?	no spec Y/N NA
03	What is the Pre-Start-Up Electrical Power Reading? What is the power requirement?	495 V
04	What is the Pre-Start-Up Mega Ohm Reading? What is the manufacturer requirement?	no spec NA See note
05	Engineer approval prior to start up.	Yes
06	Is the pump direction correct?	(Y)N see notes
07	Is VFD controller working correctly?	(Y)N
08	Conduct VFD operation in "hand" check. Is it working correctly?	(Y)N
09	Conduct VFD operation in "auto" check. Is it working correctly?	(Y)N
10	Confirm "remote run switch" is working correctly.	(Y)N
11	Confirm "HOA" is working correctly.	(Y)N

Test Section: 6.2 Equipment ID: B-101 (Pass) / Fail

Notes:

No spec in design for Mega Ohms. Design requires Amp testing. 11A max per Sheet E3. 9.6A was max observed. 8.4A @ 32.9 Hz is continuous operation observed Amps.

- Blower wiring was reversed, fixed during shakedown testing.

I certify that all equipment/material information included on this Equipment/Material Testing Form has been collected and observed in accordance to both the engineer's and contractor's approval.

Print: [redacted] Sign: [redacted] Date: 05-07-19

Arcadis: Print:_____ Sign:_____ Date:_____

Table 6-1
Suggested Pre-commissioning Checklist

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
SUBSURFACE							
IAS/SVE Wells							
Soil physical and chemical characteristics established		✓					
IAS wells/trenches installed per specification (e.g., screen length, size, diameter, depth, filter pack, grout, seal, riser)		✓					
SVE wells/trenches installed per specification (e.g., screen length, size, diameter, depth, filter pack, grout, seal, riser)[1]	✓						
IAS wells purged/cleaned/developed		✓					
Monitoring locations established (e.g., neutron access tubes, ERT boreholes, groundwater monitoring wells, piezometers, and soil gas probes)		✓					
IAS well and monitoring locations surveyed and located on layout plan		·	✓	COMPLETE SURVEY	[redacted]	DEC 2019	SCHEDULED FOR 2019
SVE well and monitoring locations surveyed and located on layout plan	✓						
Groundwater access ports installed at each IAS well		✓					
SVE sample ports installed at each well	✓						
IAS airflow control provided at each well head		✓					
SVE airflow control provided at each well head	✓						
Baseline monitoring data collected (e.g., dissolved oxygen, Eh, VOCs)							

Table 6-1
Suggested Pre-commissioning Checklist (Continued)

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
IAS/SVE Piping							
IAS underground piping to pumps installed per specifications (e.g., size, material type, location, depth, etc.)		✓					
SVE underground piping to pumps installed per specifications (e.g., size, material type, location, depth, etc.)	✓						
Piping insulation/heat tape installed	✓						
Piping flushed/cleaned/pressure tested		✓					
Subsurface as-built equipment schematic provided			✓	COMPLETE AS-BUILTS	[redacted]	JUNE 2019	
SURFACE							
IAS/SVE Mechanical/Civil							
IAS surface equipment schematic shown (including pressure tanks and compressor)			✓	COMPLETE AS-BUILTS	[redacted]	JUNE 2019	
SVE surface equipment schematic shown (including blower)	✓						
IAS foundations complete		✓					
SVE foundations complete	✓						
IAS compressor provided and installed per specifications		✓					
SVE blower provided and installed per specifications	✓						
SVE sample ports installed upstream and downstream of blower	✓						
IAS compressor(s) grouted in place	✓						INSTALLED ON STEEL SKID
SVE blower(s) grouted in place	✓						
IAS vibration dampers installed		✓					
SVE vibration dampers installed	✓						
IAS coupling alignment/level to specifications		✓					

Table 6-1
Suggested Pre-commissioning Checklist (Continued)

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
SVE coupling alignment/level to specifications	✓						
IAS compressor/pipe connections installed/tested		✓					
SVE blower/pipe connections installed/tested	✓						
IAS compressor and seal integrity verified		✓					
SVE blower and seal integrity verified	✓						
Silencers installed before and/or after IAS compressor		✓					
Silencers installed before and/or after SVE blower	✓						
SVE air/water separator provided	✓						
IAS air filtered for oil and particulates		✓					
IAS piping layout provided (as practical and economical)			✓	COMPLETE AS-BUILT	[redacted]	JUNE 2019	
SVE offgas treatment installed and functional (if needed)	✓						
Auxiliary fuel operational (if needed)	✓						
Aftercooler system functional (if needed)		✓					
IAS/SVE Electrical							
System grounding installed/checked		✓					
Enclosure lighting/HVAC functional		✓					
Pump rotation verified		✓					
Disconnects in sight of units being controlled		✓					
Power connected to monitoring instruments		✓					

Table 6-1
Suggested Pre-commissioning Checklist (Continued)

Checklist Item	N/A	MR	AN	Recommended Action	Responsible (Initials)	Target Complete Date	Comments
Instrument/Controls							
Valves (including air bleed, dilution, and check valves) installed and operation verified		✓					
Temperature, pressure and flow gauges installed in piping upstream (if necessary) and downstream of compressor/blower		✓					
Gauges calibrated, tested, and readings in range		✓					
Control/alarms and interlocks functional		✓					

Notes: [1]Italicized text identify components associated with SVE systems.
N/A Indicates not applicable
MR Meets requirements
AN Action needed

Project: ARCADIS- DSCP Philadelphia
Date: 3/6/2019

Table 1: ALARM FUNCTION TESTING DOCUMENTATION

Input Type	INPUT	Alarm	DESCRIPTION	INITIAL LIMITS	ALARM DELAY (sec)	System Shutdown (y/n)	HMI Display	Email Notification (y/n)	Comments	Pass / Fail
MSG	B3:15	Permissive	Permissive Bit from Main System signaling blower is on		5	y	y	y		Pass
MSG	N7:10/15	Comm Fail	Communiation with Main System PLC failed		30	y	y	y		Pass
DI	I:0/1	Estop Alarm	Estop Signal OK		0	y	y	y		Pass
DI	I:0/2	Power Fail	Power Fail Alarm		3	y	y	y		Pass
DI	I:0/3	UPS Fail	UPS output fail		3	n	y	y		Pass
DI	I:0/10	HX-101 Fault	HX-101 Failed to Start		1	y	y	y		Pass
DI	I:0/11	HX-201 Fault	HX-201 Failed to Start		1	y	y	y		Pass
DI	I:0/12	B-101 Fault	B-101 VFD Fault Signal		3	y	y	y		Pass
DI	I:0/13	B-201 Fault	B-201 VFD Fault Signal		3	y	y	y		Pass
AI	I:1.0	PAH-101	Biovent Blower Discharge High Pressure	7.5 psi	3	y	y	y		Pass
AI	I:1.1	PAH-201	Biosparge Blower Discharge High Pressure	12.5 psi	3	y	y	y		Pass
AI	I:1.2	TAH-101	Biovent Blower Discharge High Temperature	130 DegF	3	y	y	y		Pass
AI	I:1.3	TAH-201	Biosparge Blower Discharge High Temperature	130 DegF	3	y	y	y		Pass
AI	I:2.0	FAL-101	Biovent Blower Discharge Low Flow	10 cfm	300/10	y	y	y		Pass
AI	I:2.1	FAL-201	Biosparge Blower Discharge Low Flow	5 cfm	300/10	y	y	y		Pass
AI	I:2.0	PDIT-101 Fail	Biovent Blower Discharge Flow Meter Fail	<3.6mA/>20.5mA	3	y	y	y		Pass
AI	I:2.1	PDIT-201 Fail	Biosparge Blower Discharge Flow Meter Fail	<3.6mA/>20.5mA	3	y	y	y		Pass

Project: ARCADIS- DSCP Philadelphia
Date: 3/6/2019

Table 2: FAT I/O Testing Form

Panel	I/O Type	Panel I/O ID	Description	I/O Module	I/O#	I/O Voltage 24VDC/120VAC	Panel FAT I/O Simulate Test (Pass/Fail)	Range (if applicable)	Notes
MCP	DI	RESET	Estop Reset PB	Embedded Inputs	I:0/00	24vdc	pass		
MCP	DI	Estop	Estop Ok	Embedded Inputs	I:0/01	24vdc	pass		
MCP	DI	104CR	AC Power Ok	Embedded Inputs	I:0/02	24vdc	pass		
MCP	DI	111CR	UPS Ok	Embedded Inputs	I:0/03	24vdc	pass		
MCP	DI	B-101 HOA	B-101 in Auto	Embedded Inputs	I:0/04	24vdc	pass		
MCP	DI	B-101 HOA	B-101 in Remote	Embedded Inputs	I:0/05	24vdc	pass		
MCP	DI	B-201 HOA	B-201 in Auto	Embedded Inputs	I:0/06	24vdc	pass		
MCP	DI	B-201 HOA	B-201 in Remote	Embedded Inputs	I:0/07	24vdc	pass		
MCP	DI	VFD-1	B-101 VFD Running	Embedded Inputs	I:0/08	24vdc	pass		
MCP	DI	VFD-2	B-201 VFD Running	Embedded Inputs	I:0/09	24vdc	pass		
MCP	DI	C-1	HX-101 MS Aux	Embedded Inputs	I:0/10	24vdc	pass		
MCP	DI	C-2	HX-201 MS Aux	Embedded Inputs	I:0/11	24vdc	pass		
MCP	DI	B-101 VFD Fault	B-101 Effluent High Temp Switch	Embedded Inputs	I:0/12	24vdc	pass		
MCP	DI	B-201 VFD Fault	B-201 Effluent High Temp Switch	Embedded Inputs	I:0/13	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/14	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/15	24vdc	pass		
MCP	DI		HX-101 Effluent High Temp Switch	Embedded Inputs	I:0/16	24vdc	pass		
MCP	DI		HX-201 Effluent High Temp Switch	Embedded Inputs	I:0/17	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/18	24vdc	pass		
MCP	DI		Spare	Embedded Inputs	I:0/19	24vdc	pass		
MCP	DO	C-1	HX-101 MS Call	Embedded Outputs	O:0/0	24vdc/120vac	pass		
MCP	DO	C-2	HX-201 MS Call	Embedded Outputs	O:0/1	24vdc/120vac	pass		
MCP	DO	VFD-1	B-101 VFD Call	Embedded Outputs	O:0/2	24vdc	pass		
MCP	DO	VFD-2	B-201 VFD Call	Embedded Outputs	O:0/3	24vdc	pass		
MCP	DO		Spare	Embedded Outputs	O:0/4				
MCP	DO		Spare	Embedded Outputs	O:0/5				
MCP	DO		Spare	Embedded Outputs	O:0/6				
MCP	DO		Spare	Embedded Outputs	O:0/7				
MCP	DO		Spare	Embedded Outputs	O:0/8				
MCP	DO		Spare	Embedded Outputs	O:0/9				
MCP	DO		Spare	Embedded Outputs	O:0/10				
MCP	DO		Spare	Embedded Outputs	O:0/11				
MCP-MCE	AI	PIT-101	Biovent Pressure Transmitter	Slot 3, 1762SC-IF8U	I:1.0	24vdc	pass	0-145 psi	
MCP-MCE	AI	PIT-201	Biosparge Pressure Transmitter	Slot 3, 1762SC-IF8U	I:1.1	24vdc	pass	0-145 psi	
MCP-MCE	AI	TIT-101	Biovent Temperature Transmitter	Slot 3, 1762SC-IF8U	I:1.2	24vdc	pass	0-300 DegF	
MCP-MCE	AI	TIT-201	Biosparge Temperature Transmitter	Slot 3, 1762SC-IF8U	I:1.3	24vdc	pass	0-300 DegF	
MCP-MCE	AI	FIT-201	Biovent Flow Transmitter	Slot 3, 1762SC-IF8U	I:2.0	24vdc	pass	0-2 "H2O	
MCP-MCE	AI	FIT-201	Biosparge Flow Transmitter	Slot 3, 1762SC-IF8U	I:2.1	24vdc	pass	0-6 " H2O	
MCP-MCE	AI		Spare	Slot 3, 1762SC-IF8U	I:2.2				
MCP-MCE	AI		Spare	Slot 3, 1762SC-IF8U	I:2.3				
MCP-MCE	AI	VFD-1	B-101 Speed Freq Feedback	Slot 4, 1762-IF2OF2	I:3.0	24vdc	pass	0-100%	
MCP-MCE	AI	VFD-2	B-201 Speed Freq Feedback	Slot 4, 1762-IF2OF2	I:3.1	24vdc	pass	0-100%	
MCP-MCE	AO	VFD-1	B-101 Speed Command	Slot 4, 1762-IF2OF2	O:3.0	24vdc	pass	0-100%	
MCP-MCE	AO	VFD-2	B-201 Speed Command	Slot 4, 1762-IF2OF2	O:3.1	24vdc	pass	0-100%	

Table3: Southern Skimmer I/O Testing Form

Panel	I/O Type	Panel I/O ID	Description	I/O Module	I/O#	I/O Voltage 24VDC/120VAC	Panel FAT I/O Simulate Test (Pass/Fail)	PLC ALARM / Function TEST	HMI ALARM TEST	NOTIFICATION ALARM TEST
RCP-1	DI	RESET	Estop Reset PB	Embedded Inputs	I:0/00	24vdc	pass	pass	pass	pass
RCP-1	DI	Estop	Estop Ok	Embedded Inputs	I:0/01	24vdc	pass	pass	pass	pass
RCP-1	DI	104CR	AC Power Ok	Embedded Inputs	I:0/02	24vdc	pass	pass	pass	pass
RCP-1	DI	111CR	UPS Ok	Embedded Inputs	I:0/03	24vdc	pass	pass	pass	pass
RCP-1	DI			Embedded Inputs	I:0/04					
RCP-1	DI			Embedded Inputs	I:0/05					
RCP-1	DI			Embedded Inputs	I:0/06					
RCP-1	DI			Embedded Inputs	I:0/07					
RCP-1	DI			Embedded Inputs	I:0/08					
RCP-1	DI			Embedded Inputs	I:0/09					
RCP-1	DI			Embedded Inputs	I:0/10					
RCP-1	DI			Embedded Inputs	I:0/11					
RCP-1	DI			Embedded Inputs	I:0/12					
RCP-1	DI			Embedded Inputs	I:0/13					
RCP-1	DI			Embedded Inputs	I:0/14					
RCP-1	DI			Embedded Inputs	I:0/15					
RCP-1	DI			Embedded Inputs	I:0/16					
RCP-1	DI			Embedded Inputs	I:0/17					
RCP-1	DI			Embedded Inputs	I:0/18					
RCP-1	DI			Embedded Inputs	I:0/19					
RCP-1	DO			Embedded Outputs	O:0/0					
RCP-1	DO			Embedded Outputs	O:0/1					
RCP-1	DO			Embedded Outputs	O:0/2					
RCP-1	DO			Embedded Outputs	O:0/3					
RCP-1	DO			Embedded Outputs	O:0/4					
RCP-1	DO			Embedded Outputs	O:0/5					
RCP-1	DO			Embedded Outputs	O:0/6					
RCP-1	DO			Embedded Outputs	O:0/7					
RCP-1	DO			Embedded Outputs	O:0/8					
RCP-1	DO			Embedded Outputs	O:0/9					
RCP-1	DO			Embedded Outputs	O:0/10					
RCP-1	DO			Embedded Outputs	O:0/11					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.0					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.1					
RCP-1	AI		Product Tank Level	Slot 1, 1762-IF4	I:1.2	24vdc	pass	pass	pass	pass
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.3					

Range (if applicable)	Notes

Table3: Northern Skimmer I/O Testing Form

Panel	I/O Type	Panel I/O ID	Description	I/O Module	I/O#	I/O Voltage 24VDC/120VAC	Panel FAT I/O Simulate Test (Pass/Fail)	PLC ALARM / Function TEST	HMI ALARM TEST	NOTIFICATION ALARM TEST
RCP-1	DI	RESET	Estop Reset PB	Embedded Inputs	I:0/00	24vdc	pass	pass	pass	pass
RCP-1	DI	Estop	Estop Ok	Embedded Inputs	I:0/01	24vdc	pass	pass	pass	pass
RCP-1	DI	104CR	AC Power Ok	Embedded Inputs	I:0/02	24vdc	pass	pass	pass	pass
RCP-1	DI	111CR	UPS Ok	Embedded Inputs	I:0/03	24vdc	pass	pass	pass	pass
RCP-1	DI			Embedded Inputs	I:0/04					
RCP-1	DI			Embedded Inputs	I:0/05					
RCP-1	DI			Embedded Inputs	I:0/06					
RCP-1	DI	AC-1 Starter	Air Compressor 1 enabled	Embedded Inputs	I:0/07	24vdc	pass	pass	pass	pass
RCP-1	DI	LSH	Product Tank Alarm	Embedded Inputs	I:0/08					
RCP-1	DI			Embedded Inputs	I:0/09					
RCP-1	DI			Embedded Inputs	I:0/10					
RCP-1	DI			Embedded Inputs	I:0/11					
RCP-1	DI			Embedded Inputs	I:0/12					
RCP-1	DI			Embedded Inputs	I:0/13					
RCP-1	DI	AC-1 OL	Air Compressor 1 overload	Embedded Inputs	I:0/14	24vdc	pass	pass	pass	pass
RCP-1	DI			Embedded Inputs	I:0/15					
RCP-1	DI			Embedded Inputs	I:0/16					
RCP-1	DI			Embedded Inputs	I:0/17					
RCP-1	DI			Embedded Inputs	I:0/18					
RCP-1	DI		Smoke Detector Alarmed	Embedded Inputs	I:0/19	24vdc	pass	pass	pass	pass
RCP-1	DO	AC-1 Call	AC-1 Call	Embedded Outputs	O:0/0					
RCP-1	DO			Embedded Outputs	O:0/1					
RCP-1	DO			Embedded Outputs	O:0/2					
RCP-1	DO			Embedded Outputs	O:0/3					
RCP-1	DO			Embedded Outputs	O:0/4					
RCP-1	DO			Embedded Outputs	O:0/5					
RCP-1	DO			Embedded Outputs	O:0/6					
RCP-1	DO			Embedded Outputs	O:0/7					
RCP-1	DO			Embedded Outputs	O:0/8					
RCP-1	DO			Embedded Outputs	O:0/9					
RCP-1	DO			Embedded Outputs	O:0/10					
RCP-1	DO		Smoke Detector Reset	Embedded Outputs	O:0/11	24vdc	pass	pass	pass	pass
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.0					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.1					
RCP-1	AI		Product Tank Level	Slot 1, 1762-IF4	I:1.2					
RCP-1	AI		Spare	Slot 1, 1762-IF4	I:1.3					

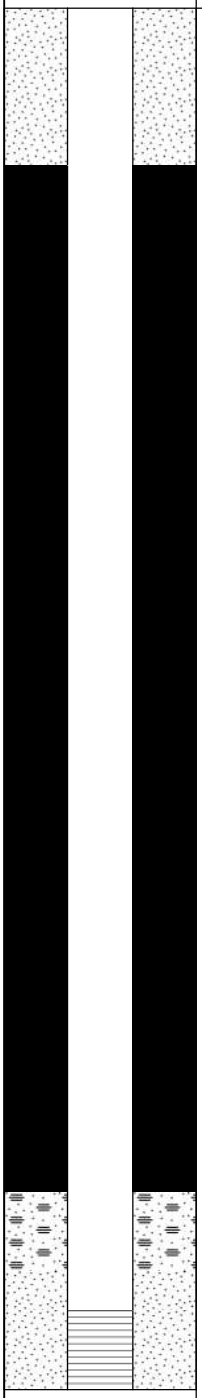
Range (if applicable)	Notes
	Probe not working, could not test

APPENDIX B – Monitoring Well Construction Logs

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1A

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Dark brown topsoil, loose silt, some coarse sand. (ML)	
					2	Brown to light brown to orange brown loose to dense silt, little fine sand, trace fine to coarse subrounded to subangular gravel. (ML)	
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					10		Intense vibration, slow drilling from 11 to 11.5 ft bgs.
					11		
					12		Strong vibration at 12.5 ft bgs.
					13		
					14		
					15		
					16		
					17		
					18		
					19		
					20		
					21		
					22		
					23		Saturated at 23 ft bgs.
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		

Comments:

Well BS-1A completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

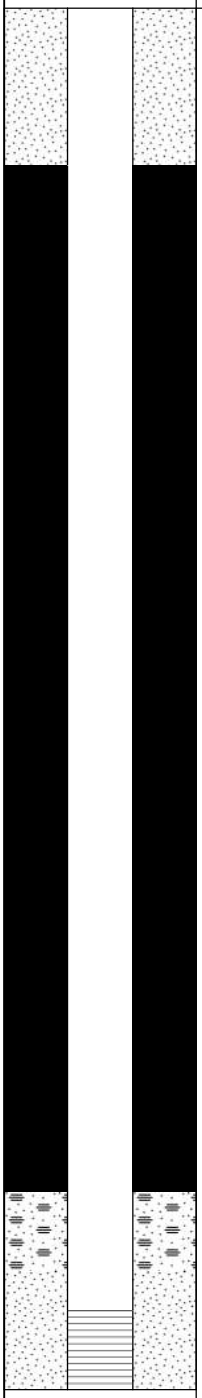
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1B

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–17	Brown-light brown silt, little fine sand, trace fine gravel. (ML)	Moderately cohesive soils from 0 to 10 ft bgs. Strong vibrations at 11 ft bgs. Moderately cohesive soils. Moderately cohesive soils from 11 to 18 ft bgs.
					18–35	Light brown-tan fine sand, some silt, little gravel. (SM)	Wet at 23 feet bgs.

Comments:

Well MW-1B completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

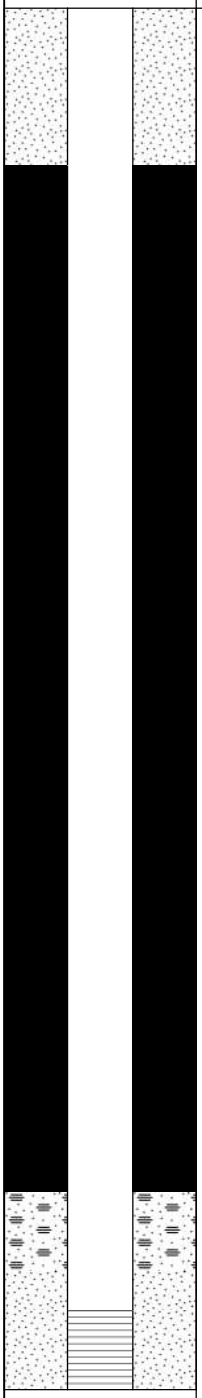
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-1C

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–7	Grey-brown silt, some fine sand. (ML)	
					8–10	Grey-brown silt, some small rounded gravel. (ML)	Vibration and cobbles at 10 ft bgs.
					11–14	Brown silt, Trenton gravel. (ML)	Vibration and cobbles from 11 to 16 ft bgs.
					15–16	Grey-brown silt, large angular gravel. (ML)	
					17–23	Grey silt. (ML)	
					24–28	Grey sand. (SM)	Saturated, product odor from 23 to 28 ft bgs.
					29–35	Brown sand. (SM)	Saturated from 28 to 35 ft bgs.

Comments:

Well BS-1C completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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LOG OF BIOSPARGE WELL
BS-1D

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Topsoil, dark brown sandy silt. (ML)	
					2	Brown sandy silt. (ML)	
					3		
					4		
					5		
					6		
					7		
					8	Grey-brown sandy silt, some rounded small gravel. (ML)	
					9		
					10		
					11	Brown silt, some fine sand, some small rounded gravel. (ML)	
					12		
					13		
					14		
					15		
					16		
					17		
					18		
					19		
					20		
					21	Brown silt, large angular gravel, Trenton gravel stone-concrete fill. (ML)	
					22		
					23		
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31	Dark brown sand, trace angular gravel, some silt.	Vibration and cobbles from 10 to 20 ft bgs.
					32		
					33		
					34		
					35		Saturated from 30 to 35 ft bgs.

Comments:

Well BS-1D completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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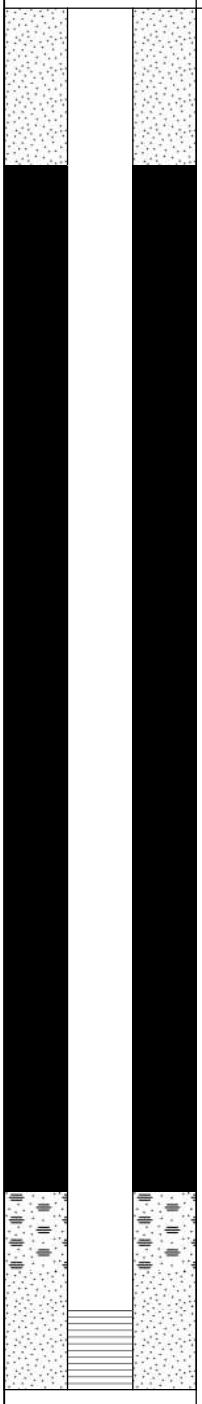
LOG OF BIOSPARGE WELL
BS-1E

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Pea and Trenton gravel. (GP)	
					2		
					3	Tan-grey silt, some fine sand. (ML)	
					4		
					5	Light brown silt, some fine sand. (ML)	
					6		
					7		
					8		
					9		
					10		
					11	Grey-brown silt, some find sand. (ML)	
					12		
					13		
					14		Vibration and cobbles from 10 to 18 ft bgs.
					15		
					16		
					17		
					18		
					19	Brown silty sand. (SM)	
					20		
					21		
					22		
					23		
					24		
					25		
					26		
					27		Moist from 18 to 35 ft bgs.
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		

Comments:

Well BS-1E completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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LOG OF BIOSPARGE WELL
BS-1F

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–3	Pea gravel. (GP)	
					3–8	Brown silt, some fine sand, some gravel. (ML)	
					8–18	Grey silt, some fine sand. (ML)	Vibration and cobbles from 11 to 18 ft bgs.
					18–27	Grey silty sand and gravel. (SM)	Product odor at 25 ft bgs.
					27–35	Grey-brown fine sand. (SM)	Vibrations and cobbles from 27 to 29 ft bgs.

Comments:

Well BS-1F completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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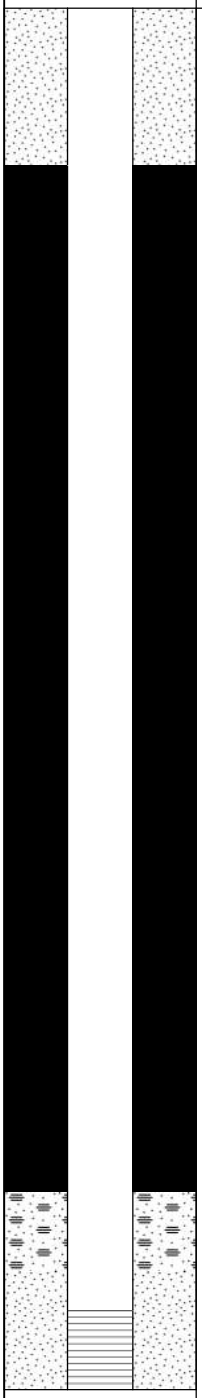
LOG OF BIOSPARGE WELL
BS-1G

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–10	Tan silt and fine sand. (ML)	
					11–12	Tan silt, some fine sand. (ML)	Vibration and possible cobbles from 11 to 15 ft bgs.
					13–14	Tan-grey silt, some fine sand. (ML)	
					15–24	Grey brown sand. (SM)	
					25–35	Grey-brown silty sand. (SM)	Strong odor from 25 to 35 ft bgs.

Comments:

Well BS-1G completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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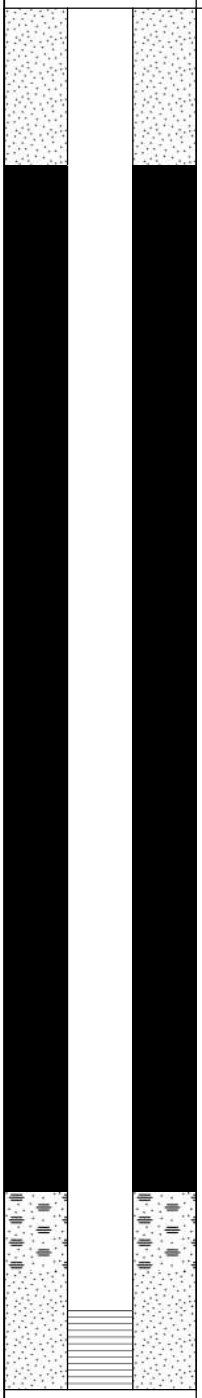
LOG OF BIOSPARGE WELL
BS-1H

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–4	Tan pea gravel. (GP)	Strong vibrations from 8.5 to 13 ft bgs.
					5–8	Tan-grey silt, little fine sand. (ML)	
					9–12	No cuttings except pea gravel and silt. Cuttings likely fell back in boring hole.	
					13–18	Brown sand, some gravel. (SW-SM)	
					19–20	Reddish brown silty sand and gravel. (SW)	
					21–35	Reddish brown silty sand. (ML)	Saturated, strong odor from 21 to 35 ft bgs.

Comments:

Well BS-1H completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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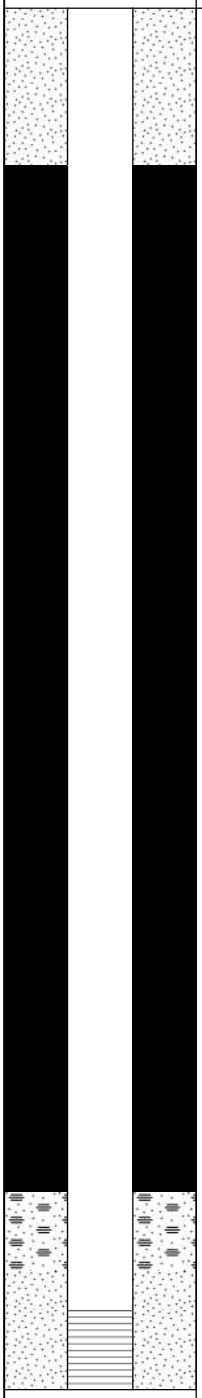
LOG OF BIOSPARGE WELL
BS-2A

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–9	Light brown silt, little fine sand. (ML)	Moist, moderate cohesiveness from 0 to 9 ft bgs.
					9–35	Light brown-brown red fine sand, some silt, little fine-medium gravel.	Moist at 16 ft bgs.

Comments:

Well BS-2A completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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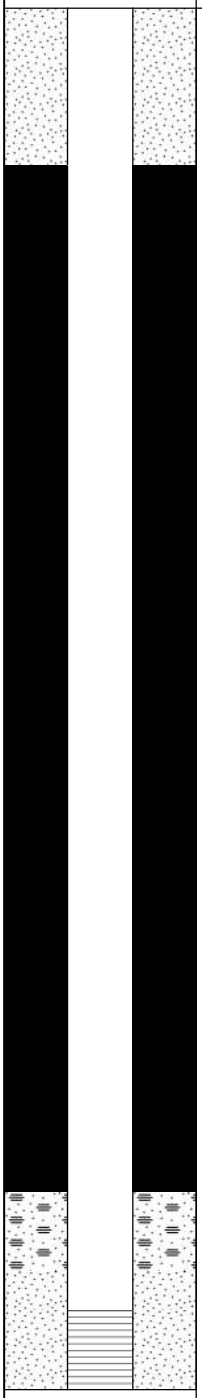
LOG OF BIOSPARGE WELL
BS-2B

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–35	Topsoil, brown silty sand. (SM) Brown sandy silt, trace rounded small gravel. (ML) Grey-brown sandy silt. (ML) Grey-brown sandy silt, some coarse angular gravel. (ML) Dark brown silty sand. (SM) Dark brown sand. (SM)	Vibrations and cobbles at 10 ft bgs. Vibrations and cobbles from 13 to 22 ft bgs. Product odor from 22 to 27 ft bgs. Saturated from 27 to 35 ft bgs.

Comments:

Well BS-2B completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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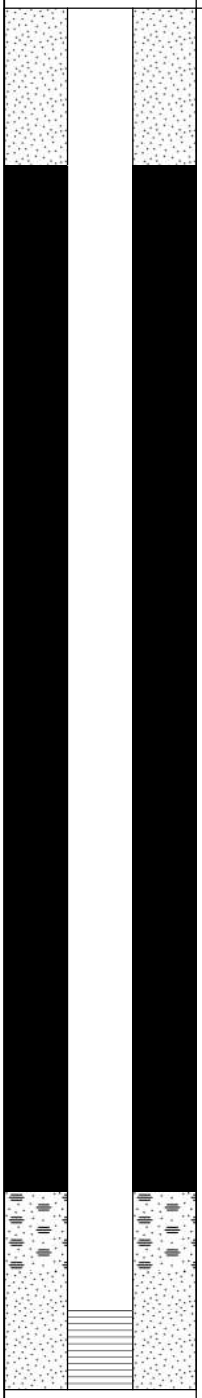
LOG OF BIOSPARGE WELL
BS-2C

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–8	Brown silt, some fine sand, some gravel. (ML)	Concrete fill at 1 ft bgs.
					8–14	Grey-brown silt, some fine sand, some gravel. (ML)	Vibrations and cobbles from 11 to 14 ft bgs.
					14–16	Brown silty sand, some gravel. (SM)	Cobbles from 14 to 16 ft bgs.
					16–25	Brown silt, some gravel, some Trenton gravel. (ML)	
					25–35	Grey-brown sandy silt. (ML)	Saturated at 30 ft bgs.

Comments:

Well BS-2C completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-2D

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/3/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–10	Grey-brown silt with sand. (ML)	
					10–16	Dark brown silt with sand, some angular gravel. (ML)	Vibrations and cobbles from 10 to 20 ft bgs.
					16–20	Dark brown silt with Trenton gravel. (ML)	
					20–23	Brown sandy silt, trace rounded gravel, some Trenton gravel. (ML)	
					23–30	Brown silt. (ML)	Saturated from 23 to 35 ft bgs, product odor from 28 to 35 ft bgs.
					30–35	Grey-brown fine-medium sand. (SM)	

Comments:

Well BS-2D completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

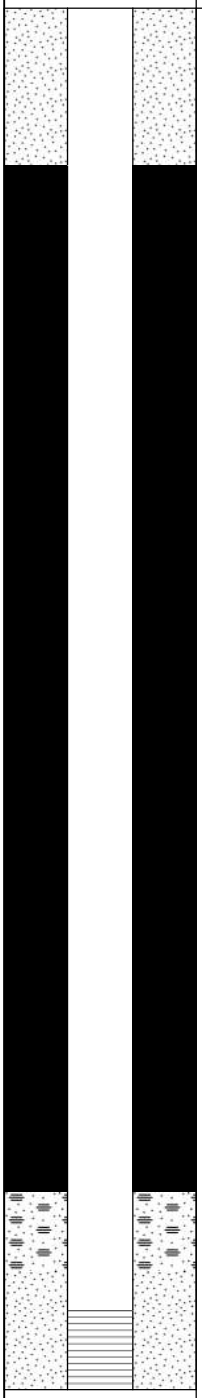
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL BS-2E

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/4/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–12	Brown-light brown-grey silt with trace fine sand. (ML)	
					12–17	Brown-light brown sandy silt, some fine-coarse sand, trace fine rounded gravel. (ML)	Vibrations at 13 ft bgs.
					17–24	Brown-grey poorly graded gravel with silt, coarse rounded-subrounded medium-coarse gravel. (GP-GM)	
					24–27	Brown-red brown poorly graded medium sand with few silts. (SP-SM)	Wet, strong odor from 23.5 to 27 feet bgs.
					27–35	Brown-red brown sandy silt, some fine-coarse sand, trace fine rounded gravel. (ML)	Saturated at 33 ft bgs.

Comments:

Well BS-2E completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOSPARGE WELL
BS-2F

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/27/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–4	Brown silt, some fine sand. (ML)	
					4–10	Grey silt, some fine sand, gravel. (ML)	
					10–13	Dark grey silt, some fine sand. (ML)	Vibrations and cobbles from 10 to 13 ft bgs.
					13–18	Brown silt, some fine sand, large subround gravel. (ML)	
					18–25	Brown sand. (SM)	
					25–35	Grey-brown sand. (SM)	Saturated from 18 to 35 ft bgs, product odor from 25 to 35 ft bgs.

Comments:

Well BS-2F completed to 35 ft bgs with 2 ft of 0.01" slotted 2" sch 40 PVC screen from 33 to 35 ft bgs. #1 quartz sand emplaced from 32 to 35 ft bgs and #00 quartz sand emplaced from 30 to 32 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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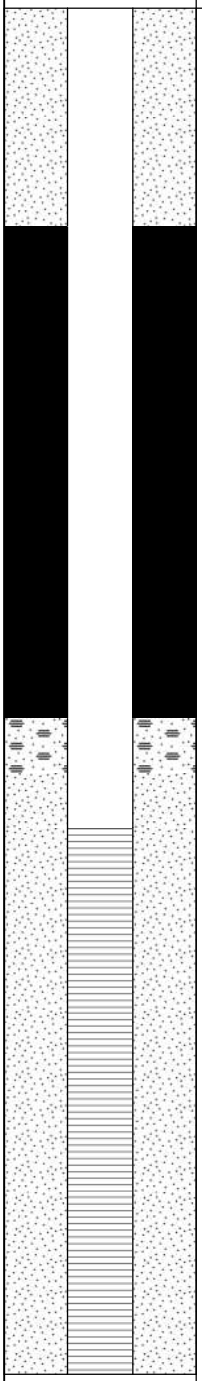
LOG OF BIOVENT WELL BV-1A

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/3/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Dark brown topsoil, sandy silt, rounded gravel. (ML)	
					2		
					3	Trenton and pea gravel, some brown silt. (GP)	
					4	Bown silt, some fine sand, some small angular gravel. (ML)	
					5		
					6		
					7		
					8	Tan-light grey silt, some fine sand, some angular gravel. (ML)	
					9		
					10		
					11	Brown-grey silt, some fine sand. (ML)	
					12		Vibration and cobbles from 10 to 15 ft bgs.
					13		
					14		
					15		
					16		
					17		
					18	Brown sandy silt, trace angular gravel. (ML)	
					19		
					20		
					21		
					22		Cobbles from 20 to 24 ft bgs.
					23		
					24		Saturated from 23 to 25 ft bgs.
					25		

Comments:

Well BV-1A completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
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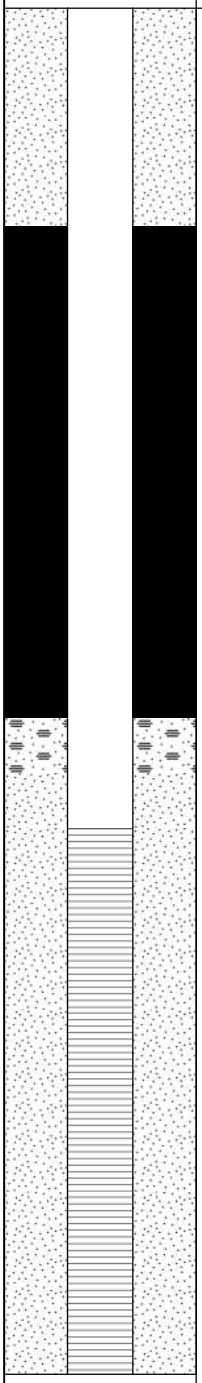
LOG OF BIOVENT WELL BV-1C

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/4/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–25	Brown-light brown-grey silt with fine sand, trace fine subrounded gravel. (ML) Brown-grey silt with little fine sand, few fine-coarse subround-subangular gravel pieces. (ML) Brown-grey sandy silt, little medium-coarse sand, few fine-coarse subround-subangular gravel pieces. (ML) Brown-orange sandy silt, little medium-coarse sand and fine-coarse subround-subangular gravel. (ML)	Strong vibration at 11 ft bgs. Moist from 17 to 25 ft bgs.

Comments:

Well BV-1C completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
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Project No: 756-10

PARS ENVIRONMENTAL
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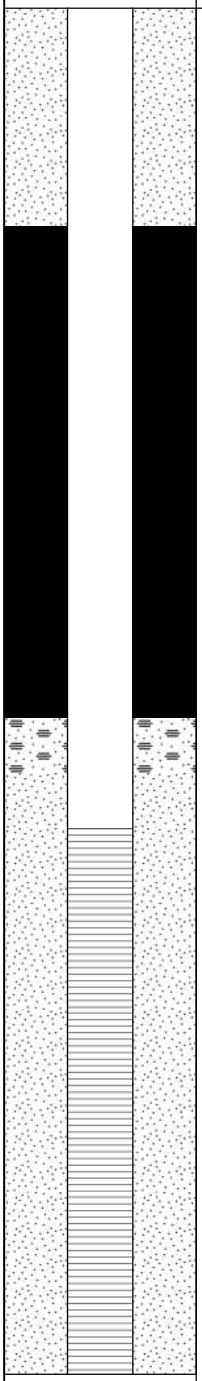
LOG OF BIOVENT WELL BV-1E

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Black-brown sand, fine rounded gravel. (SM)	
					2	Brown silt, some fine sand. (ML)	
					3		
					4		
					5		
					6		
					7		
					8	Grey-brown silt, some gravel. (ML)	
					9		
					10		
					11	Brown silt, some fine sand. (ML)	
					12		
					13		
					14		
					15		Vibration and cobbles from 11 to 18 ft bgs.
					16		
					17		
					18	Brown silty sand, fine angular gravel. (SM)	
					19		
					20	Brown silt, some fine sand. (ML)	
					21		Cobbles from 20 to 22 ft bgs.
					22	Dark brown silt, some fine sand. (ML)	
					23		Moist, strong product odor from 22 to 25 ft bgs.
					24		
					25		

Comments:

Well BV-1E completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

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Project No: 756-10

PARS ENVIRONMENTAL
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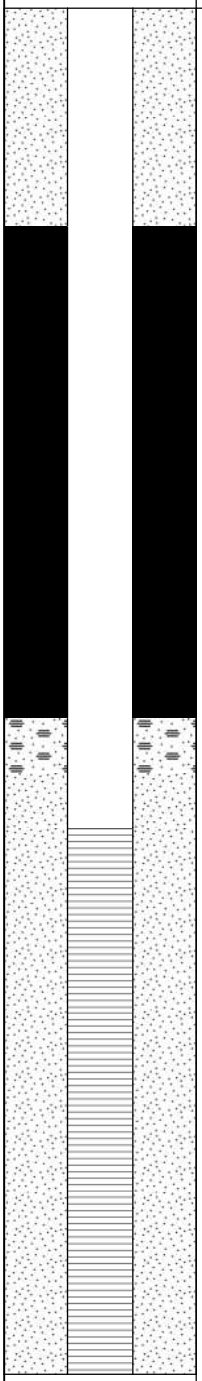
LOG OF BIOVENT WELL BV-1G

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1 2 3 4 5 6 7 8 9 10 11 12 13	Brown silt, some fine sand, some gravel. (ML)	
					14 15 16 17 18 19 20	Brown silt, some gravel. (ML)	Vibration and cobbles from 13 to 20 ft bgs.
					21 22 23 24 25	Brown silty sand. (SM)	Product odor from 20 to 25 ft bgs.

Comments:

Well BV-1G completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

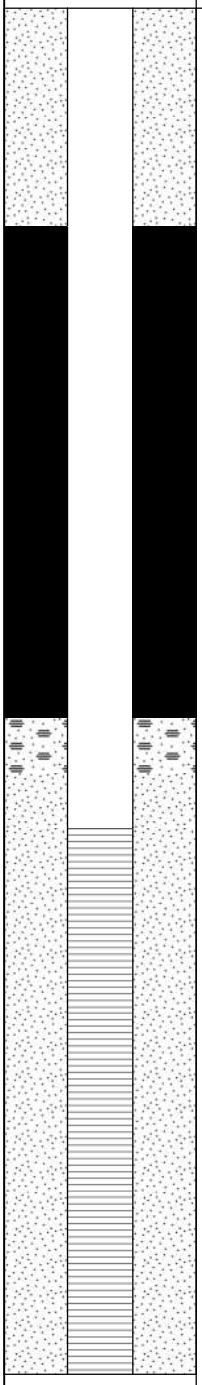
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-2A

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/29/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Topsoil, pea gravel. (GP)	
					2	Dark brown silt, concrete-glass fill material. (ML)	
					3	Black fine sand with coarse rounded gravel. (SM)	
					4		
					5	Brown sandy silt, some large rounded gravel. (ML)	
					6		
					7	Grey sandy silt, large rounded gravel, Trenton gravel. (ML)	
					8		
					9		
					10	Brown silt, some fine sand. (ML)	
					11		
					12		
					13		
					14		Vibration and cobbles from 10 to 18 ft bgs.
					15		
					16		
					17		
					18	Brown silt, Trenton gravel. (ML)	
					19		
					20	Brown coarse sand, some rounded gravel. (ML)	
					21		
					22	Dark brown silt, Trenton gravel. (ML)	
					23		
					24		
					25		Saturated, product odor at 25 ft bgs.

Comments:

Well BV-2A completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

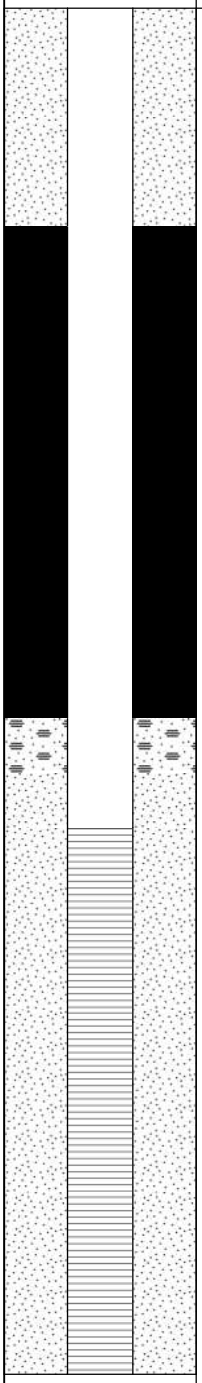
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-2C

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/28/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1	Topsoil, brown silty sand, some small angular gravel, brick fill. (SM)	Perched water from 5 to 7 ft bgs.
					2		
					3	Grey silt, some fine sand, trace fine-coarse gravel. (ML)	
					4	Brown silt, some fine sand. (ML)	
					5		
					6		
					7		
					8		
					9		
					10		
					11	Brown silt, some fine sand, some Trenton gravel. (ML)	Vibrations and cobbles from 11 to 19 ft bgs.
					12		
					13		
					14		
					15		
					16		
					17		
					18		
					19	Brown silty sand, large angular gravel, some Trenton gravel. (SM)	
					20		
					21		
					22		
					23		
					24		
					25		

Comments:

Well BV-2C completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

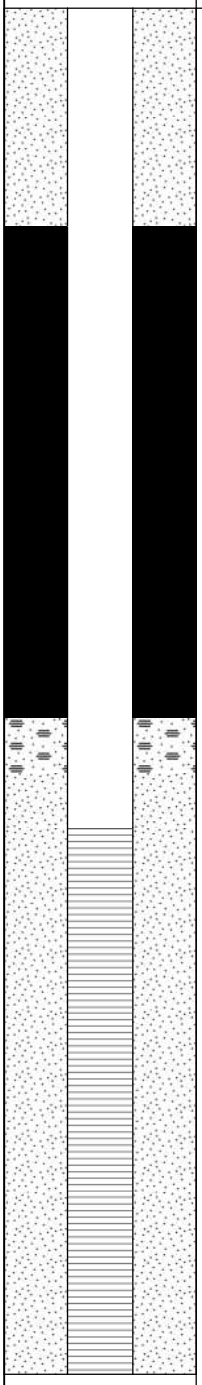
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF BIOVENT WELL BV-2E

Drill Method: Hollow Stem Augers	**Date Drilled:** 12/5/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–25	Dark brown-grey-light brown-orange silt with some to little fine sand. (ML) Light brown-orange sandy silt with some little medium-coarse sand, little to few subrounded fine gravel. (ML) Light brown-orange silty medium-coarse sand with some silt and little medium-coarse round-subround gravel. (SM) Light brown-orange-grey poorly graded medium-coarse round-subround gravel with silt. (GP-GM) Light brown silty coarse sand, rounded-subrounded gravel. (SM) Light brown silt, fine-medium sand, little to few medium-coarse round-subround gravel. (SM)	Vibration at 11 ft bgs. Wet at 23 ft bgs.

Comments:

Well BV-2EV completed to 25 ft bgs with 10 ft of 0.02" slotted 4" sch 40 PVC screen from 15 to 25 ft bgs. #1 quartz sand emplaced from 14 to 25 ft bgs and #00 quartz sand emplaced from 13 to 14 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

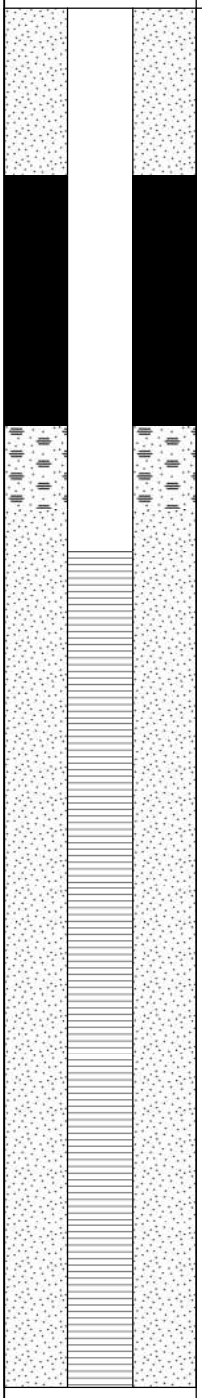
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF MONITORING WELL
PH-MW-66

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/30/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–33	Dark brown-brow-light grey silt, little fine sand, trace fine gravel. (ML) Dark brown-reddish brown sandy silt with gravel. (ML)	Strong vibrations from 11 to 15 ft bgs. Strong vibrations from 25 to 27 ft bgs.

Comments:

Well PH-MW-66 completed to 33 ft bgs with 10 ft of 0.02" slotted 2" sch 40 PVC screen from 13 to 33 ft bgs. #1 quartz sand emplaced from 12 to 33 ft bgs and #00 quartz sand emplaced from 10 to 12 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

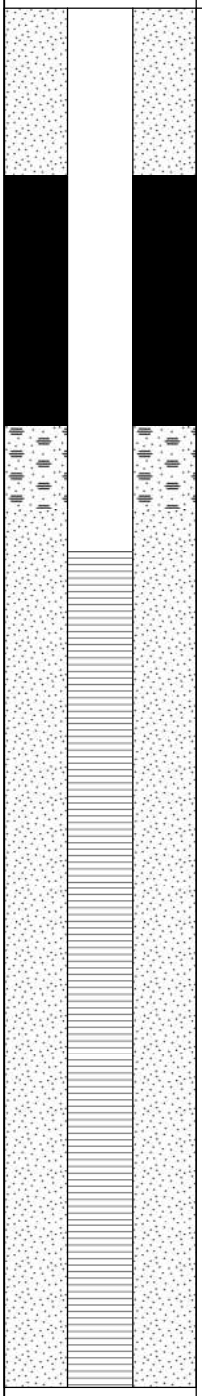
Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF MONITORING WELL
PH-MW-67

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/26/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					1–8	Brown-tan silt, little sand. (ML)	
					9–18	Brown-tan sand, some gravel 1" to 0.25" grading up, little silt. (SW-SM)	
					18–33	Reddish-brown sand, gravel, some silt. (SM)	Wet, strong odor at 26 ft bgs. Saturated from 30 to 31 ft bgs.

Comments:

Well PH-MW-67 completed to 33 ft bgs with 10 ft of 0.02" slotted 2" sch 40 PVC screen from 13 to 33 ft bgs. #1 quartz sand emplaced from 12 to 33 ft bgs and #00 quartz sand emplaced from 10 to 12 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

PARS ENVIRONMENTAL
a Montrose Environmental Group company

LOG OF MONITORING WELL
PH-MW-67

Drill Method: Hollow Stem Augers	**Date Drilled:** 11/26/18	**Logged By:** D. N. Habecker
Drilling Contractor: ECDI	**Permit No:**	

Well Completion	Recovery (FT)	Recovery Graphic	PID Response (ppm)	Lithology	Depth (ft bgs)	Description	Remarks
					35		
					36		
					37		
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					67		

Comments:

Well PH-MW-67 completed to 33 ft bgs with 10 ft of 0.02" slotted 2" sch 40 PVC screen from 13 to 33 ft bgs. #1 quartz sand emplaced from 12 to 33 ft bgs and #00 quartz sand emplaced from 10 to 12 ft bgs and hydrated. Neat cement grout emplaced to 4 ft bgs prior to completion of well trenching and piping installation.

Site: DSCP Valmont BV/BS Install
3100 Penrose Ferry Rd.
Philadelphia, PA

Project No: 756-10

APPENDIX C
C1 – Construction Change Detail
C2 – Construction As-Built Drawings

DSCP Biovent/Biosparge Pilot Test
PARS Environmental Contractor Change Request (CCR) Tracking Log

Change Request No.	Description of Change	Submitted to	Schedule Impact	Design Drawings Affected	Date Submitted	Engineer's Comments	Engineer Approval Date	Approval Status
001	Modifies the design of the conveyance support structure on the south (PHA) side of the DSCP Biovent/Biosparge Pilot System to be positioned vertically on supports instead of horizontally on grade as shown in Design Drawing C-7 Detail D-1. Also changes western portion to be buried IAW drawing C-3, detail T1, T2 (shallow buried portion) and T5, T6 (lower buried portion).	ARCADIS Project Engineer	N/A	C-2, C-7	10/26/18	ARCADI desig Eng responde with request to honor expansion loop dimensions.	11/6/18	Approved
002	Modifies the configuration of BV/BS manifold header pipes to accommodate limited height for BV/BS valving/instrumentation assemblies. Raises lower header and shifts assemblies in lower header to the left, shifts assemblies in upper header to the right. Places biovent manifold on the west wall and the biosparge manifold on the east wall. Re-routes the flexible tubing connections along the wall near the floor level from the west biovent manifold to the east wall where they enter the shed.	ARCADIS Project Engineer	N/A	M-3, M-4	12/21/18	Maintain All shut-off valve functionality	12/21/18	Approved
003	Changes Shed type from Grainger Model # 2RMZ2 to 8' x 12' Mini Barn	ARCADIS Project Engineer	N/A	C-6	11/12/18	Approved proposed shed change	11/19/18	Approved
004	Home run piping from well field (biovent and biosparge wells) was changed from entering the shed vertially through the floor to entering through the eastern wall of the Shed. Exposed pipes were covered within a framed wooden enclosure completed with a shingled roof attached to the manifold shed.	ARCADIS Project Engineer	N/A	C-4	12/6/18	Requested that the exposed PVC piping be covered within an enclosure to prevent degradation and damage to the PVC due to UV light exposure and physical impacts.	12/7/18	Approved
005	Blower and Skid Package reconfiguration inside the VES control room was changed from as shown on C-4 to a skid mounted design that is oriented 90-degrees and geneally in the location where the air compressor was to be moved to. The air compressor remained in its original location along the south wall.	ARCADIS Project Engineer	N/A	C-4	12/6/18	Several design revisions were made in order to make the skid package fit appropriately in the VES room. Early designs were too long (north-south) for the Team's preferences.	12/26/18	Approved

Design Change Photo Log



Change Request No. 001: Modification of layout of aboveground piping and supports in PHA swale; Progress of attaching pipes to vertical supports shown, facing Northwest



Change Request No. 002: Modification of manifold configuration inside shed; Final layout pictured, facing North-Northeast



Change Request No. 003: Modified model of shed housing manifold; Installed model pictured, facing North.



Change Request No. 004: Modified configuration of well field piping at connection to manifold shed; Final layout pictured, facing Northwest.



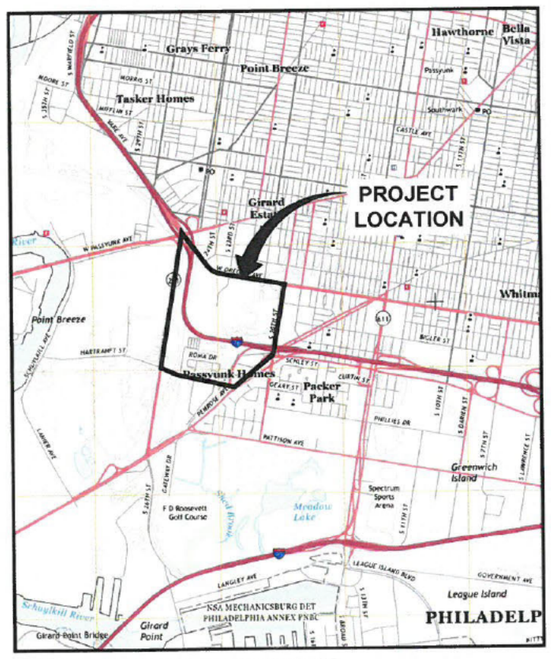
Change Request No. 004: Enclosure constructed to protect final pipe layout where above ground; Completed enclosure pictured, facing Northwest.



Change Request No. 005: Blower and Skid Package locations reconfigured; Final layout pictured, facing South-Southwest.

CONSTRUCTION DRAWINGS

SYSTEM UPGRADES, PILOT DESIGN AND STUDY
FORMER DEFENSE SUPPLY CENTER (DSCP) - PHILADELPHIA
PHILADELPHIA, PENNSYLVANIA
CONTRACT NUMBER: [redacted]



REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE: PHILADELPHIA, PA, DATED 2013.

ORIGINAL DATE ISSUED:
NOVEMBER 18, 2016

REVISED WORK PLAN ISSUED:
JUNE 13, 2018

2990 SOUTH 20th STREET
PHILADELPHIA, PA 19145

PREPARED FOR:
UNITED STATES ARMY CORPS OF ENGINEERS, PHILADELPHIA DISTRICT

ARCADIS

ARCADIS U.S., INC.

[redacted]

INDEX TO DRAWINGS

COVER PAGE

GENERAL

G-1 CONSTRUCTION NOTES AND SPECIFICATIONS (1 OF 2)
G-2 CONSTRUCTION NOTES AND SPECIFICATIONS (2 OF 2)
G-3 MAJOR EQUIPMENT AND INSTRUMENT LIST

CIVIL

C-1 SITE PLAN
C-2 PILOT TEST SYSTEM LAYOUT
C-3 TRENCHING DETAILS
C-4 PILOT TREATMENT SYSTEM BLOWERS (IN EXISTING REMEDIATION BUILDING)
C-5 EXISTING REMEDIATION BUILDING: SOUTH EXTERIOR WALL
C-6 PILOT SYSTEM MANIFOLD ENCLOSURE
C-7 ABOVEGROUND PIPE DETAILS AND CROSSINGS

MECHANICAL

M-1 BIOSPARGE AND BIOVENT WELLHEAD CONSTRUCTION DETAILS
M-2 PERFORMANCE MONITORING WELL CONSTRUCTION DETAILS
M-3 PILOT SYSTEM BIOSPARGE MANIFOLD DETAILS
M-4 PILOT SYSTEM BIOVENT MANIFOLD DETAILS
M-5 NORTH EXIT VAULT DETAILS
M-6 SOUTH EXIT VAULT DETAILS
M-7 BIOSPARGE/BIOVENT BLOWER PACKAGE

PID

PID-1 BIOSPARGING PIPING AND INSTRUMENTATION DIAGRAM
PID-2 BIOVENTING PIPING AND INSTRUMENTATION DIAGRAM
PID-3 PIPING AND INSTRUMENTATION DIAGRAM LEGEND

INSTRUMENTATION

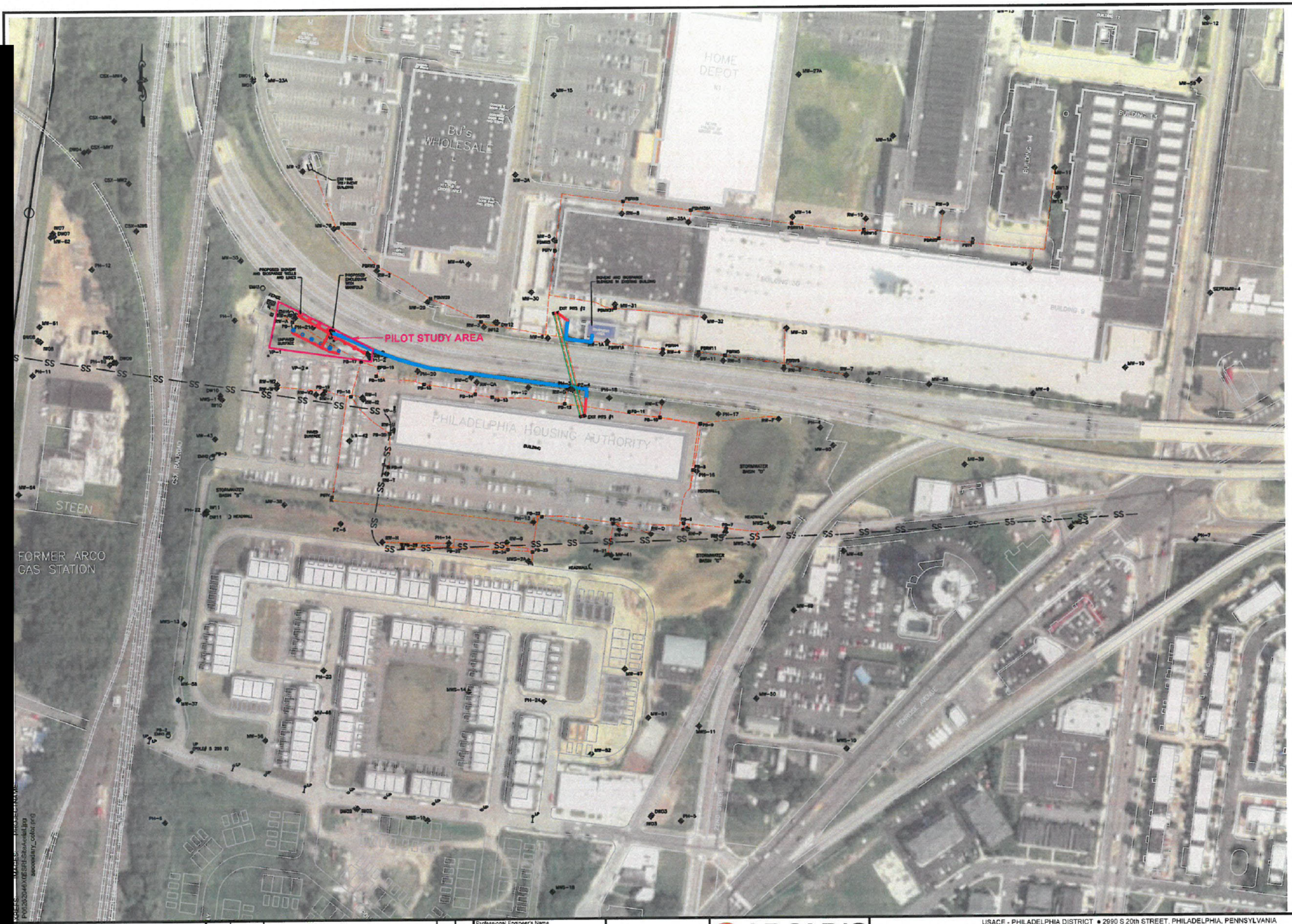
I-L PILOT TREATMENT SYSTEM CONTROL PANEL LAYOUT
I-B PILOT TREATMENT SYSTEM CONTROL PANEL BILL OF MATERIALS
I-1 PILOT TREATMENT SYSTEM CONTROL PANEL POWER DISTRIBUTION WIRING DIAGRAM
I-2 PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX 1400 DISCRETE INPUTS
I-3 PILOT TREATMENT SYSTEM CONTROL PANEL MICROLOGIX RELAY OUTPUTS
I-4 PILOT TREATMENT SYSTEM CONTROL PANEL SLOTS 1 AND 2 ANALOG INPUTS
I-5 PILOT TREATMENT SYSTEM CONTROL PANEL SLOT 3 ANALOG INPUTS AND OUTPUTS

INSTRUMENTATION, CONTINUED

I-6 PILOT TREATMENT SYSTEM CONTROL PANEL - THIS PAGE LEFT INTENTIONALLY BLANK
I-7 PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 1 OF 2)
I-8 PILOT TREATMENT SYSTEM CONTROL PANEL 480 VAC WIRING DIAGRAM (SHEET 2 OF 2)
I-N0 NORTHERN SKIMMER SYSTEM PANEL LAYOUT
I-N1 NORTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-N2 NORTHER SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-N3 NORTHERN SKIMMER SYSTEM MICROLOGIX RELAY OUTPUTS
I-N4 NORTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-N5 NORTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S0 SOUTHERN SKIMMER SYSTEM PANEL LAYOUT
I-S1 SOUTHERN SKIMMER SYSTEM POWER DISTRIBUTION
I-S2 SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 24 VDC DISCRETE INPUTS
I-S3 SOUTHERN SKIMMER SYSTEM MICROLOGIX 1400 RELAY OUTPUTS
I-S4 SOUTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-S5 SOUTHERN SKIMMER SYSTEM SLOT 1 ANALOG INPUTS
I-S6 SOUTHERN SKIMMER SYSTEM- THIS PAGE LEFT INTENTIONALLY BLANK
I-S7 COMPRESSOR CONTROL ENCLOSURE (CCE) PANEL LAYOUT
I-S8 SOUTHERN SKIMMER SYSTEM MOTOR CONTROL PANEL WIRING DETAILS

ELECTRICAL

E-1 ELECTRICAL SYMBOL LEGEND AND SPECIFICATIONS
E-2 PILOT TREATMENT SYSTEM ELECTRICAL SINGLE LINE DIAGRAM (SHEET 1 OF 2)
E-3 PILOT TREATMENT SYSTEM ELECTRICAL SINGLE LINE DIAGRAM (SHEET 2 OF 2)
E-4 PILOT TREATMENT SYSTEM ELECTRICAL LAYOUT DIAGRAM
E-5 SOUTHERN SKIMMER SYSTEM ELECTRICAL SINGLE LINE DIAGRAM
E-6 NORTHERN SKIMMER SYSTEM ELECTRICAL SINGLE LINE DIAGRAM



LEGEND:

- FENCE
- UTILITY POLE
- LIGHT POLE
- SHALLOW OR INTERMEDIATE WELL
- DEEP WELL
- VAPOR POINTS
- PB-10 ELECTRICAL PULL BOX
- WELL VAULT
- TERMINATION VAULT
- REMEDIATION SYSTEM TRENCH ROUTE
- ABANDONED ELECTRICAL CONDUIT
- ELECTRIC/COMMUNICATIONS LINE
- SS SEWER LINE (LOCATION APPROXIMATE)
- SD STORM DRAIN LINE (LOCATION APPROXIMATE)
- ELECTRICAL TRANSFORMER
- EMH ELECTRICAL MANHOLE
- PROPOSED ABOVE GRADE PIPING ON UNISTRUT RACK
- PROPOSED BELOW GROUND PIPING (TRENCH AND RESTORATION FOR PAVED AREAS, DIRECT BURY IN GRASS)
- EXISTING BURIED CONDUIT

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

NOTES:

CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION. THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC. DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."
2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.
4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.
5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 16, 2007. DWG: SK041007.
6) UTILITY PLAN, SIENA PLACE, 3100-3190 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.
7) PIPING TRENCH SURVEY, DENNIS W. SKLAR, INC.-PROFESSIONAL LAND SURVEYING, BENSALEM, PA, JUNE 6, 2010.
8) AERIAL PHOTO SOURCED FROM ESRI ARCMAP.

0 120 240

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: [redacted]
Professional Engineer's No.: [redacted]
State: [redacted] Date Signed: 6/13/18 Project Mgr.: [redacted]
Designed by: [redacted] Drawn by: [redacted] Checked by: [redacted]

ARCADIS
ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

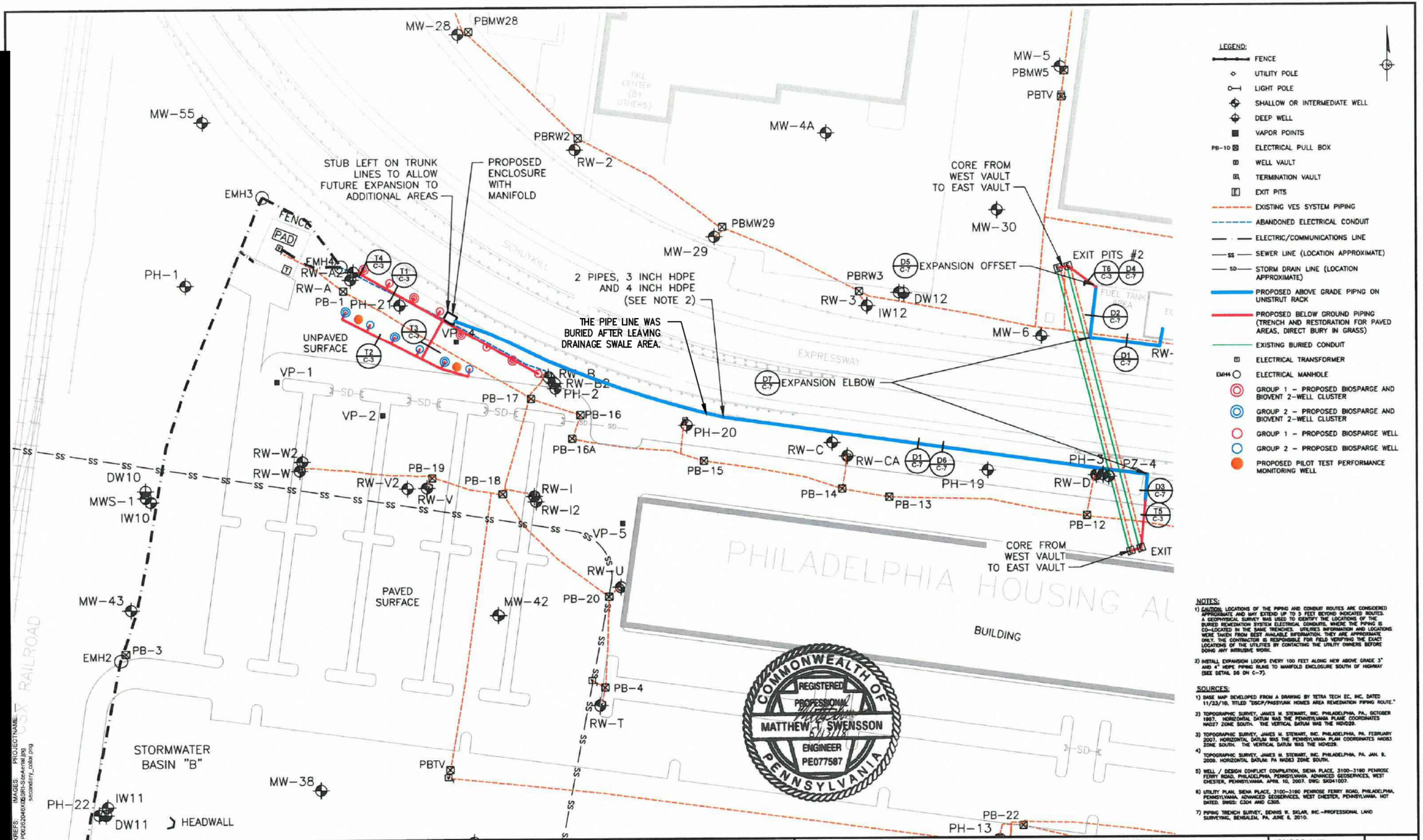
SITE PLAN

PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL: 302.656.1718

C-1



NOTES:

1) CAUTION: LOCATIONS OF THE PIPING AND CONDUIT ROUTES ARE CONSIDERED APPROXIMATE AND MAY EXTEND UP TO 5 FEET BEYOND INDICATED ROUTES. A GEOPHYSICAL SURVEY WAS USED TO IDENTIFY THE LOCATIONS OF THE BURIED REMEDIATION SYSTEM ELECTRICAL CONDUITS, WHERE THE PIPING IS CO-LOCATED IN THE SAME TRENCHES. UTILITIES INFORMATION AND LOCATIONS WERE TAKEN FROM BEST AVAILABLE INFORMATION; THEY ARE APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING THE EXACT LOCATIONS OF THE UTILITIES BY CONTACTING THE UTILITY OWNERS BEFORE DOING ANY INTRUSIVE WORK.

2) INSTALL EXPANSION LOOPS EVERY 100 FEET ALONG NEW ABOVE GRADE 3" AND 4" HDPE PIPING RUNS TO MANIFOLD ENCLOSURE SOUTH OF HIGHWAY (SEE DETAIL D6 ON C-7).

SOURCES:

1) BASE MAP DEVELOPED FROM A DRAWING BY TETRA TECH EC, INC, DATED 11/23/10, TITLED "DSCP/PASSYUNK HOMES AREA REMEDIATION PIPING ROUTE."

2) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA., OCTOBER 1997. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLANE COORDINATES NAD27 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.

3) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. FEBRUARY 2007. HORIZONTAL DATUM WAS THE PENNSYLVANIA PLAN COORDINATES NAD83 ZONE SOUTH. THE VERTICAL DATUM WAS THE NGVD29.

4) TOPOGRAPHIC SURVEY, JAMES M. STEWART, INC. PHILADELPHIA, PA. JAN. 9, 2009. HORIZONTAL DATUM: PA NAD83 ZONE SOUTH.

5) WELL / DESIGN CONFLICT COMPILATION, SIENA PLACE, 3100–3180 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. APRIL 10, 2007. DWG: SK041007.

6) UTILITY PLAN, SIENA PLACE, 3100–3180 PENROSE FERRY ROAD, PHILADELPHIA, PENNSYLVANIA. ADVANCED GEOSERVICES, WEST CHESTER, PENNSYLVANIA. NOT DATED. DWGS: C304 AND C305.

7) PIPING TRENCH SURVEY, DENNIS W. SKLAR, INC.–PROFESSIONAL LAND SURVEYING, BENSALEM, PA. JUNE 6, 2010.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
MATTHEW T. SWENSSON
ENGINEER
PE077587

XREFS: IMAGES: PROJECTNAME:--- P:\06262046\06\GIS\RI-SiteAerial.jpg secondary_color.png

0 40 80

No.	Date	Revisions	By	Ckd
1	6/13/2018	FINAL	EM	MS

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Professional Engineer's Name: MATTHEW T. SWENSSON
Professional Engineer's No.: PE077587
State | Date Signed | Project Mgr.
Designed by | Drawn by | Checked by

ARCADIS U.S., INC.

USACE - PHILADELPHIA DISTRICT • 2990 S 20th STREET, PHILADELPHIA, PENNSYLVANIA
FORMER DSCP SYSTEM UPGRADES

PILOT TEST SYSTEM LAYOUT

PROCESS

ARCADIS Project No.: 06262046.0005.00004
Date: JUNE 13, 2018

ARCADIS
824 MARKET STREET
SUITE 820
WILMINGTON, DE 19801
TEL 302.658.1718

C-2

APPENDIX D – Pilot Test Data

Table 1
BIOVENT AND BIOSPARGE WELL PRESSURE AND FLOW DATA

date	time	VES ON?	BIOSPARGE ON?	BIOSPARGE GROUP RUNNING	BIOVENT ON?	BIOVENT GROUP RUNNING	BS GROUP-1 PRESSURE (psi)	BS-1A PRESSURE (psi)	BS-1A FLOW (scfm)	BS-1B PRESSURE (psi)	BS-1B FLOW (scfm)	BS-1C PRESSURE (psi)	BS-1C FLOW (scfm)	BS-1D PRESSURE (psi)	BS-1D FLOW (scfm)	BS-1E PRESSURE (psi)	BS-1E FLOW (scfm)	BS-1F PRESSURE (psi)	BS-1F FLOW (scfm)	BS-1G PRESSURE (psi)	BS-1G FLOW (scfm)	BS-1H PRESSURE (psi)	BS-1H FLOW (scfm)
2/27/2019	9:45	yes	yes	GROUP 1			8.8	0.6	2	6.2	2	7.4	0	7.8	2	8.4	0	6.3	2	6.3	2	6.3	2
2/27/2019	10:30	yes	yes	GROUP 1			8.5	0.6	2	6	2	7.2	0	7.6	2	8.3	0	6.4	2	6.2	2	6	2
2/27/2019	11:00	yes	yes	GROUP 1			8.4	0.6	2	6	2	7.1	0	7.5	2	8	0	6.1	2	6.2	2	6.2	2
2/27/2019	11:30	yes	yes	GROUP 1			8.4	0.6	2	6	2	7.1	0	7.5	2	8	0	6.2	2	6.2	2	6.2	2
2/27/2019	12:15	yes	yes	GROUP 2																			
2/27/2019	12:45	yes	yes	GROUP 2																			
2/27/2019	13:15	yes	yes	GROUP 2																			
2/27/2019	13:45	yes	yes	GROUP 2																			
2/27/2019	14:15	yes	yes	GROUP 2																			
2/27/2019	14:45	yes	yes	GROUP 2																			
2/27/2019	15:15	yes	yes	GROUP 2																			
2/28/2019	9:00	yes			yes	GROUP 1																	
2/28/2019	9:30	yes			yes	GROUP 1																	
2/28/2019	10:00	yes			yes	GROUP 1																	
2/28/2019	10:30	yes			yes	GROUP 1																	
2/28/2019	11:00	yes			yes	GROUP 1																	
2/28/2019	11:30	yes			yes	GROUP 1																	
2/28/2019	12:00	yes			yes	GROUP 1																	
2/28/2019	12:30	yes			yes	GROUP 1																	
2/28/2019	13:00	yes			yes	GROUP 1																	
2/28/2019	13:30	yes			yes	GROUP 1																	
2/28/2019	14:00	yes			yes	GROUP 1																	
2/28/2019	15:00	yes			yes	GROUP 1																	
3/5/2019	9:30	yes			yes	GROUP 1																	
3/5/2019	10:00	yes			yes	GROUP 1																	
3/5/2019	10:30	yes			yes	GROUP 1																	
3/5/2019	11:00	yes			yes	GROUP 1																	
3/6/2019	9:00	yes			YES	GROUP 2																	
3/25/2019	12:30	yes	yes																				
3/26/2019	9:20	yes	yes				7.4	0.2	1.6	6.1	1.6	7.2	0	7.1	0	7.2	0	7	1.7	7	0	6.1	1.6
3/26/2019	10:10	yes	yes																				
3/26/2019	11:05	yes	yes				6.9	0.2	1.6	6.2	1.6	6.3	0	6.7	0	6.7	0	6.4	1.6	6.1	0	6.4	1.6
3/26/2019	13:15	yes	yes				6.6	0.1	1.6	6	1.6	6	0	6.4	0	6.5	0	6.2	0	6.1	0	6.2	1.6
3/26/2019	15:05	yes	yes				7.3	0.2	1.6	6.1	1.6	6.4	0	7	0	7.2	0	6.2	1.8	6.3	0	6.2	1.8
3/29/2019	9:45	yes	yes				7.1	0.4	1.8	6.2	1.8	7.8	0	7.8	0	8	0	6.6	1.8	6.2	0	6.4	1.8
3/29/2019	10:45	yes	yes				7.5	0.4	1.8	6.3	1.9	6.8	0	7.2	0	7.2	0	6.4	1.8	6.2	0	6.2	1.8
3/29/2019	12:30	yes	yes				7.5	0.4	1.8	6.2	1.8	6.6	0	7.1	0	6.4	0	6.4	1.8	6.2	0	6.3	1.8
3/29/2019	15:25	yes	yes					0.4	1.2	6	1.2	7	stuck	7	0-10	6.1	0	5.9	0-4	6.6	0	6.4	0
4/2/2019	10:50																						
4/2/2019	11:15	yes	yes																				
4/2/2019	11:55	yes	yes																				
4/2/2019	13:25	yes	yes																				
4/2/2019	13:50	yes	yes																				
4/3/2019	7:36	yes	yes	GROUP 2																			
4/3/2019	8:50	yes	yes	GROUP 2																			
4/3/2019	9:20	yes	yes	GROUP 2																			
4/3/2019	11:05	yes	yes	GROUP 2																			
4/3/2019	11:50	yes	yes	GROUP 2																			
4/3/2019	12:20	yes	yes	GROUP 2																			
4/15/2019	8:44	yes	yes	GROUP 1			7.8	0.25	1.4	6	1.4	6.5	1.4	6.75	14	6.5	1.4	6.25	1.4	6.25	1.4	6.25	1.4
4/15/2019	12:01	yes	yes	GROUP 2																			
4/16/2019	8:17	yes	yes	GROUP 2																			
4/17/2019	12:37	yes	yes	GROUP 2																			
4/22/2019	7:57	yes	yes	GROUP 2																			
4/22/2019	10:02	yes	yes	GROUP 2	yes	GROUP 1																	
4/22/2019	13:26	yes	yes	GROUP 2	yes	GROUP 1																	
4/23/2019	8:14	yes	yes	GROUP 2	yes	GROUP 1																	
4/23/2019	11:27	yes	yes	GROUP 2	yes	GROUP 1																	
4/29/2019	11:21	yes	yes	GROUP 2	yes	GROUP 2																	
4/30/2019	8:46	yes	yes	GROUP 2	yes	GROUP 2																	
4/30/2019	13:56	yes	yes	GROUP 2	yes	GROUP 2																	
5/1/2019	10:37	yes	yes	GROUP 2	yes	GROUP 2																	
5/6/2019	8:05	yes	yes	GROUP 2	yes	GROUP 2																	

Table 1
BIOVENT AND BIOSPARGE WELL PRESSURE AND FLOW DATA

date	time	VES ON?	BIOSPARGE ON?	BIOSPARGE GROUP RUNNING	BIOVENT ON?	BIOVENT GROUP RUNNING	BS GROUP-2 PRESSURE (psi)	BS-2A PRESSURE (psi)	BS-2A FLOW (scfm)	BS-2B PRESSURE (psi)	BS-2B FLOW (scfm)	BS-2C PRESSURE (psi)	BS-2C FLOW (scfm)	BS-2D PRESSURE (psi)	BS-2D FLOW (scfm)	BS-2E PRESSURE (psi)	BS-2E FLOW (scfm)	BS-2F PRESSURE (psi)	BS-2F FLOW (scfm)	BV GROUP-1 PRESSURE (psi)	BV-1A PRESSURE (psi)	BV-1A FLOW (scfm)	BV-1C PRESSURE (psi)	BV-1C FLOW (scfm)	BV-1E PRESSURE (psi)	BV-1E FLOW (scfm)	BV-1G PRESSURE (psi)	BV-1G FLOW (scfm)
2/27/2019	9:45	yes	yes	GROUP 1																									
2/27/2019	10:30	yes	yes	GROUP 1																									
2/27/2019	11:00	yes	yes	GROUP 1																									
2/27/2019	11:30	yes	yes	GROUP 1																									
2/27/2019	12:15	yes	yes	GROUP 2			9.4	5.4	2	6	2	6.8	2	9.2	0	8.6	2	9.2	0										
2/27/2019	12:45	yes	yes	GROUP 2			9.4	5.4	2	6	2	5.4	2	9.1	0	8	2												
2/27/2019	13:15	yes	yes	GROUP 2			9.4	5	2	6	2	7.2	2	0	0	7.3	2	9.1	0										
2/27/2019	13:45	yes	yes	GROUP 2			9.4	5.2	2	6	2	7.2	2	0	0	7.4	2	9.2	0										
2/27/2019	14:15	yes	yes	GROUP 2						6	2	7.2	2	0	0	7.4	2	9.2	0										
2/27/2019	14:45	yes	yes	GROUP 2			9.4	5.2	2	6	2	7.2	2	0	0	7.4	2	9.2	0										
2/27/2019	15:15	yes	yes	GROUP 2			9.4	5	2	5.8	2	7	2	0	0	7.3	2	9.1	0										
2/28/2019	9:00	yes			yes	GROUP 1														4	0	5	0	3.5	0	5	0	5	
2/28/2019	9:30	yes			yes	GROUP 1														3.7	0	5	0	3.8	0	5	0	5	
2/28/2019	10:00	yes			yes	GROUP 1														3.7	0	5	0	3.8	0	5	0	5	
2/28/2019	10:30	yes			yes	GROUP 1														3.7	0	5	0	3.8	0	5	0	5	
2/28/2019	11:00	yes			yes	GROUP 1														3.7	0	5	0	3.7	0	5	0	5	
2/28/2019	11:30	yes			yes	GROUP 1														3.2	0	10	0	2.2	0	10	0	10	
2/28/2019	12:00	yes			yes	GROUP 1														3.2	0	10	0	2.2	0	10	0	10	
2/28/2019	12:30	yes			yes	GROUP 1														3.2	0	10	0	2.2	0	10	0	10	
2/28/2019	13:00	yes			yes	GROUP 1														2.7	0	13.5	0	1.8	0	13.5	0	15	
2/28/2019	13:30	yes			yes	GROUP 1														2.6	0	15	0	1.8	0	15	0	15	
2/28/2019	14:00	yes			yes	GROUP 1														2.6	0	15	0	1.8	0	15	0	15	
2/28/2019	15:00	yes			yes	GROUP 1														2.6	0	15	0	1.7	0	15	0	15	
3/5/2019	9:30	yes			yes	GROUP 1														2.1	0	20	0	1.5	0	20	0	20	
3/5/2019	10:00	yes			yes	GROUP 1														2.1	0	17.5	0	1.5	0	29	0.2	20.5	
3/5/2019	10:30	yes			yes	GROUP 1														2.1	0.2	19	0	1.5	0	20.25	0.2	19	
3/5/2019	11:00	yes			yes	GROUP 1														2	0.2	20	0	1.5	0	20	0.2	19.5	
3/6/2019	9:00	yes			YES	GROUP 2																							
3/25/2019	12:30	yes	yes																										
3/26/2019	9:20	yes	yes																										
3/26/2019	10:10	yes	yes																										
3/26/2019	11:05	yes	yes																										
3/26/2019	13:15	yes	yes																										
3/26/2019	15:05	yes	yes																										
3/29/2019	9:45	yes	yes																										
3/29/2019	10:45	yes	yes																										
3/29/2019	12:30	yes	yes																										
3/29/2019	15:25	yes	yes																										
4/2/2019	10:50																												
4/2/2019	11:15	yes	yes																										
4/2/2019	11:55	yes	yes																										
4/2/2019	13:25	yes	yes																										
4/2/2019	13:50	yes	yes																										
4/3/2019	7:36	yes	yes	GROUP 2			8.8	5.9	1	6.9	1	7.2	1	8.4	0	8.2	1	8.2	1										
4/3/2019	8:50	yes	yes	GROUP 2			8.4	5	1	6.1	1	6.3	1	7.4	1	6.4	1	7.3	1										
4/3/2019	9:20	yes	yes	GROUP 2			8.4	5	1	6	1	6.1	1	7.1	1	7.5	1	7.2	1										
4/3/2019	11:05	yes	yes	GROUP 2			8.4	4.8	1	6	1	6	1	6.7	1	6.2	1	7.1	1										
4/3/2019	11:50	yes	yes	GROUP 2			8.4	4.8	1	6	1	6	1	6.7	1	6.1	1	7.1	1										
4/3/2019	12:20	yes	yes	GROUP 2			8.4	4.8	1	6	1	6	1	6.7	1	6.2	1	7.1	1										
4/15/2019	8:44	yes	yes	GROUP 1																									
4/15/2019	12:01	yes	yes	GROUP 2																									
4/16/2019	8:17	yes	yes	GROUP 2			7.9	5	1.4	5.75	1.4	5.75	1.4	6	1.4	5.5	1.4	6.75	1										
4/17/2019	12:37	yes	yes	GROUP 2			8.25	5	1.4	5.75	1.4	6	1.4	6.5	1.4	6	1.4	6.5	1.4										
4/22/2019	7:57	yes	yes	GROUP 2			4.8	4.8	1	5.7	1	5.8	1	6.2	1	5.9	1	7	1										
4/22/2019	10:02	yes	yes	GROUP 2	yes	GROUP 1	8.1	5	1.4	6	1.4	6	1.4	6.25	1.4	6.5	1.4	7	1.4	3.7	9	5	2	0	0	5	0	5	
4/22/2019	13:26	yes	yes	GROUP 2	yes	GROUP 1	8.1	4.75	1.4	6	1.4	6	1.4	6.25	1.4	6.25	1.4	7	1.4	3.75	0	5	2.25	0	0	5	0	5	
4/23/2019	8:14	yes	yes	GROUP 2	yes	GROUP 1	8.1	4.8	1.4	6	1.4	6	1.4	6.25	1.4	6.25	1.4	7	1.4	3.5	0	5	2	0	0	5	0	5	
4/23/2019	11:27	yes	yes	GROUP 2	yes	GROUP 1	8.1	4.75	1.4	6	1.4	6	1.4	6.25	1.4	6.25	1.4	7	1.4	3.5	0	5	2	0	0	5	0	5	
4/29/2019	11:21	yes	yes	GROUP 2	yes	GROUP 2	8.5	4.75	1.4	5.75	1.4	6	1.4	6.25	1.4	6	1.4	7	1.4										
4/30/2019	8:46	yes	yes	GROUP 2	yes	GROUP 2	8.25	4.75	1.4	6	1	6	1.4	6.25	1.4	6	1.4	7	1.4										
4/30/2019	13:56	yes	yes	GROUP 2	yes	GROUP 2	8.25	4.5	1.4	6	1.4	6.25	1.4	6.25	1.4	6	1.4	7	1.4										
5/1/2019	10:37	yes	yes	GROUP 2	yes	GROUP 2	8.4	4.5	1.4	6	1.4	6	1.4	6.25	1.4	6	1.4	7	1.4										
5/6/2019	8:05	yes	yes	GROUP 2	yes	GROUP 2	8.1	4.25	1.4	5.75	1.4	6	1.4	6.5	1.4	6	1.4	7	1.4										

Table 1
BIOVENT AND BIOSPARGE WELL PRESSURE AND FLOW DATA

date	time	VES ON?	BIOSPARGE ON?	BIOSPARGE GROUP RUNNING	BIOVENT ON?	BIOVENT GROUP RUNNING	BV GROUP-2 PRESSURE (psi)	BV-2A PRESSURE (psi)	BV-2A FLOW (scfm)	BV-2C PRESSURE (psi)	BV-2C FLOW (scfm)	BV-2E PRESSURE (psi)	BV-2E FLOW (scfm)	BV-1A PRESSURE ("H2O)	BV-1C PRESSURE ("H2O)	BV-1E PRESSURE ("H2O)	BV-1G PRESSURE ("H2O)	BV-2A PRESSURE ("H2O)	BV-2C PRESSURE ("H2O)	BV-2E PRESSURE ("H2O)	MW-66 PRESSURE ("H2O)	MW-67 PRESSURE ("H2O)	PH-21 PRESSURE ("H2O)	GENERAL COMMENTS
2/27/2019	9:45	yes	yes	GROUP 1																	-2.3	-2.1	-2.2	
2/27/2019	10:30	yes	yes	GROUP 1																	-1.6	-1.7	-1.5	
2/27/2019	11:00	yes	yes	GROUP 1																	-1.7	-1.9	-2.3	
2/27/2019	11:30	yes	yes	GROUP 1																	-1.5	-2.3	3.3	
2/27/2019	12:15	yes	yes	GROUP 2																	-1.7	-1.9	3.5	
2/27/2019	12:45	yes	yes	GROUP 2																	-1.2	-1.7	3.4	
2/27/2019	13:15	yes	yes	GROUP 2																	-1.3	-1.5	3.9	TURNED OFF DUE TO BAD WELL SEAL.
2/27/2019	13:45	yes	yes	GROUP 2																	-1.3	-1.8	4	
2/27/2019	14:15	yes	yes	GROUP 2																	-1.2	-1.2	2.6	
2/27/2019	14:45	yes	yes	GROUP 2																	-1	-1.3	2.6	
2/27/2019	15:15	yes	yes	GROUP 2																	-1.2	-1.2	2.1	
2/28/2019	9:00	yes			yes	GROUP 1															-2.6	-2.8	3.4	
2/28/2019	9:30	yes			yes	GROUP 1															-2.7	-2.8	3.7	
2/28/2019	10:00	yes			yes	GROUP 1															-2.4	-2.3	4.6	
2/28/2019	10:30	yes			yes	GROUP 1															-2.2	-2.2	4.9	
2/28/2019	11:00	yes			yes	GROUP 1															-2.2	-2.2	4.3	
2/28/2019	11:30	yes			yes	GROUP 1															-1.8	-1.6	3.7	
2/28/2019	12:00	yes			yes	GROUP 1															-0.7	-0.7	3.2	
2/28/2019	12:30	yes			yes	GROUP 1															-0.8	-0.6	3.2	
2/28/2019	13:00	yes			yes	GROUP 1															-0.5	0	3.7	
2/28/2019	13:30	yes			yes	GROUP 1															3.5	3.5	0.8	
2/28/2019	14:00	yes			yes	GROUP 1															0	2.6	3.7	
2/28/2019	15:00	yes			yes	GROUP 1																		
3/5/2019	9:30	yes			yes	GROUP 1															-0.5	-0.5	1.6	
3/5/2019	10:00	yes			yes	GROUP 1															0	0.8	0	
3/5/2019	10:30	yes			yes	GROUP 1															1	1.8	0	
3/5/2019	11:00	yes			yes	GROUP 1															1.3	2.4	3.5	
3/6/2019	9:00	yes			YES	GROUP 2															-1.8	1.3	-1.6	
3/25/2019	12:30	yes	yes											-3.8	-0.9	-3.6	-3.8	-3.8	-3.7	-3.4	-0.9	-3.4	-3.1	
3/26/2019	9:20	yes	yes											-4.1	0	-4	-4.2	-4.2	-4.2	-3.7	-4.2	-4	-4.2	
3/26/2019	10:10	yes	yes											-4.3	0	-4	-4.1	-4.5	-4.4	-3.9	-5	-4.5	-2.5	
3/26/2019	11:05	yes	yes											-4	0	-3.9	-3.9	-4.2	-4.2	-3.7	-4.2	-4.5	-2.5	
3/26/2019	13:15	yes	yes											-3.5	0	-3.2	-3.2	-3.7	-3.5	-3.1	-3.3	-3.4	-2	
3/26/2019	15:05	yes	yes											-3.3	0	-2.9	-2.9	-3.2	-3.1	-2.7	-3	-3.3	-2.1	
3/29/2019	9:45	yes	yes											-4.1	-0.8	-3.9	-4	-4.1	-4.1	-3.7	-3.1	-3.8	-2.1	
3/29/2019	10:45	yes	yes											-2.9	0	-2.6	-2.6	-3	-2.9	-2.5	-2.8	-2.9	-2.5	
3/29/2019	12:30	yes	yes											-2.7	0	-2.4	-2.5	-2.7	-2.6	-2.2	-2.7	-2.8	-1.7	
3/29/2019	15:25	yes	yes											-2.7	0	-2.6	-2.7	-2.9	-2.8	-2.5	-2.8	-3	-1.7	Flows bouncing
4/2/2019	10:50													-5.4	-6	-6	-8.5	-7	-6.8	-8.8				
4/2/2019	11:15	yes	yes											-5.4	-6	-6.4	-8.1	-6.6	-8.2	-8.7	-2.1	-3	-1	
4/2/2019	11:55	yes	yes											-5.4	-6	-6.2	-7.1	-6.4	-8.1	-8.5	-2.1	-2.7	-1.9	
4/2/2019	13:25	yes	yes											-5.4	-5.9	-6	-7	-6.2	-8	-8.5	0	-2.4	-1.5	
4/2/2019	13:50	yes	yes											-5.4	-5.9	-6	-7	-5.2	-8	-8.5	0	-2.3	-1.5	
4/3/2019	7:36	yes	yes	GROUP 2																	-3.1	-3.7	-2.1	
4/3/2019	8:50	yes	yes	GROUP 2																	-2.7	-3	-2	
4/3/2019	9:20	yes	yes	GROUP 2																	-2.4	-3.1	-1.9	
4/3/2019	11:05	yes	yes	GROUP 2																	-2.9	-2.5	-2.2	
4/3/2019	11:50	yes	yes	GROUP 2																	-2.6	-1.9	-1.8	
4/3/2019	12:20	yes	yes	GROUP 2																	-2.6	-2	-2.1	
4/15/2019	8:44	yes	yes	GROUP 1										-3.9	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.7	-3.5	
4/15/2019	12:01	yes	yes	GROUP 2																				
4/16/2019	8:17	yes	yes	GROUP 2										-3.9	-3.6	-3.7	-3.5	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	
4/17/2019	12:37	yes	yes	GROUP 2										-3.7	-3.6	-3.4	-3.5	-3.4	-3.4	-3.4	-3.3	-3.3	-3.1	
4/22/2019	7:57	yes	yes	GROUP 2																	-2.6	-3.5	-3.1	BV group 2 at 5 SCFM (BV-1C at 0 SCFM). System pressure 3.8 psi. BV pressures read in PSI. BV-1E does not exist. Pressure under BV-1E is BV-1F.
4/22/2019	10:02	yes	yes	GROUP 2	yes	GROUP 1															-1.9	-1.3	-1	
4/22/2019	13:26	yes	yes	GROUP 2	yes	GROUP 1												-1.3	-1.3	-1.1	-0.6	-1.2	-0.6	
4/23/2019	8:14	yes	yes	GROUP 2	yes	GROUP 1												-1.6	-1.4	-1.4	-0.9	-1.3	-0.9	
4/23/2019	11:27	yes	yes	GROUP 2	yes	GROUP 1												-1	-0.9	-0.9	-0.9	-0.5	-0.6	
4/29/2019	11:21	yes	yes	GROUP 2	yes	GROUP 2	4	0	5	0	5	0	5	-1.4	-1.3	-1.4	-1.8				-0.9	-1.3	-1.2	
4/30/2019	8:46	yes	yes	GROUP 2	yes	GROUP 2	3.75	0	5	0	5	0	5	-2.6	-2.4	-2.1	-2.4				-1.8	-2	-1.8	
4/30/2019	13:56	yes	yes	GROUP 2	yes	GROUP 2	3.75	0	5	0	5	0	5	-2.6	-2	-2.2	-2.4				-1.6	-2	-1.8	
5/1/2019	10:37	yes	yes	GROUP 2	yes	GROUP 2	3.75	0	5	0	5	0	-2.4	-1.8	-1.9	-2.3	-2.2				-1.4	-1.9	-1.8	
5/6/2019	8:05	yes	yes	GROUP 2	yes	GROUP 2	3.74	0	5	0	5	0	5	-3.2	-2.7	-2.8	-3.1				-2.1	-2.7	-2	

Table 1
BIOVENT AND BIOSPARGE WELL PRESSURE AND FLOW DATA

date	time	VES ON?	BIOSPARGE ON?	BIOSPARGE GROUP RUNNING	BIOVENT ON?	BIOVENT GROUP RUNNING	BS GROUP-1 PRESSURE (psi)	BS-1A PRESSURE (psi)	BS-1A FLOW (scfm)	BS-1B PRESSURE (psi)	BS-1B FLOW (scfm)	BS-1C PRESSURE (psi)	BS-1C FLOW (scfm)	BS-1D PRESSURE (psi)	BS-1D FLOW (scfm)	BS-1E PRESSURE (psi)	BS-1E FLOW (scfm)	BS-1F PRESSURE (psi)	BS-1F FLOW (scfm)	BS-1G PRESSURE (psi)	BS-1G FLOW (scfm)	BS-1H PRESSURE (psi)	BS-1H FLOW (scfm)
5/6/2019	9:25	yes	yes	GROUP 1	yes	GROUP 1	7.75	0	1.4	6	1.4	7.25	1.5	7	0.5	7.5	0	6	0	6.25	0	6	1.4
5/7/2019	9:25	yes	yes	GROUP 1	yes	GROUP 1	7.5	0	1.4	6	1.4	6	1.4	6.75	1.4	7	0	6	1.4	6	0.5	6	1.4
5/8/2019	12:38	yes	yes	GROUP 1	yes	GROUP 1	7.5	0	1.4	6	1.4	6	1.4	6.5	1.4	7	0	6	1.4	6	1.4	6	1.4
5/13/2019	9:08	yes	yes	GROUP 1	yes	GROUP 1	7.25	0	1.4	6	1.4	6	1.4	6.5	1.4	7	0	6	1.4	6	0	6	1.4
5/28/2019	8:40	yes	yes	GROUP 2	yes	GROUP 2																	
5/29/2019	11:56	yes	yes	GROUP 2	yes	GROUP 2																	
6/5/2019	13:33	yes	yes	GROUP 2	yes	GROUP 2																	
6/10/2019	12:12	yes	yes	GROUP 2	yes	GROUP 2																	
6/11/2019	10:41	yes	yes	GROUP 2	yes	GROUP 2																	
6/17/2019	14:18	yes	yes	GROUP 2	yes	GROUP 2																	
6/18/2019	9:44	yes	yes	GROUP 1	yes	GROUP 1	7.1	0	1.4	6.2	1.4	6.4	1	6.4	1	6.8	0	6.2	0	6.2	1	6.2	0
6/24/2019	12:17	yes	yes	GROUP 1	yes	GROUP 1	6.9	0.2	1.4	6.2	0	6.3	0	6.2	1	6.6	0	6.2	0	6.2	1	6.2	0
6/24/2019	12:33	yes	yes	GROUP 2	yes	GROUP 2																	
6/25/2019	11:58	yes	yes	GROUP 2	yes	GROUP 2																	
7/3/2019	14:21	yes	yes	GROUP 2	yes	GROUP 2																	
7/5/2019	13:51	yes			yes	GROUP 2																	
7/5/2019	14:01	yes	yes	GROUP 1	yes	GROUP 1	7.3	0.5		6.3	1.4	7	0	7.1	0	7.2	0	7.4	0	6.7	1.6	6.4	1.6
7/8/2019	15:03	yes	yes	GROUP 1	yes	GROUP 1	7	0.4	1.8	6.2	0	6.6	1.8	6.4	1.4	6.7	0	6.3	0	6.4	1.6	6.3	1
7/10/2019	8:54	yes	yes	GROUP 1	yes	GROUP 1	6.8	0.8	2.4	6.3	2	6.4	0.4	6.4	2	6.6	0	6.4	0.8	6.4	0.6	6.3	0
7/12/2019	8:55	yes	yes	GROUP 1	yes	GROUP 1	6.9	0.5	2	6.2	2	6.4	1	6.5	2	6.6	0	6.4	2	6.3	1.6	6.3	0
7/15/2019	12:08																						
7/15/2019	15:18	yes	yes	GROUP 2	yes	GROUP 2																	
7/17/2019	12:20	yes	yes	GROUP 2	yes	GROUP 2																	
7/23/2019	11:39	yes	yes	GROUP 2	yes	GROUP 2																	
7/23/2019	13:01	yes	yes	GROUP 2	yes	GROUP 2																	
7/24/2019	10:58	yes	yes	GROUP 2	yes	GROUP 2																	
7/29/2019	9:55	yes	yes	GROUP 2	yes	GROUP 2																	
8/2/2019	10:02	yes	yes	GROUP 1	yes	GROUP 1	7.3	1.1	3	6.2	3	6.8	3	6.9	1.5	7	0	6.3	3	6.2	2.6	6.3	3
8/12/2019	11:40	yes	yes	GROUP 1	yes	GROUP 1	7.8	0	0	6.2	5.4	7	5.2	7.2	5	7.5	1	6.2	2.6	6.2	2.6	6.2	2.6
8/13/2019	15:36	yes	yes	GROUP 1	yes	GROUP 1	8.2	0	0	6.2	3	6.5	3	6.8	3	8	1	6.3	3.2	6.3	3.2	6.3	3
8/16/2019	9:57	yes	yes	GROUP 1	yes	GROUP 1	8.1	0	0	6.2	3	6.4	3	6.4	3	7.9	1	6.2	3	6	3	6.3	3
8/20/2019	13:06	yes	yes	GROUP 2	yes	GROUP 2																	
8/23/2019	12:43	yes	yes	GROUP 2	yes	GROUP 2																	
8/27/2019	9:31	yes	yes	GROUP 2	yes	GROUP 2																	
8/30/2019	12:03	yes	yes	GROUP 2	yes	GROUP 2																	
8/30/2019	15:58	yes	yes	GROUP 1	yes	GROUP 1	8.6	0	0	6.2	3	8.1	2.4	8.1	1.4	8.3	0	6.7	3	6.5	1.4	6.3	2.4
9/3/2019	8:41	yes	yes	GROUP 1	yes	GROUP 1	7.8	0	0	6	2.6	7	5	7	3	7.5	0	6.1	2.6	6.1	1.4	6.1	2.2
9/4/2019	10:16	yes	yes	GROUP 1	yes	GROUP 1	7.5	0	0	6	3	6.25	2.5	7	3	7	0	6	3.5	6	3.25	6	3.5
9/5/2019	8:52	yes	yes	GROUP 1	yes	GROUP 1	7.5	0	0	6	3	6.25	2.5	7	3	7	0.5	6	3.5	6	3	6	3.5
9/16/2019	8:50	yes	yes	GROUP 1	yes	GROUP 1	7.5	0	0	6	3.2	6.4	2.8	6.8	3	7.2	0	6.1	3.6	6	3.4	6.1	3.6
9/17/2019	11:45	yes	yes	GROUP 1	yes	GROUP 1	7.6	0	0	5.9	3	6.4	3	7	4.2	7.4	0	6	3.2	6	3	6	3.4
9/18/2019	10:24	yes	yes	GROUP 1	yes	GROUP 1	7.8	0	0	5.9	3	6.4	3	6.9	3.6	7.4	0	6	3.2	6	3.2	6	3.4
9/23/2019	9:43	yes	yes	GROUP 1	yes	GROUP 1	7.8	0	0	5.9	2.6	7	6	6.7	3	7.5	0	6	3.5	6	3	5.9	2.8
9/23/2019	14:03	yes	yes	GROUP 2	yes	GROUP 2																	
9/24/2019	9:39	yes	yes	GROUP 2	yes	GROUP 2																	
9/25/2019	11:05	yes	yes	GROUP 2	yes	GROUP 2																	
10/1/2019	9:09	yes	yes	GROUP 2	yes	GROUP 2																	
10/2/2019	12:25	yes	yes	GROUP 2	yes	GROUP 2																	
10/4/2019	13:51	yes	yes	GROUP 2	yes	GROUP 2																	
10/9/2019	9:20	yes	yes	GROUP 2	yes	GROUP 2																	
10/11/2019	10:38	yes	yes	GROUP 2	yes	GROUP 2																	
10/15/2019	9:45	yes	yes	GROUP 2	yes	GROUP 2																	
10/15/2019	13:18	yes	yes	GROUP 1	yes	GROUP 1	8.2	0	0	5.8	3.4	6.5	3	6.9	3.3	6.6	0	5.8	3.5	5.8	3.8	5.9	3.7
10/16/2019	8:42	yes	yes	GROUP 1	yes	GROUP 1	8.5	0	0	5.8	3.2	6.6	3.2	6.8	3.2	7.8	0	5.8	3.2	5.8	3	5.8	3
10/18/2019	10:16	yes	yes	GROUP 1	yes	GROUP 1	8.5	0	0	5.8	3.2	6.5	3.2	6.7	3.4	7.7		5.8	3.2	5.8	3.2	5.8	3
10/18/2019	10:47																						
10/21/2019	9:19	yes	yes	GROUP 1	yes	GROUP 1	8.5	0	0	5.7	3.2	6.4	3.2	6.7	3.4	7.7	0	5.8	3.3	5.7	3.2	5.7	3
10/22/2019	13:24	yes	yes	GROUP 1	yes	GROUP 1	8.1	1	2.9	5.7	3.1	6.4	3.1	6.6	3.4	7.5	0	5.8	3	5.7	3	5.7	3
11/1/2019	13:39	yes	yes	GROUP 1	yes	GROUP 1	8.1	1	2.9	5.7	3.3	6.2	3.6	6.7	3.6	7.6	0	5.8	3.1	5.8	3.1	5.8	3
11/4/2019	10:06	yes	yes	GROUP 1	yes	GROUP 1	8.5	1	3	5.7	3.2	6	3.1	6.5	3.1	7.6	0	5.6	3.2	5.7	32	5.8	3.2
11/6/2019	11:08	yes	yes	GROUP 1	yes	GROUP 1	8.3	1.2	3.2	5.7	3	5.8	3.1	6.4	3	7.6	1	5.8	3.4	5.7	3.2	5.7	3.2
11/8/2019	12:39	yes	yes	GROUP 1	yes	GROUP 1	8.2	1.2	3.2	5.8	3.4	6	3	6.6	3	7.6	0	5.8	3.4	5.9	3.2	5.8	3.3
11/11/2019	13:27	yes	yes	GROUP 1,GROUP 2	yes	GROUP 1,GROUP 2																	
11/12/2019	9:31	yes	yes	GROUP 1	yes	GROUP 1	8	1.2	3.2	5.8	3.2	5.9	3.9	6.7	3.8	7.6	0	5.9	3.4	5.7	3.1	5.7	3

Table 1
BIOVENT AND BIOSPARGE WELL PRESSURE AND FLOW DATA

date	time	VES ON?	BIOSPARGE ON?	BIOSPARGE GROUP RUNNING	BIOVENT ON?	BIOVENT GROUP RUNNING	BS GROUP-2 PRESSURE (psi)	BS-2A PRESSURE (psi)	BS-2A FLOW (scfm)	BS-2B PRESSURE (psi)	BS-2B FLOW (scfm)	BS-2C PRESSURE (psi)	BS-2C FLOW (scfm)	BS-2D PRESSURE (psi)	BS-2D FLOW (scfm)	BS-2E PRESSURE (psi)	BS-2E FLOW (scfm)	BS-2F PRESSURE (psi)	BS-2F FLOW (scfm)	BV GROUP-1 PRESSURE (psi)	BV-1A PRESSURE (psi)	BV-1A FLOW (scfm)	BV-1C PRESSURE (psi)	BV-1C FLOW (scfm)	BV-1E PRESSURE (psi)	BV-1E FLOW (scfm)	BV-1G PRESSURE (psi)	BV-1G FLOW (scfm)
5/6/2019	9:25	yes	yes	GROUP 1	yes	GROUP 1														3.5	0	5	1.8	0	0	5	0	5
5/7/2019	9:25	yes	yes	GROUP 1	yes	GROUP 1														3.5	0	5	1.75	0		5	0	5
5/8/2019	12:38	yes	yes	GROUP 1	yes	GROUP 1														3.5	0	5	1.75	0	0	5	0	5
5/13/2019	9:08	yes	yes	GROUP 1	yes	GROUP 1														3.5	0	5	1.75	0	0	5	0	5
5/28/2019	8:40	yes	yes	GROUP 2	yes	GROUP 2	8	4.5	1.9	5.9	1.8	6	1.6	6.5	1.7	6.5	1.8	7.1	1.6									
5/29/2019	11:56	yes	yes	GROUP 2	yes	GROUP 2	7.8	4.4	1.5	5.9	1.3	6	1.2	6.5	1.2	6.2	1.4	7.1	1									
6/5/2019	13:33	yes	yes	GROUP 2	yes	GROUP 2	7.5	4	1.4	6	1.4	6	1.4	6.5	1.4	6.25	1.4	7	1									
6/10/2019	12:12	yes	yes	GROUP 2	yes	GROUP 2	7.4	4	1.4	5.9	1.2	6	1.4	6.4	1.2	6.2	1.5	7.1	1.6									
6/11/2019	10:41	yes	yes	GROUP 2	yes	GROUP 2	7.4	3.4	1.4	5.8	1.4	5.9	1.5	6.4	1.4	6.1	1.4	7	1									
6/17/2019	14:18	yes	yes	GROUP 2	yes	GROUP 2	7.4	3.3	1.4	5.8	1.4	5.9	1.5	6.4	1.2	6.1	1.4	7	2									
6/18/2019	9:44	yes	yes	GROUP 1	yes	GROUP 1														3.4	0	5	1.7	0	0	5	0.2	5
6/24/2019	12:17	yes	yes	GROUP 1	yes	GROUP 1														3	0	4.25	2.4	17.5	0	4.5	0.2	4.5
6/24/2019	12:33	yes	yes	GROUP 2	yes	GROUP 2	7.3	5.7	2	76	2	6.4	2.2	6.9	2	2.4	2	7	0									
6/25/2019	11:58	yes	yes	GROUP 2	yes	GROUP 2	7.1	5.6	1.8	6	2	6.1	1.8	6.7	2	6.3	2	6.9	0									
7/3/2019	14:21	yes	yes	GROUP 2	yes	GROUP 2	7.1	5.6	2	6	2	6.1	2.2	6.5	1.6	6.4	2.3	6.8	0									
7/5/2019	13:51	yes			yes	GROUP 2																						
7/5/2019	14:01	yes	yes	GROUP 1	yes	GROUP 1														2.9	0	7.5	0.8	7.5	0	7.5	0.2	7.5
7/8/2019	15:03	yes	yes	GROUP 1	yes	GROUP 1														2.7	0	7.5	0.8	7.5	0	7	0.2	7.5
7/10/2019	8:54	yes	yes	GROUP 1	yes	GROUP 1														2.6	0	8.5	0.7	7	0	8	0.2	8
7/12/2019	8:55	yes	yes	GROUP 1	yes	GROUP 1														2.8	0	9	0.7	8	0	8.5	0.2	7.5
7/15/2019	12:08																											
7/15/2019	15:18	yes	yes	GROUP 2	yes	GROUP 2	7.4	5.9	2.4	6.3	2.4	6.3	2	7.1	1	6.6	2.2	7.3	0									
7/17/2019	12:20	yes	yes	GROUP 2	yes	GROUP 2	7.4	5.7	1.8	6.1	1.9	6.2	2.1	6.9	2.8	6.4	2.2	7.2	0									
7/23/2019	11:39	yes	yes	GROUP 2	yes	GROUP 2	7.6	5.7	1.8	6.2	2	6.2	1.7	6.9	1.4	6.4	2	7.3	0									
7/23/2019	13:01	yes	yes	GROUP 2	yes	GROUP 2	10.5	5.5	3	6.1	3	5.8	3	7.2	3	6.3	3	7.6	3									
7/24/2019	10:58	yes	yes	GROUP 2	yes	GROUP 2	9.4	5.7	3.1	6	3	6.1	3	6.9	3	6.4	3	7.5	3									
7/29/2019	9:55	yes	yes	GROUP 2	yes	GROUP 2	8.6	5.7	2.8	6	2.6	6.1	2.6	6.7	2.8	6.3	2.4	7.3	2.2									
8/2/2019	10:02	yes	yes	GROUP 1	yes	GROUP 1														3	0	7.5	1	7.5	0	7.5	0.2	7.5
8/12/2019	11:40	yes	yes	GROUP 1	yes	GROUP 1														3.1	0	7.5	0.8	8	0	7.5	0.2	8
8/13/2019	15:36	yes	yes	GROUP 1	yes	GROUP 1														3.1	0	7.5	0.8	7.5	0	7.5	0.2	7.5
8/16/2019	9:57	yes	yes	GROUP 1	yes	GROUP 1														3.1	0	7.5	0.9	7.5	0	7.5	0.2	7.5
8/20/2019	13:06	yes	yes	GROUP 2	yes	GROUP 2	7.5	5.5	2.5	5.9	2.4	6	2.8	7.2	4	7.1	5	7.1	1.6									
8/23/2019	12:43	yes	yes	GROUP 2	yes	GROUP 2	7.9	5.5	3	5.8	3	5.9	3.2	6.7	3	6.2	3	7.2	3									
8/27/2019	9:31	yes	yes	GROUP 2	yes	GROUP 2	8.3	5.5	3.3	5.7	3	5.9	2.8	6.8	3.4	6.4	3.2	7.5	3.6									
8/30/2019	12:03	yes	yes	GROUP 2	yes	GROUP 2	7.1	5.4	3	5.8	3.6	5.9	3.2	5.6	3.3	6	2.9	6.9	0									
8/30/2019	15:58	yes	yes	GROUP 1	yes	GROUP 1														3.1	0	7.5	0.8	7.5	0	7.5	0.2	7.5
9/3/2019	8:41	yes	yes	GROUP 1	yes	GROUP 1														3.3	0	7.5	0.8	8	0	7.5	0.2	7.5
9/4/2019	10:16	yes	yes	GROUP 1	yes	GROUP 1														3.25	0	7.5	1	7.5	0	7.5	0	8
9/5/2019	8:52	yes	yes	GROUP 1	yes	GROUP 1														3.5	0	7.5	0	8	0	7.5	0	7
9/16/2019	8:50	yes	yes	GROUP 1	yes	GROUP 1														3.3	0.2	8	0.8	8	0	7.25	0.2	7.5
9/17/2019	11:45	yes	yes	GROUP 1	yes	GROUP 1														3.4	0.2	7.5	0.8	7.5	0	7.5	0.2	7.5
9/18/2019	10:24	yes	yes	GROUP 1	yes	GROUP 1														3.4	0.2	8	0.8	7.5	0	7.5	0.2	7.5
9/23/2019	9:43	yes	yes	GROUP 1	yes	GROUP 1														3.5	0.2	7.5	0.7	7.5	0	7.5	0.2	8
9/23/2019	14:03	yes	yes	GROUP 2	yes	GROUP 2	8.7	5.5	3	6	3	7.3	3.2	8.4	2	8.2	3.4	7.9	3.6									
9/24/2019	9:39	yes	yes	GROUP 2	yes	GROUP 2	7.7	5.4	2.6	5.8	2.6	5.9	4.8	7.3	4.4	6.9	5.4	7	3.2									
9/25/2019	11:05	yes	yes	GROUP 2	yes	GROUP 2	8.9	5	3.2	5.6	3.1	5.5	3	5.4	3.2	5.8	3.2	6.8	3									
10/1/2019	9:09	yes	yes	GROUP 2	yes	GROUP 2	8.9	5.3	3.2	5.7	3.1	5.5	3	6.4	3.2	5.9	3.2	6.8	3									
10/2/2019	12:25	yes	yes	GROUP 2	yes	GROUP 2	9.7	5.3	3.2	5.6	3.1	5.5	3	6.4	3.2	5.9	3	6.9	3									
10/4/2019	13:51	yes	yes	GROUP 2	yes	GROUP 2	8.8	5.3	3.2	5.6	3	5.5	3	6.4	3.2	5.9	3	6.8	3.2									
10/9/2019	9:20	yes	yes	GROUP 2	yes	GROUP 2	8.9	5.2	3.2	5.6	3.2	5.5	3	6.4	3.2	5.9	3	6.8	3.2									
10/11/2019	10:38	yes	yes	GROUP 2	yes	GROUP 2	9	5.2	3.2	5.6	3.2	5.5	3	6.4	3.2	5.9	3	7.8	3.2									
10/15/2019	9:45	yes	yes	GROUP 2	yes	GROUP 2	9	5.2	3.2	5.6	3.2	5.5	3	64	3.2	5.8	3	6.8	3.4									
10/15/2019	13:18	yes	yes	GROUP 1	yes	GROUP 1														3.6	0	7.5	0.4	8.75	0	8	0.2	6
10/16/2019	8:42	yes	yes	GROUP 1	yes	GROUP 1														3.6	0	7.5	0.5	7.75	0	7.5	0.2	7.5
10/18/2019	10:16	yes	yes	GROUP 1	yes	GROUP 1														3.6	0	7.75	0.5	7.75	0.1	8.5	0.2	7.5
10/18/2019	10:47																											
10/21/2019	9:19	yes	yes	GROUP 1	yes	GROUP 1														3.7	0.1	7.75	0.5	7.75	0	7.5	0.2	7.5
10/22/2019	13:24	yes	yes	GROUP 1	yes	GROUP 1														3.6	0.1	7.75	0.5	7.75	0	7.5	0.2	7.75
11/1/2019	13:39	yes	yes	GROUP 1	yes	GROUP 1														3.6	0.2	7.75	0.5	7.75	0	7.5	0.2	7.5
11/4/2019	10:06	yes	yes	GROUP 1	yes	GROUP 1														3.7	0	7.75	0.5	7.75	0	7.5	0.2	7.5
11/6/2019	11:08	yes	yes	GROUP 1	yes	GROUP 1														3.8	0	7.5	0.3	7.75	0	7.75	0.2	7.5
11/8/2019	12:39	yes	yes	GROUP 1	yes	GROUP 1														3.8	0.1	7.25	0.3	7.75	0	7.75	0.2	7
11/11/2019	13:27	yes	yes	GROUP 1,GROUP 2	yes	GROUP 1,GROUP 2																						
11/12/2019	9:31	yes	yes	GROUP 1	yes	GROUP 1														3.7	0.2	7.5	0.4	7.75	0	7.5	0.2	7.5

Table 1
BIOVENT AND BIOSPARGE WELL PRESSURE AND FLOW DATA

date	time	VES ON?	BIOSPARGE ON?	BIOSPARGE GROUP RUNNING	BIOVENT ON?	BIOVENT GROUP RUNNING	BV GROUP-2 PRESSURE (psi)	BV-2A PRESSURE (psi)	BV-2A FLOW (scfm)	BV-2C PRESSURE (psi)	BV-2C FLOW (scfm)	BV-2E PRESSURE (psi)	BV-2E FLOW (scfm)	BV-1A PRESSURE ("H2O)	BV-1C PRESSURE ("H2O)	BV-1E PRESSURE ("H2O)	BV-1G PRESSURE ("H2O)	BV-2A PRESSURE ("H2O)	BV-2C PRESSURE ("H2O)	BV-2E PRESSURE ("H2O)	MW-66 PRESSURE ("H2O)	MW-67 PRESSURE ("H2O)	PH-21 PRESSURE ("H2O)	GENERAL COMMENTS
5/6/2019	9:25	yes	yes	GROUP 1	yes	GROUP 1												-2	-1.8	-1.8	-2	-1.7	-1.9	Turned off Groups 2 and turned on Groups 1.
5/7/2019	9:25	yes	yes	GROUP 1	yes	GROUP 1												-1.2	-1	-1	-1	-1	0	
5/8/2019	12:38	yes	yes	GROUP 1	yes	GROUP 1												-1.1	-0.8	-0.8	-0.9	-0.9	0	
5/13/2019	9:08	yes	yes	GROUP 1	yes	GROUP 1												-0.8	-0.5	-0.6	-0.6	-0.8	0	
5/28/2019	8:40	yes	yes	GROUP 2	yes	GROUP 2	3.7	0	6.5	0	5	0	5	-2	-1.6	-1.6	-1.9				-1	-1.5	-1.4	
5/29/2019	11:56	yes	yes	GROUP 2	yes	GROUP 2	3.7	0	6.5	0	5	0	5	-1.5	-1.2	-1.1	-1.6				-0.5	-0.95	0.9	
6/5/2019	13:33	yes	yes	GROUP 2	yes	GROUP 2	4	0	5	0	5	0	5	-1.3	-0.7	-1	-1				0	-0.7	0	
6/10/2019	12:12	yes	yes	GROUP 2	yes	GROUP 2	3.8	0	6	0	5.25	0	4.75	-1.6	-1.1	-1.2	-1.6				-0.7	-1.1	-1	BV-2A, BV-2C, BV-2E set to 5 SCFM. BS-2A thru BS-2E All adjusted to 1.4 SCFM. BS-2F bouncing between 0 and 2.4 SCFM.
6/11/2019	10:41	yes	yes	GROUP 2	yes	GROUP 2	3.8	-1.2	5	-1.1	5	0	5	-2.2	-1.8	-1.8	-2.2				-1.3	-1.8	-1.6	BS-2F flow bouncing from 0 to 2 SCFM.
6/17/2019	14:18	yes	yes	GROUP 2	yes	GROUP 2	3.8	0	4.75	0	5	0	5	-2.6	-2.1	-2.2	-2.6				-1.6	-2	-1.9	
6/18/2019	9:44	yes	yes	GROUP 1	yes	GROUP 1												-0.9	-0.7	-0.7	-0.8	-0.7	0	0940 hours - switched from Group 2 to Group 1
6/24/2019	12:17	yes	yes	GROUP 1	yes	GROUP 1																		
6/24/2019	12:33	yes	yes	GROUP 2	yes	GROUP 2	3.6	0	7.5	0	7.5	0	7.5	-0.8	0	0	-0.9				0	0	0	Switched to Group 2 from Group 1
6/25/2019	11:58	yes	yes	GROUP 2	yes	GROUP 2	3.6	0	7.5	0	7.5	1.1	7.5	-1.7	-1.2	-1.3	-1.8				-0.6	-1.1	-0.7	BS-2D bouncing between 0 and 4. BS-1E measures 1.7 i.o.w. Even through valve was closed yesterday.
7/3/2019	14:21	yes	yes	GROUP 2	yes	GROUP 2	3.6	0	7.5	0	7.5	0.2	7.5	-1.2	-0.7	-0.8	-1.3				0	-0.6	-0.5	
7/5/2019	13:51	yes			yes	GROUP 2	3.6	0	7.5	0	7.5	0.2	7.5	0.8	0	0	0.9				0	0.7	0	
7/5/2019	14:01	yes	yes	GROUP 1	yes	GROUP 1												-0.6	0	-0.5	0	0	0	Switching from Group 2 to Group 1, BV and BS
7/8/2019	15:03	yes	yes	GROUP 1	yes	GROUP 1												-0.5	0	0	-0.6	-0.5	0	BS-1C bouncing BS-1H bouncing
7/10/2019	8:54	yes	yes	GROUP 1	yes	GROUP 1												-0.6	0	0	-0.5	0	0	BS-1C, 1D, 1F bouncing
7/12/2019	8:55	yes	yes	GROUP 1	yes	GROUP 1												-0.7	-0.5	-0.5	-0.6	0	0	BV flows set to 7.5
7/15/2019	12:08																							Switched from BS/BV Group 1 to BS/BV Group 2 prior to starting BS/BV system
7/15/2019	15:18	yes	yes	GROUP 2	yes	GROUP 2	3.3	0	9	0	7.5	0.2	7	-0.5	0	0	-0.6				0	0	0	
7/17/2019	12:20	yes	yes	GROUP 2	yes	GROUP 2	3.3	0	7.5	0	7.25	0.2	7.5	-1	0	-0.5	-0.9				0	0	0	BS/BV adjusted as needed to meet current target flows. Readings at wells taken prior to changes.
7/23/2019	11:39	yes	yes	GROUP 2	yes	GROUP 2	3.2	0	7.5	0	7.5	0	7.75	-1.3	-0.7	-0.8	-1.2				0	-0.6	-0.7	
7/23/2019	13:01	yes	yes	GROUP 2	yes	GROUP 2	3.3	0	7.5	0	7.5	0	7.5	0	0	0	0				0.8	0.5	0	BS flows increased to 3 scfm per Carlo. Pressure to BS system increased by slightly closing the relief gate valve at the blower.
7/24/2019	10:58	yes	yes	GROUP 2	yes	GROUP 2	3.3	0	7.5	0	7.5	0.2	7.5	-0.5	0	0	-0.5				0.7	0	0	
7/29/2019	9:55	yes	yes	GROUP 2	yes	GROUP 2	3.3	0	7.5	0	7.5	0	7.5											
8/2/2019	10:02	yes	yes	GROUP 1	yes	GROUP 1																		
8/12/2019	11:40	yes	yes	GROUP 1	yes	GROUP 1														0				BV-1C and BV-1G flows reduced to 7.5. All BS Group 1 wells set to 3 cfm, except BS-1A and BS-1E.
8/13/2019	15:36	yes	yes	GROUP 1	yes	GROUP 1																		
8/16/2019	9:57	yes	yes	GROUP 1	yes	GROUP 1																		Switching from Group 1 to Group 2.
8/20/2019	13:06	yes	yes	GROUP 2	yes	GROUP 2	3.5	0	7.5	0	6.5	0.2	7.5											BS-Group 2 flows adjusted, all operating at about 3 scfm.
8/23/2019	12:43	yes	yes	GROUP 2	yes	GROUP 2	3.5	0	7.5	0	7.5	0.2	7.5	1	0.5	0.5	1				0	0	0	
8/27/2019	9:31	yes	yes	GROUP 2	yes	GROUP 2	3.5	0	7.75	0	7.5	0.2	7.75	1	0.5	0.5	1				0		0	
8/30/2019	12:03	yes	yes	GROUP 2	yes	GROUP 2	3.5	0	7.75	0	7.5	0.2	7.75	-1.5	-0.5	-1	-1.5				-0.5	-1	-0.75	
8/30/2019	15:58	yes	yes	GROUP 1	yes	GROUP 1																		
9/3/2019	8:41	yes	yes	GROUP 1	yes	GROUP 1												0.5	0	0	-0.5	-0.5	-0.1	BS flows adjusted.
9/4/2019	10:16	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0.25	0	0	
9/5/2019	8:52	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0.25	0	0	
9/16/2019	8:50	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0.25	0	0	Flow rates adjusted
9/17/2019	11:45	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0.5		0	
9/18/2019	10:24	yes	yes	GROUP 1	yes	GROUP 1												0.25	0	0	0.1	0	0	Flow rates adjusted.
9/23/2019	9:43	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0.25	0	0	Flow rates adjusted
9/23/2019	14:03	yes	yes	GROUP 2	yes	GROUP 2	0		7	0	8	0	7.5											Switched from Group 1 to Group 2
9/24/2019	9:39	yes	yes	GROUP 2	yes	GROUP 2	3.6	0	7.5	0	8	0	7.75	1	0.1	0.25	1				0	0	0	All BS points set between 3.0 and 3.2 scfm. All BV points set at 7.5 scfm.
9/25/2019	11:05	yes	yes	GROUP 2	yes	GROUP 2	4.7	0	7.5	0	7.5	0.2	7.75	1	0.5	0.5	1.25				0	0.5	0.5	No changes made.
10/1/2019	9:09	yes	yes	GROUP 2	yes	GROUP 2	3.7	0	7.5	0	7.5	0.2	7.75	-1	-0.5	-0.5	-1.25				0	-0.75	-0.25	
10/2/2019	12:25	yes	yes	GROUP 2	yes	GROUP 2	3.7	0	7.5	0	7.5	0.2	7.75	1	0.5	0.5	1.25				0	0.5	0.5	
10/4/2019	13:51	yes	yes	GROUP 2	yes	GROUP 2	3.7	0	7.5	0	7.5	0.2	7.75	1.25	0.5	0.75	1.5				0.25	0.75	0.5	
10/9/2019	9:20	yes	yes	GROUP 2	yes	GROUP 2	3.8	0	7.75	0	7.75	0.2	7.75	1.5	0.5	0.75	1.5				0.25	0.75	0.5	
10/11/2019	10:38	yes	yes	GROUP 2	yes	GROUP 2	3.8	0	7.5	0	7.75	0.2	7.75	1	0.5	0.75	1.25				0	0.5	0.5	
10/15/2019	9:45	yes	yes	GROUP 2	yes	GROUP 2	3.8		7.5		7.75		8	1.25	0.75	1	1.5				0.25	0.5	0.5	Switched to Group 1 at 0956.
10/15/2019	13:18	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0	0	0	Flow rates adjusted
10/16/2019	8:42	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0.25	0	0	
10/18/2019	10:16	yes	yes	GROUP 1	yes	GROUP 1												0.5	0.25	0.25	0.25	0.1	0	
10/18/2019	10:47																							
10/21/2019	9:19	yes	yes	GROUP 1	yes	GROUP 1												0.5	0.25	0.25	0.25	0.25	0	BS-1A opened, set at 3 SCFM .
10/22/2019	13:24	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0	0	0	
11/1/2019	13:39	yes	yes	GROUP 1	yes	GROUP 1												0.5	0.5	0.5	0.5	0.5	0	Slight adjustments made to BS points
11/4/2019	10:06	yes	yes	GROUP 1	yes	GROUP 1												0.25	0	0	0.25	0	0	
11/6/2019	11:08	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0	0	0	
11/8/2019	12:39	yes	yes	GROUP 1	yes	GROUP 1												0	0	0	0	0	0	All flows adjusted to desired set points.
11/11/2019	13:27	yes	yes	GROUP 1,GROUP 2	yes	GROUP 1,GROUP 2																		Both groups of BV and BS opened at 1326 hours. Turned Group 2 off at 1500 hours.
11/12/2019	9:31	yes	yes	GROUP 1	yes	GROUP 1												-0.7	0	0	-0.6	0	0	

Table 2A

Baseline Sewer Monitoring Results

Date	Manhole	PID	LEL	IN/OUT
2/13/2019	19th CUT	0	0	OUT
2/13/2019	19th EAST	0	0	IN
2/13/2019	19th WEST	0	0	OUT
2/13/2019	POLL + MOYA	0	0	OUT
2/13/2019	MH-G	1	0	IN
2/13/2019	MH-C	2.8	0	OUT
2/13/2019	MH-A	2.8	0	OUT
2/13/2019	MH-B	2.2	0	IN
2/13/2019	A-ROMA	0	0	IN
2/13/2019	B-ROMA	0	0	OUT
2/21/2019	POLL + MOYA	0	0	OUT
2/21/2019	19th CUT	0	0	IN
2/21/2019	19th EAST	0	0	OUT
2/21/2019	19th WEST	0	0	OUT
2/21/2019	MH-G	0.7	0	IN
2/21/2019	MH-B	2.8	0	IN
2/21/2019	MH-C	1.3	0	IN
2/21/2019	MH-A	11.4	0	IN
2/21/2019	A-ROMA	0	0	OUT
2/21/2019	B-ROMA	0	0	OUT

Table 2B
Pilot Test Sewer Monitoring Results

Data Through:	10/15/2019	System Status			MH-A			MH-B			MH-C			MH-E		
date	time	VES ON?	BIOSPARGE ON?	BIOVENT ON?	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)
2/27/2019	10:30	yes	yes	no	In	0	0	Out	0	0	In	0	0			
2/27/2019	13:00	yes	yes	no	In	0	0	Out	0	0	In	0	0			
2/27/2019	13:50	yes	yes	no	In	0	0	Out	0	0	In	0	0			
2/27/2019	14:50	yes	yes	no	In	0	0	Out	0	0	In	0	0			
3/5/2019	13:30	yes	no	yes							Out	10.3	0			
3/5/2019	14:00	yes	no	yes	Out	20.7	0	Out	17.3	0	Out	14.3	0			
3/5/2019	14:45	yes	no	yes	Out	16.1	0	Out	12.8	0	Out	11.8	0			
3/6/2019	13:30	no	no	yes		37	0		32.7	0		28.3	0			
3/6/2019	14:45	yes	no	yes		24.9	0		34.1	0		28	0			
3/12/2019	13:45				IN	2.2	0	OUT	60.4	0.4	OUT	88.6	0			
3/12/2019	14:00				OUT	101.3*	0.1	OUT	92.3*	0	OUT	107.5*	0			
3/12/2019	14:15				IN	12.4*	0	OUT	83.5*	0	OUT	83.5*	0			
3/12/2019	14:35				OUT	27.4	0	OUT	49	0	OUT	49	0			
3/18/2019	15:00	no	no	no	OUT	14.7	0	OUT	6.7	0	OUT	10.4	0	OUT	0	0
3/25/2019	11:47	yes	yes	no	IN	0	0	IN	0	0	IN	0.1	0	IN	0	0
3/25/2019	15:57	yes	yes	no	IN	0.3	0	OUT	0.5	0	OUT	0.4	0	OUT	0.4	0
3/26/2019	8:13	yes	yes	no	OUT	0.1	0	IN	0.1	0	OUT	0.1	0	OUT	0.1	0
3/26/2019	11:07	yes	yes	no	IN	0.3	0	OUT	0.5	0	OUT	0.4	0	OUT	0.3	0
3/26/2019	13:20	yes	yes	no	OUT	0.3	0	OUT	0.3	0	IN	0.2	0	IN	0.2	0
3/26/2019	15:06	yes	yes	no	IN	10.1	0	IN	7.7	0	IN	6.8	0	OUT	0.4	0
3/29/2019	10:10	yes	yes	no	IN	0.4	0	IN	0.2	0	OUT	0.4	0	OUT	0.2	0
3/29/2019	12:40	yes	yes	no	IN	0.5	0	OUT	0.3	0	IN	0.3	0	IN	0.1	0
3/29/2019	15:35	yes	yes	no	IN	0.2	0	OUT	0.1	0	IN	0.2	0	IN	0.2	0
4/2/2019	9:35	yes	no	no	IN	0	0	OUT	0	0	OUT	0	0	OUT	0	0
4/2/2019	12:15	yes	yes	no	IN	0	0	OUT	0	0	OUT	0	0	OUT	0	0
4/2/2019	13:58	yes	yes	no	IN	0	0	OUT	0	0	OUT	0	0	IN	0	0
4/3/2019	7:32	yes	no	no	OUT	77.1	0.1	OUT	78.5	0.1	OUT	66.2	0.1	OUT	56.2	0.1
4/3/2019	9:34	yes	yes	no	OUT	55.9	0.1	OUT	44	0	OUT	58.7	0.1	OUT	67.6	0.1
4/3/2019	11:20	yes	yes	no	OUT	26	0	IN	8.4	0	OUT	19.8	0	IN	6	0
4/3/2019	12:25	yes	yes	no	OUT	5.3	0	OUT	16.9	0	OUT	27.6	0	OUT	15	0
4/4/2019	7:46	yes	no	no	OUT	1.1	0	OUT	0.7	0	OUT	0.7	0	OUT	0.3	0
4/4/2019	9:41	yes	yes	no	IN	0.3	0	OUT	0.1	0	OUT	0.5	0	OUT	0.2	0
4/4/2019	12:51	yes	yes		OUT	0.7	0	OUT	0.3	0	IN	0.3	0	OUT	0.1	0
4/8/2019	8:08	yes	no	no	OUT	0	0	IN	0	0	OUT	0	0	OUT	0	0
4/8/2019	11:43	yes	yes	no	IN	0.3	0	IN	0.1	0	OUT	0.2	0	OUT	0.1	0
4/8/2019	13:48	yes	yes	no	IN	0.1	0	OUT	0	0	IN	0	0	IN	0	0
4/9/2019	8:51	yes	no	no	IN	0.1	0	IN	0.1	0	OUT	0.1	0	IN	0.2	0
4/9/2019	11:52	yes	yes	no	IN	0.1	0	IN	0	0	OUT	0.1	0	IN	0.1	0
4/9/2019	14:33	yes	yes	no	IN	0	0	IN	0.1	0	OUT	0	0	IN	0	0
4/10/2019	11:22	yes	yes	no	OUT	0.1	0	OUT	0	0	OUT	0	0	OUT	0.1	0
4/11/2019	10:45	yes	yes	no	IN	0	0	IN	0	0	IN	0.1	0	IN	0.1	0
4/15/2019	8:41	yes	yes	no	IN	0	0	IN	0	0	IN	0	0	IN	0	0
4/16/2019	8:29	yes	yes	no	OUT	21	0	IN	7.6	0	OUT	20.9	0	OUT	23	0
4/17/2019	12:44	yes	yes	no	IN	0.1	0	IN	0.1	0	IN	0	0	IN	0	0
4/22/2019	7:45	yes	yes	no	IN	0	0	IN	0	0	OUT	0	0	IN	0	0
4/22/2019	10:43	yes	yes	no	IN	0.1	0	IN	0	0	IN	0.1	0	IN	0.1	0
4/22/2019	13:39	yes	yes	yes	IN	0.1	0	IN	0.1	0	IN	0.1	0	IN	0.1	0
4/23/2019	8:30	yes	yes	yes	IN	0.1	0	OUT	0	0	OUT	0.1	0	IN	0.1	0
4/23/2019	11:49	yes	yes	yes	IN	0.1	0	OUT	0.1	0	IN	0.1	0	IN	0.1	0
4/29/2019	11:42	yes	yes	yes	IN	0	0	OUT	0.1	0	IN	0	0	IN	0	0
4/30/2019	8:57	yes	yes	yes	OUT	0.1	0	OUT	0.1	0	OUT	0.1	0	IN	0.1	0
4/30/2019	14:01	yes	yes	yes	IN	0.1	0	OUT	0	0	IN	0	0	IN	0	0
5/1/2019	10:52	yes	yes	yes	IN	0.1	0	IN	0	0	IN	0.1	0	IN	0.1	0
5/6/2019	8:29		yes	yes	IN	0	0	OUT	0	0	IN	0	0	OUT	0	0
5/7/2019	9:36		yes	yes	IN	0	0	IN	0	0	IN	0	0	IN	0	0
5/8/2019	12:44		yes	yes	IN	0	0	IN	0	0	OUT	0	0	IN	0	0
5/13/2019	9:29		yes	no	IN	0	0	OUT	0.1	0	OUT	0.1	0	OUT	0	0
5/29/2019	14:09	yes	yes	yes	IN	0	0	IN	0	0	IN	0	0			
6/24/2019	14:07	yes	yes	yes	IN	0	0	IN	0	0	IN	0	0			
6/25/2019	12:24	yes	yes	yes	IN	0	0	OUT	0	0	OUT	0	0	OUT	0	0
7/17/2019	12:01	yes	yes	yes	OUT	0		IN	0		IN	0				
8/21/2019	9:24	yes	yes	yes	IN	0	0	IN	0	0	IN	0	0			
8/22/2019	9:55	yes	yes	yes												
9/17/2019	11:33	yes	yes	yes	IN	0	0	IN	0	0	OUT	0	0			
10/15/2019	12:26	yes	yes	yes	OUT	0	0	IN	0	0	IN	0	0			

* these readings are suspect, as they dropped by half after the PID was re-calibrated.

Table 2B
Pilot Test Sewer Monitoring Results

Data Through:	10/15/2019	System Status			MH-G			STEEN			Pollock & Moyamensing			19th & Moyamensing East		
date	time	VES ON?	BIOSPARGE ON?	BIOVENT ON?	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)
2/27/2019	10:30	yes	yes	no												
2/27/2019	13:00	yes	yes	no												
2/27/2019	13:50	yes	yes	no												
2/27/2019	14:50	yes	yes	no												
3/5/2019	13:30	yes	no	yes												
3/5/2019	14:00	yes	no	yes												
3/5/2019	14:45	yes	no	yes												
3/6/2019	13:30	no	no	yes												
3/6/2019	14:45	yes	no	yes												
3/12/2019	13:45															
3/12/2019	14:00															
3/12/2019	14:15															
3/12/2019	14:35															
3/18/2019	15:00	no	no	no	OUT	0	0	OUT	1.3	0						
3/25/2019	11:47	yes	yes	no	IN	0	0	IN	0.1	0						
3/25/2019	15:57	yes	yes	no	OUT	0.4	0	IN	0.4	0						
3/26/2019	8:13	yes	yes	no	IN	0.1	0	IN	0.3	0						
3/26/2019	11:07	yes	yes	no	OUT	0.3	0	IN	0.8	0						
3/26/2019	13:20	yes	yes	no	OUT	0.3	0	OUT	17.9	0						
3/26/2019	15:06	yes	yes	no	IN	0.5	0	OUT	14.3	0						
3/29/2019	10:10	yes	yes	no	IN	0.3	0	OUT	0.4	0						
3/29/2019	12:40	yes	yes	no	IN	0.3	0	OUT	0.5	0						
3/29/2019	15:35	yes	yes	no	IN	0.1	0	IN	0.3	0						
4/2/2019	9:35	yes	no	no	IN	0	0	IN	0.2	0						
4/2/2019	12:15	yes	yes	no	OUT	0	0	IN	0.1	0						
4/2/2019	13:58	yes	yes	no	IN	0	0	IN	0	0						
4/3/2019	7:32	yes	no	no	OUT	34.1	0	OUT	155.7	0.2						
4/3/2019	9:34	yes	yes	no	OUT	57.5	0.1	OUT	61.7	0.1						
4/3/2019	11:20	yes	yes	no	IN	3.4	0	IN	21.9	0						
4/3/2019	12:25	yes	yes	no	OUT	13.5	0	IN	22.6	0						
4/4/2019	7:46	yes	no	no	OUT	0	0	OUT	1.1	0						
4/4/2019	9:41	yes	yes	no	IN	0.1	0	IN	0.1	0						
4/4/2019	12:51	yes	yes		OUT	0.3	0	IN	0.2	0						
4/4/2019	9:41	yes	yes	no	IN	0.1	0	IN	0.1	0						
4/4/2019	12:51	yes	yes		OUT	0.3	0	IN	0.2	0						
4/8/2019	8:08	yes	no	no	IN	0	0	IN	0.2	0						
4/8/2019	11:43	yes	yes	no	IN	0.2	0	IN	0.4	0						
4/8/2019	13:48	yes	yes	no	IN	0	0	IN	0.3	0						
4/9/2019	8:51	yes	no	no	IN	0.2	0	IN	0.2	0						
4/9/2019	11:52	yes	yes	no	IN	0.2	0	OUT	0.1	0						
4/9/2019	14:33	yes	yes	no	IN	0	0	IN	0	0						
4/10/2019	11:22	yes	yes	no	IN	0.1	0	OUT	0.1	0						
4/11/2019	10:45	yes	yes	no	IN	0.1	0	IN	0	0						
4/15/2019	8:41	yes	yes	no	IN	0	0	IN	0	0						
4/16/2019	8:29	yes	yes	no	IN	10.4	0	IN	8.7	0						
4/17/2019	12:44	yes	yes	no	IN	0	0	IN	0.1	0						
4/22/2019	7:45	yes	yes	no	IN	0	0	IN	0	0						
4/22/2019	10:43	yes	yes	no	IN	0.1	0	IN	0.1	0						
4/22/2019	13:39	yes	yes	yes	IN	0.1	0	IN	0.1	0						
4/23/2019	8:30	yes	yes	yes	OUT	0	0	IN	0.1	0						
4/23/2019	11:49	yes	yes	yes	IN	0	0									
4/29/2019	11:42	yes	yes	yes	IN	0.1	0	IN	0.1	0						
4/30/2019	8:57	yes	yes	yes	IN	0.1	0	OUT	0.1	0						
4/30/2019	14:01	yes	yes	yes	IN	0	0	IN	0.1	0						
5/1/2019	10:52	yes	yes	yes	IN	0.1	0.1	IN	0.1	0						
5/6/2019	8:29		yes	yes	IN	0	0	IN	0	0						
5/7/2019	9:36		yes	yes	IN	0	0	IN	0	0						
5/8/2019	12:44		yes	yes	IN	0		IN	0	0						
5/13/2019	9:29		yes	no	IN	0.1	0									
5/29/2019	14:09	yes	yes	yes	IN	0	0				0	0	IN	0	0	
6/24/2019	14:07	yes	yes	yes												
6/25/2019	12:24	yes	yes	yes	IN								OUT	0	0	
7/17/2019	12:01	yes	yes	yes	IN	0					0		OUT	0		
8/21/2019	9:24	yes	yes	yes	IN	0.1	0				0		IN	0	0	
8/22/2019	9:55	yes	yes	yes												
9/17/2019	11:33	yes	yes	yes	OUT	0.2	0				0		OUT	0	0	
10/15/2019	12:26	yes	yes	yes	IN	0.1	0				0		OUT	0	0	

Table 2B
Pilot Test Sewer Monitoring Results

Data Through:	10/15/2019	System Status			19th & Moyamensing West			19th Street (Near cut through)			A-Roma			B-Roma		
date	time	VES ON?	BIOSPARGE ON?	BIOVENT ON?	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)	FLOW (IN/OUT)	PID (ppm)	CH4 (%)
2/27/2019	10:30	yes	yes	no												
2/27/2019	13:00	yes	yes	no												
2/27/2019	13:50	yes	yes	no												
2/27/2019	14:50	yes	yes	no												
3/5/2019	13:30	yes	no	yes												
3/5/2019	14:00	yes	no	yes												
3/5/2019	14:45	yes	no	yes												
3/6/2019	13:30	no	no	yes												
3/6/2019	14:45	yes	no	yes												
3/12/2019	13:45															
3/12/2019	14:00															
3/12/2019	14:15															
3/12/2019	14:35															
3/18/2019	15:00	no	no	no												
3/25/2019	11:47	yes	yes	no												
3/25/2019	15:57	yes	yes	no												
3/26/2019	8:13	yes	yes	no												
3/26/2019	11:07	yes	yes	no												
3/26/2019	13:20	yes	yes	no												
3/26/2019	15:06	yes	yes	no												
3/29/2019	10:10	yes	yes	no												
3/29/2019	12:40	yes	yes	no												
3/29/2019	15:35	yes	yes	no												
4/2/2019	9:35	yes	no	no												
4/2/2019	12:15	yes	yes	no												
4/2/2019	13:58	yes	yes	no												
4/3/2019	7:32	yes	no	no												
4/3/2019	9:34	yes	yes	no												
4/3/2019	11:20	yes	yes	no												
4/3/2019	12:25	yes	yes	no												
4/4/2019	7:46	yes	no	no												
4/4/2019	9:41	yes	yes	no												
4/4/2019	12:51	yes	yes													
4/8/2019	8:08	yes	no	no												
4/8/2019	11:43	yes	yes	no												
4/8/2019	13:48	yes	yes	no												
4/9/2019	8:51	yes	no	no												
4/9/2019	11:52	yes	yes	no												
4/9/2019	14:33	yes	yes	no												
4/10/2019	11:22	yes	yes	no												
4/11/2019	10:45	yes	yes	no												
4/15/2019	8:41	yes	yes	no												
4/16/2019	8:29	yes	yes	no												
4/17/2019	12:44	yes	yes	no												
4/22/2019	7:45	yes	yes	no												
4/22/2019	10:43	yes	yes	no												
4/22/2019	13:39	yes	yes	yes												
4/23/2019	8:30	yes	yes	yes												
4/23/2019	11:49	yes	yes	yes												
4/29/2019	11:42	yes	yes	yes												
4/30/2019	8:57	yes	yes	yes												
4/30/2019	14:01	yes	yes	yes												
5/1/2019	10:52	yes	yes	yes												
5/6/2019	8:29		yes	yes												
5/7/2019	9:36		yes	yes												
5/8/2019	12:44		yes	yes												
5/13/2019	9:29		yes	no												
5/29/2019	14:09	yes	yes	yes	OUT	0	0	OUT	0.1	0	IN	0	0	IN	0	0
6/24/2019	14:07	yes	yes	yes												
6/25/2019	12:24	yes	yes	yes	OUT	0	0	OUT	0	0	IN	0	0	OUT	0	0
7/17/2019	12:01	yes	yes	yes	OUT	6.3		OUT	0		OUT	0		OUT	0	
8/21/2019	9:24	yes	yes	yes	IN	0	0	OUT	0	0	IN	0	0	OUT	0	0
8/22/2019	9:55	yes	yes	yes	IN	0	0									
9/17/2019	11:33	yes	yes	yes	IN	0	0	OUT	0	0	IN	0	0	OUT	0	0
10/15/2019	12:26	yes	yes	yes	OUT	0	0	OUT	0	0	OUT	0	0	IN	0	0

Table 3A
PHA SSDS READINGS
BIOSPARGE SYSTEM PROVE OUT

PHA PORTS			Temperature, Flow, and Pressure Measurements							
DATE	TIME	PORT	PID	LEL (%)	CH4 (%)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Weather/Notes
2/27/2019	10:00	PH-1	0	0	0	0	21.2	0	0	
2/27/2019	10:00	PH-2	0	0	0	0	21.5	0	0	
2/27/2019	10:00	PH-3	0	0	0	0	21.7	1	0	
2/27/2019	11:00	PH-1	0	0	0	0	20.7	0	0	
2/27/2019	11:00	PH-2	0	0	0	0	20.6	1	0	
2/27/2019	11:00	PH-3	0	0	0	0	20.7	0	0	
2/27/2019	12:30	PH-1	0	0	0	0	21.5	0	0	
2/27/2019	12:30	PH-2	0	0	0	0.1	21.4	0	0	
2/27/2019	12:30	PH-3	0	0	0	0.1	21.6	0	0	
2/27/2019	13:30	PH-1	0	0	0	0	21.3	1	0	
2/27/2019	13:30	PH-2	0	0	0	0.4	20.9	0	0	
2/27/2019	13:30	PH-3	0	0	0	0	21.3	0	0	
2/27/2019	14:20	PH-1	0	0	0	0	21.4	0	0	
2/27/2019	14:20	PH-2	0	0	0	0	20.7	0	0	
2/27/2019	14:20	PH-3	0	0	0	0	21.4	0	0	

Table 3B
PHA SSDS READINGS
BIOVENT GROUP 1 PROVE OUT

PHA PORTS			Temperature, Flow, and Pressure Measurements							
DATE	TIME	PORT	PID	LEL (%)	CH4 (%)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Weather/Notes
2/28/2019	9:30	PH-1	0.1	0	0	0.1	21.4	0	0	
2/28/2019	9:30	PH-2	0.1	0	0	0	21.3	0	0	
2/28/2019	9:30	PH-3	0.1	0	0	0.1	21	0	0	
2/28/2019	10:30	PH-1	0.2	0	0	0	21.1	0	0	
2/28/2019	10:30	PH-2	0.2	0	0	0.1	20.9	0	0	
2/28/2019	10:30	PH-3	0.1	0	0	0	20.9	0	0	
2/28/2019	12:00	PH-1	0.2	0	0	0	20.4	0	0	
2/28/2019	12:00	PH-2	0.2	0	0	0	20.4	0	0	
2/28/2019	12:00	PH-3	0.2	0	0	0	20.6	0	0	
2/28/2019	13:00	PH-1	0.3	0	0	0	20.8	0	0	
2/28/2019	13:00	PH-2	0.3	0	0	0	20.9	0	0	
2/28/2019	13:00	PH-3	0.3	0	0	0	21	0	0	
2/28/2019	14:00	PH-1	0.2	0	0	0	21.1	0	0	
2/28/2019	14:00	PH-2	0.2	0	0	0	21.1	0	0	
2/28/2019	14:00	PH-3	0.2	0	0	0	21.5	0	0	
3/5/2019	10:00	PH-1	0.1	0	0	0	20.2	1	0	
3/5/2019	10:00	PH-2	0	0	0	0.1	20.5	0	0	
3/5/2019	10:00	PH-3	0	1	0	0.1	20.6	0	0	
3/5/2019	10:30	PH-1	0.1	0	0	0	21.1	0	0	
3/5/2019	10:30	PH-2	0.1	0	0	0	21.2	0	0	
3/5/2019	10:30	PH-3	0	0	0	0	21.3	0	0	
3/5/2019	11:00	PH-1	0.1	0	0	0	21.9	0	0	
3/5/2019	11:00	PH-2	0	0	0	0	21.9	0	0	
3/5/2019	11:00	PH-3	0	0	0	0	21.7	0	0	
3/5/2019	12:45	PH-1	0.1	0	0	0	20.9	1	0	
3/5/2019	12:45	PH-2	0	0	0	0	21.1	0	0	
3/5/2019	12:45	PH-3	0	0	0	0	21.1	0	0	
3/5/2019	13:30	PH-1	0.1	0	0	0	21.1	0	0	
3/5/2019	13:30	PH-2	0.1	0	0	0	21.3	0	0	
3/5/2019	13:30	PH-3	0.1	0	0	0	21.2	0	0	
3/5/2019	14:00	PH-1	0.2	0	0	0	20.9	0	0	
3/5/2019	14:00	PH-2	0.1	0	0	0	21.2	0	0	
3/5/2019	14:00	PH-3	0.1	0	0	0	21.3	0	0	
3/5/2019	14:45	PH-1	0.2	0	0	0	21	0	0	
3/5/2019	14:45	PH-2	0.2	0	0	0	21.1	0	0	
3/5/2019	14:45	PH-3	0.2	0	0	0	21.2	0	0	

Table 3C
PHA SSDS READINGS
BIOVENT GROUP 2 PROVE OUT

PHA PORTS			Temperature, Flow, and Pressure Measurements							
DATE	TIME	PORT	PID	LEL (%)	CH4 (%)	CO2 (%)	O2 (%)	CO (ppm)	H2S (ppm)	Weather/Notes
3/6/2019	14:45	PH-1	0	0	0	0	21.4	0	0	
3/6/2019	14:45	PH-2	0	0	0	0	20.9	0	0	
3/6/2019	14:45	PH-3	0.1	0	0	0	20.5	0	0	

Table 4A
MONITORING WELLS PRESSURE READINGS
BIOSPARGE SYSTEM PROVE OUT

MW PRESSURE READINGS			Temperature, Flow, and Pressure Measurements						
DATE	TIME	MW-66	MW-67	PH-21					Weather/Notes
2/27/2019	9:45	-2.3	-2.1	-2.2					
2/27/2019	10:30	-1.6	-1.7	-1.5					
2/27/2019	11:00	-1.7	-1.9	-2.3					
2/27/2019	11:30	-1.5	-2.3	3.3					
2/27/2019	12:15	-1.7	-1.9	3.5					
2/27/2019	12:45	-1.2	-1.7	3.4					
2/27/2019	13:00	-1.3	-1.5	3.9					
2/27/2019	13:45	-1.3	-1.8	4					
2/27/2019	14:15	-1.2	-1.2	2.6					
2/27/2019	14:45	-1.0	-1.3	2.6					
2/27/2019	15:15	-1.2	-1.2	2.1					
3/25/2019	12:30	-0.9	-3.4	-3.1					
3/26/2019	9:20	-4.2	-4.0	-4.2					
3/26/2019	10:10	-5.0	-4.5	-2.5					
3/26/2019	11:05	-4.2	-4.5	-2.5					
3/26/2019	13:15	-3.3	-3.4	-2					
3/26/2019	15:05	-3.0	-3.3	-2.1					
3/29/2019	9:45	-3.1	-3.8	-2.1					
3/29/2019	10:45	-2.8	-2.9	-2.5					
3/29/2019	12:30	-2.7	-2.8	-1.7					
3/29/2019	15:25	-2.8	-3	-1.7					
4/2/2019	11:15	-2.1	-3	-1					
4/2/2019	11:55	-2.1	-2.7	-1.9					
4/2/2019	13:25	0.0	-2.4	-1.5					
4/2/2019	13:50	0.0	-2.3	-1.5					
4/3/2019	7:36	-3.1	-3.7	-2.1					
4/3/2019	8:50	-2.7	-3	-2					
4/3/2019	9:20	-2.4	-3.1	-1.9					
4/3/2019	11:05	-2.9	-2.5	-2.2					
4/3/2019	11:50	-2.6	-1.9	-1.8					
4/3/2019	12:20	-2.6	-2	-2.1					

Table 4B
MONITORING WELLS PRESSURE READINGS
BIOVENT GROUP 1 PROVE OUT

MW PRESSURE READINGS			Temperature, Flow, and Pressure Measurements						
DATE	TIME	MW-66	MW-67	PH-21					Weather/Notes
2/28/2019	9:00	-2.6	-2.8	3.4					
2/28/2019	9:30	-2.7	-2.8	3.7					
2/28/2019	10:00	-2.4	-2.3	4.6					
2/28/2019	10:30	-2.2	-2.2	4.9					
2/28/2019	11:00	-2.2	-2.2	4.3					
2/28/2019	11:30	-1.8	-1.6	3.7					
2/28/2019	12:00	-0.7	-0.7	3.2					
2/28/2019	12:30	-0.8	-0.6	3.2					
2/28/2019	13:00	-0.5	0	3.7					
2/28/2019	13:30	3.5	3.5	0.8					
2/28/2019	14:00	0.0	2.6	3.7					
3/5/2019	9:30	-0.5	-0.5	1.6					
3/5/2019	10:00	0.0	0.8	0					
3/5/2019	10:30	1.0	1.8	0					
3/5/2019	11:00	1.3	2.4	3.5					

Table 4C
MONITORING WELLS PRESSURE READINGS
BIOVENT GROUP 2 PROVE OUT

MW PRESSURE READINGS			Temperature, Flow, and Pressure Measurements						
DATE	TIME	MW-66	MW-67	PH-21					Weather/Notes
3/6/2019	9:00	-1.8	1.3	-1.6					

Table 5
VES System Proveout Readings

date	time	BIOSPARGE ON?	BS GROUP RUNNING	BIOVENT ON?	BV GROUP RUNNING	BS TARGET FLOW (cfm/well)	BS-SPEED (% total)	BV-SPEED (% total)	BV TARGET FLOW (cfm/well)	PIT-201 (psi)	FIT-201 ("H2O)	FIT-201 (scfm)	TT-201 (deg F)	B-201 (hrs)	HX-201 (hrs)	TI-202 (deg F)	PI-202 (psi)
2/27/2019	9:45		GROUP 1				75			8.3		0.5	32.4			155	6
2/27/2019	10:45		GROUP 1				75			8.2		0.5	34			150	5.8
2/28/2019	9:40				GROUP 1			55									
2/28/2019	11:40				GROUP 1			55									
2/28/2019	13:30				GROUP 1			55									
3/5/2019	9:51				GROUP 1			55									
3/5/2019	11:10				GROUP 1			55									
3/6/2019	14:55		GROUP 1				55			3.76	0.25		30.9			80	3.8
3/6/2019	16:30		GROUP 1				55			3.76	0.23		26.9			85	2.1
3/12/2019	9:48				GROUP 2												
3/12/2019	11:20				GROUP 2												
3/25/2019	15:10		GROUP 1				64			7.09	0.5		47.3			120	6.1
3/25/2019	16:10		GROUP 1				64			6.39	0.48		46.3			143	4.1
3/25/2019	16:40		GROUP 1				64			6.92	0.48		46.6			143	4.1
3/26/2019	9:32		GROUP 1				64			7.2	0.5		43.2			78	7.1
3/26/2019	11:26		GROUP 1				64			6.4	0.4		56.6			138	4.1
3/26/2019	13:10		GROUP 1				70			7.04	0.5		66.3			140	4.2
3/26/2019	14:31		GROUP 1				70			7.14	0.5		57.7			151	4
3/26/2019	16:03		GROUP 1				70			7.14	0.6		54.1			157	4
3/29/2019	9:46		GROUP 1				70			8.11	0.6		58			80	8
3/29/2019	10:41		GROUP 1				70			7.31	0.5		58			150	4.1
3/29/2019	12:25		GROUP 1				70			7.1	0.5		60.1			160	4
3/29/2019	13:54		GROUP 1				70			7.09	0.5		61			160	4
3/29/2019	15:33						70			7.14	0.5		62.4			165	3.9
4/2/2019	11:00		GROUP 2				70			8.41	0.55		62			160	6.5
4/2/2019	11:30		GROUP 2				70			8.15	0.55		62			162	5.5
4/2/2019	12:00		GROUP 2				70			8.15	0.55		62			164	5
4/2/2019	12:30		GROUP 2				70			8.1	0.55		64			164	5
4/2/2019	13:00		GROUP 2				70			8.07	0.55		64			164	5
4/2/2019	13:30		GROUP 2				70			8.05	0.55		64			166	4.5
4/2/2019	14:00		GROUP 2				70			8.05	0.55		64			166	4.5
4/2/2019	14:30		GROUP 2				70			8.05	0.55		66			166	4.5
4/3/2019	8:00		GROUP 2				70			8.68	0.7		60			100	9
4/3/2019	8:30		GROUP 2				70			8.14	0.5		60			148	6.4
4/3/2019	9:00		GROUP 2				70			8.1	0.55		62			160	5.1
4/3/2019	9:30		GROUP 2				70			8.1	0.55		62			160	5
4/3/2019	10:00		GROUP 2				70			8.05	0.55		62			162	5
4/3/2019	11:00		GROUP 2				70			8	0.55		64			164	4.8
4/3/2019	11:30		GROUP 2				70			8	0.55		64			166	4.8
4/3/2019	12:00		GROUP 2				70			8	0.55		64			166	4.8
4/3/2019	12:30		GROUP 2				70			8	0.55		66			166	4.8
4/3/2019	13:00		GROUP 2				70			7.95	0.55		66			166	4.8
4/3/2019	13:30		GROUP 2				70			7.95	0.55		66			166	4.8
4/3/2019	14:00		GROUP 2				70			7.95	0.55		66			166	4.8
4/16/2019	7:33	yes	GROUP 2			1	70			7.24	0.94	131.4	47.3			160	6.4
4/16/2019	9:25	yes	GROUP 2			1	70			7.79	0.8	128	56			164	7
4/16/2019	13:31	yes	GROUP 2			1	70			7.68	0.69	124.1	74.8			170	6.4
4/16/2019	7:33	yes	GROUP 2			1	70			7.24	0.94	131.4	47.3			160	6.4
4/16/2019	9:25	yes	GROUP 2			1	70			7.79	0.8	128	56			164	7
4/16/2019	13:31	yes	GROUP 2			1	70			7.68	0.69	124.1	74.8			170	6.4
4/17/2019	10:19	yes	GROUP 2			1	70			7.71	0.75	128	66.2			170	6.8
4/17/2019	13:17	yes	GROUP 2			1	70			7.89	0.74	124	63.7			178	6.6
4/17/2019	10:19	yes	GROUP 2			1	70			7.71	0.75	128	66.2			170	6.8
4/17/2019	13:17	yes	GROUP 2			1	70			7.89	0.74	124	63.7			178	6.6
4/22/2019	7:59	yes	GROUP 2			1	70			8.1	0.73	123	60.1			178	6.4
4/22/2019	8:48	yes	GROUP 2	yes		1	70			8.07	0.69	129	62.4			178	6.4
4/22/2019	9:31	yes	GROUP 2	yes		1	70			8.05	0.7	120.9	65.1			178	8
4/22/2019	13:08	yes	GROUP 2	yes	GROUP 1	1	70			8	0.72	123.4	75.8	1.8	1.8	180	7.8
4/22/2019	14:10	yes	GROUP 2	yes	GROUP 1	1	70			8	0.74	124	72.3	2.8	2.8	180	7.75
4/22/2019	7:59	yes	GROUP 2			1	70			8.1	0.73	123	60.1			178	6.4
4/22/2019	8:48	yes	GROUP 2	yes		1	70			8.07	0.69	129	62.4			178	6.4
4/22/2019	9:31	yes	GROUP 2	yes		1	70			8.05	0.7	120.9	65.1			178	8
4/22/2019	13:08	yes	GROUP 2	yes	GROUP 1	1	70			8	0.72	123.4	75.8	1.8	1.8	180	7.8
4/22/2019	14:10	yes	GROUP 2	yes	GROUP 1	1	70			8	0.74	124	72.3	2.8	2.8	180	7.75
4/23/2019	7:23	yes	GROUP 2	yes	GROUP 1	1	70			8.05	0.65	122	59.2	20	20	178	8
4/23/2019	10:57	yes	GROUP 2	yes	GROUP 1	1	70			7.95	0.69	122	82.8	23.6	23.6	180	8
4/23/2019	13:10	yes	GROUP 2	yes	GROUP 1	1	70			7.9	0.62	118	86	25.8	25.8	184	7
4/23/2019	7:23	yes	GROUP 2	yes	GROUP 1	1	70			8.05	0.65	122	59.2	20	20	178	8
4/23/2019	10:57	yes	GROUP 2	yes	GROUP 1	1	70			7.95	0.69	122	82.8	23.6	23.6	180	8
4/23/2019	13:10	yes	GROUP 2	yes	GROUP 1	1	70			7.9	0.62	118	86	25.8	25.8	184	7
4/24/2019	11:34	yes	GROUP 2	yes	GROUP 1	1	70			8	0.64	119	75.2	48.2	48.2	182	5.8
4/29/2019	10:54	yes	GROUP 2	yes	GROUP 1	1	70			8.18	0.68	130.5	65.5	167.6	167.6	172	9

Table 5
VES System Proveout Readings

date	time	BIOSPARGE ON?	BS GROUP RUNNING	BIOVENT ON?	BV GROUP RUNNING	BS TARGET FLOW (cfm/well)	BS-SPEED (% total)	BV-SPEED (% total)	BV TARGET FLOW (cfm/well)	B-101 (hrs)	HX-101 (hrs)	TI-102 (deg F)	PI-102 (psi)	DIFFERENTIAL PRESSURE FI-102 ("H2O)	BLOWER TEMP BV HANDHELD (deg F)	Total Flow (cfm)	Total Flow ("H2O)	comments
2/27/2019	9:45		GROUP 1				75									155	1	
2/27/2019	10:45		GROUP 1				75									154	0.9	
2/28/2019	9:40				GROUP 1			55				92	2.2			260	0.4	
2/28/2019	11:40				GROUP 1			55				84	1.8			250	0.43	
2/28/2019	13:30				GROUP 1			55				82	1.5			213	0.34	
3/5/2019	9:51				GROUP 1			55				66	1.9			200	0.4	
3/5/2019	11:10				GROUP 1			55				80	1.8			205	0.32	
3/6/2019	14:55		GROUP 1				55									250		
3/6/2019	16:30		GROUP 1				55									260		
3/12/2019	9:48				GROUP 2							65	3					
3/12/2019	11:20				GROUP 2							80	1.8					
3/25/2019	15:10		GROUP 1				64									100	0.63	
3/25/2019	16:10		GROUP 1				64									105	0.58	
3/25/2019	16:40		GROUP 1				64									108	0.55	
3/26/2019	9:32		GROUP 1				64									105	0.6	
3/26/2019	11:26		GROUP 1				64									105	0.65	
3/26/2019	13:10		GROUP 1				70									125	0.8	
3/26/2019	14:31		GROUP 1				70									128	0.85	
3/26/2019	16:03		GROUP 1				70									129	0.85	
3/29/2019	9:46		GROUP 1				70									120	0.7	
3/29/2019	10:41		GROUP 1				70									120	0.7	
3/29/2019	12:25		GROUP 1				70									126	0.78	
3/29/2019	13:54		GROUP 1				70									126	0.8	
3/29/2019	15:33						70									125	0.8	
4/2/2019	11:00		GROUP 2				70									126	0.74	
4/2/2019	11:30		GROUP 2				70									127	0.74	
4/2/2019	12:00		GROUP 2				70									127	0.7	
4/2/2019	12:30		GROUP 2				70									127	0.72	
4/2/2019	13:00		GROUP 2				70									127	0.72	
4/2/2019	13:30		GROUP 2				70									128	0.73	
4/2/2019	14:00		GROUP 2				70									128	0.73	
4/2/2019	14:30		GROUP 2				70									128	0.73	
4/3/2019	8:00		GROUP 2				70									128	0.63	
4/3/2019	8:30		GROUP 2				70									128	0.76	
4/3/2019	9:00		GROUP 2				70									128	0.8	
4/3/2019	9:30		GROUP 2				70									128	0.77	
4/3/2019	10:00		GROUP 2				70									128	0.77	
4/3/2019	11:00		GROUP 2				70									128	0.77	
4/3/2019	11:30		GROUP 2				70									128	0.77	
4/3/2019	12:00		GROUP 2				70									128	0.77	
4/3/2019	12:30		GROUP 2				70									128	0.75	
4/3/2019	13:00		GROUP 2				70									128	0.74	
4/3/2019	13:30		GROUP 2				70									128	0.74	
4/3/2019	14:00		GROUP 2				70									125	0.7	
4/16/2019	7:33	yes	GROUP 2			1	70								174			
4/16/2019	9:25	yes	GROUP 2			1	70								189			
4/16/2019	13:31	yes	GROUP 2			1	70								198			
4/16/2019	7:33	yes	GROUP 2			1	70											
4/16/2019	9:25	yes	GROUP 2			1	70											
4/16/2019	13:31	yes	GROUP 2			1	70											
4/17/2019	10:19	yes	GROUP 2			1	70								195			
4/17/2019	13:17	yes	GROUP 2			1	70								203			
4/17/2019	10:19	yes	GROUP 2			1	70											
4/17/2019	13:17	yes	GROUP 2			1	70											
4/22/2019	7:59	yes	GROUP 2			1	70								201			Just switched from Group 1 to Group 2
4/22/2019	8:48	yes	GROUP 2	yes		1	70			253308	252937	110	1.8	0.2	107			
4/22/2019	9:31	yes	GROUP 2	yes		1	70			265740	265347	118	1.4	0.2	109			
4/22/2019	13:08	yes	GROUP 2	yes	GROUP 1	1	70			1.8	1.8	120	1	0.2	107			Hours meter was just reset by Presido
4/22/2019	14:10	yes	GROUP 2	yes	GROUP 1	1	70			2.8	2.8	120	1	0.2	116			
4/22/2019	7:59	yes	GROUP 2			1	70								201			Just switched from Group 1 to Group 2
4/22/2019	8:48	yes	GROUP 2	yes		1	70			253308	252937	110	1.8	0.2	107			
4/22/2019	9:31	yes	GROUP 2	yes		1	70			265740	265347	118	1.4	0.2	109			
4/22/2019	13:08	yes	GROUP 2	yes	GROUP 1	1	70			1.8	1.8	120	1	0.2	107			Hours meter was just reset by Presido
4/22/2019	14:10	yes	GROUP 2	yes	GROUP 1	1	70			2.8	2.8	120	1	0.2	116			
4/23/2019	7:23	yes	GROUP 2	yes	GROUP 1	1	70			20	20	110	2	0.2	108			
4/23/2019	10:57	yes	GROUP 2	yes	GROUP 1	1	70			23.6	23.6	120	1.4	0.2	114			
4/23/2019	13:10	yes	GROUP 2	yes	GROUP 1	1	70			25.8	25.8	124	0.8	0.2	118			
4/23/2019	7:23	yes	GROUP 2	yes	GROUP 1	1	70			20	20	110	2	0.2	108			
4/23/2019	10:57	yes	GROUP 2	yes	GROUP 1	1	70			23.6	23.6	120	1.4	0.2	114			
4/23/2019	13:10	yes	GROUP 2	yes	GROUP 1	1	70			25.8	25.8	124	0.8	0.2	118			
4/24/2019	11:34	yes	GROUP 2	yes	GROUP 1	1	70			48.2	48.2	120	1.8	0.2	114			
4/29/2019	10:54	yes	GROUP 2	yes	GROUP 1	1	70			167.6	167.6	110	3	0.2	105			

Table 5
VES System Proveout Readings

date	time	BIOSPARGE ON?	BS GROUP RUNNING	BIOVENT ON?	BV GROUP RUNNING	BS TARGET FLOW (cfm/well)	BS-SPEED (% total)	BV-SPEED (% total)	BV TARGET FLOW (cfm/well)	DIFFERENTIAL PRESSURE FI-202 ("H2O)	BLOWER TEMP BS HANDHELD (deg F)	TOTAL FLOW BLOWER FI-101 (scfm)	DIFFUSER PRESSURE GAUGE PDIT-101 ("H2O)	PIT-101 (psi)	FIT-101 ("H2O)	FIT-101 (scfm)	TT-101 (deg F)
2/27/2019	9:45		GROUP 1				75				169						
2/27/2019	10:45		GROUP 1				75				164						
2/28/2019	9:40				GROUP 1			55						3.61	0.25		46
2/28/2019	11:40				GROUP 1			55						2.96	0.2		50.3
2/28/2019	13:30				GROUP 1			55						2.49	0.24		47.5
3/5/2019	9:51				GROUP 1			55						1.9	0.4		40.2
3/5/2019	11:10				GROUP 1			55						1.9	0.4		50.1
3/6/2019	14:55		GROUP 1				55										
3/6/2019	16:30		GROUP 1				55										
3/12/2019	9:48				GROUP 2									3.13	0.2		47.9
3/12/2019	11:20				GROUP 2									3.07	0.2		54.2
3/25/2019	15:10		GROUP 1				64				125						
3/25/2019	16:10		GROUP 1				64				155						
3/25/2019	16:40		GROUP 1				64				158						
3/26/2019	9:32		GROUP 1				64				72						
3/26/2019	11:26		GROUP 1				64				149.2						
3/26/2019	13:10		GROUP 1				70				143						
3/26/2019	14:31		GROUP 1				70				162						
3/26/2019	16:03		GROUP 1				70				164.2						
3/29/2019	9:46		GROUP 1				70				83.7						
3/29/2019	10:41		GROUP 1				70				170						
3/29/2019	12:25		GROUP 1				70				167.6						
3/29/2019	13:54		GROUP 1				70				167.5						
3/29/2019	15:33						70				177.3						
4/2/2019	11:00		GROUP 2				70				88						
4/2/2019	11:30		GROUP 2				70				162						
4/2/2019	12:00		GROUP 2				70				180						
4/2/2019	12:30		GROUP 2				70				197						
4/2/2019	13:00		GROUP 2				70				198						
4/2/2019	13:30		GROUP 2				70				198						
4/2/2019	14:00		GROUP 2				70				198						
4/2/2019	14:30		GROUP 2				70				198						
4/3/2019	8:00		GROUP 2				70				137						
4/3/2019	8:30		GROUP 2				70				181						
4/3/2019	9:00		GROUP 2				70				189						
4/3/2019	9:30		GROUP 2				70				192						
4/3/2019	10:00		GROUP 2				70				193						
4/3/2019	11:00		GROUP 2				70				199						
4/3/2019	11:30		GROUP 2				70				198						
4/3/2019	12:00		GROUP 2				70				199						
4/3/2019	12:30		GROUP 2				70				204						
4/3/2019	13:00		GROUP 2				70				202						
4/3/2019	13:30		GROUP 2				70				203						
4/3/2019	14:00		GROUP 2				70				203						
4/16/2019	7:33	yes	GROUP 2			1	70			0.5							
4/16/2019	9:25	yes	GROUP 2			1	70			0.5							
4/16/2019	13:31	yes	GROUP 2			1	70			0.5							
4/16/2019	7:33	yes	GROUP 2			1	70			0.5	174						
4/16/2019	9:25	yes	GROUP 2			1	70			0.5	189						
4/16/2019	13:31	yes	GROUP 2			1	70			0.5	198						
4/17/2019	10:19	yes	GROUP 2			1	70			0.5							
4/17/2019	13:17	yes	GROUP 2			1	70			0.5							
4/17/2019	10:19	yes	GROUP 2			1	70			0.5	195						
4/17/2019	13:17	yes	GROUP 2			1	70			0.5	203						
4/22/2019	7:59	yes	GROUP 2			1	70			0.55							
4/22/2019	8:48	yes	GROUP 2	yes		1	70			0.55				3.39	0.36	227	64
4/22/2019	9:31	yes	GROUP 2	yes		1	70			0.5	204			3.39	0.27	223.7	66.8
4/22/2019	13:08	yes	GROUP 2	yes	GROUP 1	1	70			0.5	207			3.33	0.28	220	75.1
4/22/2019	14:10	yes	GROUP 2	yes	GROUP 1	1	70			0.5	208			3.28	0.37	204	72.4
4/22/2019	7:59	yes	GROUP 2			1	70			0.55							
4/22/2019	8:48	yes	GROUP 2	yes		1	70			0.55				3.39	0.36	227	64
4/22/2019	9:31	yes	GROUP 2	yes		1	70			0.5	204			3.39	0.27	223.7	66.8
4/22/2019	13:08	yes	GROUP 2	yes	GROUP 1	1	70			0.5	207			3.33	0.28	220	75.1
4/22/2019	14:10	yes	GROUP 2	yes	GROUP 1	1	70			0.5	208			3.28	0.37	204	72.4
4/23/2019	7:23	yes	GROUP 2	yes	GROUP 1	1	70			0.5	202			3.39	0.34	230	59.4
4/23/2019	10:57	yes	GROUP 2	yes	GROUP 1	1	70			0.5	211			3.28	0.24	228	84
4/23/2019	13:10	yes	GROUP 2	yes	GROUP 1	1	70			0.5	215			3.26	0.33	208	86.7
4/23/2019	7:23	yes	GROUP 2	yes	GROUP 1	1	70			0.5	202			3.39	0.34	230	59.4
4/23/2019	10:57	yes	GROUP 2	yes	GROUP 1	1	70			0.5	211			3.28	0.24	228	84
4/23/2019	13:10	yes	GROUP 2	yes	GROUP 1	1	70			0.5	215			3.26	0.33	208	86.7
4/24/2019	11:34	yes	GROUP 2	yes	GROUP 1	1	70			0.5	210			3.32	0.31	226	79.7
4/29/2019	10:54	yes	GROUP 2	yes	GROUP 1	1	70			0.5	201			3.39	0.43	232.4	67.9

Table 5
VES System Proveout Readings

date	time	BIOSPARGE ON?	BS GROUP RUNNING	BIOVENT ON?	BV GROUP RUNNING	BS TARGET FLOW (cfm/well)	BS-SPEED (% total)	BV-SPEED (% total)	BV TARGET FLOW (cfm/well)	PIT-201 (psi)	FIT-201 ("H2O)	FIT-201 (scfm)	TT-201 (deg F)	B-201 (hrs)	HX-201 (hrs)	TI-202 (deg F)	PI-202 (psi)
4/29/2019	13:03	yes	GROUP 2	yes	GROUP 2	1	70			8.15	0.7	131.7	73.1	169.7	169.7	180	9
4/30/2019	7:47	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.13	0.74	128	55.2	188.5	188.5	178	9
4/30/2019	13:42	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.02	0.69	123	81.6	194.3	194.3	180	9
5/1/2019	7:19	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.15	0.71	126.5	56.4	212	212	175	9
5/1/2019	13:27	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.14	0.75	124	62.1	218.1	218.1	178	9
5/6/2019	7:34	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.1	0.75	126	57.3	332.2	332.2	172	9
5/6/2019	10:30	yes	GROUP 1	yes	GROUP 1	1	70	55	5	7.31	124	0.68	71	335.1	335.1	170	8
5/7/2019	8:07	yes	GROUP 1	yes	GROUP 1	1	70	55	5	7.2	0.84	132	58.8	356.7	356.7	160	8.8
5/7/2019	13:20	yes	GROUP 1	yes	GROUP 1	1	70	55	5	7.31	0.74	130.5	73.1	362	362	179	9
5/8/2019	11:33	yes	GROUP 1	yes	GROUP 1	1	70	55	5	7.33	0.72	133	62.6	384.3	384.3	170	8.8
5/13/2019	8:19	yes	GROUP 1	yes	GROUP 1	1	70	55	5	7.63	0.82	130	47.4	500.9	500.9	160	9
5/15/2019	11:35	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.2	0.68	130	70.9	503.8	503.8	170	9
5/20/2019	7:42	yes	GROUP 2	yes	GROUP 2	1	70	55	5	7.94	0.66	117	76.2	619.9	619.9	190	8
5/22/2019	11:23	yes	GROUP 1	yes	GROUP 1	1	70	55	5	8.21	0.64	118	81.1	666.5	666.5	190	9
5/28/2019	11:01	yes	GROUP 2	yes	GROUP 2		70	55		8.03	0.7	123	77.2	809.4	809.4	185	9.1
6/4/2019	13:40	yes	GROUP 2	yes	GROUP 2	1	70	55	5	8.33	0.67	115	79.4	859.4	859.4	180	7.8
6/5/2019	11:09	yes	GROUP 2	yes	GROUP 2	1	70	55	55	8.15	117.4	0.61	86.5	880.9	880.9	190	5
6/10/2019	14:22	yes	GROUP 2	yes	GROUP 2	1	70	55	5	7.99	0.65	117	80	906.3	906.3		
6/11/2019	7:32	yes	GROUP 2	yes	GROUP 2	1	70	55	5	7.9	0.71	121	68.1	923.5	923.5	182	6.8
6/17/2019	12:15	yes	GROUP 2	yes	GROUP 2	1	70	55	5	7.76	0.67	116	300	1071.4	952.5	186	8
6/18/2019	12:10	yes	GROUP 1	yes	GROUP 1	1	70	55	5	7.6	0.68	116	86.5	1095.3	952.5	186	7.6
6/24/2019	15:07	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	8.7	0.74	134	91	1242.3	952.5	211	8.3
6/25/2019	11:25	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	8.49	0.81	136	88.7	1262.5	952.5	200	9.3
6/27/2019	14:24	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	8.31	0.8	135		1313.5	952.5	208	9
7/3/2019	13:57	yes	GROUP 2	yes	GROUP 2	2	75	75	7.5	8.17	0.88	134	98.9	1457	952.5	202	9.8
7/5/2019	12:14	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	8.6	0.84	133	92.6	1503.3	952.5	205	10.1
7/8/2019	14:21	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	8.58	0.84	139	77.4	1577.6	955	196	10.6
7/9/2019	9:06	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	8.36	0.82	135	80.2	1596.2	973.6	195	10.7
7/10/2019	10:17	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	8.31	0.88	134	87.6	1621.1	998.5	202	9.7
7/12/2019	8:32	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	8.31	0.76	143	79.1	1667.4	1044.8	198	9.9
7/15/2019	14:55	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	8.53	0.86	132	87.8	1669.2	1046.6	204	8.2
7/17/2019	13:19	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	8.42	0.86	133		1715.7	1093.1	214	7.6
7/23/2019	14:00	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	10.7	0.6	137	77.1	1721.2	1098.6	228	8
7/24/2019	12:21	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	10	0.7	135	83.5	1743.6	1121	210	9
7/29/2019	11:18	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	8.8	0.7	132	96.1	1862	1239.9	204	9.5
8/2/2019	8:21	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.5	0.75	130	78.9	1955.6	1333	182	9.8
8/12/2019	12:36	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.5	0.8	144	94.6	2033.8	1411.2	200	7.6
8/13/2019	14:48	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.6	0.8	125	80.5	2059.9	1437.3	194	9.2
8/16/2019	7:59	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.9	0.8	140	77.7	2125.1	1502.5	195	9.8
8/20/2019	11:35	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	8.8	0.85	141	98.4	2224.6	1602.1	204	9.6
8/23/2019	12:15	yes	GROUP 2	yes	GROUP 2	3	75	55	3	9.4	0.75	137	68.2	2297.3	1674.7	194	13
8/27/2019	8:30	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	9.1	0.77	139	69.9	2389.7	1767.1	190	11
8/30/2019	13:38	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	7.8	0.88	131	95	2466.7	1844.1	184	9
9/3/2019	8:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.36	83	136	73.1	2557.1	1934.4	184	10.5
9/4/2019	9:30	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.31	0.83	130	77.8	2582.5	1959.9	180	10
9/5/2019	7:58	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.25	0.9	131.3	70.2	2604.9	1982.3	180	10.5
9/13/2019	13:33	yes	GROUP 1	yes	GROUP 1	3	78	55	7.5	8.4	0.94	144	74.2	2655.3	2032.7	130	8.5
9/16/2019	8:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.1	0.85	141	73.4	2721.7	2099.1	180	8.7
9/17/2019	13:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.3	0.8	134	88.5	2750.7	2128.1	190	8.6
9/18/2019	10:01	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.3	0.8	141	76.1	2771.7	2149.1	178	9.4
9/23/2019	9:01	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	7.8	0.86	137	76.8	2890.7	2268.1	178	8.8
9/24/2019	9:08	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	8	0.9	144	73.9	2914.9	2292.3	176	9.4
9/25/2019	10:45	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	8.9	0.8	141	82.9	2940.4	2317.8	198	9.2
10/1/2019	8:25	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	9	0.85	131	70.1	3082.1	2459.5	194	10.5
10/2/2019	11:14	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	8.9	8	121	93.6	3108.9	2486.3	200	9.5
10/4/2019	13:31	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	9.2	0.8	145	75.9	3159.1	2536.6	188	11.5
10/9/2019	8:47	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	9.26	0.71	134	62.2	3274.4	2651.8	186	11
10/11/2019	9:56	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	9.32	0.74	136	70.6	3323.6	2701	191	10.9
10/15/2019	9:17	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	9.21	0.82	143	64.3	3418.9	2796.4	180	11.3
10/16/2019	9:25	yes	GROUP 1	yes	GROUP 1	3	78	55	7.5	8.53	0.87	142	64.8	3443.1	2820.5	176	10.5
10/18/2019	10:47	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.6	0.85	144	57.5	3492.4	2869.9	170	10.6
10/21/2019	8:52	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.53	0.87	153	57.8	3562.4	2938.9	170	10.5
10/22/2019	14:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.21	0.95	146	65.5	3592	2969.4	185	9.2
11/1/2019	12:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.3	0.86	140	61.3	3829.9	3207.4	172	10.2
11/4/2019	8:56	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.5			60.7	3900.1	3277.5	172	10.5
11/8/2019	13:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.6	1.01	155	47.2	3996.2	3374.1	160	10.5
11/11/2019	14:36	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	6.88	1.1	142	70.7	4069.5	3447.4	158	8
11/12/2019	10:18	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	8.1	1.1	162	40.5	4089.2	3467.1	158	9.7

Table 5
VES System Proveout Readings

date	time	BIOSPARGE ON?	BS GROUP RUNNING	BIOVENT ON?	BV GROUP RUNNING	BS TARGET FLOW (cfm/well)	BS-SPEED (% total)	BV-SPEED (% total)	BV TARGET FLOW (cfm/well)	DIFFERENTIAL PRESSURE FI-202 ("H2O)	BLOWER TEMP BS HANDHELD (deg F)	TOTAL FLOW BLOWER FI-101 (scfm)	DIFFUSER PRESSURE GAUGE PDIT-101 ("H2O)	PIT-101 (psi)	FIT-101 ("H2O)	FIT-101 (scfm)	TT-101 (deg F)
4/29/2019	13:03	yes	GROUP 2	yes	GROUP 2	1	70			0.5	210			3.76	0.36	249.6	73.5
4/30/2019	7:47	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	199			3.76	0.36	242	54.7
4/30/2019	13:42	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	204			3.65	0.36	233	77.7
5/1/2019	7:19	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.55	197			3.76	0.27	242	56
5/1/2019	13:27	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.55	200			3.76	0.27	224	62.3
5/6/2019	7:34	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.55	198			3.76	0.4	226.8	57.1
5/6/2019	10:30	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	188			3.3	0.33	224	73.4
5/7/2019	8:07	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	183			3.39	0.4	225	58.6
5/7/2019	13:20	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	189			3.33	0.32	229	72.6
5/8/2019	11:33	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	190			3.33	0.35	233	62.8
5/13/2019	8:19	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	185			3.38	0.48	221	47
5/15/2019	11:35	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	199			3.7	0.33	238	77.9
5/20/2019	7:42	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	211			3.65	0.32	238	76.3
5/22/2019	11:23	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	214			3.71	0.28	244	88.4
5/28/2019	11:01	yes	GROUP 2	yes	GROUP 2		70	55		0.5	202			3.65	0.32	235	78.9
6/4/2019	13:40	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	212			3.68	0.3	224.2	76.6
6/5/2019	11:09	yes	GROUP 2	yes	GROUP 2	1	70	55	55	0.5	217			3.65	0.24	210	90.9
6/10/2019	14:22	yes	GROUP 2	yes	GROUP 2	1	70	55	5								
6/11/2019	7:32	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	198			3.73	0.34	225	67.9
6/17/2019	12:15	yes	GROUP 2	yes	GROUP 2	1	70	55	5	0.5	196			3.7	0.31	226	89.4
6/18/2019	12:10	yes	GROUP 1	yes	GROUP 1	1	70	55	5	0.5	134			3.3	0.34	235	84
6/24/2019	15:07	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	0.95	223			3.4	0.3	223	90.6
6/25/2019	11:25	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	2	213			3.39	0.33	217	90.7
6/27/2019	14:24	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	2	221			3.4	0.3	223	96
7/3/2019	13:57	yes	GROUP 2	yes	GROUP 2	2	75	75	7.5	2	227			3.38	0.29	216	95.3
7/5/2019	12:14	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	2	222			3.43	0.32	221	94.7
7/8/2019	14:21	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	2	218			3.22	0.28	221	75.8
7/9/2019	9:06	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	2	221			3.07	0.31	214	83.2
7/10/2019	10:17	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	2	225			3.11	0.34	217	92
7/12/2019	8:32	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	2	221			3.12	0.34	244	78.5
7/15/2019	14:55	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	2	228			3.38	0.31	228	88
7/17/2019	13:19	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	2	233			3.43	0.31	224	99.6
7/23/2019	14:00	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	248			3.4	0.3	232	77.3
7/24/2019	12:21	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	240			3.4	3	220	87
7/29/2019	11:18	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	221			3.4	0.3	210	
8/2/2019	8:21	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1.35	202			3.2	0.35	227	79
8/12/2019	12:36	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	202			3.1	0.32	210	99.6
8/13/2019	14:48	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	212			3.1	0.3	203	80.7
8/16/2019	7:59	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	215			3.1	0.3	211	76.9
8/20/2019	11:35	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	229			3.5	0.32	216	
8/23/2019	12:15	yes	GROUP 2	yes	GROUP 2	3	75	55	3	2	137			3.4	0.3	232	69.3
8/27/2019	8:30	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	208			3.5	0.31	223	70
8/30/2019	13:38	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	200			3.53	0.31	213	92.4
9/3/2019	8:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	205			3.28	0.35	227	75.4
9/4/2019	9:30	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	204			3.28	0.31	209.7	78
9/5/2019	7:58	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	193			3.33	0.34	238	70.2
9/13/2019	13:33	yes	GROUP 1	yes	GROUP 1	3	78	55	7.5	2	204			3.3	0.33	230	74.6
9/16/2019	8:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	204			3.3	0.35	233	75.4
9/17/2019	13:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	214			3.3	0.3	208	92.9
9/18/2019	10:01	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	196			3.4	0.3	238	81.8
9/23/2019	9:01	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2	193			3.3	0.33	242	77.5
9/24/2019	9:08	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	193			3.65	0.35	239	77.3
9/25/2019	10:45	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	223			3.7	0.3	240	90.7
10/1/2019	8:25	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	220			3.75	0.35	229	69.6
10/2/2019	11:14	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	218			3.6	0.3	232	100.6
10/4/2019	13:31	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	213			3.75	0.35	207	73.2
10/9/2019	8:47	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	210			3.8	0.35	252	61.2
10/11/2019	9:56	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	1	212			3.8	0.33	241	75.1
10/15/2019	9:17	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2	192			3.86	0.36	256	66.2
10/16/2019	9:25	yes	GROUP 1	yes	GROUP 1	3	78	55	7.5	1.6	182			3.44	0.34	271	64.5
10/18/2019	10:47	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1.35	181			3.49	0.41	264	57.9
10/21/2019	8:52	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1.35	181			3.54	0.39	257	57.4
10/22/2019	14:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1.75	201			3.49	0.32	233	65.4
11/1/2019	12:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1.25	184			3.59	0.36	241	64.9
11/4/2019	8:56	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1.25	191			3.65			65.1
11/8/2019	13:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1	168			3.7	0.35	241	48.1
11/11/2019	14:36	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	0.85	177			2.75	0.37	221	72.2
11/12/2019	10:18	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	0.65	175			3.7	0.36	260	40.7

Table 5
VES System Proveout Readings

date	time	BIOSPARGE ON?	BS GROUP RUNNING	BIOVENT ON?	BV GROUP RUNNING	BS TARGET FLOW (cfm/well)	BS-SPEED (% total)	BV-SPEED (% total)	BV TARGET FLOW (cfm/well)	B-101 (hrs)	HX-101 (hrs)	TI-102 (deg F)	PI-102 (psi)	DIFFERENTIAL PRESSURE FI-102 ("H2O)	BLOWER TEMP BV HANDHELD (deg F)	Total Flow (cfm)	Total Flow ("H2O)	comments
4/29/2019	13:03	yes	GROUP 2	yes	GROUP 2	1	70			169.7	169.7	110	3	0.2	114			
4/30/2019	7:47	yes	GROUP 2	yes	GROUP 2	1	70	55	5	188.5	188.5	110	3.2	0.2	106			
4/30/2019	13:42	yes	GROUP 2	yes	GROUP 2	1	70	55	5	194.3	194.3	120	2.75	0.2	118			
5/1/2019	7:19	yes	GROUP 2	yes	GROUP 2	1	70	55	5	212	212	118	3.5	0.2	110			
5/1/2019	13:27	yes	GROUP 2	yes	GROUP 2	1	70	55	5	218.1	218.1	120	3.2	0.2	112			
5/6/2019	7:34	yes	GROUP 2	yes	GROUP 2	1	70	55	5	332.2	332.2	118	3.8	0.2	111			
5/6/2019	10:30	yes	GROUP 1	yes	GROUP 1	1	70	55	5	335	335.1	118	3	0.2	114			
5/7/2019	8:07	yes	GROUP 1	yes	GROUP 1	1	70	55	5	356.7	356.7	110	3.8	0.2	107			
5/7/2019	13:20	yes	GROUP 1	yes	GROUP 1	1	70	55	5	362	362	115	3	0.2	111			
5/8/2019	11:33	yes	GROUP 1	yes	GROUP 1	1	70	55	5	384.3	384.3	115	3.5	0.2	111			
5/13/2019	8:19	yes	GROUP 1	yes	GROUP 1	1	70	55	5	500.9	500.9	100	4	0.2	92			
5/15/2019	11:35	yes	GROUP 2	yes	GROUP 2	1	70	55	5	503.8	503.8	120	3.5	0.2	109			
5/20/2019	7:42	yes	GROUP 2	yes	GROUP 2	1	70	55	5	619.9	619.9	130	3	0.2	124			
5/22/2019	11:23	yes	GROUP 1	yes	GROUP 1	1	70	55	5	666.5	666.5	124	3.5	0.2	118			
5/28/2019	11:01	yes	GROUP 2	yes	GROUP 2		70	55		809.4	809.4	130	3.6	0.075	120			
6/4/2019	13:40	yes	GROUP 2	yes	GROUP 2	1	70	55	5	859.4	859.4	120	3.3	0.2	120			
6/5/2019	11:09	yes	GROUP 2	yes	GROUP 2	1	70	55	55	880.9	880.9	130	2.8	0.2	125			
6/10/2019	14:22	yes	GROUP 2	yes	GROUP 2	1	70	55	5									
6/11/2019	7:32	yes	GROUP 2	yes	GROUP 2	1	70	55	5	923.7	923.7	122	3.2	0.075	140			
6/17/2019	12:15	yes	GROUP 2	yes	GROUP 2	1	70	55	5	171.5	952.5	133	3.4	0.075	204			
6/18/2019	12:10	yes	GROUP 1	yes	GROUP 1	1	70	55	5	1095.4	952.5	128	3	0.075	196			
6/24/2019	15:07	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	1242.3	952.5	138	2.4	0.06	149			B-201 increased to 75%
6/25/2019	11:25	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	1262.6	952.5	132	3.4	0.075	136			
6/27/2019	14:24	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	1313.5	952.5	140	2.9	0.075	154			
7/3/2019	13:57	yes	GROUP 2	yes	GROUP 2	2	75	75	7.5	1457	952.5	141	3.5	0.05	149			
7/5/2019	12:14	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	1503.3	952.5	136	3.8	0.075	146			
7/8/2019	14:21	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	1577.6	955	121	4.3	0.1	134			
7/9/2019	9:06	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	1596.2	973.6	124	4.3	0.075	135			
7/10/2019	10:17	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	1621.1	998.5	130	3.5	0.1	144			
7/12/2019	8:32	yes	GROUP 1	yes	GROUP 1	2	75	55	7.5	1667.4	1044.8	122	3.5	0.1	137			
7/15/2019	14:55	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	1669.2	1046.6	134	2.8	0.075	146			
7/17/2019	13:19	yes	GROUP 2	yes	GROUP 2	2	75	55	7.5	1715.7	1093.1	144	2.5	0.075	156			
7/23/2019	14:00	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	1721.3	1098.6	128	2.9	0.075	143			
7/24/2019	12:21	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	1743.6	1121	132	3.3	0.075	145			Reducing pressure at PI-202 using gate valve at silencer.
7/29/2019	11:18	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	1862.5	1239.9	139	3.1	0.075	153			
8/2/2019	8:21	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	1955.6	1333	120	4.1	0.1	138			
8/12/2019	12:36	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2033.8	1411.2	130	3	0.075	155			
8/13/2019	14:48	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2059.9	1437.3	124	3.4	0.075	143			
8/16/2019	7:59	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2125.1	1502.5	119	3.9	0.075	136			
8/20/2019	11:35	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2224.6	1602.1	137	3.5	0.05	157			
8/23/2019	12:15	yes	GROUP 2	yes	GROUP 2	3	75	55	3	2297.3	1674.7	118	5.2	0.1	217			
8/27/2019	8:30	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2389.7	1767.1	120	4.5	0.075	138			PI-202 reduced to 9.5.
8/30/2019	13:38	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2466.7	1844.1	136	3.5	0.075	153			
9/3/2019	8:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2557.1	1934.4	118	4	0.075	136			
9/4/2019	9:30	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2582.6	1960	120	4	0.15	120			
9/5/2019	7:58	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2605	1982.4	120	4	0.25	117			
9/13/2019	13:33	yes	GROUP 1	yes	GROUP 1	3	78	55	7.5	2655.3	2032.7	116	4	0.1	137			
9/16/2019	8:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2721.7	2099.1	120	3.5	0.075	140			
9/17/2019	13:00	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2750.7	2128.1	126	3	0.075	148			
9/18/2019	10:01	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2771.7	2149.1	120	3.8	0.075	136			
9/23/2019	9:01	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	2890.7	2268.1	122	3.4	0.075	141			
9/24/2019	9:08	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2914.9	2292.3	122	4	0.075	138			
9/25/2019	10:45	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	2940.4	2317.8	126	3.6	0.075	141			
10/1/2019	8:25	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	3082.1	2459.5	122	4.2	0.075	141			
10/2/2019	11:14	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	3108.9	2486.3	136	3.2	0.075	151			
10/4/2019	13:31	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	3951.1	2536.6	118	4.8	0.075	136			
10/9/2019	8:47	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	3274.4	2651.8	116	4.7	0.075	127			
10/11/2019	9:56	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	3323.6	2701	118	4.3	0.075	137			
10/15/2019	9:17	yes	GROUP 2	yes	GROUP 2	3	75	55	7.5	3418.9	2796.4	116	4.7	0.075	136			
10/16/2019	9:25	yes	GROUP 1	yes	GROUP 1	3	78	55	7.5	3443.1	2820.5	112	4.1	0.075	127			
10/18/2019	10:47	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	3492.4	2869.9	106	4.5	0.075	115			
10/21/2019	8:52	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	3562.4	2939.9	108	4.3	0.075	119			
10/22/2019	14:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	3592	2969.4	116	3.3	0.075	127			
11/1/2019	12:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	3829.9	3207.4	104	4.4	0.075	118			
11/4/2019	8:56	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	3900.1	3277.5	106	4.3	0.075	117			
11/8/2019	13:19	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	3996.2	3374.1	98	4.6	0.1	113			
11/11/2019	14:36	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	4069.5	3447.4	106	2.8	0.125	118			
11/12/2019	10:18	yes	GROUP 1	yes	GROUP 1	3	75	55	7.5	4089.2	3467.1	98	4.6	0.075	113			

Table 6
Pilot Test Oxygenation

Time	System Status Change	Run time (mins)	BS Group 1 (cfm)	BS Group 2 (cfm)	BV Group 1 (cfm)	BV Group 2 (cfm)	BS Periodic Air (cuft)	BS Periodic O_2 (lbs)	BS Cumulative O_2 (lbs)	BV Periodic Air (cuft)	BV Periodic O_2 (lbs)	BV Cumulative O_2 (lbs)
2/27/19 9:45			12									
2/27/19 10:30		45	12				540	9	9	0	0	0
2/27/19 11:00		30	12				360	6	15	0	0	0
2/27/19 11:30		30	12				360	6	22	0	0	0
2/27/19 12:15		45		8			360	6	28	0	0	0
2/27/19 12:45		30		8			240	4	32	0	0	0
2/27/19 13:15		30		8			240	4	36	0	0	0
2/27/19 13:45		30		8			240	4	40	0	0	0
2/27/19 14:15		30		6			180	3	44	0	0	0
2/27/19 14:45		30		8			240	4	48	0	0	0
2/27/19 15:15		30		8			240	4	52	0	0	0
2/28/19 9:00					18.5		0	0	52	0	0	0
2/28/19 9:30		30			18.8		0	0	52	564	10	10
2/28/19 10:00		30			18.8		0	0	52	564	10	20
2/28/19 10:30		30			18.8		0	0	52	564	10	30
2/28/19 11:00		30			18.7		0	0	52	561	10	39
2/28/19 11:30		30			32.2		0	0	52	966	17	56
2/28/19 12:00		30			32.2		0	0	52	966	17	73
2/28/19 12:30		30			32.2		0	0	52	966	17	90
2/28/19 13:00		30			43.8		0	0	52	1314	23	113
2/28/19 13:30		30			46.8		0	0	52	1404	25	138
2/28/19 14:00		30			46.8		0	0	52	1404	25	162
2/28/19 15:00		60			46.7		0	0	52	2802	49	211
3/5/19 9:30					61.5		0	0	52	0	0	211
3/5/19 10:00		30			68.5		0	0	52	2055	36	247
3/5/19 10:30		30			59.75		0	0	52	1793	31	279
3/5/19 11:00		30			61		0	0	52	1830	32	311
3/5/19 16:52	OFF	352					0	0	52	0	0	311
3/6/19 9:00							0	0	52	0	0	311
3/6/19 9:44	ON	44					0	0	52	0	0	311
3/14/19 11:59	OFF						0	0	52	0	0	311
3/14/19 14:29	ON						0	0	52	0	0	311
3/15/19 10:29	OFF						0	0	52	0	0	311
3/18/19 9:29	ON						0	0	52	0	0	311
3/19/19 14:59	OFF						0	0	52	0	0	311
3/19/19 16:29	ON						0	0	52	0	0	311
3/22/19 18:30	OFF						0	0	52	0	0	311
3/25/19 10:15	ON						0	0	52	0	0	311
3/25/19 12:30		135					0	0	52	0	0	311
3/25/19 17:30	OFF	300					0	0	52	0	0	311
3/26/19 7:15	ON						0	0	52	0	0	311
3/26/19 9:20		125	6.5				812	14	66	0	0	311

Table 6
Pilot Test Oxygenation

Time	System Status Change	Run time (mins)	BS Group 1 (cfm)	BS Group 2 (cfm)	BV Group 1 (cfm)	BV Group 2 (cfm)	BS Periodic Air (cuft)	BS Periodic O_2 (lbs)	BS Cumulative O_2 (lbs)	BV Periodic Air (cuft)	BV Periodic O_2 (lbs)	BV Cumulative O_2 (lbs)
3/26/19 10:10		50	0				0	0	66	0	0	311
3/26/19 11:05		55	6.4				352	6	72	0	0	311
3/26/19 13:15		130	4.8				624	11	83	0	0	311
3/26/19 15:05		110	6.8				748	13	96	0	0	311
3/29/19 9:45		4000	7.2				28800	504	600	0	0	311
3/29/19 10:45		60	7.3				438	8	608	0	0	311
3/29/19 12:30		105	7.2				756	13	621	0	0	311
3/29/19 15:25		175	2.4				420	7	629	0	0	311
4/2/19 10:50		5485					0	0	629	0	0	311
4/2/19 11:15		25					0	0	629	0	0	311
4/2/19 11:55		40					0	0	629	0	0	311
4/2/19 13:25		90					0	0	629	0	0	311
4/2/19 13:50		25					0	0	629	0	0	311
4/3/19 7:36		1066		5			5330	93	722	0	0	311
4/3/19 8:50		74		6			444	8	730	0	0	311
4/3/19 9:20		30		6			180	3	733	0	0	311
4/3/19 11:05		105		6			630	11	744	0	0	311
4/3/19 11:50		45		6			270	5	749	0	0	311
4/3/19 12:20		30		6			180	3	752	0	0	311
4/15/19 8:44		17064	23.8				406123	7107	7859	0	0	311
4/15/19 12:01		197					0	0	7859	0	0	311
4/16/19 8:17		1216		8			9728	170	8029	0	0	311
4/17/19 12:37		1700		8.4			14280	250	8279	0	0	311
4/22/19 10:02		7045		8.4			59178	1036	9315	0	0	311
4/22/19 13:26		204		8.4			1714	30	9345	0	0	311
4/23/19 8:14		1128		8.4	15		9475	166	9510	16920	296	607
4/23/19 11:27		193		8.4	15		1621	28	9539	2895	51	657
4/29/19 11:21		8634		8.4		15	72526	1269	10808	129510	2266	2924
4/30/19 8:46		1285		8		15	10280	180	10988	19275	337	3261
4/30/19 13:56		310		8.4		15	2604	46	11034	4650	81	3343
5/1/19 10:37		1241		8.4		7.6	10424	182	11216	9432	165	3508
5/6/19 8:05		7048		8.4		15	59203	1036	12252	105720	1850	5358
5/6/19 9:25		80	6.2		15		496	9	12261	1200	21	5379
5/7/19 9:25		1440	8.9		15		12816	224	12485	21600	378	5757
5/8/19 12:38		1633	9.8		15		16003	280	12765	24495	429	6185
5/13/19 9:08		6990	8.4		15		58716	1028	13793	104850	1835	8020
5/28/19 8:40		21572		10.4		16.5	224349	3926	17719	355938	6229	14249
5/29/19 11:56		1636		7.6		16.5	12434	218	17936	26994	472	14722
5/30/19 12:30	OFF	1474					0	0	17936	0	0	14722
6/5/19 13:33				8		15	0	0	17936	0	0	14722
6/10/19 12:12		7119		8.3		16	59088	1034	18970	113904	1993	16715
6/11/19 10:41		1349		8.1		15	10927	191	19162	20235	354	17069

Table 6
Pilot Test Oxygenation

Time	System Status Change	Run time (mins)	BS Group 1 (cfm)	BS Group 2 (cfm)	BV Group 1 (cfm)	BV Group 2 (cfm)	BS Periodic Air (cuft)	BS Periodic O_2 (lbs)	BS Cumulative O_2 (lbs)	BV Periodic Air (cuft)	BV Periodic O_2 (lbs)	BV Cumulative O_2 (lbs)
6/17/19 14:18		8857		8.9		14.75	78827	1379	20541	130641	2286	19355
6/18/19 9:44		1166	5.8		15		6763	118	20659	17490	306	19661
6/24/19 12:17		8793	3.4		30.75		29896	523	21183	270385	4732	24393
6/24/19 12:33		16		10.2		22.5	163	3	21185	360	6	24399
6/25/19 11:58		1405		9.6		22.5	13488	236	21421	31613	553	24953
7/3/19 14:21		11663		10.1		22.5	117796	2061	23483	262417	4592	29545
7/5/19 13:51		2850				22.5	0	0	23483	64125	1122	30667
7/5/19 14:01		10	4.6		30		46	1	23484	300	5	30672
7/8/19 15:03		4382	7.6		29.5		33303	583	24066	129269	2262	32934
7/10/19 8:54		2511	8.2		31.5		20590	360	24427	79097	1384	34319
7/12/19 8:55		2881	10.6		33		30539	534	24961	95073	1664	35982
7/15/19 12:08		4513					0	0	24961	0	0	35982
7/15/19 15:18		190		10		23.5	1900	33	24994	4465	78	36061
7/17/19 12:20		2702		10.8		22.25	29182	511	25505	60120	1052	37113
7/23/19 11:39		8599		8.9		22.75	76531	1339	26844	195627	3423	40536
7/23/19 13:01		82		18		22.5	1476	26	26870	1845	32	40568
7/24/19 10:58		1317		18.1		22.5	23838	417	27287	29632	519	41087
7/29/19 9:55		7137		15.4		22.5	109910	1923	29211	160583	2810	43897
8/2/19 10:02		5767	19.1		30		110150	1928	31138	173010	3028	46925
8/12/19 11:40		14498	24.4		31		353751	6191	37329	449438	7865	54790
8/13/19 15:36		1676	19.4		30		32514	569	37898	50280	880	55670
8/16/19 9:57		3981	19		30		75639	1324	39222	119430	2090	57760
8/20/19 13:06		5949		18.3			108867	1905	41127	0	0	57760
8/23/19 12:43		4297		18.2			78205	1369	42496	0	0	57760
8/27/19 9:31		5568		19.3			107462	1881	44376	0	0	57760
8/30/19 12:03		4472		16			71552	1252	45628	0	0	57760
8/30/19 15:58		235	13.6		30		3196	56	45684	7050	123	57883
9/5/2019 23:59		9121	13.6		30		124046	2171	47855	273630	4789	62672
		Averages	9.8		31.3							

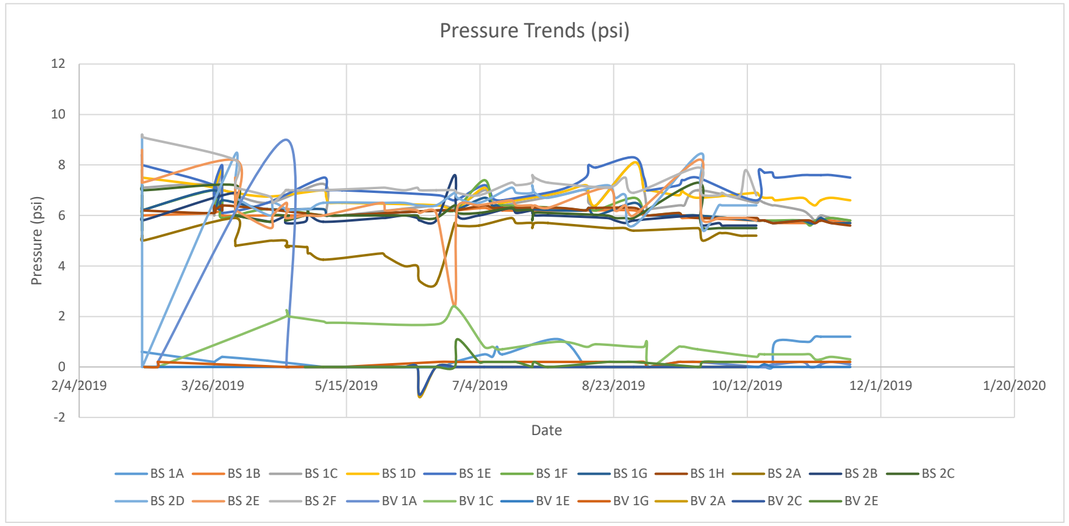
References:

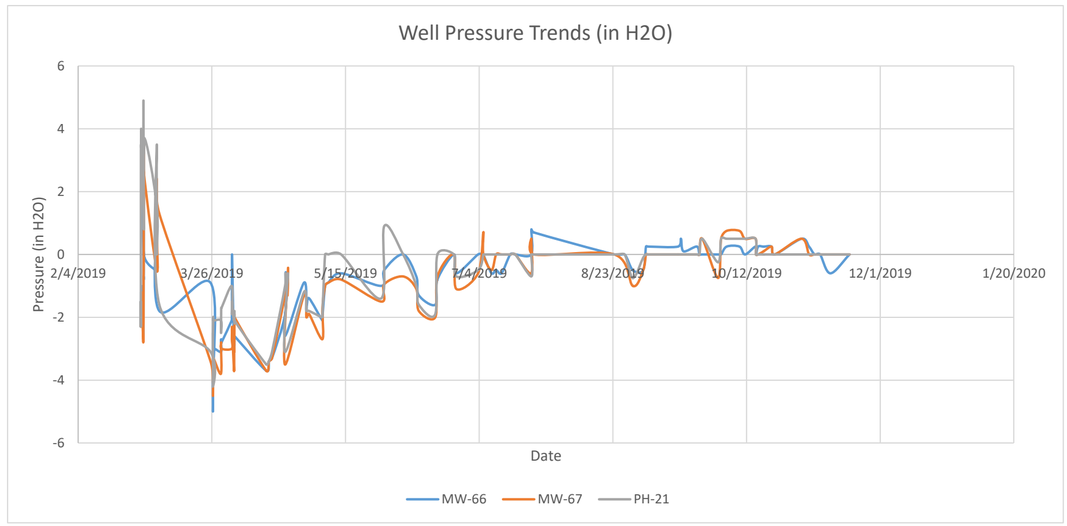
3.5	lbs O2 needed to degrade 1 lbs of Benzene (USEPA 2012)
0.0175	lbs O2 in cu-ft of air (Kuo 1999)

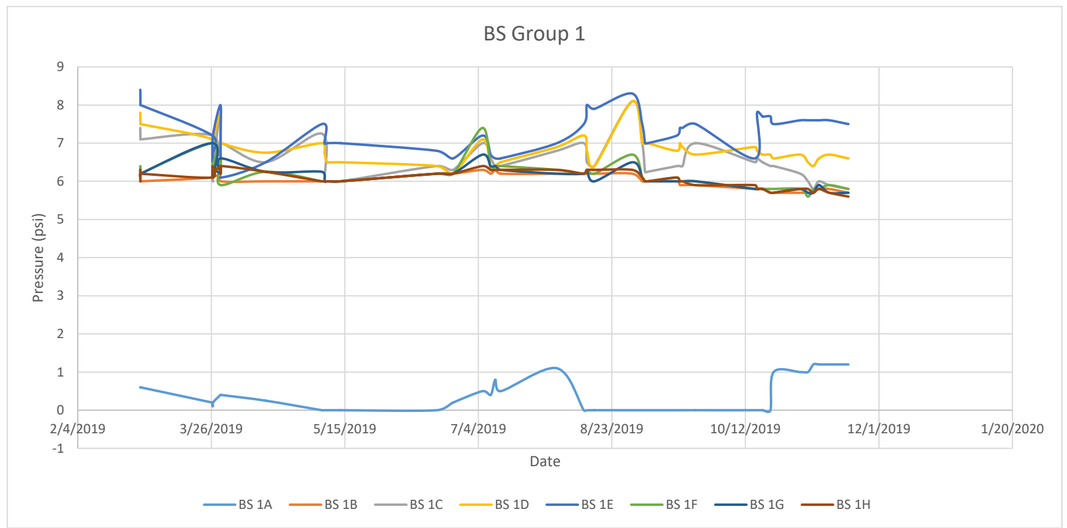
	Biosparge	Biovent
Cumulative O2 (lbs)	47855	62672
Theoretical Benzene Degraded (lbs)	13673	17906
Total Pilot O2 added (lbs)	110527	
Total Theoretical Benzene Degraded (lbs)	31579	

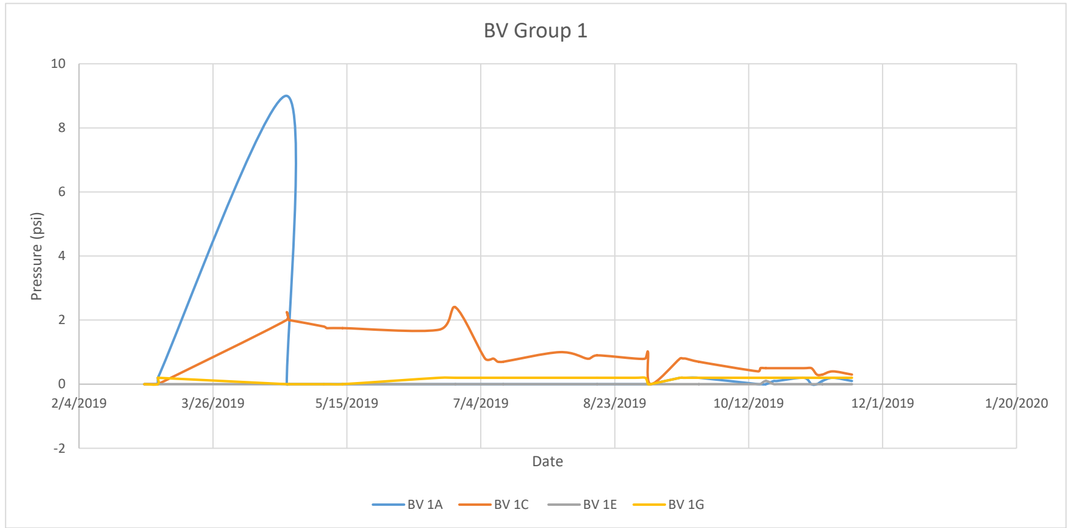
APPENDIX D - FIGURE 1

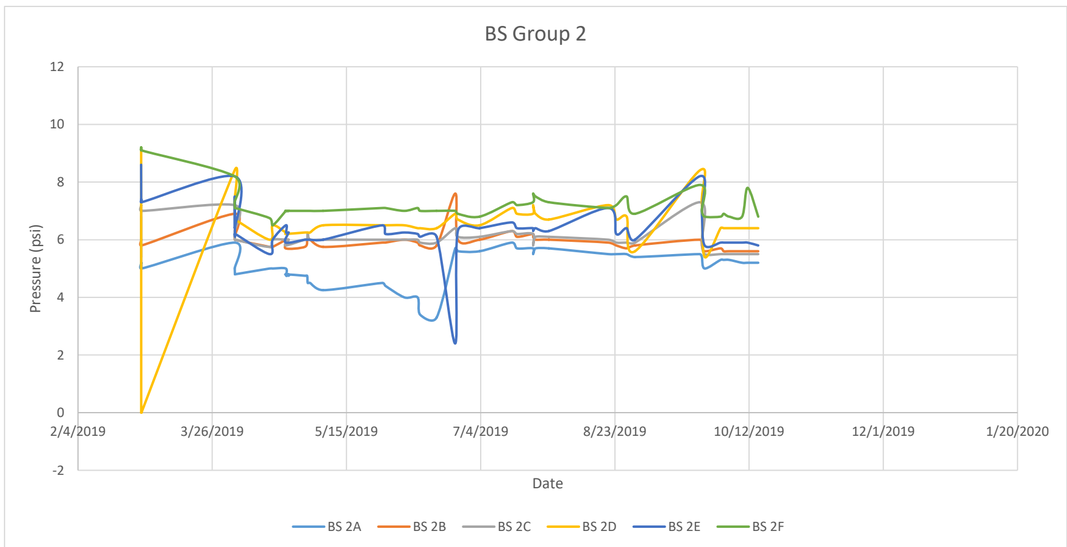
PRESSURE TREND GRAPHS











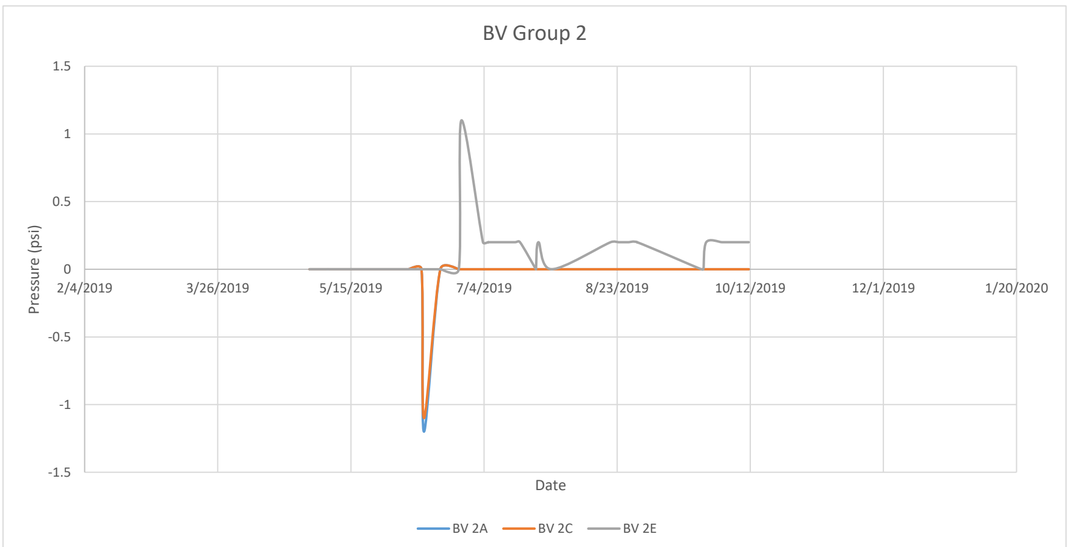
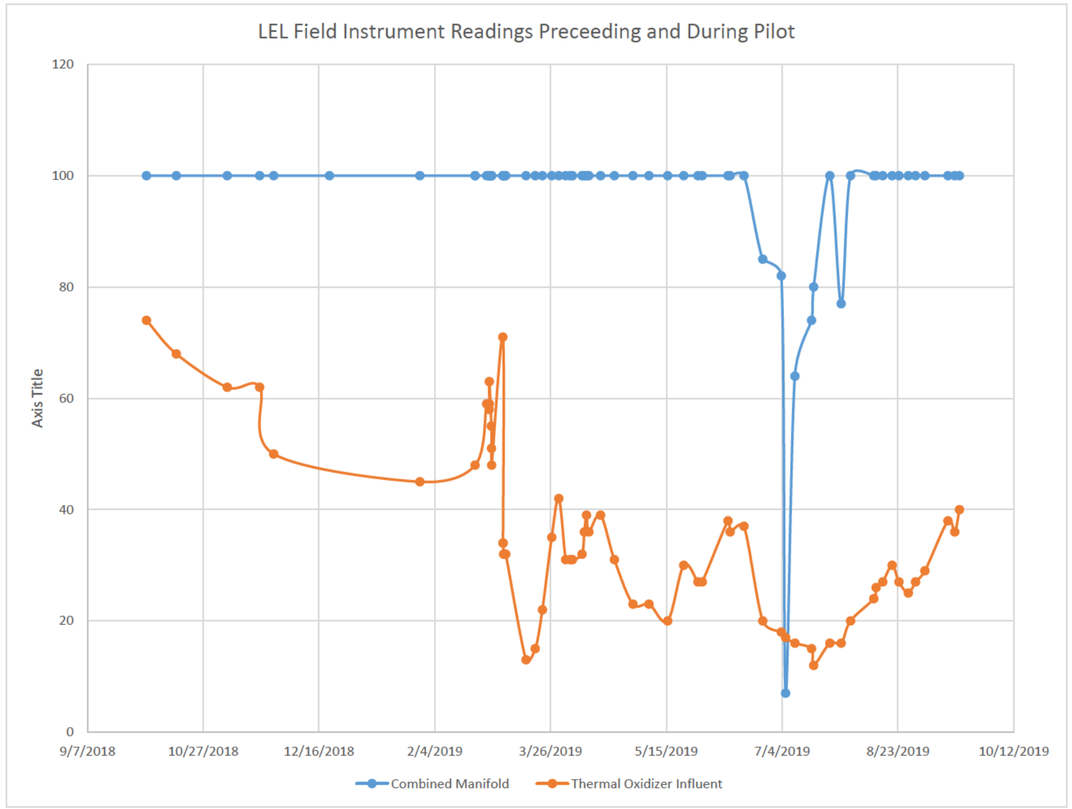
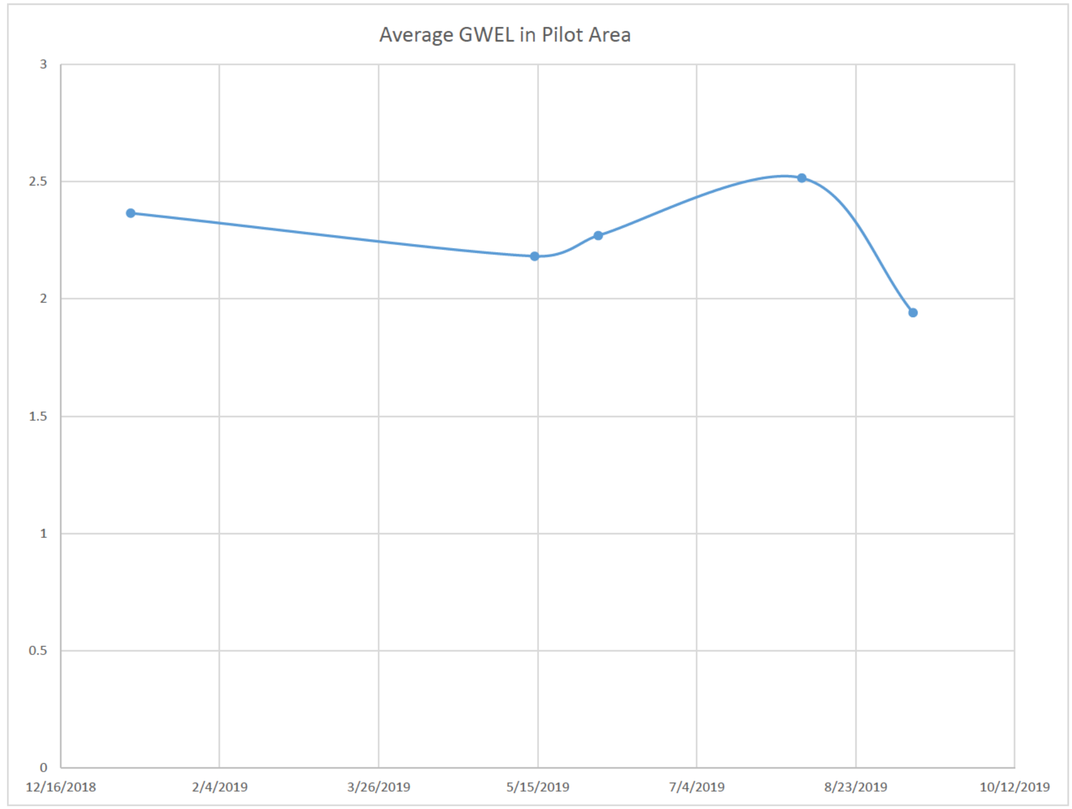
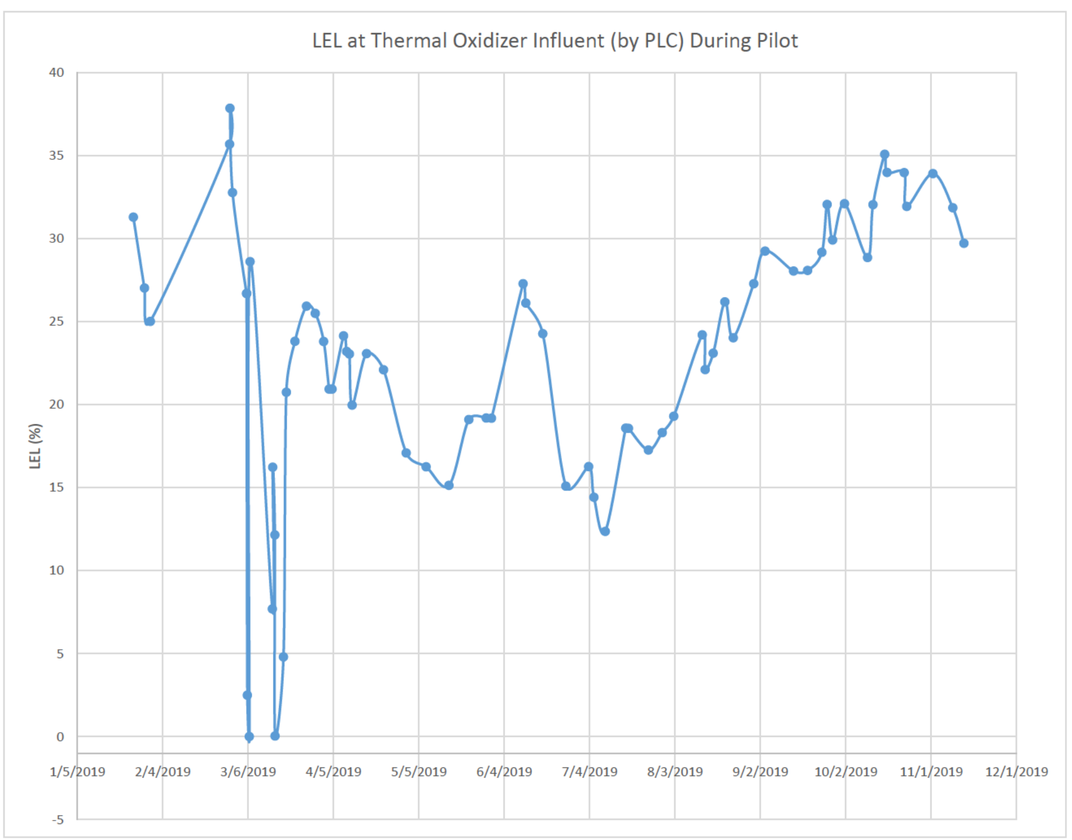


Figure 2
LEL Trend Graphs vs Groundwater







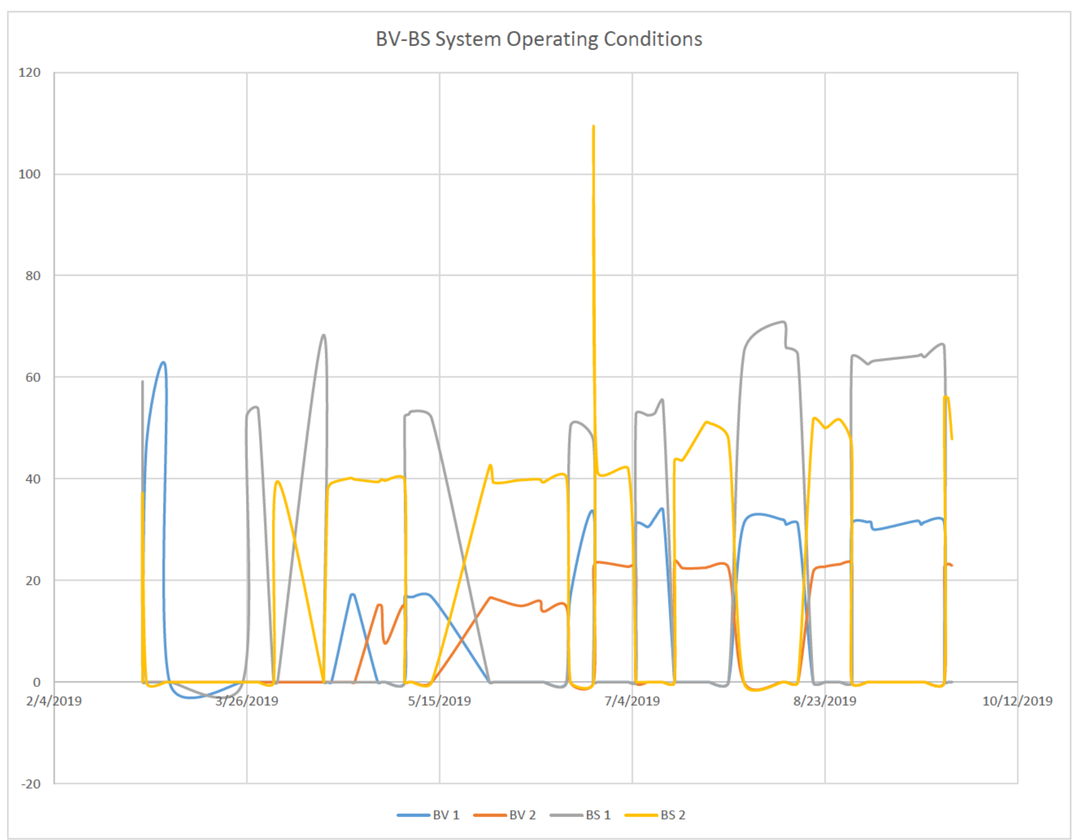
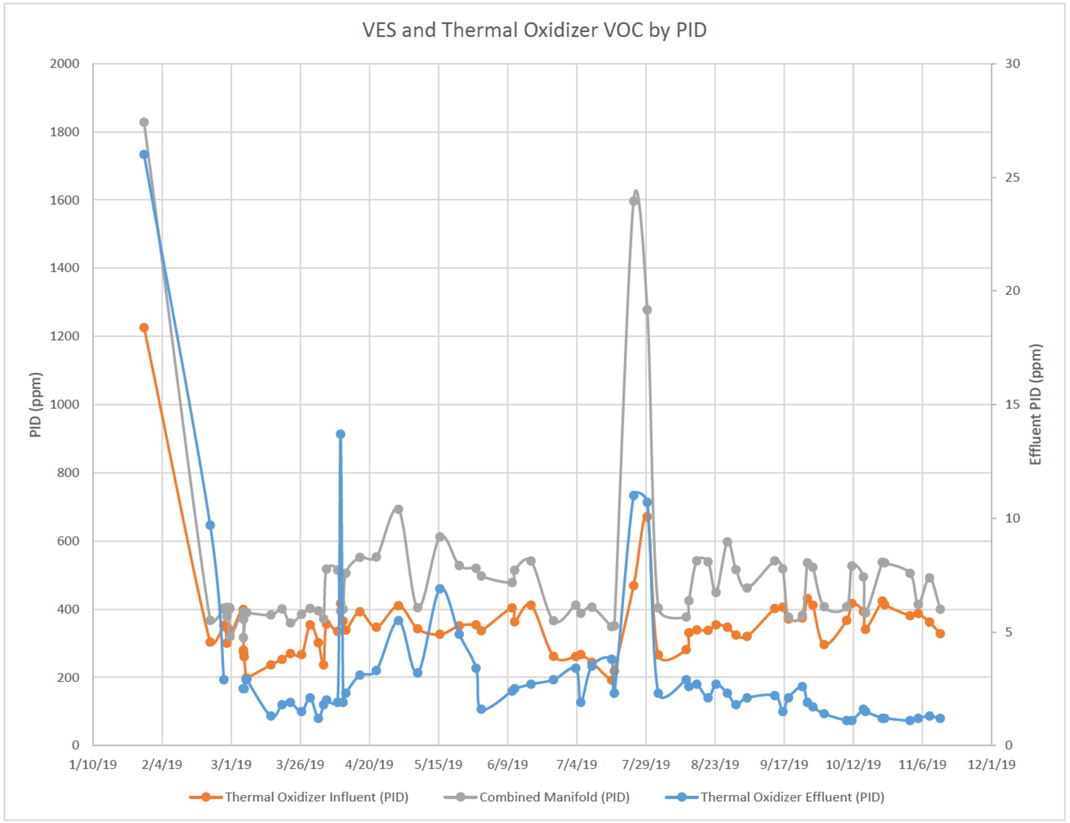
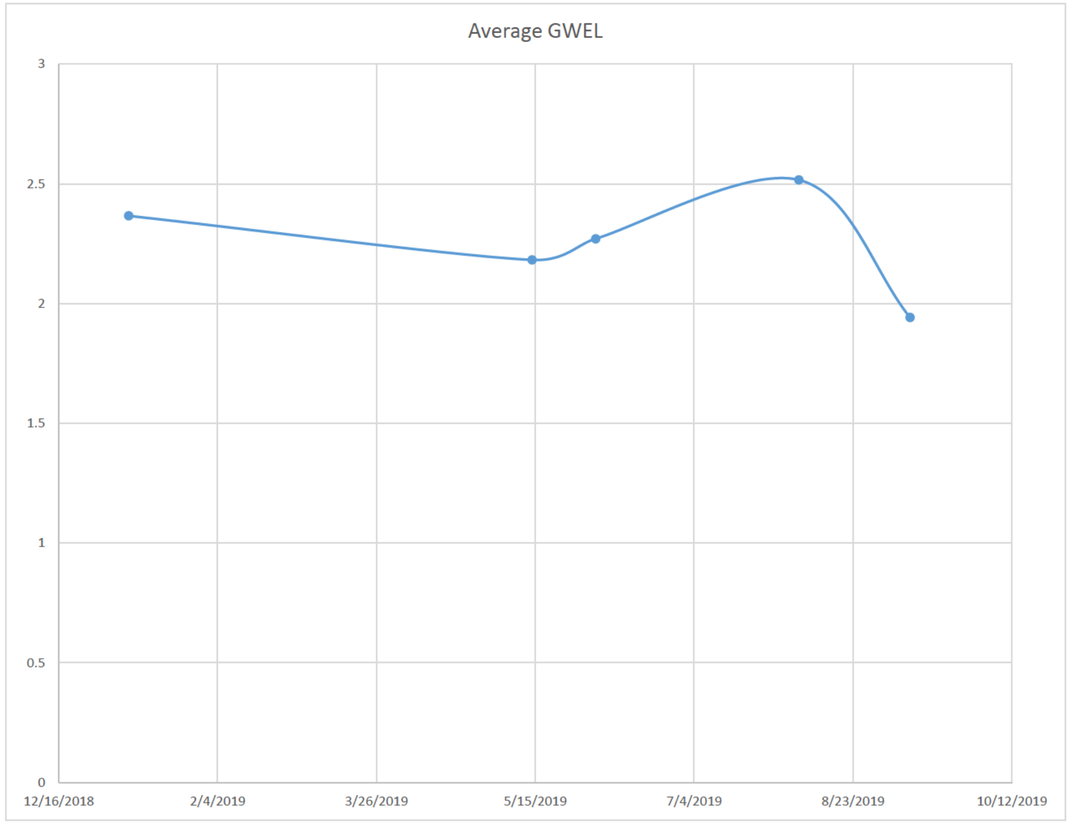
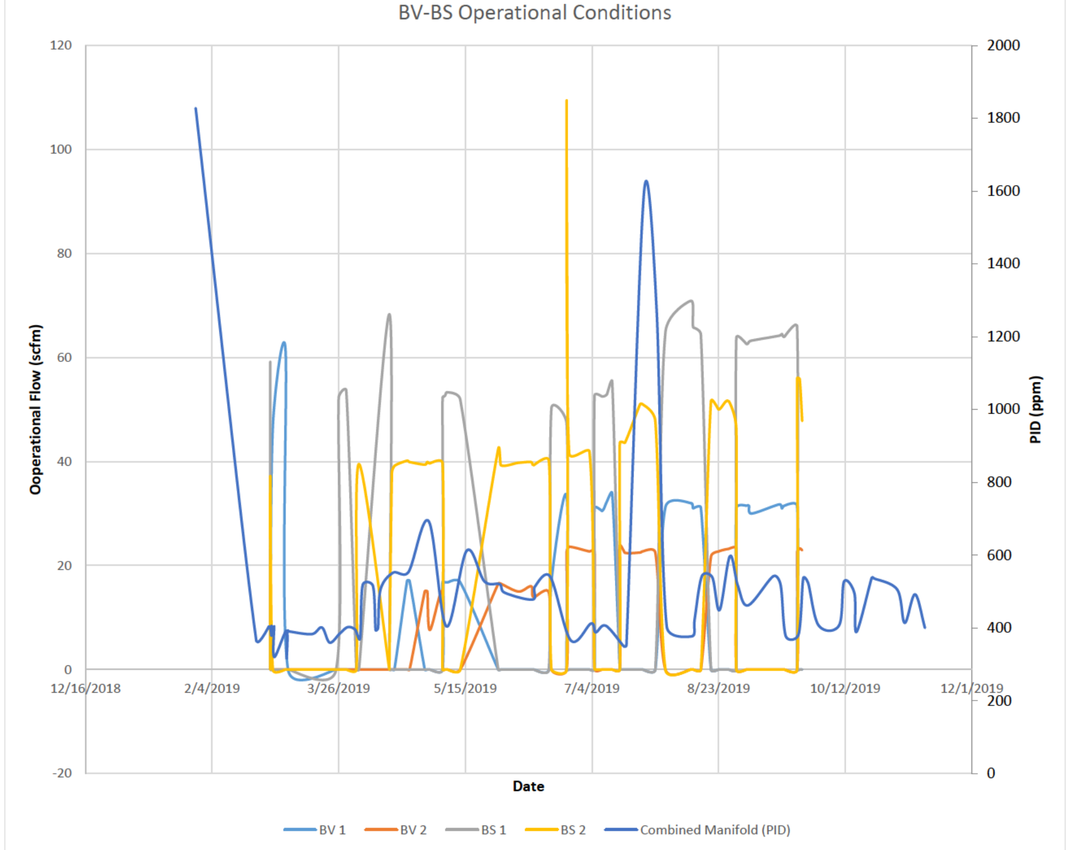


FIGURE 3
VOC - PID TREND GRAPHS







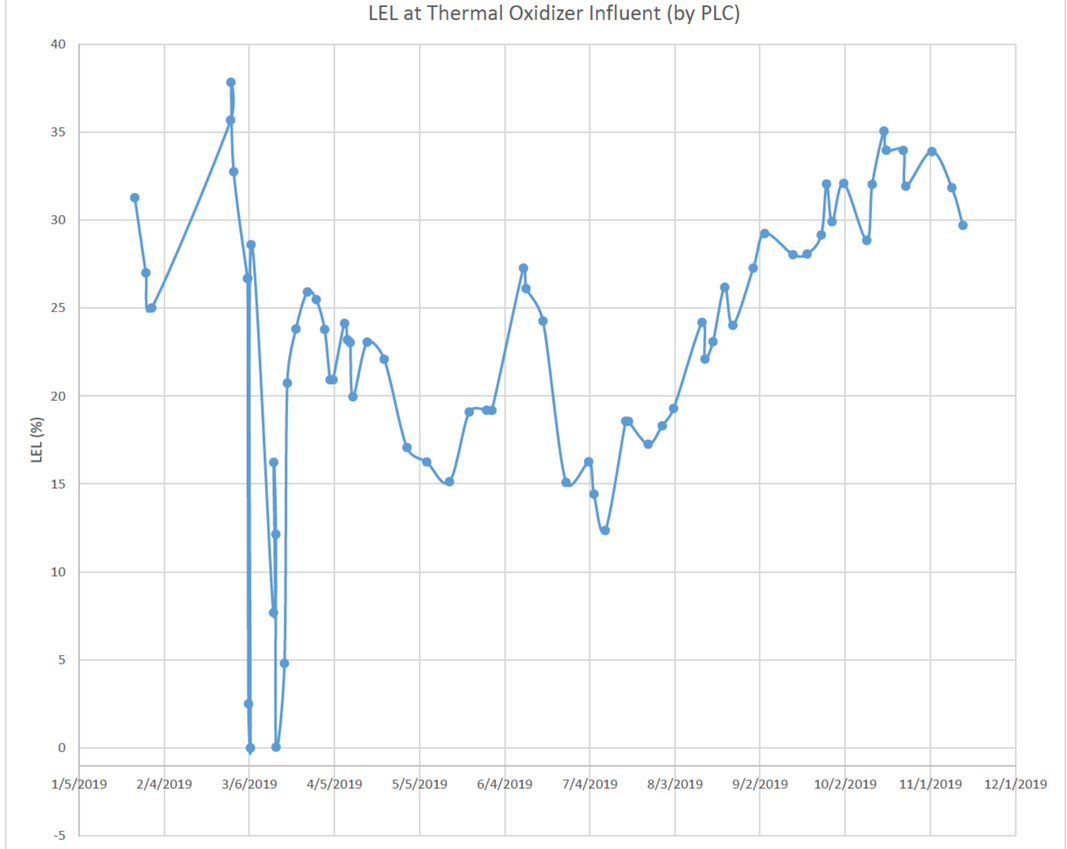
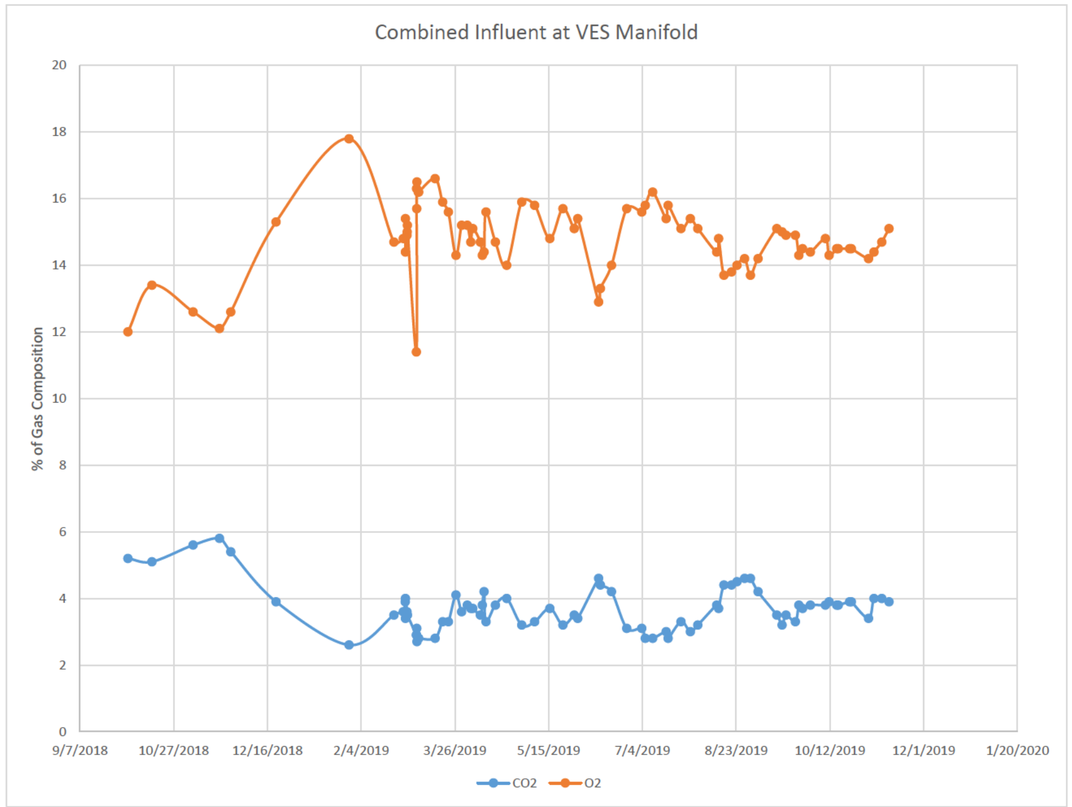
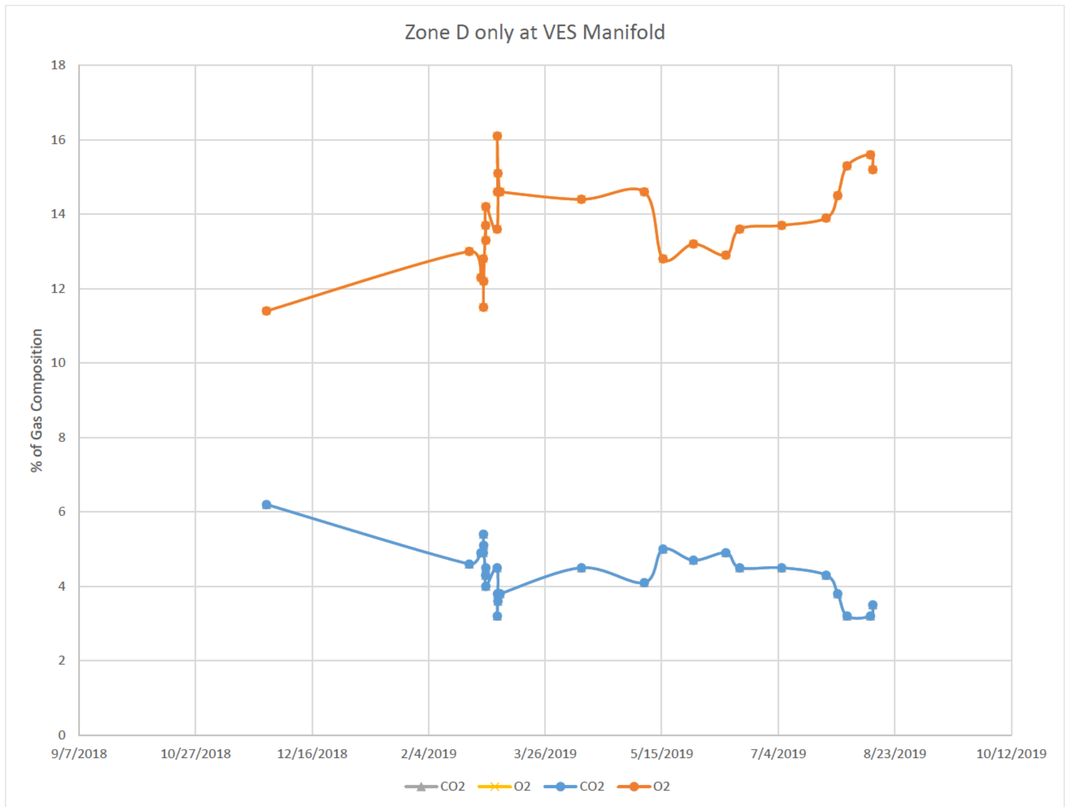
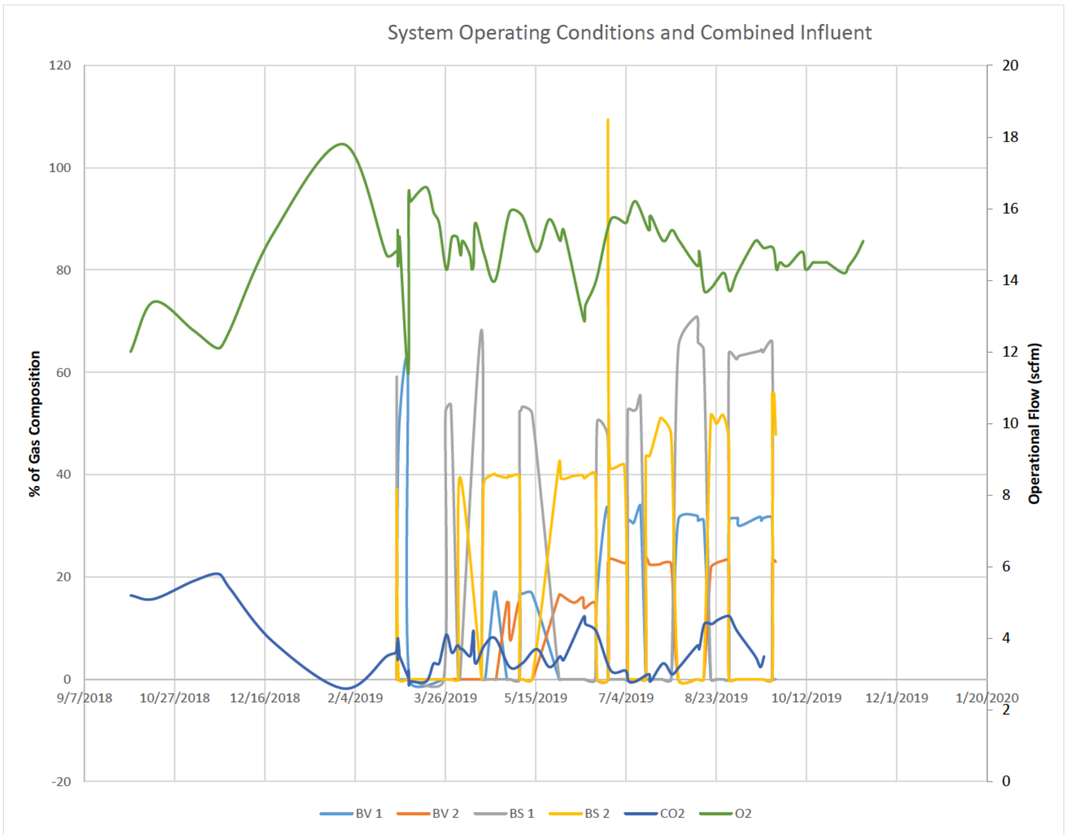


Figure 4
Carbon Dioxide and Oxygen - PID TREND GRAPHS







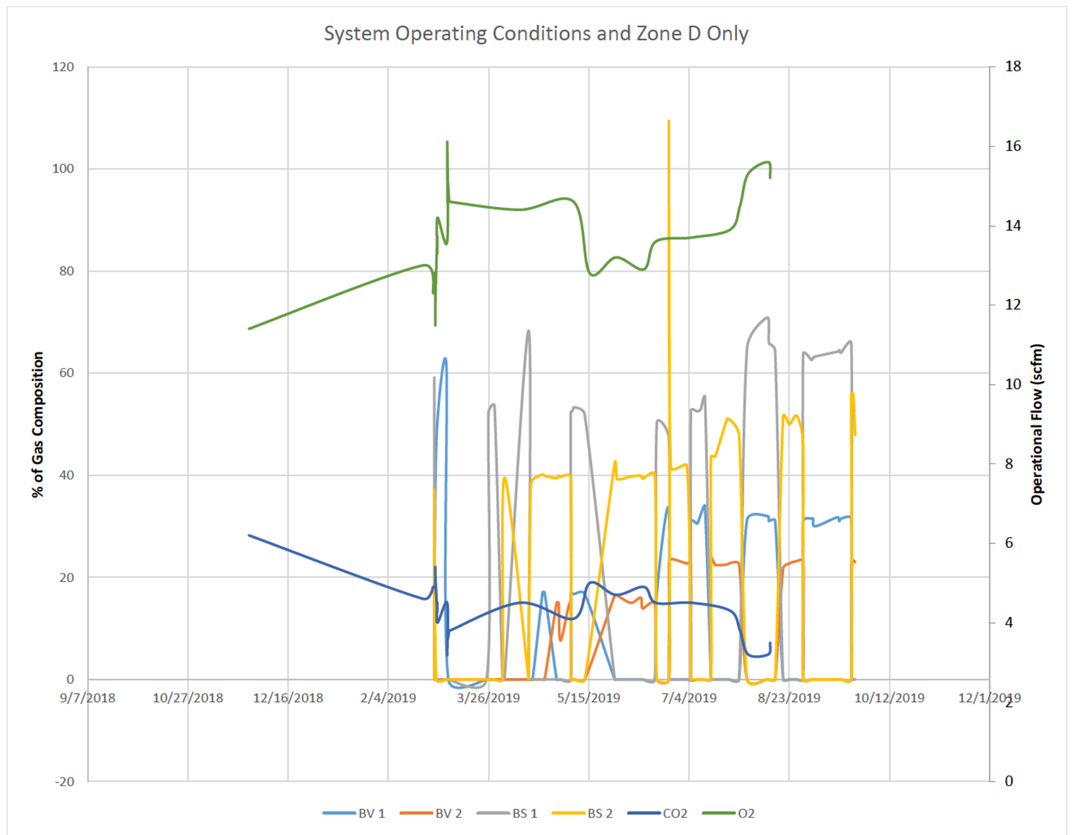
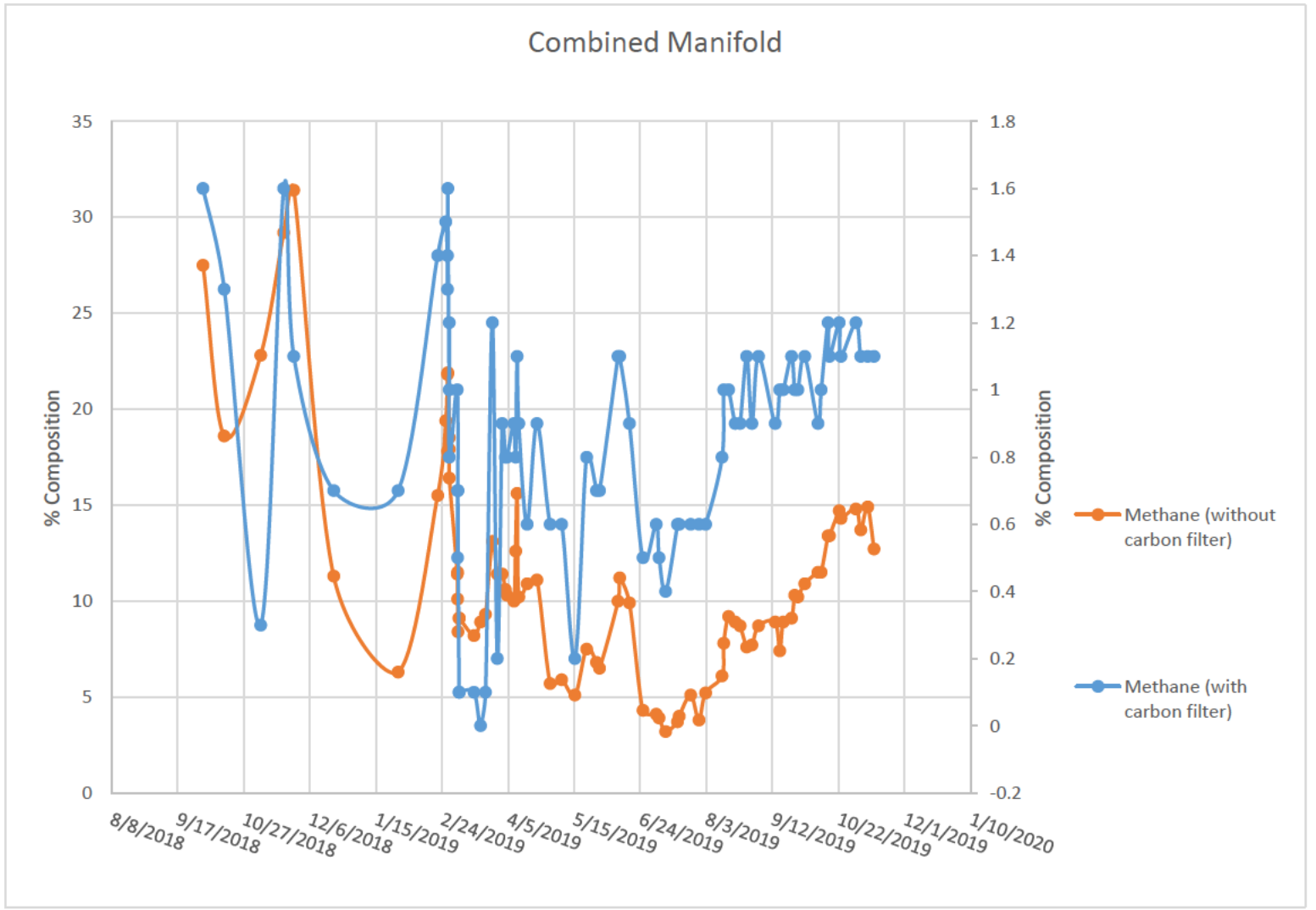


Figure 5
Methane Trends



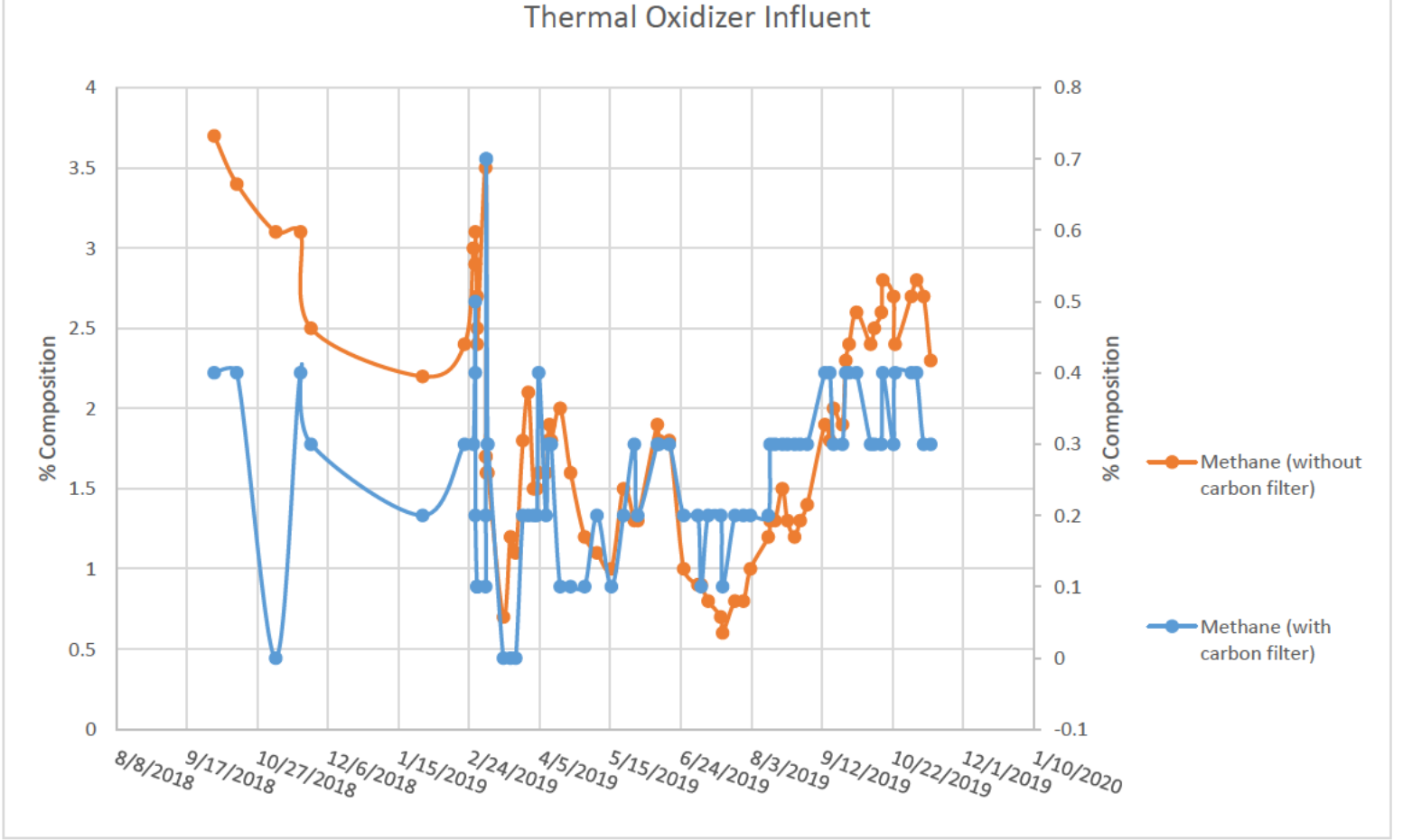


Figure 6
Propane Usage Trends

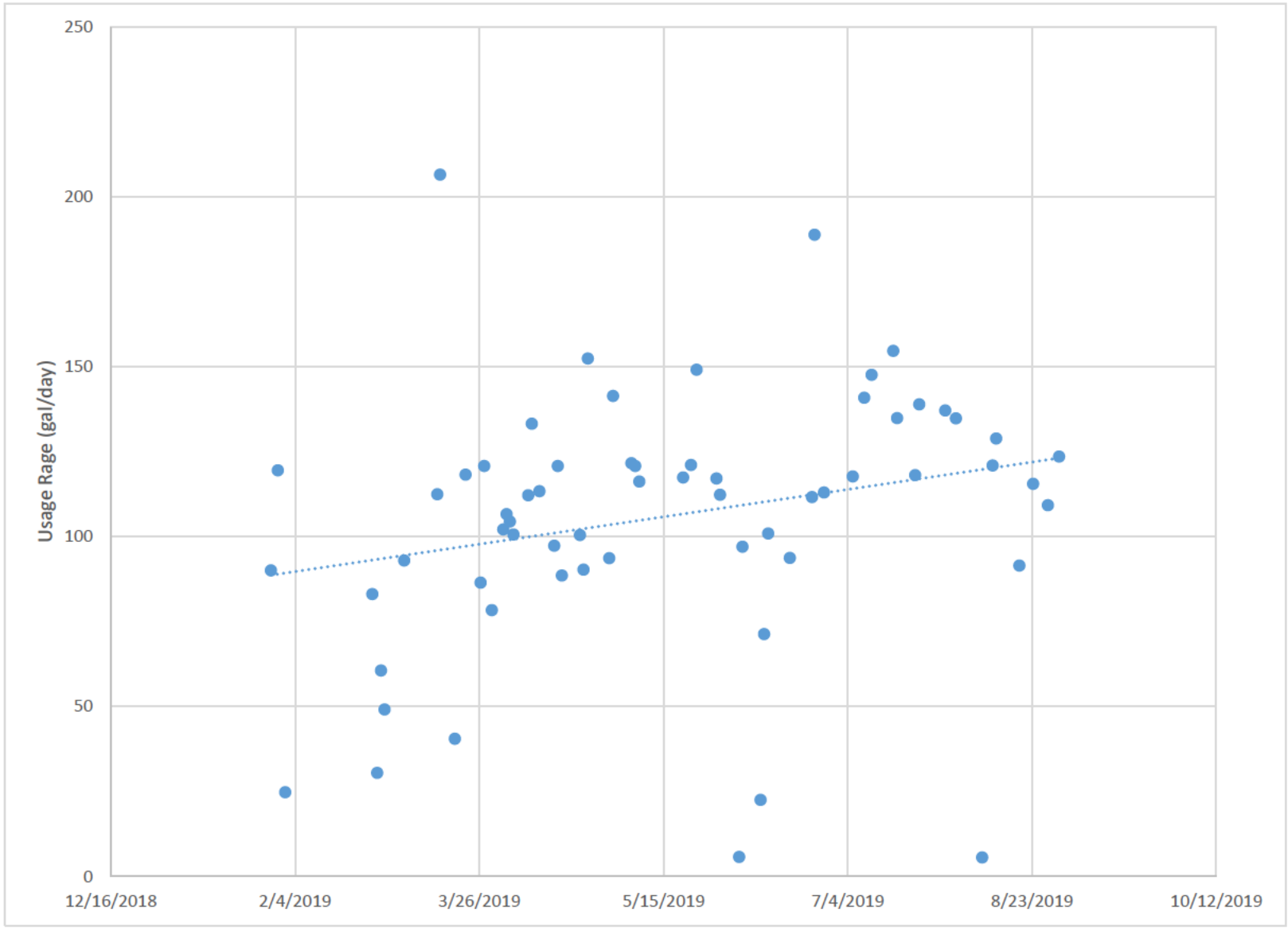
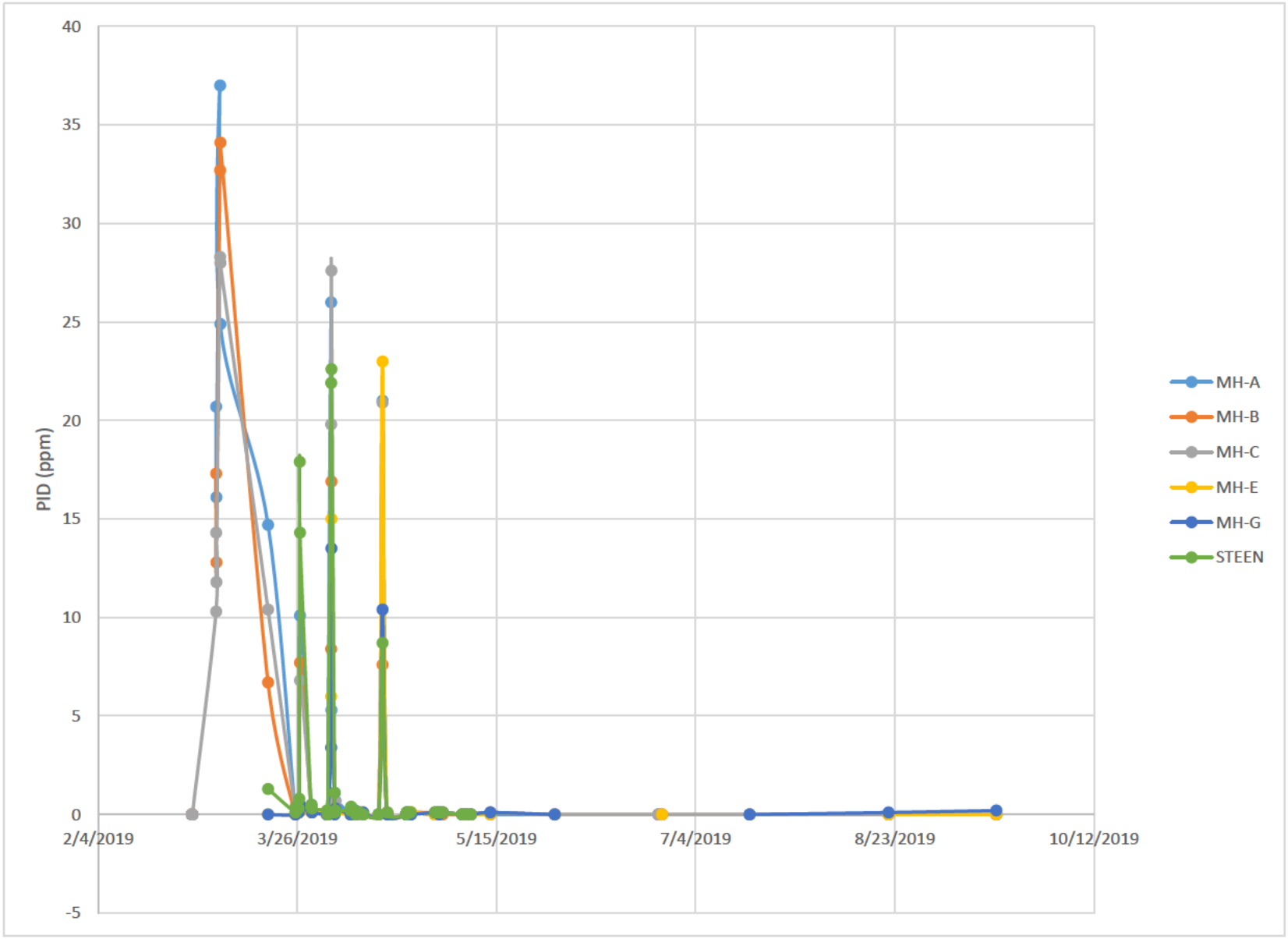
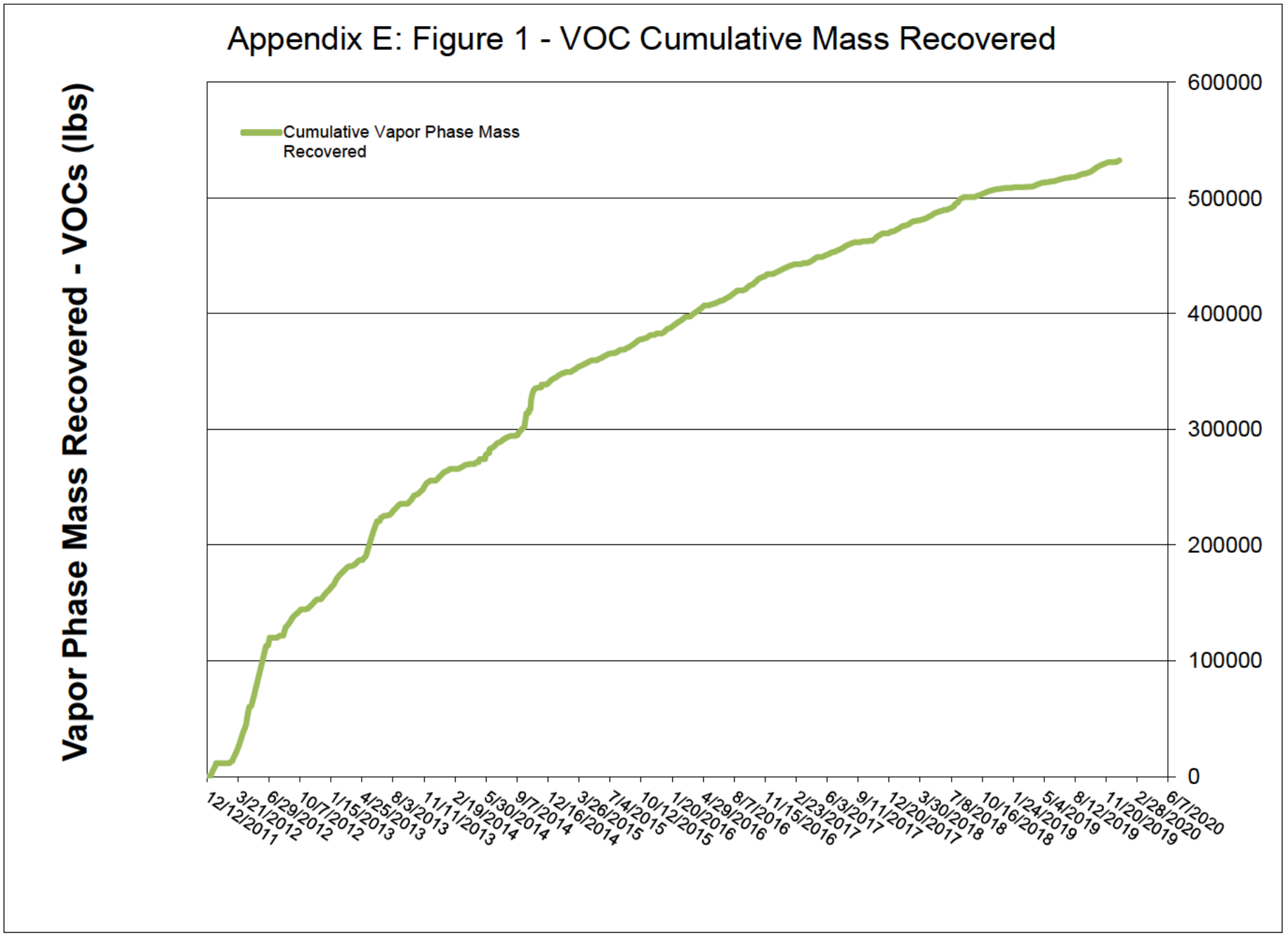


Figure 7
Sewer PID Reading Trends

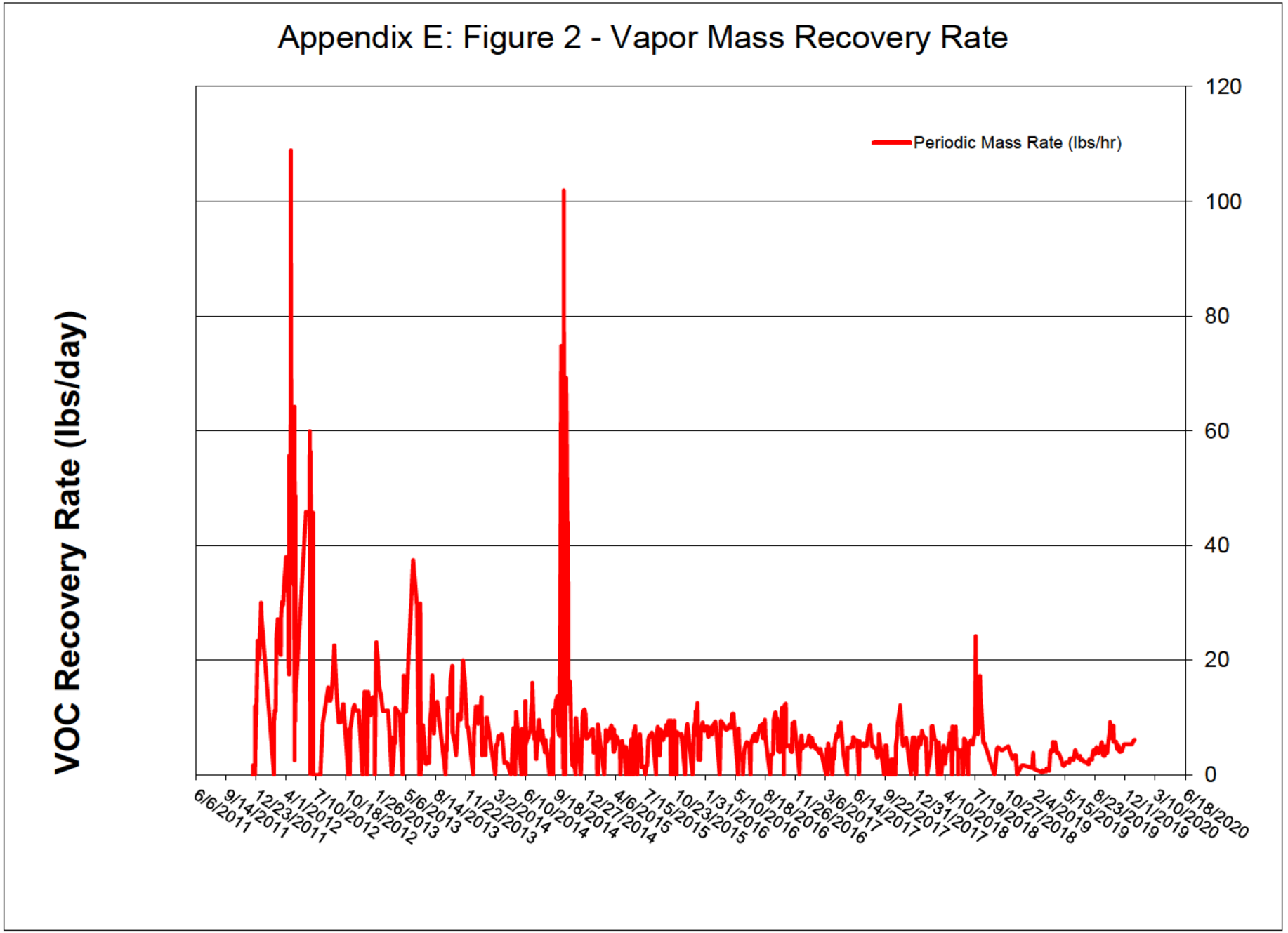


APPENDIX E – Mass Recovery

Appendix E: Figure 1 - VOC Cumulative Mass Recovered



Appendix E: Figure 2 - Vapor Mass Recovery Rate



Appendix E: Mass Recovery
Table 1
PLC Data- VES System
Former Defense Supply Center Philadelphia
Annual Report 2019

Date / Time	Blower B-1					Blower B-2					Blower B-3					Blower B-4					Summary						
	Blower VFD	Dilution Air	Blower Speed (%) (PLC SI-B1)	Blower Vacuum (in Hg) (PI-109)	Influent Air Flow Rate at PLC (SCFM - Blower Screen) (FQIT-101)	Blower VFD	Dilution Air	Blower Speed (%) (PLC SI-B1)	Blower Vacuum (in Hg) (PI-109)	Influent Air Flow Rate at PLC (SCFM - Blower Screen) (FQIT-101)	Blower VFD	Dilution Air	Blower Speed (%) (PLC SI-B3)	Blower Vacuum (in Hg) (PI-109)	Influent Air Flow Rate at PLC (SCFM - Blower Screen) (FQIT-103)	Blower VFD	Dilution Air	Blower Speed (%) (PLC SI-B4)	Blower Vacuum (in Hg) (PI-109)	Influent Air Flow Rate at PLC (SCFM - Blower Screen) (FQIT-101)	Combined Influent Flow Rate (pre-dilution air - SCFM)	Influent Vapor Phase Mass Recovery rate (PLC) (lbs/hr)	Thermal Oxidizer Mass Emissions Rate (PLC) (lbs/hr)	LEL at Thermal Oxidizer % (by PLC) (AIT-201)	Thermal Oxidizer Temperature (by PLC)	Oxidizer Influent Vapor Flow Rate (scfm) (PLC) (FIT-106)	Dilution Air Blower (BL-200) Flow Rate (scfm) (PLC) (FIT-108)
1/24/19 15:20										199.27											199.3	4.39	0.09	31.28	1454	406.25	115
1/28/19 12:47										209.99											210.0	3.92	0.08	27.01	1443	421.25	117.5
1/30/19 14:35										202.56											202.6	3.56	0.07	25.01	1444	413.75	115
2/20/19 11:16																					0.0						
2/27/19 10:10										192.68											192.7	5.46	0.11	35.68	1446	381.75	187
2/27/19 13:45										188.18											188.2	5.79	0.12	37.84	1447	384.25	184.25
2/28/19 12:10										181.96											182.0	4.92	0.1	32.76	1444	377	181.25
3/5/19 9:38										175.13											175.1	3.89	0.08	26.68	1451	376.25	164.75
3/5/19 11:00										174.28											174.3	4.03	0.08	26.69	1444	382.5	178.25
3/5/19 16:52										174.77											174.8	0	0	2.5	896	0	0
3/6/19 9:44										0											0.0	0	0	0	41	580.25	0
3/6/19 15:44										181.47											181.5	4.28	0.09	28.6	1441	373.5	182.5
3/12/19 9:41										174.4											174.4	4.17	0.08	26.73	1450	370.75	209
3/12/19 11:37										177.82											177.8	4.26	0.09	27.69	1443	370.75	201.5
3/14/19 11:59										0											0.0	1.19	0.1	7.69	1176	400.75	575.25
3/14/19 14:29										206.33											206.3	420	0.08	16.23	1435	420	550.75
3/15/19 9:00										196.95											197.0	3.37	0.7	12.15	1466	389.75	640.75
3/15/19 10:29										0											0.0	0.01	0	0.04	1303	0	597.25
3/18/19 9:29										219.86											219.9	1.2	0.02	4.8	1417	390.5	535.5
3/19/19 9:25										211.45											211.5	4.21	0.8	20.74	1430	460.5	294
3/22/19 10:42										196.83											196.8	4.37	0.9	23.81	1431	444.5	237.25
3/25/19 0:00																											
3/26/19 11:25										209.14											209.14	4.99	0.1	25.92	1431	464.25	250.5
3/29/19 13:30										211.33											211.3	4.8	0.1	25.49	1428	454.25	233.75
4/1/19 12:48										214.74											214.7	4.54	0.09	23.79	1428	463.25	245
4/3/19 10:42										213.4											213.4	3.86	0.08	20.93	1429	458.75	227
4/4/19 11:36										217.43											217.4	3.9	0.08	20.93	1430	462.25	230.75
4/8/19 12:47										210.84											210.8	4.31	0.09	24.13	1427	453.5	210.75
4/9/19 13:53										213.28											213.3	4.14	0.08	23.2	1427	446	216.5
4/10/19 13:02										216.45											216.5	4.18	0.08	23.04	1431	451.75	222.75
4/11/19 12:25										220.23											220.2	3.74	0.07	19.96	1429	462.5	233
4/16/19 13:23										211.33											211.3	4.24	0.08	23.07	1426	456	226.5
4/22/19 12:59										210.36											210.4	4.01	0.08	22.09	1426	452.25	222.75
4/30/19 13:00										206.58											206.6	3.09	0.06	17.08	1432	454.75	216.75
5/7/19 11:59										200.85											200.9	2.78	0.06	16.25	1428	452	182.75
5/15/19 13:01										176.96											177.0	2.48	0.05	15.13	1427	434.25	173.5
5/22/19 12:19										216.33											216.3	3.28	0.07	19.09	1424	469.75	168.75
5/28/19 14:26										202.19											202.2	3.2	0.06	19.19	1429	456	163.25
5/30/19 11:09										200.97											201.0	3.16	0.06	19.18	1432	455.25	156.75
6/10/19 14:28										188.91											188.9	4.3	0.09	27.27	1431	452.75	133.75
6/11/19 12:52										188.91											188.9	4.13	0.08	26.11	1426	451.75	135.75
6/17/19 11:45										193.05											193.1	3.81	0.08	24.26	1427	454.75	129.25
6/25/19 14:48										193.17											193.2	2.32	0.05	15.09	1430	455.25	115
7/3/19 15:01										194.51											194.5	2.66	0.05	16.26	1432	455.25	153
7/5/19 11:18										195.37											195.4	2.45	0.05	14.42	1432	471.25	160
7/9/19 11:21										191.95											192.0	2.06	0.04	12.36	1427	458.75	160
7/16/19 15:17										193.05											193.1	3.32	0.07	18.57	1426	535.75	129.5
7/17/19 14:34										190.37											190.4	3.31	0.07	18.56	1431	530.75	131
7/24/19 13:46										191.95											192.0	3.17	0.06	17.26	1430	537.75	143.75
7/29/19 12:04										202.68											202.7	3.28	0.07	18.31	1432	530	136.25
8/2/19 12:30										189.27											189.3	3.37	0.07	19.29	1428	533.75	115.75
8/12/19 13:22										202.43											202.4	4.22	0.08	24.19	1432	533.75	115
8/13/19 13:47										202.8											202.8	3.83	0.08	22.1	1432	529	115
8/16/19 9:32										199.39											199.4	4.01	0.08	23.09	1432	530.5	115
8/20/19 12:07										203.04											203.0	4.54	0.09	26.18	1432	529.5	115
8/23/19 9:27										200.24											200.2	4.17	0.08	24.02	1427	527.75	118
8/27/19 11:11										205.2											205.2	4.04	0.08	23.08	1431	535.75	115
8/30/19 14:24										205.24											205.2	4.73	0.09	27.27	1430	529.25	115
9/3/19 15:06										207.8											207.8	5.09	0.1	29.24	1432	531.5	115
9/13/19 14:26										266.78											266.8	5.07	0.1	28.04	1444	547	125
9/16/19 11:41										264.8											264.8	4.98	0.1	28.14	1429	542	115
9/18/19 13:12										269.95											270.0	5	0.1	28.07	1431	544	117.5
9/23/19 13:24										266.17											266.2	5.38	0.11	29.16	1428	538.75	147.25
9/25/19 10:22										285.92											285.9	5.66	0.11	32.05	1451	537.75	118.25
9/27/19 8:38										292.26											292.3	5.34	0.11	29.91	1443	541.25	122.5
10/1/19 11:36										289.45											289.5	5.73	0.11	32.09	1441	542.25	120.75
10/9/19 13:58										302.01											302.0	5.56	0.11	28.85	1430	540.25	175.5
10/11/19 12:44										298.72											298.7	6.11	0.12	32.03	1430	540	169.25
10/15/19 15:08										280.43											280.4	6.66	0.13	35.06	1459	551	154.25
10/16/19 10:39										280.92											280.9	6.44	0.13	33.97	1458	547.25	157.25
10/22/19 11:32										271.9											271.9	6.47	0.13	33.96	1440	551.75	156.5
10/23/19 8:54										273.12											273.1	6.08	0.12	31.93	1429	549	158.5
11/1/19 13:10										269.95											270.0	6.5	0.13	33.9	1453	547	165.25
11/4/19 11:30										269.95											270.0	6.5	0.13	33.9	1453	547	165.25
11/8/19 13:44										268.61											268.6	5.81	0.12	31.84	1441	543.25	134.5
11/12/19 11:48										254.11											254.1	5.41	0.11	29.7	1434	539.25	137.5
11/20/19 12:36					224.62																224.6	4.97	0.1	27.83	1428	544	120.25
11/26/19 13:11					229.37																229.4	5.47	0.11	30.88	1429	542.75	115
12/23/19 13:04										252.65											252.7	6.62	0.13	33.9	1428	575.5	150
12/30/19 13:50										269.1											269.1	6.45	0.13	33.85	1430	559.75	147.75

Notes:
Yellow shading represents interpolated data or data from different time than manifold data.
Above data provided for Q4 2018 only. Previous quarterly data
available in preceeding quarterly reports or upon request.

Appendix E: Mass Recovery
Table 2
Manifold Data- VES System
Former Defense Supply Center Philadelphia
Annual Report 2019

Date / Time	Zone A							Zone B							Zone C							Zone D							Zone E							Zone F						
	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID
	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)
11/26/18 10:55	3.2	19.5	100	1.8	17.3	0	337.6	3.6	41.1	100	5.5	12.1	0	922.6	3.3	53.8	100	7.5	9.3	1	1169.0	1.1	30.6	100	6.2	11.4	0	2065	3.7	63.3	100	6.2	12	0	1008							
12/20/18 13:10																																										
2/21/19 10:00	0	0.6	12	0.2	20.6	o	992.6	0.8	13.7	100	4.7	12.9	0	628.4	0.5	6.2	100	1.9	18.1	0	398.2	0.5	13.6	100	4.4	14.2	0	585.6	0.1	6.7	100	1.3	19.2	0	282.1							
1/24/19 15:20																																										
1/28/19 12:47																																										
2/21/19 10:20																						1.4	24.7	100	4.6	13	0	364.8														
2/26/19 9:43																						1.5	28.4	100	4.9	12.3	0	397.8														
2/27/19 10:10																						1.3	27.3	100	4.9	12.8	0	462.7														
2/27/19 12:15																						1.7	33.7	100	5.4	11.5	0	369.8														
2/27/19 13:45																						1.7	35.3	100	5.1	12.2	0	456.6														
2/28/19 10:00																						0.8	23.1	100	4.3	13.7	1	377.1														
2/28/19 12:10																						1.1	24.8	100	4.5	13.3	0	520.4														
2/28/19 13:30																						0.8	18.4	100	4	14.2	1	413														
3/5/19 9:38																						1.1	19	100	4.5	13.6	0	528.5														
3/5/19 11:00																						0	9.3	100	3.2	16.1	0	400.8														
3/5/19 13:13																						1	11.9	100	3.8	14.6	0	381.5														
3/5/19 16:52																						0.7	11.4	100	3.6	15.1	0	390.1														
3/6/19 9:44																						0.2	13.6	100	3.8	14.6	0	483.6														
3/6/19 15:44																						0.2	13.6	100	3.8	14.6	0	483.6														
3/12/19 9:41																						0.1	8.4	100	3.4	15.5	0	389.5														
3/12/19 11:37																						0.3	16.6	100	4.7	13.6	0	657														
3/15/19 9:00																																										
3/19/19 9:25																																										
3/22/19 10:42																																										
3/26/19 11:25																																										
3/29/19 13:30																																										
4/1/19 12:48																																										
4/3/19 10:42																																										
4/4/19 11:36																																										
4/8/19 12:47																																										
4/9/19 13:53																																										
4/10/19 13:02																						0.5	14.3	100	4.5	14.4	3	623														
4/11/19 12:25																																										
4/16/19 13:23																																										
4/22/19 12:59																																										
4/30/19 13:00																																										
5/7/19 11:59																						0.6	6.7	100	4.1	14.6	0	521.1														
5/15/19 13:01																						0.5	5.8	100	5	12.8	0	700.5														
5/22/19 12:19																																										
5/28/19 14:26																						0.6	7.6	100	4.7	13.2	1	658														
5/30/19 11:09																																										
6/10/19 14:28																																										
6/11/19 12:52																						0.7	9.3	100	4.9	12.9	1	592														
6/17/19 11:45																						0.6	8.9	100	4.5	13.6	1	572														
6/25/19 14:48																																										
7/3/19 15:01																																										
7/5/19 11:18	0.4	0.9	18	0.2	19.9	0	161	0.4	4.2	84	4.5	13.2	1	426.0	1.1	10.8	100	3.2	15.4	1	438.0	0.4	5.4	100	4.5	13.7	1	651	0.8	6.4	100	2.2	17.1	0	374							
7/9/19 11:21																																										
7/16/19 15:17																																										
7/17/19 14:34																																										
7/24/19 13:46																						0.3	4.7	93	4.3	13.9	0	2133														
7/29/19 12:04																						0.2	3.1	62	3.8	14.5	0	1641														
8/2/19 12:30	2.9	9.8	100	1.7	16.8	0	426	0.4	6.1	100	7	8.9	0	497.0	1.7	16.9	100	4.2	13.5	0	409.0	0.2	3.3	66	3.2	15.3	0	484	1.2	8.1	100	2.4	16.6	0	343							
8/12/19 13:22																						0.2	3	60	3.2	15.6	0	396														
8/13/19 13:47																						0.2	3.5	70	3.5	15.2	0	491														
8/16/19 9:32																																										
8/20/19 12:07																						0.3	6.5	100	4.8	13.1	0	395														
8/23/19 9:27																						0.3	5.3	100	4.9	13.4	0	440														
8/27/19 11:11																						0.4	5.8	100	5.1	13.5	0	661														
8/30/19 14:24																						0.3	5.4	100	4.9	13.2	0	667														
9/3/19 15:06																						0.3	4.5	91	4.1	14.4	0	541														
9/13/19 14:26																																										
9/16/19 11:41	4.4	24.4	100	2.4	15.5	0	413	2.2	25.1	100	7.3	7.5	0	535.0	1.9	20.6	100	3.8	14.2	0	516.0	0.2	3.7	71	2.8	15.8	0	588	1.9	16.4	100	3.1	15.5	0	490							
9/18/19 13:12																						0.2	70	3.5	2.9	5.9	0	471	1.7	19.3	100	3.4	15.2	1	368							
9/23/19 13:24																																										
9/25/19 10:22																																										
9/27/19 8:38																																										
10/1/19 11:36																																										
10/9/19 13:58																																										
10/11/19 12:44	6.8	46.5	100	3.9	13.1	0	272	1.7	21	100	6.7	9.7	1	514.0	1.6	21.5	100	4.2	13.7	1	514.0	0.3	5.8	100	3.7	14.7	0	626	1.8	27.3	100	4.1	13.8	2	522							
10/15/19 15:08	7.7	57.1	100	4.3	12.4	0	244																																			
10/16/19 10:39																																										
10/22/19 11:32																																										
10/23/19 8:54																																										
11/1/19 13:10																																										
11/4/19 11:30																																										
11/8/19 13:44																																										
11/12/19 11:48																																										
11/20/19 12:36																						0.4	5.4	100	3.3	15.1	0	665														
11/26/19 13:11	7.3	79.8	100	5	11.2	2	265	2	31.7	100	8.4	6.1	2	528.0	1.6	28.3	100	4.4	13.5	2	502.0	0.8	6	100	3.3	15.3	0	594	1.7	37.3	100	4.5	13	2	524							
12/23/19 13:04																																										
12/30/19 13:50	6.8	47.9	100	3.4	1	1	219	2.6	31.7	100	5.9	9.8	2	445.0	1.3	11	100	2	17.2	0	423.0	0.3	4.4	88	2.4	16.9	0	502	1.5	18.4	100	2.6	16.4	1	434							

Notes:
Yellow shading represents interpolated data.
100 % is used in place of the "off-scale" reading of the Landfill Gas Meter for calculation purposes
Above data provided for Q4 2018 only. Previous quarterly data available in preceeding quarterly reports or upon request.

Appendix D: Mass Recovery
Table 2
Manifold Data- VES System
Former Defense Supply Center Philadelphia
Annual Report 2019

Date / Time	Zone G							Post Manifold Legs (Combined Manifold Sample Port)							Pre BL-200 (After VES blowers and dilution air valve; before thermal oxidizer dilution air blower)							Thermal Oxidizer Influent (Post BL-200 dilution air blower)						
	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID	Landfill Gas Meter Readings						PID
	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (%)	Influent PID Reading at Manifold Leg (ppm)	Influent Methane with Carbon Filter (%)	Influent Methane Without Carbon Filter (%)	Influent LEL (%)	Influent CO_2 (%)	Influent O_2 (%)	Influent H_2S (ppm)	Influent PID Reading at Manifold Leg (ppm)	Methane with Carbon Filter (%)	Methane Without Carbon Filter (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S (%)	PID Reading (ppm)	Methane with Carbon Filter (%)	Methane Without Carbon Filter (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S (%)	PID Reading (ppm)
11/28/18 10:55	6.2	100	100	7.8	7.8	3	965.8	1.1	31.4	100	5.4	12.6	1	1994								0.3	2.5	50	1.4	18.8	0	933.3
12/20/18 13:10								0.7	11.3	100	3.9	15.3	1	667														
2/21/19 10:00	2.8	51.3	100	4.4	13.5	1	277.4	0.8	7.3	100	2.6	17.2	0	523.1														
1/24/19 15:20																												
1/28/19 12:47								0.7	6.3	100	2.6	17.8	0	1828								0.2	2.2	45	1.4	19.1	0	1226
2/21/19 10:20								1.4	15.5	100	3.5	14.7	0	367								0.3	2.4	48	1.1	19	0	303.3
2/26/19 9:43								1.5	19.4	100	3.6	14.8	0	403.4								0.3	3	59	1.3	18.9	0	352.7
2/27/19 10:10								1.3	21.8	100	3.9	14.8	0	379								0.5	2.9	58	1.2	19.3	0	300.1
2/27/19 12:15								1.4	17.8	100	3.4	15.4	0	405.3								0.4	2.9	59	1.2	19	0	345.3
2/27/19 13:45								1.6	21.9	100	4	14.4	0	394.3								0.2	3.1	63	1.3	19	0	346
2/28/19 10:00								1	18.5	100	3.6	14.9	1	400								0.1	2.7	55	1.2	19	0	329.6
2/28/19 12:10								1.2	17.9	100	3.5	15.0	0	403.9								0.1	2.5	51	1.1	19	0	337.2
2/28/19 13:30								0.8	16.4	100	3.5	15.2	0	320.1								0.1	2.4	48	1.1	19.1	0	320.1
3/5/19 9:38								1	11.4	100	2.9	11.4	0	392.1								0.1	3.5	71	1.7	18.5	0	399.4
3/5/19 11:00								0.5	10.1	100	2.9	16.3	0	316.6								0.2	1.7	34	1	19.4	0	279.9
3/5/19 13:13								0.7	11.5	100	3.1	15.7	0	370.3								0.7	1.7	34	1	19.4	0	272.5
3/5/19 16:52								0.7	8.4	100	2.7	16.5	0	392.3								0.7	1.6	32	1	19.4	0	260.8
3/6/19 9:44								0.1	9.1	100	2.8	16.2	0	389.9								0.3	1.6	32	1	19.4	0	197.4
3/6/19 15:44								0.1	9.1	100	2.8	16.2	0	389.9								0.3	1.6	32	1	19.4	0	197.4
3/12/19 9:41								0.1	7.2	100	2.5	16.9	0	329.5								0.1	1.6	33	1	19.3	0	282
3/12/19 11:37								0.4	4.7	100	3.2	15.9	0	589.9								0.3	1.7	35	1.1	19.2	0	299.1
3/15/19 9:00								0.1	8.2	100	2.8	16.6	0	382.9								0	0.7	13	0.5	19.7	0	236.6
3/19/19 9:25								0	8.9	100	3.3	15.9	0	401								0	1.2	15	0.8	19.8	0	252.4
3/22/19 10:42								0.1	9.3	100	3.3	15.6	0	359.7								0	1.1	22	0.9	19.5	0	269.6
3/26/19 11:25								1.2	13.1	100	4.1	14.3	0	384.8								0.2	1.8	35	1.2	19.1	0	266.7
3/29/19 13:30								0.2	11.4	100	3.6	15.2	0	402								0.2	2.1	42	1.3	19	0	354
4/1/19 12:48								0.9	11.4	100	3.8	15.2	0	395.2								0.2	1.5	31	1.2	19.4	0	302.1
4/3/19 10:42								0.8	10.6	100	3.7	14.7	0	371.5								0.2	1.5	31	1.1	18.8	0	236.8
4/4/19 11:36								0.8	10.3	100	3.7	15.1	0	517.7								0.4	1.6	31	1.2	19.1	0	356.4
4/8/19 12:47								0.9	10	100	3.5	14.7	0	515.1								0.2	1.6	32	1	18.4	0	335.1
4/9/19 13:53								0.8	12.6	100	3.8	14.3	8	394.6								0.3	1.8	36	1	19	2	416.7
4/10/19 13:02								1.1	15.6	100	4.2	14.4	5	399.6								0.3	1.9	39	1.1	19.6	1	365.5
4/11/19 12:25								0.9	10.2	100	3.3	15.6	4	505.4								0.3	1.8	36	1.2	19.1	1	338.4
4/16/19 13:23								0.6	10.9	100	3.8	14.7	0	552.1								0.1	2	39	1.2	18.7	0	392.4
4/22/19 12:59								0.9	11.1	100	4	14.0	0	553.3								0.1	1.6	31	1.1	19.2	0	347.1
4/30/19 13:00								0.6	5.7	100	3.2	15.9	0	693								0.1	1.2	23	1	19.2	0	410.3
5/7/19 11:59								0.6	5.9	100	3.3	15.8	0	404.4								0.2	1.1	23	1.1	19.4	0	342.3
5/15/19 13:01								0.2	5.1	100	3.7	14.8	0	611.9								0.1	1	20	1	19.1	0	326.3
5/22/19 12:19								0.8	7.5	100	3.2	15.7	1	528.1								0.2	1.5	30	1.2	19	0	351.3
5/28/19 14:26								0.7	6.8	100	3.5	15.1	1	520								0.3	1.3	27	1.1	18.9	0	354
5/30/19 11:09								0.7	6.5	100	3.4	15.4	0	497								0.2	1.3	27	1.1	19.1	0	337
6/10/19 14:28								1.1	10	100	4.6	12.9	1	478								0.3	1.9	38	1.5	18.1	0	404
6/11/19 12:52								1.1	11.2	100	4.4	13.3	1	514								0.3	1.8	36	1.4	18.6	0	363
6/17/19 11:45	3.5	49.6	100	6.9	8.8	1	496	0.9	9.9	100	4.2	14.0	1	541								0.3	1.8	37	1.4	18.5	0	412
6/25/19 14:48								0.5	4.3	85	3.1	15.7	1	366								0.2	1	20	1	19.1	0	282
7/3/19 15:01								0.6	4.1	82	3.1	15.6	0	412								0.2	0.9	18	0.9	18.9	0	261
7/5/19 11:18	2.3	13.8	100	3.6	13.8	0	411	0.5	3.9	7	2.8	15.8	0	388								0.1	0.9	17	0.9	19.1	0	267
7/9/19 11:21								0.4	3.2	64	2.8	16.2	0	406								0.2	0.8	16	0.9	19.3	0	244
7/16/19 15:17								0.6	3.7	74	3	15.4	1	349								0.2	0.7	15	0.6	19	0	192
7/17/19 14:34								0.6	4	80	2.8	15.8	0	351								0.1	0.6	12	0.5	19.4	0	219
7/24/19 13:48								0.6	5.1	100	3.3	15.1	0	1597								0.2	0.8	16	0.8	19.2	0	469
7/29/19 12:04								0.6	3.8	77	3	15.4	0	1278								0.2	0.8	16	0.9	18.9	0	671
8/2/19 12:30	3.8	39.7	100	6.3	10	0	386	0.6	5.2	100	3.2	15.1	0	404								0.2	1	20	0.9	18.7	0	266
8/12/19 13:22								0.8	6.1	100	3.8	14.4	0	377								0.2	1.2	24	1.1	18.7	0	281
8/13/19 13:47								1	7.8	100	3.7	14.8	0	425								0.3	1.3	26	1.1	18.7	0	331
8/16/19 9:32								1	9.2	100	4.4	13.7	0	542								0.3	1.3	27	1.2	18.8	0	339
8/20/19 12:07								0.9	8.9	100	4.4	13.8	0	539								0.3	1.5	30	1.3	18.3	0	338
8/23/19 9:27								0.9	8.7	100	4.5	14.0	0	449								0.3	1.3	27	1.3	18.6	0	354
8/27/19 11:11								1.1	7.6	100	4.6	14.2	0	597								0.3	1.2	25	1.3	18.9	0	347
8/30/19 14:24								0.9	7.7	100	4.6	13.7	0	516								0.3	1.3	27	1.3	18.5	0	324
9/3/19 15:06								1.1	8.7	100	4.2	14.2	0	462								0.3	1.4	29	1.3	18.7	0	320
9/13/19 14:26								0.9	8.9	100	3.5	15.1	0	542								0.4	1.9	38	1.2	18.9	0	402
9/16/19 11:41	4.4	34.1	100	4.7	12.9	0	418	1	7.4	100	3.2	15.0	0	518								0.4	1.8	36	1.1	18.3	0	406
9/18/19 13:12								1	8.9	100	3.5	14.9	0	377								0.3	2	40	1.2	18.6	0	371
9/23/19 13:24								1.1	9.1	100	3.3	14.9	0	382								0.3	1.9	38	1	18.2	0	374
9/25/19 10:22								1	10.3	100	3.8	14.3	0	536								0.4	2.3	47	1.4	17.9	0	431
9/27/19 8:38								1	10.2	100	3.7	14.5	0	523								0.4	2.4	48	1.4	18	0	412
10/1/19 11:36								1.1	10.9	100	3.8	14.4	0	407								0.4	2.6	52	1.5	17.8	0	296
10/9/19 13:58								0.9	11.5	100	3.8	14.8	0	407								0.3	2.4	48	1.31	18.6	0	367
10/11/19 12:44	3.7	34.8	100	4.5	13.3	0	418	1	11.5	100	3.9	14.3	0	527								0.3	2.5	50	1.4	18.1	0	417
10/15/19 15:08								1.2	13.4	100	3.8	14.5	0	495								0.3	2.6	53	1.2	18.6	0	393
10/16/19 10:39								1.1	13.4	100	3.8	14.5	0	389								0.4	2.8	37	1.3	18.5	0	341
10/22/19 11:32								1.2	14.7	100	3.9	14.5	0	538								0.3	2.7	55	1.3	18.4	0	424
10/23/19 8:54								1.1	14.3	100	3.9	14.5	1	536								0.4	2.4	49	1.2	18.6	0	413
11/1/19 13:10								1.2	14.8	100	3.4	14.2	0	505								0.4	2.7	55	1.3	18.5	0	381
11/4/19 11:30								1.1	13.7	100	4	14.4	0	414								0.4	2.8	57	1.4	18.4	0	387
11/8/19 13:44								1.1	14.9	100	4	14.7	1	492								0.3	2.7	53	1.4	18.7	0	362
11/12/19 11:48								1.1	12.7	100	3.9	15.1	0	400								0.3	2.3	47	1.3	18.9	0	328
11/20/19 12:36								1.1	13	100	3.7	14.2	0	396								0.3	2.4	49	1.1	18.5	0	357
11/28/19 13:11	3.4	31.1	100	3.4	14.9	0	381	1	16.2	100	3.9	14.1	1	506								0.3	2.5	50	1.1	18.4	0	392
12/23/19 13:04								1.4	10.8	100	2.5	16.4	0	377								0.4	1.9	39	0.7	19	0	264
12/30/19 13:50	7.5	82.9	100	5.6	10.9	1	221	1.2	9.5	100	2.5	16.3	0	407								0.4	2.2	44	0.9	18.9	0	301

Notes:
Yellow shading represents interpolated data.
100 % is used in place of the "off-scale" reading of the Landfill Gas Meter for calculation purposes
Above data provided for Q4 2018 only. Previous quarterly data available in preceeding quarterly reports or upon request.

Appendix E: Mass Recovery
Table 2
Manifold Data- VES System
Former Defense Supply Center Philadelphia
Annual Report 2019

Date / Time	Thermal Oxidizer Effluent (atmospheric discharge)												
	Landfill Gas Meter Readings						PID						
	Methane with Carbon Filter (%)	Methane Without Carbon Filter (%)	LEL (%)	CO_2 (%)	O_2 (%)	H_2S (%)	PID Reading (ppm)	Applied Vacuum manifold (in H_2O) (top of KO - PI-107)	Water Recovered at Manifold (Estimated)	Average Combined Influent Methane (% estimated)	Average Combined Influent Oxygen (% estimated)	Average Combined Influent CO2 (% Estimated)	Average Combined Influent VOCs by PID (ppmv Estimated)	Notes:
11/28/18 10:55	0	0	0	2.5	17.1	0	17.1	45						
12/20/18 13:10								45						
2/21/19 10:00								43						
1/24/19 15:20														
1/28/19 12:47	0	0	0	2.3	17.8	0	28	45						
2/21/19 10:20	0	0	0	2.7	16.6	0	9.7	28						
2/26/19 9:43	0	0	0	0.7	20.0	0	2.9	33						
2/27/19 10:10								33						
2/27/19 12:15								33						
2/27/19 13:45								33						
2/28/19 10:00								33						
2/28/19 12:10								33						
2/28/19 13:30								33						
3/5/19 9:38	0	0	0	0.2	19.8	0	2.5	36						
3/5/19 11:00								36						
3/5/19 13:13								36						
3/5/19 16:52	0.7	0	0	0.2	19.8	0	2.5	37						
3/6/19 9:44	0.5	0	0	1.2	19.1	0	2.9	37						
3/6/19 15:44	0.5	0	0	1.2	19.1	0	2.9	37						
3/12/19 9:41								37						
3/12/19 11:37	0	0	0	1.2	19.3	0	3.2	37						
3/15/19 9:00	0	0	0	1.4	18.5	0	1.3	41						
3/19/19 9:25	0	0	0	2.7	17.1	0	1.8	41						
3/22/19 10:42	0	0	0	2.5	17.2	0	1.9	40						
3/26/19 11:25	0	0	0	2.8	16.8	0	1.5	30						
3/29/19 13:30	0	0	0	2.6	16.9	0	2.1	30						
4/1/19 12:48	0	0	0	2.7	17.2	0	1.2	40						
4/3/19 10:42	0	0	0	2.6	16.2	0	1.8	40						
4/4/19 11:36	0	0	0	2.8	16.7	0	2	40						
4/8/19 12:47	0	0	0	2.3	16.2	0	1.9	40						
4/9/19 13:53	0	0	1	2.4	16.8	3	13.7	40						
4/10/19 13:02	0	0	0	2.5	17.5	3	1.9	40						
4/11/19 12:25	0	0	0	2.6	16.9	3	2.3	40						
4/16/19 13:23	0	0	0	2.6	16.6	0	3.1	40						
4/22/19 12:59	0	0	1	2.8	16.6	0	3.3	40						
4/30/19 13:00	0	0	0	2.5	16.9	0	5.5	40						
5/7/19 11:59	5	0.1	0	2.4	17.3	0	3.2	42						
5/15/19 13:01	0	0	0	2.3	17.0	0	6.9	45						
5/22/19 12:19	0	0	0	2.5	16.8	0	4.9	40						
5/28/19 14:26	0	0	0	2.3	16.8	0	3.4	40						
5/30/19 11:09	0	0	0	2.5	16.6	0	1.6	45						
6/10/19 14:28	0	0	0	3.0	15.5	0	2.4							
6/11/19 12:52	0	0	0	2.9	15.9	0	2.5	49						
6/17/19 11:45	0	0	0	2.6	16.1	0	2.7	48						
6/25/19 14:48	0	0	10	2.3	16.7	0	2.9	45						
7/3/19 15:01	0	0	0	2.2	16.6	0	3.4	46						
7/5/19 11:18	0	0	0	2.4	16.6	0	1.9	47						
7/9/19 11:21	0	0	1	2.3	16.8	0	3.5	48						
7/16/19 15:17	0	0	0	2.2	16.5	0	3.8	39						
7/17/19 14:34	0	0	0	2.1	16.6	0	2.3	39						
7/24/19 13:46	0	2.4	0	2.3	16.6	0	11	39						
7/29/19 12:04	0	0	0	2.1	16.8	0	10.7	42						
8/2/19 12:30	0	0	0	2.3	16.2	0	2.3	46						
8/12/19 13:22	0	0	0	2.6	16.1	0	2.9	41						
8/13/19 13:47	0	1	0	2.7	16.3	0	2.6	41						
8/16/19 9:32	0	0	1	2.7	16.3	0	2.7	41						
8/20/19 12:07	0	0	1	2.7	16.1	0	2.1	41						
8/23/19 9:27	0	0	0	2.8	16.2	0	2.7	41						
8/27/19 11:11	0	0	0	2.7	16.6	0	2.3	41						
8/30/19 14:24	0	0	0	2.6	16.1	0	1.8	41						
9/3/19 15:06	0	0	0	2.5	16.4	0	2.1	41						
9/13/19 14:26	0	0	0	2.6	16.9	0	2.2	41						
9/16/19 11:41	0	0	0	2.6	15.8	0	1.5	41						
9/18/19 13:12	0	0	0	2.7	16.3	0	2.1	41						
9/23/19 13:24	0	0	0	2.4	16.0	0	2.6	41						
9/25/19 10:22	0	0	0	2.8	15.7	0	1.9	40						
9/27/19 8:38	0	0	0	2.9	15.8	0	1.7	40						
10/1/19 11:36	0	0	0	2.9	15.7	0	1.4	40						
10/9/19 13:58	0	0	0	1.4	18.4	0	1.1	40						
10/11/19 12:44	0	0	0	2.7	16.1	0	1.1	40						
10/15/19 15:08	0	0	0	2.6	16.1	0	1.6	39						
10/16/19 10:39	0	0	0	2.8	16.2	0	1.5	39						
10/22/19 11:32	0	0	0	2.8	16.3	0	1.2	37						
10/23/19 8:54	0	0	0	2.8	16.2	0	1.2	37						
11/1/19 13:10	0	0	0	2.8	16.2	0	1.1	37						
11/4/19 11:30	0	0	0	2.9	16.1	0	1.2	37						
11/8/19 13:44	0	0	0	2.7	16.7	0	1.3	44						
11/12/19 11:48	0	0	0	2.8	16.9	0	1.2	44						
11/20/19 12:36	0	0	0	2.8	16.3	0	1.3	37						
11/26/19 13:11	0	0	0	2.5	16.3	0	1	41						
12/23/19 13:04	0	0	0	2.4	16.7	0	1.3	30						
12/30/19 13:50	0	0	0	2.3	16.9	0	1.2	33						

Notes:
Yellow shading represents interpolated data.
100 % is used in place of the "off-scale" reading of the Landfill Gas Meter for calculation purposes
Above data provided for Q2 2017 only. Previous quarterly data available in preceeding quarterly reports or upon request.

Appendix E - Table 3
VES System Mass Recovered
Former Defense Supply Center Philadelphia
Annual Report 2019

Date / Time	System Switched On/Off This Day? Notes	Periodic Hours (Calculated)	Hours Operational (approximate)	% Uptime	VES System		Manifold (Influent) Vapor Phase Mass Recovery (pre-dilution					
					Applied Vacuum (inches H2O)	Combined Influent Flow (SCFM)	Combined Influent Concentration (VOC-PID) (ppmv)	Manifold Influent Concentration VOC-by TO15 ppmv	Calculated Weighted Average Density lbs/gal	Sample info Notes	Average Correction Factor (actual / PID)	Estimated Actual VOC Concentration by PID with correction factor applied (ppmv)
12/31/18 23:59	Off	81.4	0.0	0	0	0	0				0.82	
1/11/19 12:14	On	252.3	0.0	0	0	0	0				0.82	
1/24/19 15:20	On	315.1	315.1	100	0	199	523				0.82	427
1/28/19 12:47	On	93.4	93.4	100	45	210	1828	1300	5.91		0.71	1300
1/30/19 14:35	Off	49.8	49.8	100	45	199	523				0.71	372
2/20/19 11:16	On	500.7	0.0	0	0	0	0				0.71	
2/27/19 10:10	On	166.9	166.9	100	33	109	379				0.71	270
2/27/19 13:45	On	3.6	3.6	100	33	188	394				0.71	280
2/28/19 12:10	On	22.4	22.4	100	33	182	404				0.71	287
3/5/19 11:00	On	118.8	118.8	100	36	174	317				0.71	225
3/5/19 16:52	Off	5.9	5.9	100	37	175	317				0.71	225
3/6/19 9:44	On	16.9	0.0	0	0	0	0				0.71	
3/6/19 15:44	On	6.0	6.0	100	37	181	390				0.71	277
3/12/19 9:41	On	138.0	138.0	100	37	174	330				0.71	234
3/12/19 11:37	On	1.9	1.9	100	37	178	590				0.71	420
3/14/19 11:59	OFF	188.3	188.3	100	37	178	590				0.71	420
3/14/19 14:29	on	2.5	0.0	0	0	206	0				0.71	
3/15/19 9:00	on	18.5	18.5	100	41	197	383				0.71	272
3/15/19 10:29	off	1.5	1.5	100	41	197	383				0.71	272
3/18/19 9:29	on	71.0	0.0	0	0	0	0				0.71	
3/19/19 9:25	on	23.9	23.9	100	41	211	401				0.71	285
3/19/19 14:59	off	5.6	5.6	100	41	211	401				0.71	285
3/19/19 16:29	on	1.5	0.0	0	0	0	0				0.71	
3/22/19 10:42	on	66.2	66.2	100	40	197	360				0.71	256
3/22/19 18:30	off	7.8	7.8	100	40	197	360				0.71	256
3/25/19 10:15	on	63.8	0.0	0	0	0	0				0.71	
3/25/19 17:30	off	7.2	7.2	100	0	0	0				0.71	
3/26/19 7:15	on	13.8	0.0	0	0	0	0				0.71	
3/26/19 11:25	on	4.2	4.2	100	30	209	385	1400	5.91		3.64	1400
3/29/19 13:30	on	74.1	74.1	100	30	211	402				3.64	1463
3/31/19 23:59	on	58.5	58.5	100	30	211	402				3.64	1463
4/1/19 12:48	on	12.8	12.8	100	40	215	395				3.64	1438
4/3/19 10:42	on	45.9	45.9	100	40	213	372				3.64	1352
4/4/19 11:36	on	24.9	24.9	100	40	217	518				3.64	1884
4/8/19 12:47	on	97.2	97.2	100	40	211	515				3.64	1874
4/9/19 13:53	on	25.1	25.1	100	40	213	395				3.64	1436
4/10/19 13:02	on	23.2	23.2	100	40	216	400				3.64	1454
4/11/19 12:25	on	23.4	23.4	100	40	220	505				3.64	1839
4/16/19 13:23	on	121.0	121.0	100	40	211	552	1300	5.93		2.35	1300
4/22/19 12:59	on	143.6	143.6	100	40	210	553				2.35	1303
4/30/19 13:00	on	192.0	192.0	100	40	207	693	970	5.94		1.40	970
4/30/19 23:59	on	11.0	11.0	100	40	207	693				1.40	970
5/7/19 11:59	on	156.0	156.0	100	42	201	404				1.40	566
5/13/19 9:59	off	142.0	142.0	100	42	201	404				1.40	566
5/15/19 8:14	on	46.2	0.0	0	45	177	612				1.40	
5/15/19 13:01	on	4.8	4.8	100	45	177	612				1.40	856
5/22/19 12:19	on	167.3	167.3	100	40	216	528				1.40	739
5/28/19 14:26	on	146.1	146.1	100	40	202	520				1.40	728
5/30/19 11:09	on	44.7	44.7	100	45	201	497	1000	5.94		2.01	1000
5/30/2019 12:30	off	1.4	1.4	100	45	201	497				2.01	1000
5/31/19 23:59	off	36.8	0.0	0	0	0	0				2.01	
6/4/19 10:45	on	118.2	0.0	0	0	0	0				2.01	
6/6/19 8:15	off	128.3	128.3	100	0	201	497				2.01	1000
6/10/19 9:29	on	97.2	0.0	0	0	0	0				2.01	
6/10/19 14:28	on	5.0	5.0	100	0	189	478				2.01	962
6/11/19 12:52	on	22.4	22.4	100	49	189	514				2.01	1034
6/17/19 11:45	on	142.9	142.9	100	48	193	541	1600	5.92		2.96	1600
6/25/19 14:48	on	195.0	195.0	100	45	193	366				2.96	1082
6/30/19 23:59	on	129.2	129.2	100	45	193	366				2.96	1082
7/3/19 15:01	on	63.0	63.0	100	46	195	412				2.96	1218
7/5/19 11:18	on	44.3	44.3	100	47	195	388	930	5.94		2.40	930
7/9/19 11:21	on	96.0	96.0	100	48	192	406				2.40	973
7/12/19 9:29	off	70.1	70.1	100	48	192	406				2.40	973
7/15/19 11:44	on	74.3	0.0	0	0	0	0				2.40	
7/16/19 15:17	on	27.6	27.6	100	39	193	349				2.40	837
7/17/19 14:34	on	23.3	23.3	100	39	190	351				2.40	841
7/24/19 13:46	on	167.2	167.2	100	39	192	1597	830	5.99		0.52	830
7/29/19 12:04	on	118.3	118.3	100	42	203	1278				0.52	664
7/31/19 23:59	on	59.9	59.9	100	42	203	1278				0.52	664
8/2/19 12:30	on	36.5	36.5	100	46	189	404	1000	5.99		2.48	1000
8/2/19 14:59	off	2.5	2.5	100	46	189	404				2.48	1000
8/9/19 12:16	on	165.3	0.0	0	0	0	0				2.48	
8/12/19 13:22	on	73.1	73.1	100	41	202	377				2.48	933
8/13/19 13:47	on	24.4	24.4	100	41	203	425	1200	5.95		2.82	1200
8/16/19 9:32	on	67.7	67.7	100	41	199	542				2.82	1530
8/20/19 12:07	on	98.6	98.6	100	41	203	539				2.82	1522
8/23/19 9:27	on	69.3	69.3	100	41	200	449				2.82	1268
8/27/19 11:11	on	97.7	97.7	100	41	205	597				2.82	1686
8/30/19 14:24	on	75.2	75.2	100	41	205	516				2.82	1457
8/31/19 23:59	on	33.6	33.6	100	41	205	516				2.82	1457
9/3/19 15:06	on	63.1	63.1	100	41	208	462				2.82	1304
9/5/19 11:02	off	43.9	43.9	100	41	208	462				2.82	1304
9/11/19 15:14	on	148.2	0.0	0	0	0	0				2.82	
9/13/19 14:26	on	47.2	47.2	100	41	267	542				2.82	1530
9/16/19 11:41	on	69.2	69.2	100	41	265	518	1200	5.94		2.32	1200
9/18/19 13:12	on	49.5	49.5	100	41	270	377				2.32	873
9/23/19 13:24	on	120.2	120.2	100	41	266	382				2.32	885
9/25/19 10:22	on	45.0	45.0	100	40	286	536				2.32	1242
9/27/19 8:38	on	46.3	46.3	100	40	292	523				2.32	1212
9/30/19 23:59	on	87.3	87.3	100	40	292	523				2.32	1212
10/1/19 11:36	on	11.6	11.6	100	40	289	407				2.32	943
10/9/19 13:58	on	194.4	194.4	100	40	302	407	1700	5.94		4.18	1700
10/11/19 12:44	on	46.8	46.8	100	40	299	527				4.18	2201
10/15/19 15:08	on	98.4	98.4	100	39	280	495				4.18	2068
10/16/19 10:39	on	19.5	19.5	100	39	281	389				4.18	1625
10/22/19 11:32	on	144.9	144.9	100	37	272	538				4.18	2247
10/23/19 8:54	on	21.4	21.4	100	37	273	536	1500	5.96		2.80	1500
10/31/19 23:59	on	207.1	207.1	100	37	273	536				2.80	1500
11/1/19 13:10	on	13.2	13.2	100	37	270	505				2.80	1413
11/4/19 11:30	on	70.3	70.3	100	37	270	414				2.80	1159
11/8/19 13:44	on	98.2	98.2	100	44	269	492				2.80	1377
11/12/19 11:48	on	94.1	94.1	100	44	254	400				2.80	1119
11/20/19 12:36	on	192.8	192.8	100	37	225	396	1300	5.93		3.28	1300
11/26/19 13:11	on	144.6	144.6	100	41	229	506				3.28	1661
11/26/19 14:28	off	1.3	1.3	100	41	229	506				3.28	1661
11/30/19 23:59	off	105.5	0.0	0	41	229	506				3.28	1661
12/20/19 12:13	on	468.2	0.0	0	0	0	0				3.28	
12/23/19 13:04	on	72.8	72.8	100	30	253	377	1500	5.93		3.98	1500
12/30/19 13:50	on	168.8	168.8	100	33	269	407				3.98	1619
12/31/19 23:59	on	34.1	34.1	100	33	269	407				3.98	1619

Notes:

Yellow shading indicates that extrapolated or estimated data was used to determine concentration.

TBD: Value to be determined upon receipt of laboratory analytical results.

*Above data for Q4 0218 only. Historical data available upon request.

Cumulative mass tracking began on 12/13/2011

Appendix E - Table 3
VES System Mass Recovered
Former Defense Supply Center Philadelphia
Annual Report 2019

Date / Time	ı air)				Summary		
	Periodic Mass Rate (lbs/hr)	Periodic Mass Recovered (lbs)	Periodic Mass Recovery Rate (lbs/day)	Cumulative Mass Recovered (lbs)	Cumulative Vapor Phase Mass Recovered (lbs)	Cumulative Vapor Phase Mass Recovered (gallons)	
12/31/18 23:59				508,612.77	508,612.77	85,539.37	End of Q4 2018
1/11/19 12:14				508,612.77	508,612.77	85,539.37	TOX-200 and VES restarted using Blower #1.
1/24/19 15:20	1.19	374.80	28.55	508,987.57	508,987.57	85,602.71	
1/28/19 12:47	3.81	356.48	91.55	509,344.05	509,344.05	85,663.03	
1/30/19 14:35	1.04	51.59	24.86	509,395.64	509,395.64	85,671.76	System shut down - Control work - BV-BS system integration
2/20/19 11:16				509,395.64	509,395.64	85,671.76	TOX-200 restarted
2/27/19 10:10	0.41	68.71	9.88	509,464.35	509,464.35	85,683.39	BS Prove Out (Group 1) One data point entered per CD
2/27/19 13:45	0.74	2.64	17.70	509,466.99	509,466.99	85,683.84	BS Prove Out (Group 2) One data point entered per CD
2/28/19 12:10	0.73	16.37	17.53	509,483.36	509,483.36	85,686.61	BV Prove Out (Group 1) One data point entered per CD
3/5/19 11:00	0.55	65.16	13.16	509,548.52	509,548.52	85,697.63	BV Prove Out (Group 1) One data point entered per CD
3/5/19 16:52	0.55	3.23	13.20	509,551.75	509,551.75	85,698.18	System shut down - Low propane
3/6/19 9:44				509,551.75	509,551.75	85,698.18	TOX-200 restarted
3/6/19 15:44	0.70	4.22	16.88	509,555.97	509,555.97	85,698.89	
3/12/19 9:41	0.57	78.78	13.71	509,634.75	509,634.75	85,712.22	
3/12/19 11:37	1.04	2.02	25.02	509,636.76	509,636.76	85,712.56	
3/14/19 11:59	1.04	196.24	25.02	509,752.20	509,752.20	85,745.77	TOX-200 shut down
3/14/19 14:29				509,752.20	509,752.20	85,745.77	VES Restarted with TOX-100
3/15/19 9:00	0.75	13.88	17.99	509,766.08	509,766.08	85,748.11	
3/15/19 10:29	0.75	1.11	17.99	509,767.19	509,767.19	85,748.30	System shut down (Low LEL and clear laterals)
3/18/19 9:29				509,767.19	509,767.19	85,748.30	VES Restarted on TOX-100
3/19/19 9:25	0.84	20.17	20.22	509,787.36	509,787.36	85,751.71	
3/19/19 14:59	0.84	4.69	20.22	509,792.05	509,792.05	85,752.51	
3/19/19 16:29				509,792.05	509,792.05	85,752.51	
3/22/19 10:42	0.70	46.59	16.89	509,838.64	509,838.64	85,760.39	
3/22/19 18:30	0.70	5.49	16.89	509,844.13	509,844.13	85,761.32	System went down during storm
3/25/19 10:15				509,844.13	509,844.13	85,761.32	System restarted, went down later in the night- no data collected
3/25/19 17:30				509,844.13	509,844.13	85,761.32	
3/26/19 7:15				509,844.13	509,844.13	85,761.32	System restarted
3/26/19 11:25	4.09	17.05	98.20	509,861.17	509,861.17	85,764.20	
3/29/19 13:30	4.32	319.98	103.66	510,181.15	510,181.15	85,818.35	
3/31/19 23:59	4.32	252.60	103.66	510,433.75	510,433.75	85,861.09	End 2019 Q1
4/1/19 12:48	4.31	55.30	103.55	510,489.05	510,489.05	85,870.44	
4/3/19 10:42	4.03	185.00	96.73	510,674.05	510,674.05	85,901.75	
4/4/19 11:36	5.72	142.50	137.35	510,816.55	510,816.55	85,925.86	
4/8/19 12:47	5.52	536.60	132.52	511,353.15	511,353.15	86,016.65	
4/9/19 13:53	4.28	107.40	102.69	511,460.54	511,460.54	86,034.82	
4/10/19 13:02	4.40	101.80	105.54	511,562.34	511,562.34	86,052.05	
4/11/19 12:25	5.66	132.32	135.81	511,694.66	511,694.66	86,074.44	
4/16/19 13:23	3.84	464.40	92.14	512,159.06	512,159.06	86,152.75	
4/22/19 12:59	3.83	549.95	91.91	512,709.01	512,709.01	86,245.49	
4/30/19 13:00	2.80	537.67	67.20	513,246.68	513,246.68	86,336.01	
4/30/19 23:59	2.80	30.75	67.20	513,277.44	513,277.44	86,341.19	End of April 2019
5/7/19 11:59	1.59	247.84	38.13	513,525.27	513,525.27	86,382.91	
5/13/19 9:59	1.59	225.59	38.13	513,750.87	513,750.87	86,420.89	System shut down for BV-BS Pilot Study GW Sampling
5/15/19 8:14				513,750.87	513,750.87	86,420.89	System restarted
5/15/19 13:01	2.12	10.13	50.83	513,761.00	513,761.00	86,422.59	
5/22/19 12:19	2.23	373.84	53.63	514,134.84	514,134.84	86,485.53	
5/28/19 14:26	2.06	300.48	49.36	514,435.32	514,435.32	86,536.12	
5/30/19 11:09	2.81	125.58	67.40	514,560.90	514,560.90	86,557.26	
5/30/2019 12:30	2.81	3.79	67.40	514,564.69	514,564.69	86,557.90	System shut down for quarterly gauging
5/31/19 23:59				514,564.69	514,564.69	86,557.26	End of May 2019
6/4/19 10:45				514,564.69	514,564.69	86,557.90	System restarted
6/6/19 8:15	2.81	360.22	67.40	514,924.91	514,924.91	86,617.90	TOX-100 shutdown (Flame failure)
6/10/19 9:29				514,924.91	514,924.91	86,617.90	System restarted
6/10/19 14:28	2.54	12.65	60.93	514,937.56	514,937.56	86,620.03	
6/11/19 12:52	2.73	61.15	65.52	514,998.72	514,998.72	86,630.33	
6/17/19 11:45	4.32	616.72	103.59	515,615.44	515,615.44	86,734.50	
6/25/19 14:48	2.92	569.91	70.13	516,185.35	516,185.35	86,830.77	
6/30/19 23:59	2.92	377.46	70.13	516,562.81	516,562.81	86,894.53	End of Q2 2019
7/3/19 15:01	3.31	208.76	79.49	516,771.57	516,771.57	86,929.80	
7/5/19 11:18	2.54	112.43	60.94	516,884.01	516,884.01	86,948.72	
7/9/19 11:21	2.61	250.72	62.65	517,134.72	517,134.72	86,990.93	
7/12/19 9:29	2.61	183.07	62.65	517,317.79	517,317.79	87,021.75	System shut down (flame failure alarm)
7/15/19 11:44				517,317.79	517,317.79	87,021.75	
7/16/19 15:17	2.26	62.17	54.16	517,379.96	517,379.96	87,032.22	
7/17/19 14:34	2.24	52.11	53.71	517,432.07	517,432.07	87,040.99	
7/24/19 13:46	2.23	372.24	53.43	517,804.31	517,804.31	87,103.13	
7/29/19 12:04	1.88	222.55	45.15	518,026.85	518,026.85	87,140.29	
7/31/19 23:59	1.88	112.71	45.15	518,139.57	518,139.57	87,159.10	End of July 2019
8/2/19 12:30	2.64	96.58	63.48	518,236.15	518,236.15	87,175.23	
8/2/19 14:59	2.64	6.57	63.48	518,242.72	518,242.72	87,176.32	System shut down for BV-BS groundwater sampling
8/9/19 12:16				518,242.72	518,242.72	87,176.32	System restarted
8/12/19 13:22	2.64	192.96	63.35	518435.68	518,435.68	87,208.54	
8/13/19 13:47	3.40	83.03	81.62	518518.71	518,518.71	87,222.49	
8/16/19 9:32	4.26	288.88	102.34	518807.60	518,807.60	87,271.04	
8/20/19 12:07	4.32	425.68	103.63	519233.28	519,233.28	87,342.59	
8/23/19 9:27	3.55	245.95	85.14	519479.23	519,479.23	87,383.92	
8/27/19 11:11	4.83	472.40	116.00	519951.63	519,951.63	87,463.32	
8/30/19 14:24	4.18	314.29	100.28	520265.92	520,265.92	87,516.14	
8/31/19 23:59	4.18	140.33	100.28	520406.25	520,406.25	87,539.73	End of August 2019
9/3/19 15:06	3.79	239.08	90.91	520645.33	520,645.33	87,579.91	
9/5/19 11:02	3.79	166.42	90.91	520811.74	520,811.74	87,607.88	System shut down for quarterly gauging event
9/11/19 15:14				520811.74	520,811.74	87,607.88	System restarted
9/13/19 14:26	5.71	269.28	136.92	521081.02	521,081.02	87,653.13	
9/16/19 11:41	4.44	307.49	106.57	521388.52	521,388.52	87,704.90	
9/18/19 13:12	3.29	163.13	79.07	521551.65	521,551.65	87,732.36	
9/23/19 13:24	3.29	395.64	79.00	521947.29	521,947.29	87,798.97	
9/25/19 10:22	4.96	223.08	119.07	522170.38	522,170.38	87,836.53	
9/27/19 8:38	4.95	228.93	118.76	522399.31	522,399.31	87,875.07	
9/30/19 23:59	4.95	432.22	118.76	522831.53	522,831.53	87,947.83	End of Q3 2019
10/1/19 11:36	3.81	44.30	91.53	522875.83	522,875.83	87,955.29	
10/9/19 13:58	7.17	1394.48	172.19	524270.31	524,270.31	88,190.05	
10/11/19 12:44	9.19	429.72	220.53	524700.02	524,700.02	88,262.39	
10/15/19 15:08	8.10	797.26	194.45	525497.28	525,497.28	88,396.61	
10/16/19 10:39	6.38	124.48	153.08	525621.76	525,621.76	88,417.57	
10/22/19 11:32	8.54	1237.04	204.92	526858.80	526,858.80	88,625.82	
10/23/19 8:54	5.72	122.32	137.40	526981.12	526,981.12	88,646.35	
10/31/19 23:59	5.72	1185.52	137.40	528166.64	528,166.64	88,845.26	End of October 2019
11/1/19 13:10	5.33	70.28	127.95	528236.93	528,236.93	88,857.05	
11/4/19 11:30	4.37	307.39	104.89	528544.32	528,544.32	88,908.63	
11/8/19 13:44	5.17	507.68	124.03	529052.00	529,052.00	88,993.81	
11/12/19 11:48	3.97	373.91	95.40	529425.90	529,425.90	89,056.54	
11/20/19 12:36	4.08	786.72	97.93	530212.62	530,212.62	89,189.21	
11/26/19 13:11	5.32	769.79	127.78	530982.41	530,982.41	89,319.02	
11/26/19 14:28	5.32	6.83	127.78	530989.24	530,989.24	89,320.18	System Shutdown for sitewide groundwater sampling event
11/30/19 23:59	5.32	0.00	127.78	530989.24	530,989.24	89,320.18	End of November 2019
12/20/19 12:13		0.00	0.00	530989.24	530,989.24	89,320.18	System restarted
12/23/19 13:04	5.30	385.80	127.10	531375.04	531,375.04	89,385.24	
12/30/19 13:50	6.09	1027.69	146.15	532402.73	532,402.73	89,558.54	
12/31/19 23:59	6.09	207.95	146.15	532610.69	532,610.69	89,593.61	End of Q4 2019

Notes:
Yellow shading indicates that extrapolated or estimated data was used to determ
TBD: Value to be determined upon receipt of laboratory analytical results.
*Above data for Q4 0218 only. Historical data available upon request.
Cumulative mass tracking began on 12/13/2011

Appendix E - Mass Recovery

Table 4
Mass Degraded In-Situ by Bioremediation as Measured by Recovered Carbon Dioxide
Former Defense Supply Center Philadelphia
Annual Report 2019

					Manifold (Influent) Vapor Phase Mass Recovery (pre-dilution air)				Mass Degraded by In-Situ Bioremediation as I			
Date / Time	System Switched On/Off This Day? Notes	Periodic Hours (Calculated)	Hours Operational (approximate)	% Uptime	Calculated Weighted Average Density lbs/gal	Calculated Percent Modern Carbon pMC	Sample info Notes	Cumulative Mass Recovered (lbs)	Average Combined Influent CO2 by GEM2000 (%)	Estimated CO2 Attibuted to Degredation of VOCs (%)	Estimated CO2 Attibuted to Degredation of VOCs (ppmv)	Periodic Mass Degradation Rate (lbs/hr)
12/31/19 23:59	off	81.4	0.0	0				508,612.77	0.0	0.0	0	0.00
1/11/19 12:14	On	252.3	0.0	0				508,612.77	0.0	0.0	0	0.00
1/24/19 15:20	On	315.1	315.1	100				508,987.57	2.6	1.9	19240	26.93
1/28/19 12:47	On	93.4	93.4	100	5.91			509,344.05	2.6	1.9	19240	28.37
1/30/19 14:35	Off	49.8	49.8	100				509,395.64	2.6	1.9	19240	26.93
2/20/19 11:16	On	500.7	0.0	0				509,395.64	2.6	1.9	19240	0.00
2/27/19 10:10	On	166.9	166.9	100				509,464.35	3.9	2.9	28860	22.15
2/27/19 13:45	On	3.6	3.6	100				509,466.99	4.0	3.0	29600	39.12
2/28/19 12:10	On	22.4	22.4	100				509,483.36	3.5	2.6	25900	33.10
3/5/19 11:00	On	118.8	118.8	100				509,548.52	2.9	2.1	21460	26.27
3/5/19 16:52	Off	5.9	5.9	100				509,551.75	2.7	2.0	19980	24.52
3/6/19 9:44	On	16.9	0.0	0				509,551.75	2.8	2.1	20720	0.00
3/6/19 15:44	On	6.0	6.0	100				509,555.97	2.8	2.1	20720	26.41
3/12/19 9:41	On	138.0	138.0	100				509,634.75	2.5	1.9	18500	22.66
3/12/19 11:37	On	1.9	1.9	100				509,636.76	3.2	2.4	23680	29.57
3/14/19 11:59	OFF	188.3	188.3	100				509,752.20	2.8	2.1	20720	25.88
3/14/19 14:29	on	2.5	0.0	0				509,752.20	2.8	2.1	20720	30.02
3/15/19 9:00	on	18.5	18.5	100				509,766.08	2.8	2.1	20720	28.66
3/15/19 10:29	off	1.5	1.5	100				509,767.19	2.8	2.1	20720	28.66
3/18/19 9:29	on	71.0	0.0	0				509,767.19	2.8	2.1	20720	0.00
3/19/19 9:25	on	23.9	23.9	100				509,787.36	3.3	2.4	24420	36.26
3/19/19 14:59	off	5.6	5.6	100				509,792.05	3.3	2.4	24420	0.00
3/19/19 16:29	on	1.5	0.0	0				509,792.05	3.3	2.4	24420	0.00
3/22/19 10:42	on	66.2	66.2	100				509,838.64	3.3	2.4	24420	33.76
3/22/19 18:30	off	7.8	7.8	100				509,844.13	3.3	2.4	24420	33.76
3/25/19 10:15	on	63.8	0.0	0				509,844.13	3.3	2.4	24420	0.00
3/25/19 17:30	off	7.2	7.2	100				509,844.13	3.3	2.4	24420	0.00
3/26/19 7:15	on	13.8	0.0	0				509,844.13	3.3	2.4	24420	0.00
3/26/19 11:25	on	4.2	4.2	100	5.91			509,861.17	4.1	3.0	30340	44.56
3/29/19 13:30	on	74.1	74.1	100				510,181.15	3.6	2.7	26640	39.54
3/31/19 23:59	on	58.5	58.5	100				510,433.75	3.6	2.7	26640	39.54
4/1/19 12:48	on	12.8	12.8	100				510,489.05	3.8	2.8	28120	42.41
4/3/19 10:42	on	45.9	45.9	100				510,674.05	3.7	2.7	27380	41.03
4/4/19 11:36	on	24.9	24.9	100				510,816.55	3.7	2.7	27380	41.81
4/8/19 12:47	on	97.2	97.2	100				511,353.15	3.5	2.6	25900	38.35
4/9/19 13:53	on	25.1	25.1	100				511,460.54	3.8	2.8	28120	42.12
4/10/19 13:02	on	23.2	23.2	100				511,562.34	4.2	3.1	31080	47.24
4/11/19 12:25	on	23.4	23.4	100				511,694.66	3.3	2.4	24420	37.77
4/16/19 13:23	on	121.0	121.0	100	5.93			512,159.06	3.8	2.8	28120	41.73
4/22/19 12:59	on	143.6	143.6	100				512,709.01	4.0	3.0	29600	43.73
4/30/19 13:00	on	192.0	192.0	100				513,246.68	3.2	2.4	23680	34.35
4/30/19 23:59	on	11.0	11.0	100	5.94			513,277.44	3.2	2.4	23680	34.35
5/7/19 11:59	on	156.0	156.0	100				513,525.27	3.3	2.4	24420	34.45
5/13/19 9:59	off	142.0	142.0	100				513,750.87	3.7	2.7	27380	38.62
5/15/19 8:14	on	46.2	0.0	0				513,750.87	3.2	2.4	23680	29.44
5/15/19 13:01	on	4.8	4.8	100				513,761.00	3.7	2.7	27380	34.03
5/22/19 12:19	on	167.3	167.3	100				514,134.84	3.2	2.4	23680	35.98
5/28/19 14:26	on	146.1	146.1	100				514,435.32	3.5	2.6	25900	36.78
5/30/19 11:09	on	44.7	44.7	100	5.94			514,560.90	3.4	2.5	25160	35.51
5/30/19 12:30	off	1.4	1.4	100				514,564.69	3.4	2.5	25160	35.51
5/31/19 23:59	off	36.8	0.0	0				514,564.69	3.4	2.5	25160	0.00
6/4/19 10:45	on	118.2	0.0	0				514,564.69	3.4	2.5	25160	0.00
6/6/19 8:15	off	128.3	128.3	100				514,924.91	3.4	2.5	25160	35.51
6/10/19 9:29	on	97.2	0.0	0				514,924.91	3.4	2.5	25160	0.00
6/10/19 14:28	on	5.0	5.0	100				514,937.56	4.6	3.4	34040	45.16
6/11/19 12:52	on	22.4	22.4	100				514,998.72	4.4	3.3	32560	43.20
6/17/19 11:45	on	142.9	142.9	100	5.92	80.5%		515,615.44	4.2	3.4	33810	45.84
6/25/19 14:48	on	195.0	195.0	100				516,185.35	3.1	2.5	24955	33.85
6/30/19 23:59	on	129.2	129.2	100				516,562.81	3.1	2.5	24955	33.85
7/3/19 15:01	on	63.0	63.0	100				516,771.57	3.1	2.5	24955	34.09
7/5/19 11:18	on	44.3	44.3	100	5.94			516,884.01	2.8	2.3	22540	30.93
7/9/19 11:21	on	96.0	96.0	100				517,134.72	2.8	2.3	22540	30.38
7/12/19 9:29	off	70.1	70.1	100				517,317.79	2.8	2.3	22540	30.38
7/15/19 11:44	on	74.3	0.0	0				517,317.79	2.8	2.3	22540	0.00
7/16/19 15:17	on	27.6	27.6	100				517,379.96	3.0	2.4	24150	32.74
7/17/19 14:34	on	23.3	23.3	100				517,432.07	2.8	2.3	22540	30.13
7/24/19 13:46	on	167.2	167.2	100	5.99			517,804.31	3.3	2.7	26565	35.81
7/29/19 12:04	on	118.3	118.3	100				518,026.85	3.0	2.4	24150	34.38
7/31/19 23:59	on	59.9	59.9	100				518,139.57	3.0	2.4	24150	34.38
8/2/19 12:30	on	36.5	36.5	100	5.99			518,236.15	3.2	2.6	25760	34.24
8/2/19 14:59	off	2.5	2.5	100				518,242.72	3.2	2.6	25760	34.24
8/9/19 12:16	on	165.3	0.0	0				518,242.72	3.2	2.6	25760	0.00
8/12/19 13:22	on	73.1	73.1	100				518,435.68	3.8	3.1	30590	43.49
8/13/19 13:47	on	24.4	24.4	100	5.95	80.9%		518,518.71	3.7	3.0	29933	42.63
8/16/19 9:32	on	67.7	67.7	100				518,807.60	4.4	3.6	35596	49.84
8/20/19 12:07	on	98.6	98.6	100				519,233.28	4.4	3.6	35596	50.76
8/23/19 9:27	on	69.3	69.3	100				519,479.23	4.5	3.6	36405	51.19
8/27/19 11:11	on	97.7	97.7	100				519,951.63	4.6	3.7	37214	53.63
8/30/19 14:24	on	75.2	75.2	100				520,265.92	4.6	3.7	37214	53.64
8/31/19 23:59	on	33.6	33.6	100				520,406.25	4.6	3.7	37214	53.64
9/3/19 15:06	on	63.1	63.1	100				520,645.33	4.2	3.4	33978	49.59
9/5/19 11:02	off	43.9	43.9	100				520,811.74	4.2	3.4	33978	49.59
9/11/19 15:14	on	148.2	0.0	0				520,811.74	4.2	3.4	33978	0.00
9/13/19 14:26	on	47.2	47.2	100				521,081.02	3.5	2.8	28315	53.05
9/16/19 11:41	on	69.2	69.2	100	5.94			521,388.52	3.2	2.6	25888	48.14
9/18/19 13:12	on	49.5	49.5	100				521,551.65	3.5	2.8	28315	53.68
9/23/19 13:24	on	120.2	120.2	100				521,947.29	3.3	2.7	26697	49.90
9/25/19 10:22	on	45.0	45.0	100				522,170.38	3.8	3.1	30742	61.73
9/27/19 8:38	on	46.3	46.3	100				522,399.31	3.7	3.0	29933	61.44
9/30/19 23:59	on	87.3	87.3	100				522,831.53	3.7	3.0	29933	61.44
10/1/19 11:36	on	11.6	11.6	100				522,875.83	3.8	3.1	30742	62.49
10/9/19 13:58	on	194.4	194.4	100				524,270.31	3.8	3.1	30742	65.20
10/11/19 12:44	on	46.8	46.8	100				524,700.02	3.9	3.2	31551	66.19
10/15/19 15:08	on	98.4	98.4	100				525,497.28	3.8	3.1	30742	60.54
10/16/19 10:39	on	19.5	19.5	100				525,621.76	3.8	3.1	30742	60.65
10/22/19 11:32	on	144.9	144.9	100				526,858.80	3.9	3.2	31551	60.25
10/23/19 8:54	on	21.4	21.4	100				526,981.12	3.9	3.2	31551	60.52
10/31/19 23:59	on	207.1	207.1	100				528,166.64	3.9	3.2	31551	60.52
11/1/19 13:10	on	13.2	13.2	100				528,236.93	3.4	2.8	27506	52.15
11/4/19 11:30	on	70.3	70.3	100				528,544.32	4.0	3.2	32360	61.35
11/8/19 13:44	on	98.2	98.2	100				529,052.00	4.0	3.2	32360	61.04
11/12/19 11:48	on	94.1	94.1	100				529,425.90	3.9	3.2	31551	56.31
11/20/19 12:36	on	192.8	192.8	100				530,212.62	3.7	3.0	29933	47.22
11/26/19 13:11	on	144.6	144.6	100				530,982.41	3.9	3.2	31551	50.82
11/26/19 14:28	off	1.3	1.3	100				530,989.24	3.9	3.2	31551	50.82
11/30/19 23:59	off	105.5	0.0	0				530,989.24	3.9	3.2	31551	50.82
12/20/19 12:13	on	468.2	0.0	0				530,989.24	3.9	3.2	31551	0.00
12/23/19 13:04	on	72.8	72.8	100				531,375.04	2.5	2.0	20225	35.89
12/30/19 13:50	on	168.8	168.8	100				532,402.73	2.5	2.0	20225	38.22
12/31/19 23:59	on	34.1	34.1	100				532,610.69	2.5	2.0	20225	38.22

Notes:

Yellow shading indicates that extrapolated or estimated data was used to determine concentration.

TBD: Value to be determined upon receipt of laboratory analytical results.

Above data provided for Q4 2018 only. Previous quarterly data available in preceeding quarterly reports or upon request.

Cumulative mass tracking began on 12/13/2011

Appendix E - Mass Recovery

Table 4
Mass Degraded In-Situ by Bioremediation as Measured by Recovered Carbon Dioxide
Former Defense Supply Center Philadelphia
Annual Report 2019

	Measured by Recovered CO2			Summary	
Date / Time	Periodic Mass Degraded (as quantified by CO2) (lbs)	Periodic Mass Degradation Rate (lbs/day)	Cumulative Mass Degraded (as quantified by CO2 recovered) (lbs)	Cumulative Mass Degraded (as quantified by CO2 recovered) expressed as LNAPL (gallons)	Recovery Well Operation Log
12/31/19 23:59	0.00	0.00	1,687,627.19	284,118.94	System off; End of Q4 2018
1/11/19 12:14	0.00	0.00	1,687,627.19	284,118.94	TOX-200 and VES restarted using Blower #1.
1/24/19 15:20	8484.19	646.21	1,696,111.38	285,552.83	
1/28/19 12:47	2651.54	680.97	1,698,762.92	286,001.48	
1/30/19 14:35	1340.88	646.21	1,697,452.26	286,228.37	System shut down
2/20/19 11:16	0.00	0.00	1,697,452.26	286,228.37	TOX-200 restarted
2/27/19 10:10	3697.32	531.67	1,701,149.59	286,853.97	BS Prove Out (Group 1) One data point entered per CD
2/27/19 13:45	140.17	938.84	1,701,289.76	286,877.69	BS Prove Out (Group 2) One data point entered per CD
2/28/19 12:10	741.93	794.33	1,702,031.69	287,003.23	BV Prove Out (Group 1) One data point entered per CD
3/5/19 11:00	3121.26	630.38	1,705,152.95	287,531.36	BV Prove Out (Group 1) One data point entered per CD
3/5/19 16:52	143.87	588.56	1,705,296.82	287,555.70	System shut down
3/6/19 9:44	0.00	0.00	1,705,296.82	287,555.70	TOX-200 restarted
3/6/19 15:44	158.44	633.75	1,705,455.26	287,582.51	TOX-200 restarted
3/12/19 9:41	3125.75	543.81	1,708,581.01	288,111.40	
3/12/19 11:37	57.17	709.72	1,708,638.18	288,121.08	
3/14/19 11:59	4871.02	621.01	1,713,509.21	288,945.28	TOX-200 shut down
3/14/19 14:29	0.00	720.57	1,713,509.21	288,945.28	TOX-100 restarted
3/15/19 9:00	530.67	687.82	1,714,039.87	289,035.07	
3/15/19 10:29	42.51	687.82	1,714,082.39	289,042.26	System shut down (Low LEL and clear laterals)
3/18/19 9:29	0.00	0.00	1,714,082.39	289,042.26	VES Restarted on TOX-100
3/19/19 9:25	867.90	870.32	1,714,950.29	289,189.12	0
3/19/19 14:59	0.00	0.00	1,714,082.39	289,189.12	0
3/19/19 16:29	0.00	0.00	1,714,082.39	289,189.12	0
3/22/19 10:42	2235.21	810.15	1,717,185.50	289,567.32	0
3/22/19 18:30	263.30	810.15	1,717,448.80	289,611.87	System went down during storm
3/25/19 10:15	0.00	0.00	1,717,448.80	289,611.87	
3/25/19 17:30	0.00	0.00	1,717,448.80	289,611.87	
3/26/19 7:15	0.00	0.00	1,717,448.80	289,611.87	
3/26/19 11:25	185.68	1069.49	1,717,634.48	289,643.29	
3/29/19 13:30	2929.08	948.90	1,720,563.55	290,138.91	
3/31/19 23:59	2312.29	948.90	1,722,875.84	290,530.16	End of 2019 Q1
4/1/19 12:48	543.52	1017.78	1,723,419.36	290,622.12	
4/3/19 10:42	1883.46	984.81	1,725,302.82	290,940.81	
4/4/19 11:36	1041.04	1003.41	1,726,343.86	291,116.96	
4/8/19 12:47	3727.00	920.40	1,730,070.86	291,747.59	
4/9/19 13:53	1057.19	1010.86	1,731,128.05	291,926.47	
4/10/19 13:02	1093.72	1133.87	1,732,221.77	292,111.53	
4/11/19 12:25	883.17	906.46	1,733,104.93	292,260.97	
4/16/19 13:23	5048.44	1001.62	1,738,153.37	293,112.31	
4/22/19 12:59	6279.49	1049.50	1,744,432.86	294,171.24	
4/30/19 13:00	6596.65	824.51	1,751,029.51	295,281.79	
4/30/19 23:59	377.33	824.51	1,751,406.84	295,345.31	End of April 2019
5/7/19 11:59	5373.50	826.69	1,756,780.33	296,249.94	
5/13/19 9:59	5484.14	926.90	1,762,264.47	297,173.20	System shut down for BV-BS Pilot Study GW Sampling
5/15/19 8:14	0.00	706.45	1,762,264.47	297,173.20	System restarted
5/15/19 13:01	162.76	816.65	1,762,427.23	297,200.60	
5/22/19 12:19	6018.79	863.42	1,768,446.02	298,213.86	
5/28/19 14:26	5373.71	882.64	1,773,819.73	299,118.53	
5/30/19 11:09	1587.91	852.25	1,775,407.64	299,385.85	
5/30/19 12:30	47.94	852.25	1,775,455.58	299,393.92	System shut down for quarterly gauging
5/31/19 23:59	0.00	0.00	1,775,455.58	299,393.92	End of May 2019
6/4/19 10:45	0.00	0.00	1,775,455.58	299,393.92	System restarted
6/6/19 8:15	4554.81	852.25	1,780,010.39	300,160.72	TOX-100 shutdown (Flame failure)
6/10/19 9:29	0.00	0.00	1,780,010.39	300,160.72	System restarted
6/10/19 14:28	225.05	1083.85	1,780,235.44	300,198.68	
6/11/19 12:52	967.61	1036.73	1,781,203.06	300,361.85	
6/17/19 11:45	6549.55	1100.12	1,787,752.60	301,468.19	
6/25/19 14:48	6603.25	812.50	1,794,355.86	302,583.61	
6/30/19 23:59	4373.39	812.50	1,798,729.25	303,322.35	End of 2019 Q2
7/3/19 15:01	2148.74	818.14	1,800,878.00	303,685.32	
7/5/19 11:18	1369.52	742.23	1,802,247.51	303,915.88	
7/9/19 11:21	2918.46	729.24	1,805,165.97	304,407.20	
7/12/19 9:29	2130.99	729.24	1,807,296.96	304,765.95	System shut down (flame failure alarm)
7/15/19 11:44	0.00	0.00	1,807,296.96	304,765.95	System restarted
7/16/19 15:17	902.03	785.80	1,808,199.00	304,917.81	
7/17/19 14:34	701.64	723.23	1,808,900.63	305,035.93	
7/24/19 13:46	5987.55	859.46	1,814,888.18	306,035.52	
7/29/19 12:04	4066.56	825.00	1,818,954.75	306,714.41	
7/31/19 23:59	2059.64	825.00	1,821,014.38	307,058.26	End of July 2019
8/2/19 12:30	1250.36	821.78	1,822,264.74	307,267.00	
8/2/19 14:59	85.03	821.78	1,822,349.77	307,281.20	System shut down for BV-BS groundwater sampling
8/9/19 12:16	0.00	0.00	1,822,349.77	307,281.20	System restarted
8/12/19 13:22	3178.97	1043.71	1,825,528.74	307,811.91	
8/13/19 13:47	1040.92	1023.16	1,826,569.66	307,986.85	
8/16/19 9:32	3376.98	1196.27	1,829,946.64	308,554.41	
8/20/19 12:07	5003.81	1218.17	1,834,950.46	309,395.39	
8/23/19 9:27	3549.51	1228.68	1,838,499.97	309,991.95	
8/27/19 11:11	5241.33	1287.09	1,843,741.30	310,872.84	
8/30/19 14:24	4034.57	1287.34	1,847,775.87	311,550.92	
8/31/19 23:59	1801.39	1287.34	1,849,577.25	311,853.68	End of August 2019
9/3/19 15:06	3129.70	1190.06	1,852,706.95	312,379.67	
9/5/19 11:02	2178.47	1190.06	1,854,885.42	312,745.80	System shut down for quarterly gauging event
9/11/19 15:14	0.00	0.00	1,854,885.42	312,745.80	System restarted
9/13/19 14:26	2503.96	1273.20	1,857,389.38	313,166.64	
9/16/19 11:41	3333.89	1155.43	1,860,723.27	313,727.90	
9/18/19 13:12	2658.07	1288.33	1,863,381.33	314,175.38	
9/23/19 13:24	5998.47	1197.70	1,869,379.81	315,185.23	
9/25/19 10:22	2775.76	1481.50	1,872,155.57	315,652.53	
9/27/19 8:38	2842.51	1474.50	1,874,998.08	316,131.07	
9/30/19 23:59	5366.58	1474.50	1,880,364.66	317,034.53	End of Q3 2019
10/1/19 11:36	725.94	1499.79	1,881,090.60	317,156.74	
10/9/19 13:58	12673.31	1564.87	1,893,763.91	319,290.30	
10/11/19 12:44	3095.48	1588.56	1,896,859.39	319,811.42	
10/15/19 15:08	5957.53	1453.06	1,902,816.93	320,814.37	
10/16/19 10:39	1183.68	1455.60	1,904,000.61	321,013.65	
10/22/19 11:32	8728.82	1445.93	1,912,729.43	322,483.14	
10/23/19 8:54	1293.06	1452.42	1,914,022.49	322,700.10	
10/31/19 23:59	12532.18	1452.42	1,926,554.67	324,802.81	End of October 2019
11/1/19 13:10	687.47	1251.52	1,927,242.13	324,918.16	
11/4/19 11:30	4314.87	1472.37	1,931,557.00	325,642.13	
11/8/19 13:44	5996.59	1465.06	1,937,553.59	326,648.27	
11/12/19 11:48	5296.46	1351.33	1,942,850.05	327,536.94	
11/20/19 12:36	9103.75	1133.25	1,951,953.80	329,072.14	
11/26/19 13:11	7348.23	1219.76	1,959,302.03	330,311.30	
11/26/19 14:28	65.22	1219.76	1,959,367.26	330,322.30	System Shutdown for sitewide groundwater sampling event
11/30/19 23:59	0.00	1219.76	1,959,367.26	330,322.30	End of November 2019
12/20/19 12:13	0.00	0.00	1,959,367.26	330,322.30	System Restarted
12/23/19 13:04	2614.28	861.26	1,961,981.54	330,763.16	
12/30/19 13:50	6450.65	917.34	1,968,432.19	331,850.96	
12/31/19 23:59	1305.29	917.34	1,969,737.48	332,071.08	End of Q4 2019

Notes:
Yellow shading indicates th
TBD: Value to be determine
Above data provided for Q4
Cumulative mass tracking b

Notes:
Yellow shading indicates that extrapolated or estimated data was used to determine concentration.
TBD: Value to be determined upon receipt of laboratory analytical results.
Above data provided for Q4 2018 only. Previous quarterly data available in preceeding quarterly rep
Cumulative mass tracking began on 12/13/2011

APPENDIX F – SCADA System Reports

APPENDIX G – Precipitation Data

39.87 °N, 75.24 °W

Philadelphia, PA Weather History ★ 🏠

51° PHILADELPHIA INTERNATIONAL AIRPORT STATION (/WEATHER/US/PA/PHILADELPHIA/KPHL?CM_VEN=LOCALWX_PWSDASH) | CHANGE

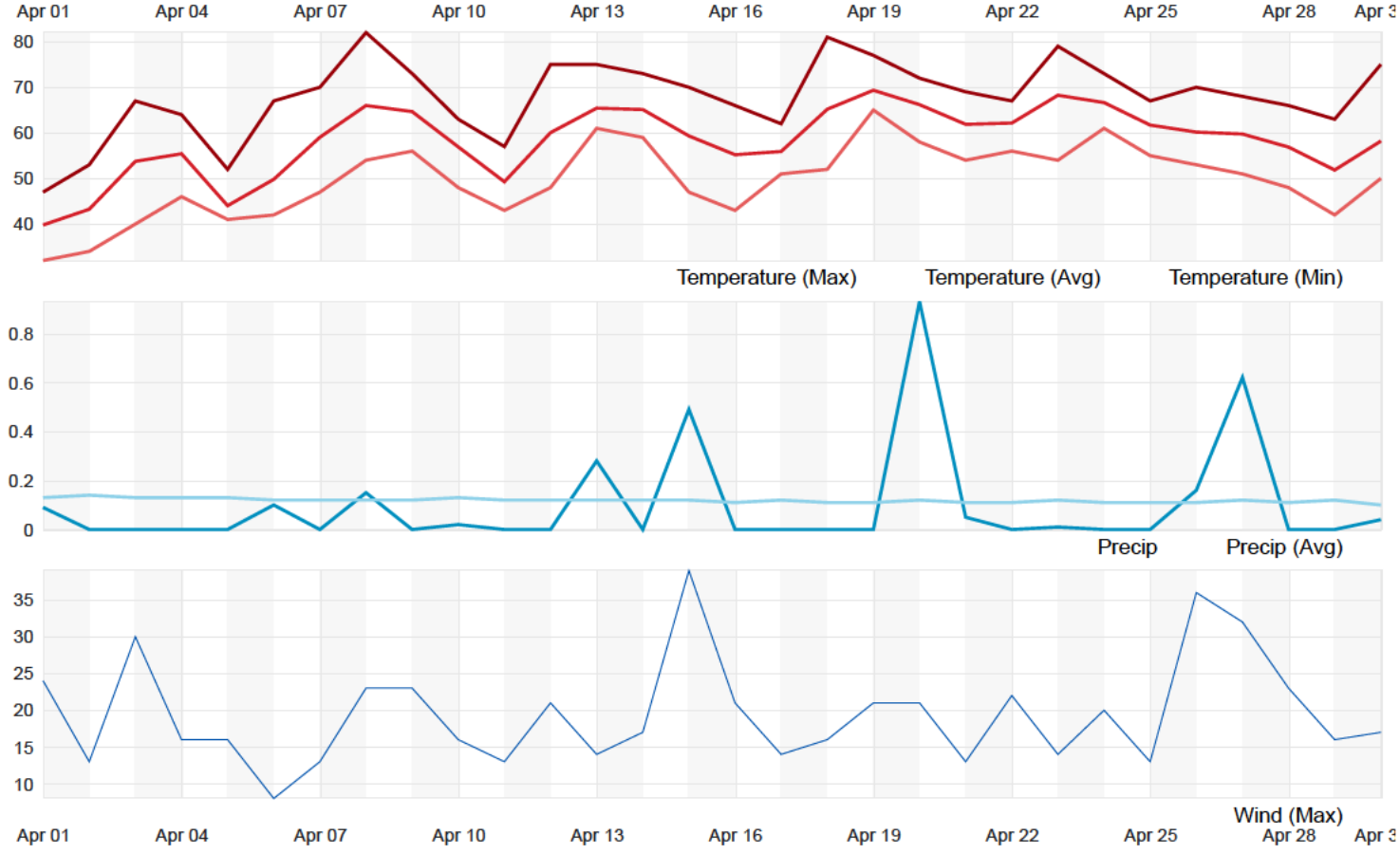
HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)

- TODAY (/WEATHER/US/PA/PHILADELPHIA/KPHL)
- HOURLY (/HOURLY/US/PA/PHILADELPHIA/KPHL)
- 10-DAY (/FORECAST/US/PA/PHILADELPHIA/KPHL)
- CALENDAR (/CALENDAR/US/PA/PHILADELPHIA/KPHL)
- HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)
- WUNDERMAP (/WUNDERMAP?LAT=39.87&LON=-75.24)

Daily | Weekly | Monthly

(/history/daily/us/pa/philadelphia/KPHL/date/2019-4-27) (/history/weekly/us/pa/philadelphia/KPHL/date/2019-4-27) (/history/monthly/us/pa/philadelphia/KPHL/date/2019-4-27)

April | 2019 | View



39.87 °N, 75.24 °W

Philadelphia, PA Weather History ★

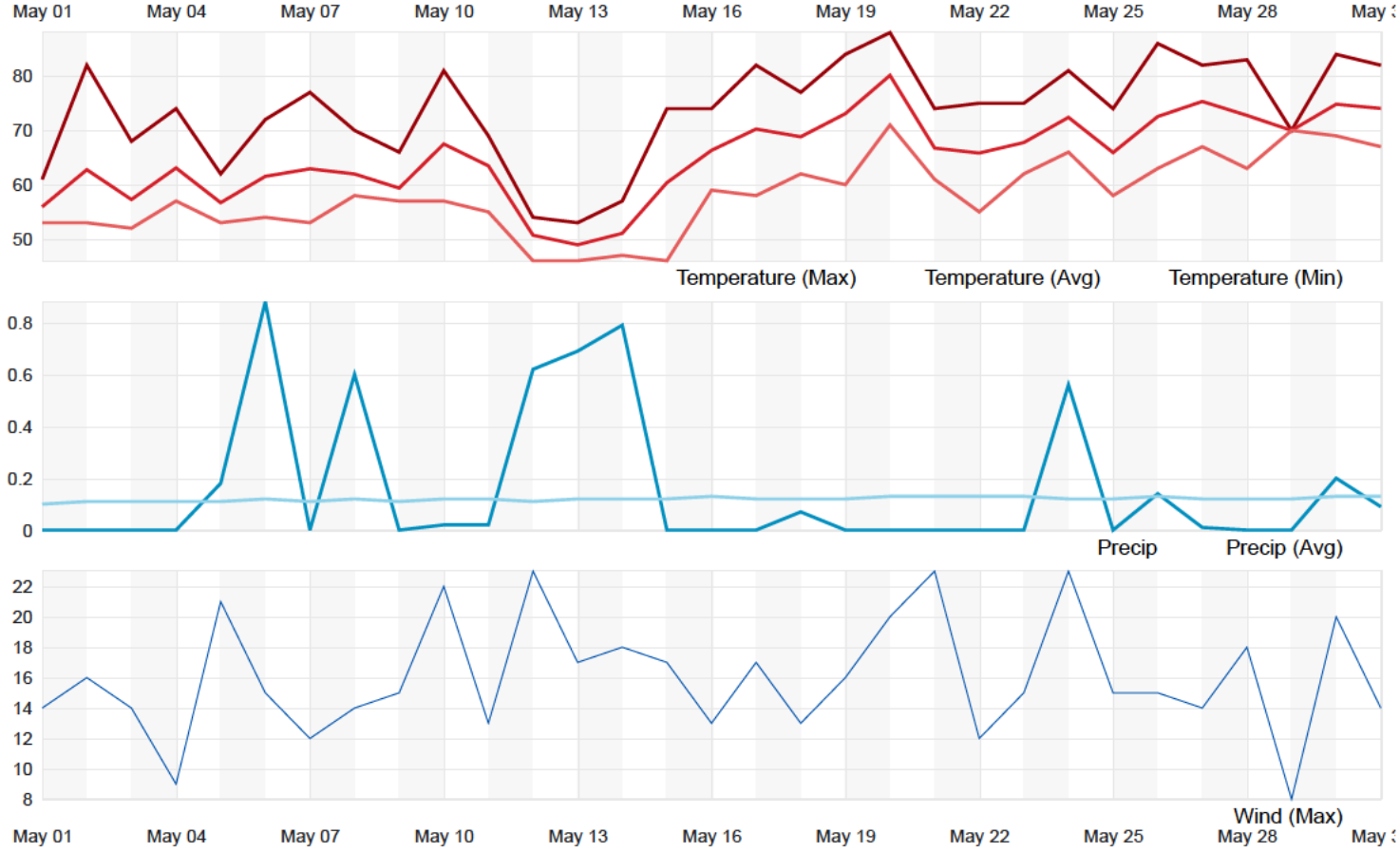
51° PHILADELPHIA INTERNATIONAL AIRPORT STATION (/WEATHER/US/PA/PHILADELPHIA/KPHL?CM_VEN=LOCALWX_PWSDASH) | CHANGE

HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)

- TODAY (/WEATHER/US/PA/PHILADELPHIA/KPHL)
- HOURLY (/HOURLY/US/PA/PHILADELPHIA/KPHL)
- 10-DAY (/FORECAST/US/PA/PHILADELPHIA/KPHL)
- CALENDAR (/CALENDAR/US/PA/PHILADELPHIA/KPHL)
- HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)
- WUNDERMAP (/WUNDERMAP?LAT=39.87&LON=-75.24)

Daily (/history/daily/us/pa/philadelphia/KPHL/date/2019-5-27)
Weekly (/history/weekly/us/pa/philadelphia/KPHL/date/2019-5-27)
Monthly
5-27)

May | 2019 | View



39.87 °N, 75.24 °W

Philadelphia, PA Weather History ★ ⌂

51° PHILADELPHIA INTERNATIONAL AIRPORT STATION (/WEATHER/US/PA/PHILADELPHIA/KPHL?CM_VEN=LOCALWX_PWSDASH) | CHANGE

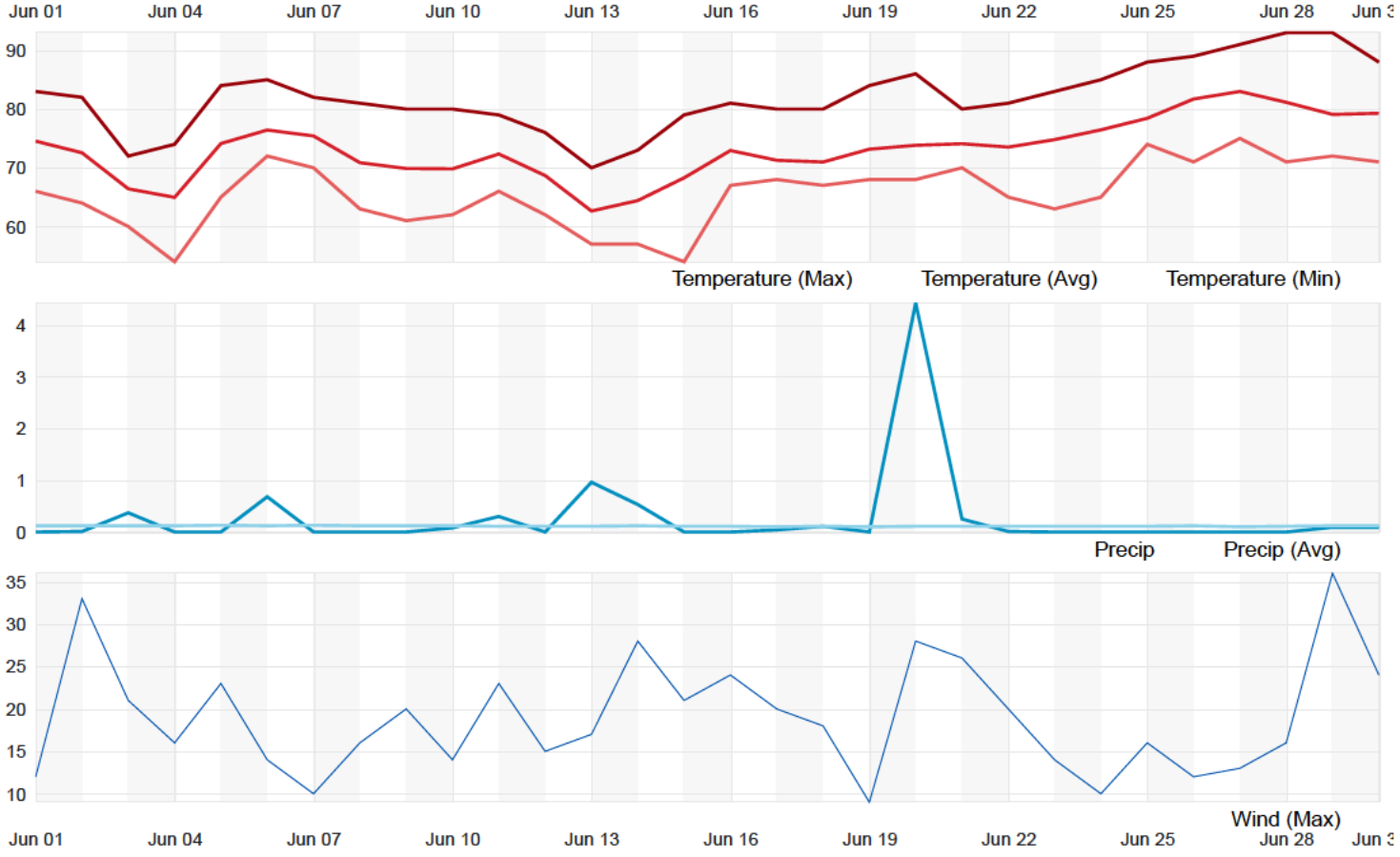
HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)

- TODAY (/WEATHER/US/PA/PHILADELPHIA/KPHL)
- HOURLY (/HOURLY/US/PA/PHILADELPHIA/KPHL)
- 10-DAY (/FORECAST/US/PA/PHILADELPHIA/KPHL)
- CALENDAR (/CALENDAR/US/PA/PHILADELPHIA/KPHL)
- HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)
- WUNDERMAP (/WUNDERMAP?LAT=39.87&LON=-75.24)

Daily Weekly Monthly

(/history/daily/us/pa/philadelphia/KPHL/date/2019-6-27) (/history/weekly/us/pa/philadelphia/KPHL/date/2019-6-27) 6-27)

June 2019 View



39.87 °N, 75.24 °W

Philadelphia, PA Weather History ★ 🏠

50° PHILADELPHIA INTERNATIONAL AIRPORT STATION (/WEATHER/US/PA/PHILADELPHIA/KPHL?CM_VEN=LOCALWX_PWSDASH) | CHANGE

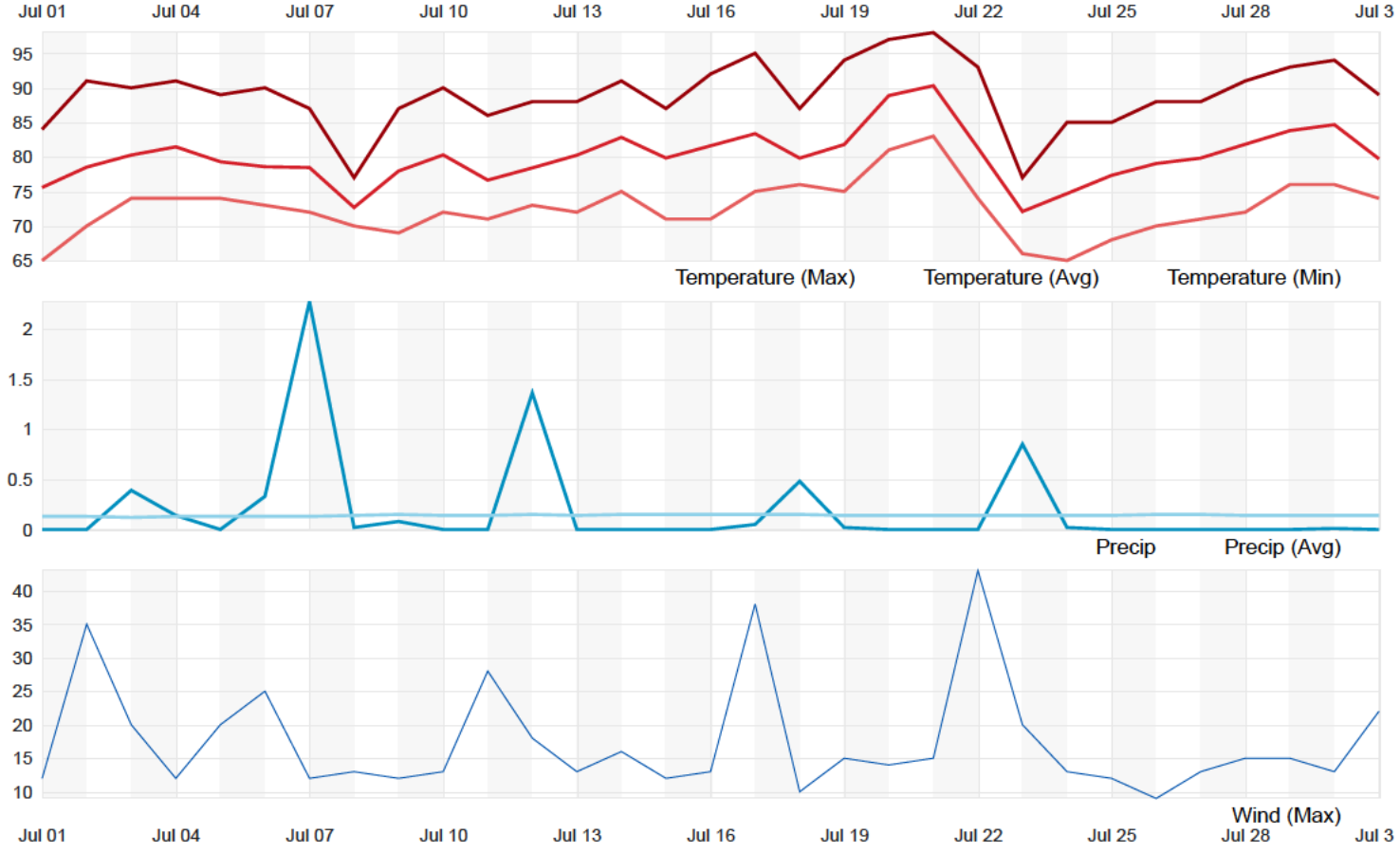
HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)

- TODAY (/WEATHER/US/PA/PHILADELPHIA/KPHL)
- HOURLY (/HOURLY/US/PA/PHILADELPHIA/KPHL)
- 10-DAY (/FORECAST/US/PA/PHILADELPHIA/KPHL)
- CALENDAR (/CALENDAR/US/PA/PHILADELPHIA/KPHL)
- HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)
- WUNDERMAP (/WUNDERMAP?LAT=39.87&LON=-75.24)

Daily | Weekly | Monthly

(/history/daily/us/pa/philadelphia/KPHL/date/2019-7-27) (/history/weekly/us/pa/philadelphia/KPHL/date/2019-7-27) 7-27)

July | 2019 | View



39.87 °N, 75.24 °W

Philadelphia, PA Weather History

51° PHILADELPHIA INTERNATIONAL AIRPORT STATION (/WEATHER/US/PA/PHILADELPHIA/KPHL?CM_VEN=LOCALWX_PWSDASH) | CHANGE

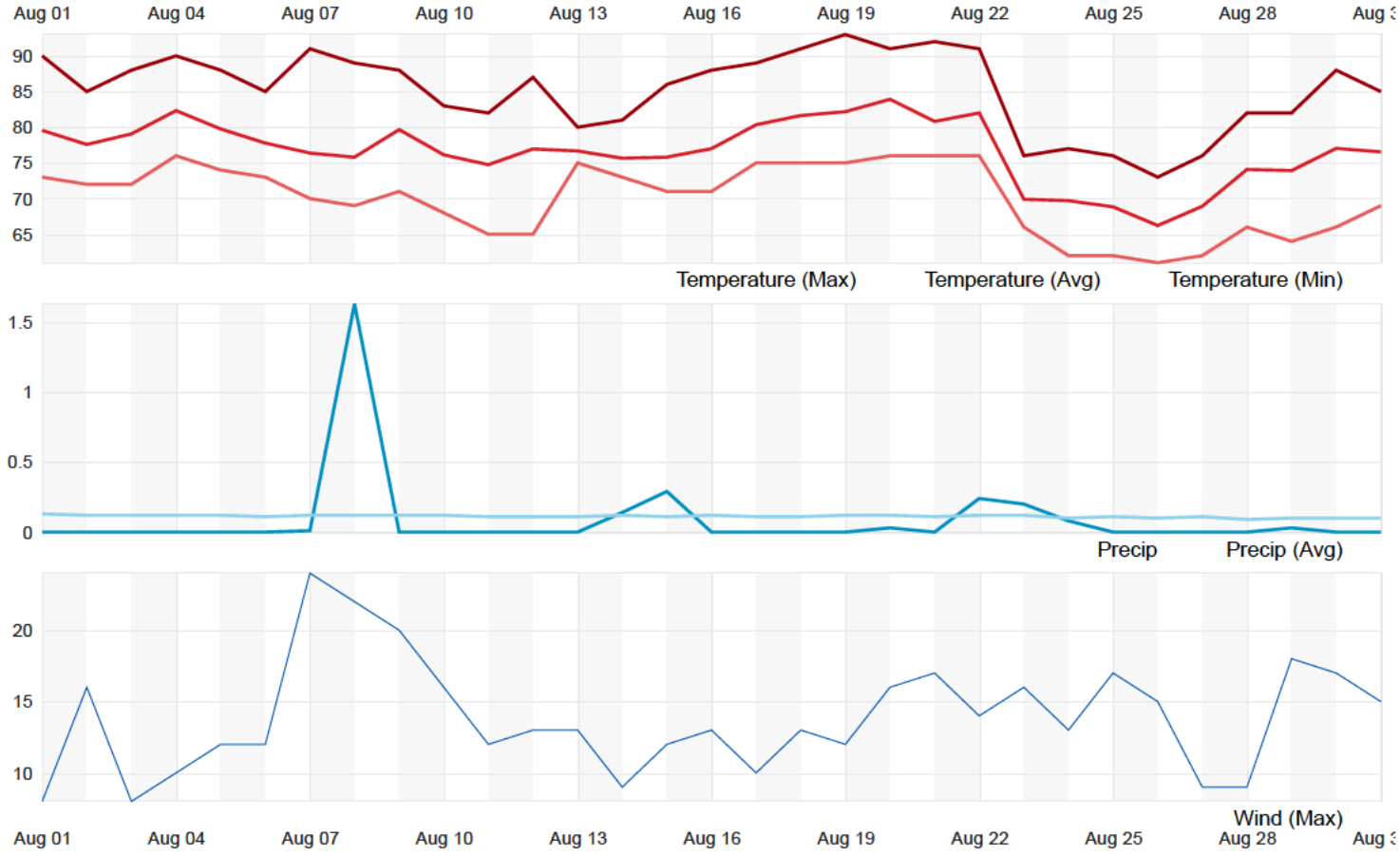
HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)

- TODAY (/WEATHER/US/PA/PHILADELPHIA/KPHL)
- HOURLY (/HOURLY/US/PA/PHILADELPHIA/KPHL)
- 10-DAY (/FORECAST/US/PA/PHILADELPHIA/KPHL)
- CALENDAR (/CALENDAR/US/PA/PHILADELPHIA/KPHL)
- HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)
- WUNDERMAP (/WUNDERMAP?LAT=39.87&LON=-75.24)

Daily | Weekly | Monthly

(/history/daily/us/pa/philadelphia/KPHL/date/2019-8-27) (/history/weekly/us/pa/philadelphia/KPHL/date/2019-8-27) 8-27)

August | 2019 | View



39.87 °N, 75.24 °W

Philadelphia, PA Weather History ★ 🏠

51° PHILADELPHIA INTERNATIONAL AIRPORT STATION (/WEATHER/US/PA/PHILADELPHIA/KPHL?CM_VEN=LOCALWX_PWSDASH) | CHANGE

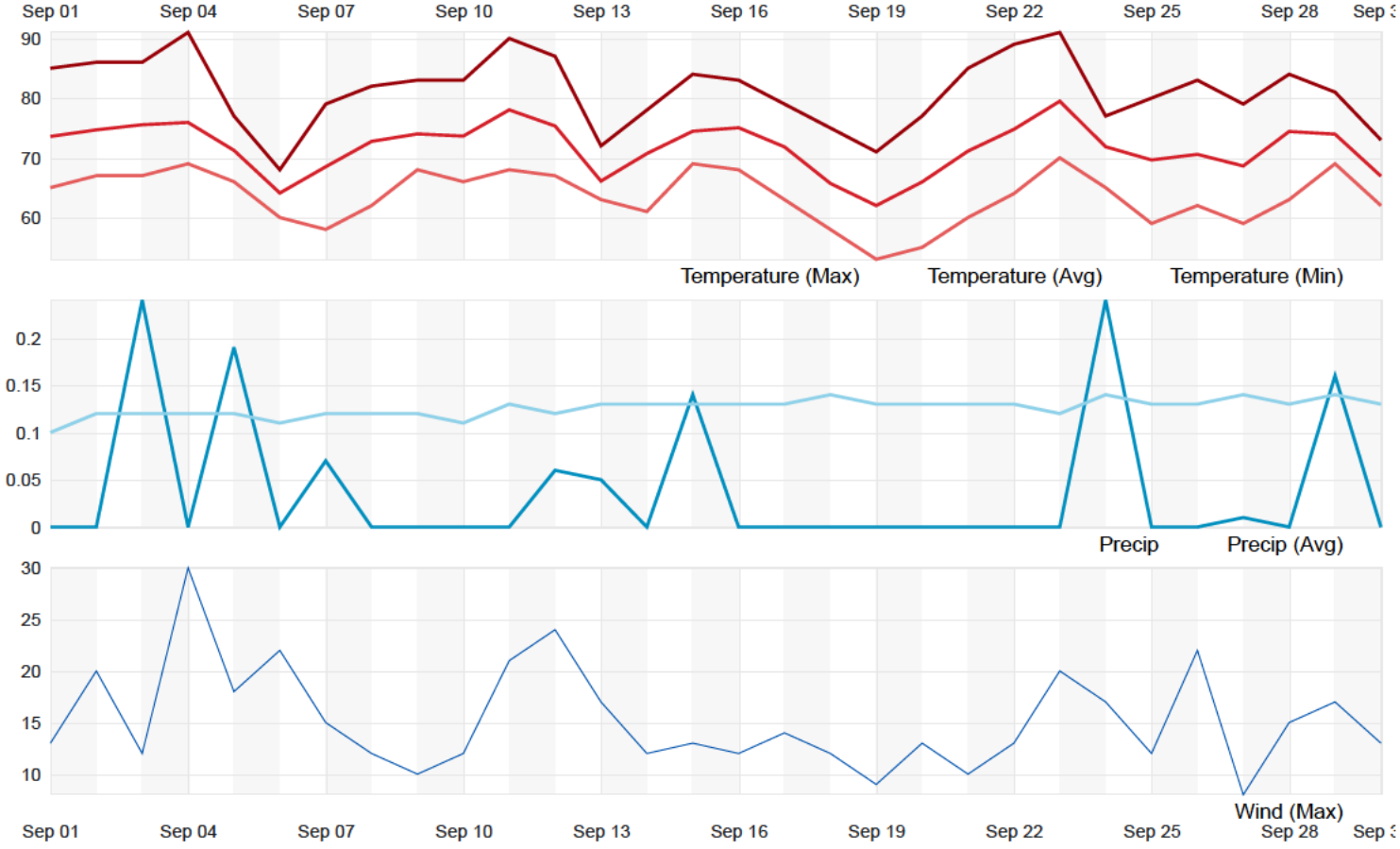
HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)

- TODAY (/WEATHER/US/PA/PHILADELPHIA/KPHL)
- HOURLY (/HOURLY/US/PA/PHILADELPHIA/KPHL)
- 10-DAY (/FORECAST/US/PA/PHILADELPHIA/KPHL)
- CALENDAR (/CALENDAR/US/PA/PHILADELPHIA/KPHL)
- HISTORY (/HISTORY/DAILY/US/PA/PHILADELPHIA/KPHL)
- WUNDERMAP (/WUNDERMAP?LAT=39.87&LON=-75.24)

Daily | Weekly | Monthly

(/history/daily/us/pa/philadelphia/KPHL/date/2019-9-27) (/history/weekly/us/pa/philadelphia/KPHL/date/2019-9-27) 9-27)

September | 2019 | View



APPENDIX H – TO 15 Lab Reports

APPENDIX I – Groundwater Lab Reports

eurofins | Air Toxics

4/9/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1903692A

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 3/27/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

[redacted]

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1903692A

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	03/27/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	04/09/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-032619	TO-15	2.0 "Hg	5 psi
02A	TOX-100-IN-032619	TO-15	3.5 "Hg	5 psi
03A	COMBINED-INFLUENT-032619	TO-15	4.0 "Hg	5 psi
04A	Lab Blank	TO-15	NA	NA
05A	CCV	TO-15	NA	NA
06A	LCS	TO-15	NA	NA
06AA	LCSD	TO-15	NA	NA

CERTIFIED BY: [redacted] DATE: 04/09/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8 , LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
EPA Method TO-15
PARS Environmental
Workorder# 1903692A

Three 6 Liter Summa Canister samples were received on March 27, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The TVOC (Total Volatile Organic Compounds) concentration was calculated by taking the total area counts in the sample and quantitating the area based on the response factor of TVOC ref. to Heptane.

Dilution was performed on samples TOX-100-IN-032619 and COMBINED-INFLUENT-032619 due to the presence of high level target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: TOX-100-OUT-032619

Lab ID#: 1903692A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TVOC ref. to Heptane	14	24	59	98

Client Sample ID: TOX-100-IN-032619

Lab ID#: 1903692A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	150	31000	530	110000
Cyclohexane	150	23000	520	78000
Benzene	150	3600	480	12000
Heptane	150	18000	620	76000
Ethyl Benzene	150	720	660	3100
m,p-Xylene	150	1200	660	5300
4-Ethyltoluene	150	280	740	1400
1,3,5-Trimethylbenzene	150	190	740	930
1,2,4-Trimethylbenzene	150	280	740	1400
TVOC ref. to Heptane	3000	690000	12000	2800000

Client Sample ID: COMBINED-INFLUENT-032619

Lab ID#: 1903692A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	480	88000	1700	310000
Cyclohexane	480	60000	1700	210000
Benzene	480	8800	1500	28000
Heptane	480	38000	2000	160000
m,p-Xylene	480	660	2100	2800
TVOC ref. to Heptane	9600	1400000	39000	5700000

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Client Sample ID: TOX-100-OUT-032619

Lab ID#: 1903692A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040811**	**Date of Collection:**	**3/26/19 10:15:00 AM**
Dil. Factor:	**1.44**	**Date of Analysis:**	**4/8/19 04:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.72	Not Detected	3.6	Not Detected
Freon 114	0.72	Not Detected	5.0	Not Detected
Chloromethane	7.2	Not Detected	15	Not Detected
Vinyl Chloride	0.72	Not Detected	1.8	Not Detected
1,3-Butadiene	0.72	Not Detected	1.6	Not Detected
Bromomethane	7.2	Not Detected	28	Not Detected
Chloroethane	2.9	Not Detected	7.6	Not Detected
Freon 11	0.72	Not Detected	4.0	Not Detected
Ethanol	2.9	Not Detected	5.4	Not Detected
Freon 113	0.72	Not Detected	5.5	Not Detected
1,1-Dichloroethene	0.72	Not Detected	2.8	Not Detected
Acetone	7.2	Not Detected	17	Not Detected
2-Propanol	2.9	Not Detected	7.1	Not Detected
Carbon Disulfide	2.9	Not Detected	9.0	Not Detected
3-Chloropropene	2.9	Not Detected	9.0	Not Detected
Methylene Chloride	7.2	Not Detected	25	Not Detected
Methyl tert-butyl ether	2.9	Not Detected	10	Not Detected
trans-1,2-Dichloroethene	0.72	Not Detected	2.8	Not Detected
Hexane	0.72	Not Detected	2.5	Not Detected
1,1-Dichloroethane	0.72	Not Detected	2.9	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.9	Not Detected	8.5	Not Detected
cis-1,2-Dichloroethene	0.72	Not Detected	2.8	Not Detected
Tetrahydrofuran	0.72	Not Detected	2.1	Not Detected
Chloroform	0.72	Not Detected	3.5	Not Detected
1,1,1-Trichloroethane	0.72	Not Detected	3.9	Not Detected
Cyclohexane	0.72	Not Detected	2.5	Not Detected
Carbon Tetrachloride	0.72	Not Detected	4.5	Not Detected
2,2,4-Trimethylpentane	0.72	Not Detected	3.4	Not Detected
Benzene	0.72	Not Detected	2.3	Not Detected
1,2-Dichloroethane	0.72	Not Detected	2.9	Not Detected
Heptane	0.72	Not Detected	3.0	Not Detected
Trichloroethene	0.72	Not Detected	3.9	Not Detected
1,2-Dichloropropane	0.72	Not Detected	3.3	Not Detected
1,4-Dioxane	2.9	Not Detected	10	Not Detected
Bromodichloromethane	0.72	Not Detected	4.8	Not Detected
cis-1,3-Dichloropropene	0.72	Not Detected	3.3	Not Detected
4-Methyl-2-pentanone	0.72	Not Detected	2.9	Not Detected
Toluene	0.72	Not Detected	2.7	Not Detected
trans-1,3-Dichloropropene	0.72	Not Detected	3.3	Not Detected
1,1,2-Trichloroethane	0.72	Not Detected	3.9	Not Detected
Tetrachloroethene	0.72	Not Detected	4.9	Not Detected
2-Hexanone	2.9	Not Detected	12	Not Detected

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Client Sample ID: TOX-100-OUT-032619

Lab ID#: 1903692A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040811**	**Date of Collection:**	**3/26/19 10:15:00 AM**
Dil. Factor:	**1.44**	**Date of Analysis:**	**4/8/19 04:11 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.72	Not Detected	6.1	Not Detected
1,2-Dibromoethane (EDB)	0.72	Not Detected	5.5	Not Detected
Chlorobenzene	0.72	Not Detected	3.3	Not Detected
Ethyl Benzene	0.72	Not Detected	3.1	Not Detected
m,p-Xylene	0.72	Not Detected	3.1	Not Detected
o-Xylene	0.72	Not Detected	3.1	Not Detected
Styrene	0.72	Not Detected	3.1	Not Detected
Bromoform	0.72	Not Detected	7.4	Not Detected
Cumene	0.72	Not Detected	3.5	Not Detected
1,1,2,2-Tetrachloroethane	0.72	Not Detected	4.9	Not Detected
Propylbenzene	0.72	Not Detected	3.5	Not Detected
4-Ethyltoluene	0.72	Not Detected	3.5	Not Detected
1,3,5-Trimethylbenzene	0.72	Not Detected	3.5	Not Detected
1,2,4-Trimethylbenzene	0.72	Not Detected	3.5	Not Detected
1,3-Dichlorobenzene	0.72	Not Detected	4.3	Not Detected
1,4-Dichlorobenzene	0.72	Not Detected	4.3	Not Detected
alpha-Chlorotoluene	0.72	Not Detected	3.7	Not Detected
1,2-Dichlorobenzene	0.72	Not Detected	4.3	Not Detected
1,2,4-Trichlorobenzene	2.9	Not Detected	21	Not Detected
Hexachlorobutadiene	2.9	Not Detected	31	Not Detected
Naphthalene	2.9	Not Detected	15	Not Detected
TVOC ref. to Heptane	14	24	59	98

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	124	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: TOX-100-IN-032619

Lab ID#: 1903692A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040812**	**Date of Collection:**	**3/26/19 10:50:00 AM**
Dil. Factor:	**303**	**Date of Analysis:**	**4/8/19 04:34 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	150	Not Detected	750	Not Detected
Freon 114	150	Not Detected	1000	Not Detected
Chloromethane	1500	Not Detected	3100	Not Detected
Vinyl Chloride	150	Not Detected	390	Not Detected
1,3-Butadiene	150	Not Detected	340	Not Detected
Bromomethane	1500	Not Detected	5900	Not Detected
Chloroethane	610	Not Detected	1600	Not Detected
Freon 11	150	Not Detected	850	Not Detected
Ethanol	610	Not Detected	1100	Not Detected
Freon 113	150	Not Detected	1200	Not Detected
1,1-Dichloroethene	150	Not Detected	600	Not Detected
Acetone	1500	Not Detected	3600	Not Detected
2-Propanol	610	Not Detected	1500	Not Detected
Carbon Disulfide	610	Not Detected	1900	Not Detected
3-Chloropropene	610	Not Detected	1900	Not Detected
Methylene Chloride	1500	Not Detected	5300	Not Detected
Methyl tert-butyl ether	610	Not Detected	2200	Not Detected
trans-1,2-Dichloroethene	150	Not Detected	600	Not Detected
Hexane	150	31000	530	110000
1,1-Dichloroethane	150	Not Detected	610	Not Detected
2-Butanone (Methyl Ethyl Ketone)	610	Not Detected	1800	Not Detected
cis-1,2-Dichloroethene	150	Not Detected	600	Not Detected
Tetrahydrofuran	150	Not Detected	450	Not Detected
Chloroform	150	Not Detected	740	Not Detected
1,1,1-Trichloroethane	150	Not Detected	830	Not Detected
Cyclohexane	150	23000	520	78000
Carbon Tetrachloride	150	Not Detected	950	Not Detected
2,2,4-Trimethylpentane	150	Not Detected	710	Not Detected
Benzene	150	3600	480	12000
1,2-Dichloroethane	150	Not Detected	610	Not Detected
Heptane	150	18000	620	76000
Trichloroethene	150	Not Detected	810	Not Detected
1,2-Dichloropropane	150	Not Detected	700	Not Detected
1,4-Dioxane	610	Not Detected	2200	Not Detected
Bromodichloromethane	150	Not Detected	1000	Not Detected
cis-1,3-Dichloropropene	150	Not Detected	690	Not Detected
4-Methyl-2-pentanone	150	Not Detected	620	Not Detected
Toluene	150	Not Detected	570	Not Detected
trans-1,3-Dichloropropene	150	Not Detected	690	Not Detected
1,1,2-Trichloroethane	150	Not Detected	830	Not Detected
Tetrachloroethene	150	Not Detected	1000	Not Detected
2-Hexanone	610	Not Detected	2500	Not Detected

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Client Sample ID: TOX-100-IN-032619

Lab ID#: 1903692A-02A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040812**	**Date of Collection:**	**3/26/19 10:50:00 AM**
Dil. Factor:	**303**	**Date of Analysis:**	**4/8/19 04:34 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	150	Not Detected	1300	Not Detected
1,2-Dibromoethane (EDB)	150	Not Detected	1200	Not Detected
Chlorobenzene	150	Not Detected	700	Not Detected
Ethyl Benzene	150	720	660	3100
m,p-Xylene	150	1200	660	5300
o-Xylene	150	Not Detected	660	Not Detected
Styrene	150	Not Detected	640	Not Detected
Bromoform	150	Not Detected	1600	Not Detected
Cumene	150	Not Detected	740	Not Detected
1,1,2,2-Tetrachloroethane	150	Not Detected	1000	Not Detected
Propylbenzene	150	Not Detected	740	Not Detected
4-Ethyltoluene	150	280	740	1400
1,3,5-Trimethylbenzene	150	190	740	930
1,2,4-Trimethylbenzene	150	280	740	1400
1,3-Dichlorobenzene	150	Not Detected	910	Not Detected
1,4-Dichlorobenzene	150	Not Detected	910	Not Detected
alpha-Chlorotoluene	150	Not Detected	780	Not Detected
1,2-Dichlorobenzene	150	Not Detected	910	Not Detected
1,2,4-Trichlorobenzene	610	Not Detected	4500	Not Detected
Hexachlorobutadiene	610	Not Detected	6500	Not Detected
Naphthalene	610	Not Detected	3200	Not Detected
TVOC ref. to Heptane	3000	690000	12000	2800000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	120	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: COMBINED-INFLUENT-032619

Lab ID#: 1903692A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040813**	**Date of Collection:**	**3/26/19 11:25:00 AM**
Dil. Factor:	**965**	**Date of Analysis:**	**4/8/19 04:57 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	480	Not Detected	2400	Not Detected
Freon 114	480	Not Detected	3400	Not Detected
Chloromethane	4800	Not Detected	10000	Not Detected
Vinyl Chloride	480	Not Detected	1200	Not Detected
1,3-Butadiene	480	Not Detected	1100	Not Detected
Bromomethane	4800	Not Detected	19000	Not Detected
Chloroethane	1900	Not Detected	5100	Not Detected
Freon 11	480	Not Detected	2700	Not Detected
Ethanol	1900	Not Detected	3600	Not Detected
Freon 113	480	Not Detected	3700	Not Detected
1,1-Dichloroethene	480	Not Detected	1900	Not Detected
Acetone	4800	Not Detected	11000	Not Detected
2-Propanol	1900	Not Detected	4700	Not Detected
Carbon Disulfide	1900	Not Detected	6000	Not Detected
3-Chloropropene	1900	Not Detected	6000	Not Detected
Methylene Chloride	4800	Not Detected	17000	Not Detected
Methyl tert-butyl ether	1900	Not Detected	7000	Not Detected
trans-1,2-Dichloroethene	480	Not Detected	1900	Not Detected
Hexane	480	88000	1700	310000
1,1-Dichloroethane	480	Not Detected	2000	Not Detected
2-Butanone (Methyl Ethyl Ketone)	1900	Not Detected	5700	Not Detected
cis-1,2-Dichloroethene	480	Not Detected	1900	Not Detected
Tetrahydrofuran	480	Not Detected	1400	Not Detected
Chloroform	480	Not Detected	2400	Not Detected
1,1,1-Trichloroethane	480	Not Detected	2600	Not Detected
Cyclohexane	480	60000	1700	210000
Carbon Tetrachloride	480	Not Detected	3000	Not Detected
2,2,4-Trimethylpentane	480	Not Detected	2200	Not Detected
Benzene	480	8800	1500	28000
1,2-Dichloroethane	480	Not Detected	2000	Not Detected
Heptane	480	38000	2000	160000
Trichloroethene	480	Not Detected	2600	Not Detected
1,2-Dichloropropane	480	Not Detected	2200	Not Detected
1,4-Dioxane	1900	Not Detected	7000	Not Detected
Bromodichloromethane	480	Not Detected	3200	Not Detected
cis-1,3-Dichloropropene	480	Not Detected	2200	Not Detected
4-Methyl-2-pentanone	480	Not Detected	2000	Not Detected
Toluene	480	Not Detected	1800	Not Detected
trans-1,3-Dichloropropene	480	Not Detected	2200	Not Detected
1,1,2-Trichloroethane	480	Not Detected	2600	Not Detected
Tetrachloroethene	480	Not Detected	3300	Not Detected
2-Hexanone	1900	Not Detected	7900	Not Detected

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Client Sample ID: COMBINED-INFLUENT-032619

Lab ID#: 1903692A-03A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040813**	**Date of Collection:**	**3/26/19 11:25:00 AM**
Dil. Factor:	**965**	**Date of Analysis:**	**4/8/19 04:57 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	480	Not Detected	4100	Not Detected
1,2-Dibromoethane (EDB)	480	Not Detected	3700	Not Detected
Chlorobenzene	480	Not Detected	2200	Not Detected
Ethyl Benzene	480	Not Detected	2100	Not Detected
m,p-Xylene	480	660	2100	2800
o-Xylene	480	Not Detected	2100	Not Detected
Styrene	480	Not Detected	2000	Not Detected
Bromoform	480	Not Detected	5000	Not Detected
Cumene	480	Not Detected	2400	Not Detected
1,1,2,2-Tetrachloroethane	480	Not Detected	3300	Not Detected
Propylbenzene	480	Not Detected	2400	Not Detected
4-Ethyltoluene	480	Not Detected	2400	Not Detected
1,3,5-Trimethylbenzene	480	Not Detected	2400	Not Detected
1,2,4-Trimethylbenzene	480	Not Detected	2400	Not Detected
1,3-Dichlorobenzene	480	Not Detected	2900	Not Detected
1,4-Dichlorobenzene	480	Not Detected	2900	Not Detected
alpha-Chlorotoluene	480	Not Detected	2500	Not Detected
1,2-Dichlorobenzene	480	Not Detected	2900	Not Detected
1,2,4-Trichlorobenzene	1900	Not Detected	14000	Not Detected
Hexachlorobutadiene	1900	Not Detected	20000	Not Detected
Naphthalene	1900	Not Detected	10000	Not Detected
TVOC ref. to Heptane	9600	1400000	39000	5700000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	120	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1903692A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 10:14 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1903692A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040805**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 10:14 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected
TVOC ref. to Heptane	10	Not Detected	41	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: CCV

Lab ID#: 1903692A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040802**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 08:58 AM**

Compound	%Recovery
Freon 12	117
Freon 114	112
Chloromethane	102
Vinyl Chloride	100
1,3-Butadiene	91
Bromomethane	101
Chloroethane	99
Freon 11	122
Ethanol	95
Freon 113	109
1,1-Dichloroethene	106
Acetone	94
2-Propanol	96
Carbon Disulfide	101
3-Chloropropene	107
Methylene Chloride	100
Methyl tert-butyl ether	109
trans-1,2-Dichloroethene	104
Hexane	96
1,1-Dichloroethane	104
2-Butanone (Methyl Ethyl Ketone)	94
cis-1,2-Dichloroethene	102
Tetrahydrofuran	91
Chloroform	110
1,1,1-Trichloroethane	116
Cyclohexane	96
Carbon Tetrachloride	122
2,2,4-Trimethylpentane	91
Benzene	97
1,2-Dichloroethane	119
Heptane	94
Trichloroethene	102
1,2-Dichloropropane	89
1,4-Dioxane	86
Bromodichloromethane	115
cis-1,3-Dichloropropene	102
4-Methyl-2-pentanone	82
Toluene	96
trans-1,3-Dichloropropene	110
1,1,2-Trichloroethane	99
Tetrachloroethene	110
2-Hexanone	83

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Client Sample ID: CCV

Lab ID#: 1903692A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040802**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 08:58 AM**	

Compound	%Recovery
Dibromochloromethane	115
1,2-Dibromoethane (EDB)	104
Chlorobenzene	101
Ethyl Benzene	103
m,p-Xylene	101
o-Xylene	104
Styrene	103
Bromoform	121
Cumene	106
1,1,2,2-Tetrachloroethane	95
Propylbenzene	104
4-Ethyltoluene	110
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	111
1,3-Dichlorobenzene	110
1,4-Dichlorobenzene	108
alpha-Chlorotoluene	119
1,2-Dichlorobenzene	108
1,2,4-Trichlorobenzene	122
Hexachlorobutadiene	140 Q
Naphthalene	94
TVOC ref. to Heptane	100

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	111	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: LCS

Lab ID#: 1903692A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 09:22 AM**	

Compound	%Recovery	Method Limits
Freon 12	119	70-130
Freon 114	118	70-130
Chloromethane	104	70-130
Vinyl Chloride	102	70-130
1,3-Butadiene	91	70-130
Bromomethane	102	70-130
Chloroethane	102	70-130
Freon 11	122	70-130
Ethanol	92	70-130
Freon 113	108	70-130
1,1-Dichloroethene	106	70-130
Acetone	91	70-130
2-Propanol	100	70-130
Carbon Disulfide	88	70-130
3-Chloropropene	94	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	108	70-130
trans-1,2-Dichloroethene	90	70-130
Hexane	96	70-130
1,1-Dichloroethane	102	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	114	70-130
Tetrahydrofuran	89	70-130
Chloroform	110	70-130
1,1,1-Trichloroethane	112	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	116	70-130
2,2,4-Trimethylpentane	88	70-130
Benzene	100	70-130
1,2-Dichloroethane	123	70-130
Heptane	100	70-130
Trichloroethene	107	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	90	70-130
Bromodichloromethane	119	70-130
cis-1,3-Dichloropropene	101	70-130
4-Methyl-2-pentanone	83	70-130
Toluene	97	70-130
trans-1,3-Dichloropropene	109	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	112	70-130
2-Hexanone	86	70-130

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Client Sample ID: LCS

Lab ID#: 1903692A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040803**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 09:22 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	117	70-130
1,2-Dibromoethane (EDB)	106	70-130
Chlorobenzene	101	70-130
Ethyl Benzene	104	70-130
m,p-Xylene	102	70-130
o-Xylene	106	70-130
Styrene	104	70-130
Bromoform	122	70-130
Cumene	106	70-130
1,1,2,2-Tetrachloroethane	96	70-130
Propylbenzene	106	70-130
4-Ethyltoluene	111	70-130
1,3,5-Trimethylbenzene	109	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	110	70-130
1,4-Dichlorobenzene	108	70-130
alpha-Chlorotoluene	120	70-130
1,2-Dichlorobenzene	106	70-130
1,2,4-Trichlorobenzene	111	70-130
Hexachlorobutadiene	134 Q	70-130
Naphthalene	81	70-130
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	97	70-130
1,2-Dichloroethane-d4	110	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCSD

Lab ID#: 1903692A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 09:47 AM**	

Compound	%Recovery	Method Limits
Freon 12	121	70-130
Freon 114	118	70-130
Chloromethane	101	70-130
Vinyl Chloride	105	70-130
1,3-Butadiene	92	70-130
Bromomethane	108	70-130
Chloroethane	103	70-130
Freon 11	126	70-130
Ethanol	94	70-130
Freon 113	110	70-130
1,1-Dichloroethene	112	70-130
Acetone	98	70-130
2-Propanol	102	70-130
Carbon Disulfide	91	70-130
3-Chloropropene	98	70-130
Methylene Chloride	102	70-130
Methyl tert-butyl ether	110	70-130
trans-1,2-Dichloroethene	92	70-130
Hexane	98	70-130
1,1-Dichloroethane	105	70-130
2-Butanone (Methyl Ethyl Ketone)	94	70-130
cis-1,2-Dichloroethene	117	70-130
Tetrahydrofuran	88	70-130
Chloroform	112	70-130
1,1,1-Trichloroethane	116	70-130
Cyclohexane	98	70-130
Carbon Tetrachloride	120	70-130
2,2,4-Trimethylpentane	92	70-130
Benzene	99	70-130
1,2-Dichloroethane	125	70-130
Heptane	99	70-130
Trichloroethene	107	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	91	70-130
Bromodichloromethane	118	70-130
cis-1,3-Dichloropropene	100	70-130
4-Methyl-2-pentanone	87	70-130
Toluene	98	70-130
trans-1,3-Dichloropropene	110	70-130
1,1,2-Trichloroethane	101	70-130
Tetrachloroethene	111	70-130
2-Hexanone	86	70-130

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Client Sample ID: LCSD

Lab ID#: 1903692A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**3040804**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/8/19 09:47 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	116	70-130
1,2-Dibromoethane (EDB)	103	70-130
Chlorobenzene	101	70-130
Ethyl Benzene	102	70-130
m,p-Xylene	102	70-130
o-Xylene	108	70-130
Styrene	104	70-130
Bromoform	122	70-130
Cumene	105	70-130
1,1,2,2-Tetrachloroethane	95	70-130
Propylbenzene	104	70-130
4-Ethyltoluene	110	70-130
1,3,5-Trimethylbenzene	106	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	109	70-130
1,4-Dichlorobenzene	109	70-130
alpha-Chlorotoluene	120	70-130
1,2-Dichlorobenzene	107	70-130
1,2,4-Trichlorobenzene	112	70-130
Hexachlorobutadiene	133 Q	70-130
Naphthalene	79	70-130
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	108	70-130

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4/9/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1903692B

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 3/27/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

[redacted]

Project Manager

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WORK ORDER #: 1903692B

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	03/27/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	04/09/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-032619	Modified ASTM D-1946	2.0 "Hg	5 psi
02A	TOX-100-IN-032619	Modified ASTM D-1946	3.5 "Hg	5 psi
03A	COMBINED-INFLUENT-032619	Modified ASTM D-1946	4.0 "Hg	5 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: [redacted] DATE: 04/09/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
PARS Environmental
Workorder# 1903692B

Three 6 Liter Summa Canister samples were received on March 27, 2019. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane in air using GC/FID. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: TOX-100-OUT-032619

Lab ID#: 1903692B-01A

No Detections Were Found.

Client Sample ID: TOX-100-IN-032619

Lab ID#: 1903692B-02A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00015	0.36

Client Sample ID: COMBINED-INFLUENT-032619

Lab ID#: 1903692B-03A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	1.2

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Client Sample ID: TOX-100-OUT-032619

Lab ID#: 1903692B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10032914**	**Date of Collection: 3/26/19 10:15:00 AM**	
Dil. Factor:	**1.44**	**Date of Analysis: 3/29/19 07:30 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00014	Not Detected

Container Type: 6 Liter Summa Canister

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Client Sample ID: TOX-100-IN-032619

Lab ID#: 1903692B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10032915**	**Date of Collection: 3/26/19 10:50:00 AM**	
Dil. Factor:	**1.52**	**Date of Analysis: 3/29/19 07:53 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00015	0.36

Container Type: 6 Liter Summa Canister

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Client Sample ID: COMBINED-INFLUENT-032619

Lab ID#: 1903692B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10032916**	**Date of Collection:**	**3/26/19 11:25:00 AM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**3/29/19 08:15 PM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	1.2

Container Type: 6 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1903692B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10032903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/29/19 02:31 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1903692B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10032902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/29/19 01:42 PM**	

Compound	%Recovery	Method Limits
Methane	102	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1903692B-05AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10032924**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 3/30/19 08:55 AM**	

Compound	%Recovery	Method Limits
Methane	103	85-115

Container Type: NA - Not Applicable

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4/30/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1904389A

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 4/17/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1904389A

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	04/17/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	04/30/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	COMBINED-INFLUENT-041619	TO-15	4.0 "Hg	5 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: [redacted] DATE: 04/30/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8 , LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
EPA Method TO-15
PARS Environmental
Workorder# 1904389A

One 6 Liter Summa Canister sample was received on April 17, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A time was not provided by the field sampler.

Analytical Notes

The TVOC (Total Volatile Organic Compounds) concentration was calculated by taking the total area counts in the sample and quantitating the area based on the response factor of TVOC ref. to Heptane.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page. Target compound non-detects in the samples that are associated with high bias in QC analyses have not been flagged.

Dilution was performed on sample COMBINED-INFLUENT-041619 due to the presence of high level target species.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: COMBINED-INFLUENT-041619

Lab ID#: 1904389A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	190	74000	680	260000
Cyclohexane	190	62000	670	210000
2,2,4-Trimethylpentane	190	21000	910	100000
Benzene	190	7800	620	25000
Heptane	190	32000	800	130000
Ethyl Benzene	190	600	840	2600
m,p-Xylene	190	870	840	3800
TVOC ref. to Heptane	3900	1300000	16000	5300000

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Client Sample ID: COMBINED-INFLUENT-041619

Lab ID#: 1904389A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14042919**	**Date of Collection:**	**4/16/19 12:30:00 PM**
Dil. Factor:	**38.8**	**Date of Analysis:**	**4/29/19 10:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	190	Not Detected	960	Not Detected
Freon 114	190	Not Detected	1400	Not Detected
Chloromethane	780	Not Detected	1600	Not Detected
Vinyl Chloride	190	Not Detected	500	Not Detected
1,3-Butadiene	190	Not Detected	430	Not Detected
Bromomethane	780	Not Detected	3000	Not Detected
Chloroethane	780	Not Detected	2000	Not Detected
Freon 11	190	Not Detected	1100	Not Detected
Ethanol	780	Not Detected	1500	Not Detected
Freon 113	190	Not Detected	1500	Not Detected
1,1-Dichloroethene	190	Not Detected	770	Not Detected
Acetone	780	Not Detected	1800	Not Detected
2-Propanol	780	Not Detected	1900	Not Detected
Carbon Disulfide	780	Not Detected	2400	Not Detected
3-Chloropropene	780	Not Detected	2400	Not Detected
Methylene Chloride	780	Not Detected	2700	Not Detected
Methyl tert-butyl ether	190	Not Detected	700	Not Detected
trans-1,2-Dichloroethene	190	Not Detected	770	Not Detected
Hexane	190	74000	680	260000
1,1-Dichloroethane	190	Not Detected	780	Not Detected
2-Butanone (Methyl Ethyl Ketone)	780	Not Detected	2300	Not Detected
cis-1,2-Dichloroethene	190	Not Detected	770	Not Detected
Tetrahydrofuran	190	Not Detected	570	Not Detected
Chloroform	190	Not Detected	950	Not Detected
1,1,1-Trichloroethane	190	Not Detected	1000	Not Detected
Cyclohexane	190	62000	670	210000
Carbon Tetrachloride	190	Not Detected	1200	Not Detected
2,2,4-Trimethylpentane	190	21000	910	100000
Benzene	190	7800	620	25000
1,2-Dichloroethane	190	Not Detected	780	Not Detected
Heptane	190	32000	800	130000
Trichloroethene	190	Not Detected	1000	Not Detected
1,2-Dichloropropane	190	Not Detected	900	Not Detected
1,4-Dioxane	780	Not Detected	2800	Not Detected
Bromodichloromethane	190	Not Detected	1300	Not Detected
cis-1,3-Dichloropropene	190	Not Detected	880	Not Detected
4-Methyl-2-pentanone	190	Not Detected	790	Not Detected
Toluene	190	Not Detected	730	Not Detected
trans-1,3-Dichloropropene	190	Not Detected	880	Not Detected
1,1,2-Trichloroethane	190	Not Detected	1000	Not Detected
Tetrachloroethene	190	Not Detected	1300	Not Detected
2-Hexanone	780	Not Detected	3200	Not Detected

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Client Sample ID: COMBINED-INFLUENT-041619

Lab ID#: 1904389A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14042919**	**Date of Collection:**	**4/16/19 12:30:00 PM**
Dil. Factor:	**38.8**	**Date of Analysis:**	**4/29/19 10:22 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	190	Not Detected	1600	Not Detected
1,2-Dibromoethane (EDB)	190	Not Detected	1500	Not Detected
Chlorobenzene	190	Not Detected	890	Not Detected
Ethyl Benzene	190	600	840	2600
m,p-Xylene	190	870	840	3800
o-Xylene	190	Not Detected	840	Not Detected
Styrene	190	Not Detected	830	Not Detected
Bromoform	190	Not Detected	2000	Not Detected
Cumene	190	Not Detected	950	Not Detected
1,1,2,2-Tetrachloroethane	190	Not Detected	1300	Not Detected
Propylbenzene	190	Not Detected	950	Not Detected
4-Ethyltoluene	190	Not Detected	950	Not Detected
1,3,5-Trimethylbenzene	190	Not Detected	950	Not Detected
1,2,4-Trimethylbenzene	190	Not Detected	950	Not Detected
1,3-Dichlorobenzene	190	Not Detected	1200	Not Detected
1,4-Dichlorobenzene	190	Not Detected	1200	Not Detected
alpha-Chlorotoluene	190	Not Detected	1000	Not Detected
1,2-Dichlorobenzene	190	Not Detected	1200	Not Detected
1,2,4-Trichlorobenzene	780	Not Detected	5800	Not Detected
Hexachlorobutadiene	780	Not Detected	8300	Not Detected
Naphthalene	780	Not Detected	4100	Not Detected
TVOC ref. to Heptane	3900	1300000	16000	5300000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	110	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904389A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14042908**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 10:59 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	20	Not Detected	78	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	20	Not Detected	69	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1904389A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14042908**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 10:59 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected
TVOC ref. to Heptane	100	Not Detected	410	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1904389A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14042903**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 07:45 AM**

Compound	%Recovery
Freon 12	97
Freon 114	99
Chloromethane	98
Vinyl Chloride	97
1,3-Butadiene	91
Bromomethane	88
Chloroethane	108
Freon 11	99
Ethanol	105
Freon 113	100
1,1-Dichloroethene	100
Acetone	97
2-Propanol	96
Carbon Disulfide	99
3-Chloropropene	112
Methylene Chloride	94
Methyl tert-butyl ether	101
trans-1,2-Dichloroethene	101
Hexane	101
1,1-Dichloroethane	100
2-Butanone (Methyl Ethyl Ketone)	103
cis-1,2-Dichloroethene	101
Tetrahydrofuran	97
Chloroform	96
1,1,1-Trichloroethane	97
Cyclohexane	103
Carbon Tetrachloride	95
2,2,4-Trimethylpentane	101
Benzene	94
1,2-Dichloroethane	88
Heptane	98
Trichloroethene	93
1,2-Dichloropropane	95
1,4-Dioxane	100
Bromodichloromethane	90
cis-1,3-Dichloropropene	96
4-Methyl-2-pentanone	101
Toluene	94
trans-1,3-Dichloropropene	96
1,1,2-Trichloroethane	97
Tetrachloroethene	96
2-Hexanone	97

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Client Sample ID: CCV

Lab ID#: 1904389A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14042903**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 07:45 AM**	

Compound	%Recovery
Dibromochloromethane	95
1,2-Dibromoethane (EDB)	96
Chlorobenzene	93
Ethyl Benzene	94
m,p-Xylene	95
o-Xylene	96
Styrene	101
Bromoform	95
Cumene	99
1,1,2,2-Tetrachloroethane	95
Propylbenzene	96
4-Ethyltoluene	98
1,3,5-Trimethylbenzene	101
1,2,4-Trimethylbenzene	92
1,3-Dichlorobenzene	96
1,4-Dichlorobenzene	98
alpha-Chlorotoluene	96
1,2-Dichlorobenzene	97
1,2,4-Trichlorobenzene	104
Hexachlorobutadiene	111
Naphthalene	114
TVOC ref. to Heptane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1904389A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14042904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 08:26 AM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Freon 114	107	70-130
Chloromethane	97	70-130
Vinyl Chloride	105	70-130
1,3-Butadiene	94	70-130
Bromomethane	113	70-130
Chloroethane	116	70-130
Freon 11	102	70-130
Ethanol	120	70-130
Freon 113	104	70-130
1,1-Dichloroethene	100	70-130
Acetone	102	70-130
2-Propanol	99	70-130
Carbon Disulfide	90	70-130
3-Chloropropene	106	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	101	70-130
trans-1,2-Dichloroethene	86	70-130
Hexane	100	70-130
1,1-Dichloroethane	102	70-130
2-Butanone (Methyl Ethyl Ketone)	105	70-130
cis-1,2-Dichloroethene	110	70-130
Tetrahydrofuran	97	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	103	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	99	70-130
Benzene	99	70-130
1,2-Dichloroethane	91	70-130
Heptane	97	70-130
Trichloroethene	95	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	106	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	93	70-130
4-Methyl-2-pentanone	108	70-130
Toluene	95	70-130
trans-1,3-Dichloropropene	100	70-130
1,1,2-Trichloroethane	97	70-130
Tetrachloroethene	98	70-130
2-Hexanone	113	70-130

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Client Sample ID: LCS

Lab ID#: 1904389A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14042904**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 08:26 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	97	70-130
1,2-Dibromoethane (EDB)	99	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	96	70-130
m,p-Xylene	93	70-130
o-Xylene	98	70-130
Styrene	98	70-130
Bromoform	99	70-130
Cumene	100	70-130
1,1,2,2-Tetrachloroethane	104	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	101	70-130
1,3,5-Trimethylbenzene	102	70-130
1,2,4-Trimethylbenzene	97	70-130
1,3-Dichlorobenzene	103	70-130
1,4-Dichlorobenzene	102	70-130
alpha-Chlorotoluene	115	70-130
1,2-Dichlorobenzene	105	70-130
1,2,4-Trichlorobenzene	148 Q	70-130
Hexachlorobutadiene	128	70-130
Naphthalene	121	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	92	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCSD

Lab ID#: 1904389A-04AA

EPA METHOD TO-15 GC/MS

File Name:	**14042905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 08:58 AM**	

Compound	%Recovery	Method Limits
Freon 12	103	70-130
Freon 114	104	70-130
Chloromethane	102	70-130
Vinyl Chloride	102	70-130
1,3-Butadiene	91	70-130
Bromomethane	116	70-130
Chloroethane	117	70-130
Freon 11	102	70-130
Ethanol	109	70-130
Freon 113	103	70-130
1,1-Dichloroethene	98	70-130
Acetone	100	70-130
2-Propanol	101	70-130
Carbon Disulfide	89	70-130
3-Chloropropene	104	70-130
Methylene Chloride	94	70-130
Methyl tert-butyl ether	101	70-130
trans-1,2-Dichloroethene	89	70-130
Hexane	101	70-130
1,1-Dichloroethane	99	70-130
2-Butanone (Methyl Ethyl Ketone)	103	70-130
cis-1,2-Dichloroethene	110	70-130
Tetrahydrofuran	97	70-130
Chloroform	98	70-130
1,1,1-Trichloroethane	97	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	97	70-130
2,2,4-Trimethylpentane	98	70-130
Benzene	97	70-130
1,2-Dichloroethane	90	70-130
Heptane	99	70-130
Trichloroethene	96	70-130
1,2-Dichloropropane	98	70-130
1,4-Dioxane	116	70-130
Bromodichloromethane	95	70-130
cis-1,3-Dichloropropene	93	70-130
4-Methyl-2-pentanone	107	70-130
Toluene	95	70-130
trans-1,3-Dichloropropene	100	70-130
1,1,2-Trichloroethane	100	70-130
Tetrachloroethene	99	70-130
2-Hexanone	120	70-130

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Client Sample ID: LCSD

Lab ID#: 1904389A-04AA

EPA METHOD TO-15 GC/MS

File Name:	**14042905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 08:58 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	98	70-130
1,2-Dibromoethane (EDB)	98	70-130
Chlorobenzene	97	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	94	70-130
o-Xylene	98	70-130
Styrene	103	70-130
Bromoform	102	70-130
Cumene	101	70-130
1,1,2,2-Tetrachloroethane	103	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	102	70-130
1,3,5-Trimethylbenzene	104	70-130
1,2,4-Trimethylbenzene	101	70-130
1,3-Dichlorobenzene	106	70-130
1,4-Dichlorobenzene	105	70-130
alpha-Chlorotoluene	119	70-130
1,2-Dichlorobenzene	109	70-130
1,2,4-Trichlorobenzene	152 Q	70-130
Hexachlorobutadiene	129	70-130
Naphthalene	133	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	102	70-130

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4/30/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1904389B

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 4/17/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

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WORK ORDER #: 1904389B

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	04/17/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	04/30/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	COMBINED-INFLUENT-041619	Modified ASTM D-1946	4.0 "Hg	5 psi
02A	Lab Blank	Modified ASTM D-1946	NA	NA
03A	LCS	Modified ASTM D-1946	NA	NA
03AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: [redacted] DATE: 04/30/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
PARS Environmental
Workorder# 1904389B

One 6 Liter Summa Canister sample was received on April 17, 2019. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane in air using GC/FID. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

The Chain of Custody (COC) was not relinquished properly. A time was not provided by the field sampler.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: COMBINED-INFLUENT-041619

Lab ID#: 1904389B-01A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	1.0

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Client Sample ID: COMBINED-INFLUENT-041619

Lab ID#: 1904389B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042024**	**Date of Collection:**	**4/16/19 12:30:00 PM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**4/20/19 11:16 AM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	1.0

Container Type: 6 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1904389B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042005**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/19/19 03:36 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1904389B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042003**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/19/19 02:36 PM**	

Compound	%Recovery	Method Limits
Methane	101	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1904389B-03AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042026**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/20/19 12:16 PM**	

Compound	%Recovery	Method Limits
Methane	102	85-115

Container Type: NA - Not Applicable

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5/8/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1904584A

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 4/25/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1904584A

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75 603 005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	04/25/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	05/08/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-042419	TO-15	4.7 "Hg	5.4 psi
02A	TOX-100-IN-042419	TO-15	4.3 "Hg	5.1 psi
03A	COMBINED-INFLUENT-042419	TO-15	4.3 "Hg	5.4 psi
04A	Lab Blank	TO-15	NA	NA
04B	Lab Blank	TO-15	NA	NA
05A	CCV	TO-15	NA	NA
05B	CCV	TO-15	NA	NA
06A	LCS	TO-15	NA	NA
06AA	LCSD	TO-15	NA	NA
06B	LCS	TO-15	NA	NA
06BB	LCSD	TO-15	NA	NA

CERTIFIED BY: [redacted] DATE: 05/08/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
EPA Method TO-15
PARS Environmental
Workorder# 1904584A

Three Client Canister samples were received on April 25, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The TVOC (Total Volatile Organic Compounds) concentration was calculated by taking the total area counts in the sample and quantitating the area based on the response factor of Heptane.

Dilution was performed on samples TOX-100-IN-042419 and COMBINED-INFLUENT-042419 due to the presence of high level target species.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

The recovery of surrogate 1,2-Dichloroethane-d4 in samples TOX-100-IN-042419 and COMBINED-INFLUENT-042419 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: TOX-100-OUT-042419

Lab ID#: 1904584A-01A

No Detections Were Found.

Client Sample ID: TOX-100-IN-042419

Lab ID#: 1904584A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	39	30000	140	100000
Cyclohexane	39	28000	140	95000
2,2,4-Trimethylpentane	39	9400	180	44000
Benzene	39	2800	120	9000
Heptane	39	14000 E	160	58000 E
Toluene	39	92	150	350
Ethyl Benzene	39	740	170	3200
m,p-Xylene	39	1400	170	6300
o-Xylene	39	120	170	500
Cumene	39	130	190	620
Propylbenzene	39	140	190	670
4-Ethyltoluene	39	410	190	2000
1,3,5-Trimethylbenzene	39	310	190	1500
1,2,4-Trimethylbenzene	39	510	190	2500
TVOC ref. to Heptane	780	460000	3200	1900000

Client Sample ID: COMBINED-INFLUENT-042419

Lab ID#: 1904584A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	80	66000	280	230000
Cyclohexane	80	58000	280	200000
2,2,4-Trimethylpentane	80	19000	370	90000
Benzene	80	6300	260	20000
Heptane	80	30000 E	330	120000 E
Toluene	80	170	300	640
Ethyl Benzene	80	680	350	2900
m,p-Xylene	80	1100	350	4800

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: COMBINED-INFLUENT-042419

Lab ID#: 1904584A-03A

4-Ethyltoluene	80	110	390	530
1,2,4-Trimethylbenzene	80	91	390	450
TVOC ref. to Heptane	1600	970000	6500	4000000

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Client Sample ID: TOX-100-OUT-042419

Lab ID#: 1904584A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050225**	**Date of Collection:**	**4/24/19 12:20:00 PM**
Dil. Factor:	**1.62**	**Date of Analysis:**	**5/3/19 12:52 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.81	Not Detected	4.0	Not Detected
Freon 114	0.81	Not Detected	5.7	Not Detected
Chloromethane	8.1	Not Detected	17	Not Detected
Vinyl Chloride	0.81	Not Detected	2.1	Not Detected
1,3-Butadiene	0.81	Not Detected	1.8	Not Detected
Bromomethane	8.1	Not Detected	31	Not Detected
Chloroethane	3.2	Not Detected	8.5	Not Detected
Freon 11	0.81	Not Detected	4.6	Not Detected
Ethanol	3.2	Not Detected	6.1	Not Detected
Freon 113	0.81	Not Detected	6.2	Not Detected
1,1-Dichloroethene	0.81	Not Detected	3.2	Not Detected
Acetone	8.1	Not Detected	19	Not Detected
2-Propanol	3.2	Not Detected	8.0	Not Detected
Carbon Disulfide	3.2	Not Detected	10	Not Detected
3-Chloropropene	3.2	Not Detected	10	Not Detected
Methylene Chloride	8.1	Not Detected	28	Not Detected
Methyl tert-butyl ether	3.2	Not Detected	12	Not Detected
trans-1,2-Dichloroethene	0.81	Not Detected	3.2	Not Detected
Hexane	0.81	Not Detected	2.8	Not Detected
1,1-Dichloroethane	0.81	Not Detected	3.3	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.2	Not Detected	9.6	Not Detected
cis-1,2-Dichloroethene	0.81	Not Detected	3.2	Not Detected
Tetrahydrofuran	0.81	Not Detected	2.4	Not Detected
Chloroform	0.81	Not Detected	4.0	Not Detected
1,1,1-Trichloroethane	0.81	Not Detected	4.4	Not Detected
Cyclohexane	0.81	Not Detected	2.8	Not Detected
Carbon Tetrachloride	0.81	Not Detected	5.1	Not Detected
2,2,4-Trimethylpentane	0.81	Not Detected	3.8	Not Detected
Benzene	0.81	Not Detected	2.6	Not Detected
1,2-Dichloroethane	0.81	Not Detected	3.3	Not Detected
Heptane	0.81	Not Detected	3.3	Not Detected
Trichloroethene	0.81	Not Detected	4.4	Not Detected
1,2-Dichloropropane	0.81	Not Detected	3.7	Not Detected
1,4-Dioxane	3.2	Not Detected	12	Not Detected
Bromodichloromethane	0.81	Not Detected	5.4	Not Detected
cis-1,3-Dichloropropene	0.81	Not Detected	3.7	Not Detected
4-Methyl-2-pentanone	0.81	Not Detected	3.3	Not Detected
Toluene	0.81	Not Detected	3.0	Not Detected
trans-1,3-Dichloropropene	0.81	Not Detected	3.7	Not Detected
1,1,2-Trichloroethane	0.81	Not Detected	4.4	Not Detected
Tetrachloroethene	0.81	Not Detected	5.5	Not Detected
2-Hexanone	3.2	Not Detected	13	Not Detected

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Client Sample ID: TOX-100-OUT-042419

Lab ID#: 1904584A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050225**	**Date of Collection:**	**4/24/19 12:20:00 PM**
Dil. Factor:	**1.62**	**Date of Analysis:**	**5/3/19 12:52 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.81	Not Detected	6.9	Not Detected
1,2-Dibromoethane (EDB)	0.81	Not Detected	6.2	Not Detected
Chlorobenzene	0.81	Not Detected	3.7	Not Detected
Ethyl Benzene	0.81	Not Detected	3.5	Not Detected
m,p-Xylene	0.81	Not Detected	3.5	Not Detected
o-Xylene	0.81	Not Detected	3.5	Not Detected
Styrene	0.81	Not Detected	3.4	Not Detected
Bromoform	0.81	Not Detected	8.4	Not Detected
Cumene	0.81	Not Detected	4.0	Not Detected
1,1,2,2-Tetrachloroethane	0.81	Not Detected	5.6	Not Detected
Propylbenzene	0.81	Not Detected	4.0	Not Detected
4-Ethyltoluene	0.81	Not Detected	4.0	Not Detected
1,3,5-Trimethylbenzene	0.81	Not Detected	4.0	Not Detected
1,2,4-Trimethylbenzene	0.81	Not Detected	4.0	Not Detected
1,3-Dichlorobenzene	0.81	Not Detected	4.9	Not Detected
1,4-Dichlorobenzene	0.81	Not Detected	4.9	Not Detected
alpha-Chlorotoluene	0.81	Not Detected	4.2	Not Detected
1,2-Dichlorobenzene	0.81	Not Detected	4.9	Not Detected
1,2,4-Trichlorobenzene	3.2	Not Detected	24	Not Detected
Hexachlorobutadiene	3.2	Not Detected	34	Not Detected
Naphthalene	3.2	Not Detected	17	Not Detected
TVOC ref. to Heptane	16	Not Detected	66	Not Detected

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	92	70-130
1,2-Dichloroethane-d4	88	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: TOX-100-IN-042419

Lab ID#: 1904584A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14050613**	**Date of Collection:**	**4/24/19 12:30:00 PM**
Dil. Factor:	**7.85**	**Date of Analysis:**	**5/6/19 05:07 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	39	Not Detected	190	Not Detected
Freon 114	39	Not Detected	270	Not Detected
Chloromethane	160	Not Detected	320	Not Detected
Vinyl Chloride	39	Not Detected	100	Not Detected
1,3-Butadiene	39	Not Detected	87	Not Detected
Bromomethane	160	Not Detected	610	Not Detected
Chloroethane	160	Not Detected	410	Not Detected
Freon 11	39	Not Detected	220	Not Detected
Ethanol	160	Not Detected	300	Not Detected
Freon 113	39	Not Detected	300	Not Detected
1,1-Dichloroethene	39	Not Detected	160	Not Detected
Acetone	160	Not Detected	370	Not Detected
2-Propanol	160	Not Detected	380	Not Detected
Carbon Disulfide	160	Not Detected	490	Not Detected
3-Chloropropene	160	Not Detected	490	Not Detected
Methylene Chloride	160	Not Detected	540	Not Detected
Methyl tert-butyl ether	39	Not Detected	140	Not Detected
trans-1,2-Dichloroethene	39	Not Detected	160	Not Detected
Hexane	39	30000	140	100000
1,1-Dichloroethane	39	Not Detected	160	Not Detected
2-Butanone (Methyl Ethyl Ketone)	160	Not Detected	460	Not Detected
cis-1,2-Dichloroethene	39	Not Detected	160	Not Detected
Tetrahydrofuran	39	Not Detected	120	Not Detected
Chloroform	39	Not Detected	190	Not Detected
1,1,1-Trichloroethane	39	Not Detected	210	Not Detected
Cyclohexane	39	28000	140	95000
Carbon Tetrachloride	39	Not Detected	250	Not Detected
2,2,4-Trimethylpentane	39	9400	180	44000
Benzene	39	2800	120	9000
1,2-Dichloroethane	39	Not Detected	160	Not Detected
Heptane	39	14000 E	160	58000 E
Trichloroethene	39	Not Detected	210	Not Detected
1,2-Dichloropropane	39	Not Detected	180	Not Detected
1,4-Dioxane	160	Not Detected	560	Not Detected
Bromodichloromethane	39	Not Detected	260	Not Detected
cis-1,3-Dichloropropene	39	Not Detected	180	Not Detected
4-Methyl-2-pentanone	39	Not Detected	160	Not Detected
Toluene	39	92	150	350
trans-1,3-Dichloropropene	39	Not Detected	180	Not Detected
1,1,2-Trichloroethane	39	Not Detected	210	Not Detected
Tetrachloroethene	39	Not Detected	270	Not Detected
2-Hexanone	160	Not Detected	640	Not Detected

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Client Sample ID: TOX-100-IN-042419

Lab ID#: 1904584A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14050613**	**Date of Collection:**	**4/24/19 12:30:00 PM**
Dil. Factor:	**7.85**	**Date of Analysis:**	**5/6/19 05:07 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	39	Not Detected	330	Not Detected
1,2-Dibromoethane (EDB)	39	Not Detected	300	Not Detected
Chlorobenzene	39	Not Detected	180	Not Detected
Ethyl Benzene	39	740	170	3200
m,p-Xylene	39	1400	170	6300
o-Xylene	39	120	170	500
Styrene	39	Not Detected	170	Not Detected
Bromoform	39	Not Detected	400	Not Detected
Cumene	39	130	190	620
1,1,2,2-Tetrachloroethane	39	Not Detected	270	Not Detected
Propylbenzene	39	140	190	670
4-Ethyltoluene	39	410	190	2000
1,3,5-Trimethylbenzene	39	310	190	1500
1,2,4-Trimethylbenzene	39	510	190	2500
1,3-Dichlorobenzene	39	Not Detected	240	Not Detected
1,4-Dichlorobenzene	39	Not Detected	240	Not Detected
alpha-Chlorotoluene	39	Not Detected	200	Not Detected
1,2-Dichlorobenzene	39	Not Detected	240	Not Detected
1,2,4-Trichlorobenzene	160	Not Detected	1200	Not Detected
Hexachlorobutadiene	160	Not Detected	1700	Not Detected
Naphthalene	160	Not Detected	820	Not Detected
TVOC ref. to Heptane	780	460000	3200	1900000

E = Exceeds instrument calibration range.
Q = Exceeds Quality Control limits.

Container Type: Client Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	144 Q	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: COMBINED-INFLUENT-042419

Lab ID#: 1904584A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14050629**	**Date of Collection:**	**4/24/19 12:45:00 PM**
Dil. Factor:	**16.0**	**Date of Analysis:**	**5/7/19 08:46 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	80	Not Detected	400	Not Detected
Freon 114	80	Not Detected	560	Not Detected
Chloromethane	320	Not Detected	660	Not Detected
Vinyl Chloride	80	Not Detected	200	Not Detected
1,3-Butadiene	80	Not Detected	180	Not Detected
Bromomethane	320	Not Detected	1200	Not Detected
Chloroethane	320	Not Detected	840	Not Detected
Freon 11	80	Not Detected	450	Not Detected
Ethanol	320	Not Detected	600	Not Detected
Freon 113	80	Not Detected	610	Not Detected
1,1-Dichloroethene	80	Not Detected	320	Not Detected
Acetone	320	Not Detected	760	Not Detected
2-Propanol	320	Not Detected	790	Not Detected
Carbon Disulfide	320	Not Detected	1000	Not Detected
3-Chloropropene	320	Not Detected	1000	Not Detected
Methylene Chloride	320	Not Detected	1100	Not Detected
Methyl tert-butyl ether	80	Not Detected	290	Not Detected
trans-1,2-Dichloroethene	80	Not Detected	320	Not Detected
Hexane	80	66000	280	230000
1,1-Dichloroethane	80	Not Detected	320	Not Detected
2-Butanone (Methyl Ethyl Ketone)	320	Not Detected	940	Not Detected
cis-1,2-Dichloroethene	80	Not Detected	320	Not Detected
Tetrahydrofuran	80	Not Detected	240	Not Detected
Chloroform	80	Not Detected	390	Not Detected
1,1,1-Trichloroethane	80	Not Detected	440	Not Detected
Cyclohexane	80	58000	280	200000
Carbon Tetrachloride	80	Not Detected	500	Not Detected
2,2,4-Trimethylpentane	80	19000	370	90000
Benzene	80	6300	260	20000
1,2-Dichloroethane	80	Not Detected	320	Not Detected
Heptane	80	30000 E	330	120000 E
Trichloroethene	80	Not Detected	430	Not Detected
1,2-Dichloropropane	80	Not Detected	370	Not Detected
1,4-Dioxane	320	Not Detected	1200	Not Detected
Bromodichloromethane	80	Not Detected	540	Not Detected
cis-1,3-Dichloropropene	80	Not Detected	360	Not Detected
4-Methyl-2-pentanone	80	Not Detected	330	Not Detected
Toluene	80	170	300	640
trans-1,3-Dichloropropene	80	Not Detected	360	Not Detected
1,1,2-Trichloroethane	80	Not Detected	440	Not Detected
Tetrachloroethene	80	Not Detected	540	Not Detected
2-Hexanone	320	Not Detected	1300	Not Detected

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Client Sample ID: COMBINED-INFLUENT-042419

Lab ID#: 1904584A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14050629**	**Date of Collection:**	**4/24/19 12:45:00 PM**
Dil. Factor:	**16.0**	**Date of Analysis:**	**5/7/19 08:46 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	80	Not Detected	680	Not Detected
1,2-Dibromoethane (EDB)	80	Not Detected	610	Not Detected
Chlorobenzene	80	Not Detected	370	Not Detected
Ethyl Benzene	80	680	350	2900
m,p-Xylene	80	1100	350	4800
o-Xylene	80	Not Detected	350	Not Detected
Styrene	80	Not Detected	340	Not Detected
Bromoform	80	Not Detected	830	Not Detected
Cumene	80	Not Detected	390	Not Detected
1,1,2,2-Tetrachloroethane	80	Not Detected	550	Not Detected
Propylbenzene	80	Not Detected	390	Not Detected
4-Ethyltoluene	80	110	390	530
1,3,5-Trimethylbenzene	80	Not Detected	390	Not Detected
1,2,4-Trimethylbenzene	80	91	390	450
1,3-Dichlorobenzene	80	Not Detected	480	Not Detected
1,4-Dichlorobenzene	80	Not Detected	480	Not Detected
alpha-Chlorotoluene	80	Not Detected	410	Not Detected
1,2-Dichlorobenzene	80	Not Detected	480	Not Detected
1,2,4-Trichlorobenzene	320	Not Detected	2400	Not Detected
Hexachlorobutadiene	320	Not Detected	3400	Not Detected
Naphthalene	320	Not Detected	1700	Not Detected
TVOC ref. to Heptane	1600	970000	6500	4000000

E = Exceeds instrument calibration range.
Q = Exceeds Quality Control limits.
Container Type: Client Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	134 Q	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904584A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050205**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 12:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1904584A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050205**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 12:34 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected
TVOC ref. to Heptane	10	Not Detected	41	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	77	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1904584A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14050610**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 03:33 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	20	Not Detected	78	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	20	Not Detected	69	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1904584A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14050610**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 03:33 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected
TVOC ref. to Heptane	100	Not Detected	410	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	90	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: CCV

Lab ID#: 1904584A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050202**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 10:58 AM**

Compound	%Recovery
Freon 12	108
Freon 114	110
Chloromethane	97
Vinyl Chloride	101
1,3-Butadiene	94
Bromomethane	127
Chloroethane	114
Freon 11	120
Ethanol	95
Freon 113	116
1,1-Dichloroethene	116
Acetone	104
2-Propanol	96
Carbon Disulfide	110
3-Chloropropene	103
Methylene Chloride	103
Methyl tert-butyl ether	100
trans-1,2-Dichloroethene	108
Hexane	92
1,1-Dichloroethane	96
2-Butanone (Methyl Ethyl Ketone)	82
cis-1,2-Dichloroethene	87
Tetrahydrofuran	71
Chloroform	89
1,1,1-Trichloroethane	90
Cyclohexane	85
Carbon Tetrachloride	91
2,2,4-Trimethylpentane	74
Benzene	93
1,2-Dichloroethane	86
Heptane	84
Trichloroethene	92
1,2-Dichloropropane	82
1,4-Dioxane	93
Bromodichloromethane	95
cis-1,3-Dichloropropene	85
4-Methyl-2-pentanone	70
Toluene	92
trans-1,3-Dichloropropene	85
1,1,2-Trichloroethane	95
Tetrachloroethene	110
2-Hexanone	73

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Client Sample ID: CCV

Lab ID#: 1904584A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 10:58 AM**	

Compound	%Recovery
Dibromochloromethane	103
1,2-Dibromoethane (EDB)	96
Chlorobenzene	98
Ethyl Benzene	93
m,p-Xylene	92
o-Xylene	91
Styrene	90
Bromoform	107
Cumene	95
1,1,2,2-Tetrachloroethane	91
Propylbenzene	93
4-Ethyltoluene	101
1,3,5-Trimethylbenzene	91
1,2,4-Trimethylbenzene	96
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	97
alpha-Chlorotoluene	85
1,2-Dichlorobenzene	99
1,2,4-Trichlorobenzene	84
Hexachlorobutadiene	104
Naphthalene	70
TVOC ref. to Heptane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	79	70-130
4-Bromofluorobenzene	110	70-130

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Client Sample ID: CCV

Lab ID#: 1904584A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14050606**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 01:29 PM**

Compound	%Recovery
Freon 12	107
Freon 114	106
Chloromethane	104
Vinyl Chloride	100
1,3-Butadiene	100
Bromomethane	103
Chloroethane	103
Freon 11	104
Ethanol	107
Freon 113	108
1,1-Dichloroethene	103
Acetone	98
2-Propanol	96
Carbon Disulfide	107
3-Chloropropene	113
Methylene Chloride	96
Methyl tert-butyl ether	109
trans-1,2-Dichloroethene	109
Hexane	106
1,1-Dichloroethane	105
2-Butanone (Methyl Ethyl Ketone)	109
cis-1,2-Dichloroethene	103
Tetrahydrofuran	99
Chloroform	103
1,1,1-Trichloroethane	104
Cyclohexane	107
Carbon Tetrachloride	103
2,2,4-Trimethylpentane	103
Benzene	104
1,2-Dichloroethane	94
Heptane	101
Trichloroethene	102
1,2-Dichloropropane	103
1,4-Dioxane	100
Bromodichloromethane	97
cis-1,3-Dichloropropene	103
4-Methyl-2-pentanone	107
Toluene	101
trans-1,3-Dichloropropene	103
1,1,2-Trichloroethane	104
Tetrachloroethene	103
2-Hexanone	87

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Client Sample ID: CCV

Lab ID#: 1904584A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14050606**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 01:29 PM**	

Compound	%Recovery
Dibromochloromethane	102
1,2-Dibromoethane (EDB)	103
Chlorobenzene	102
Ethyl Benzene	100
m,p-Xylene	100
o-Xylene	100
Styrene	106
Bromoform	99
Cumene	104
1,1,2,2-Tetrachloroethane	100
Propylbenzene	101
4-Ethyltoluene	107
1,3,5-Trimethylbenzene	107
1,2,4-Trimethylbenzene	103
1,3-Dichlorobenzene	101
1,4-Dichlorobenzene	103
alpha-Chlorotoluene	86
1,2-Dichlorobenzene	101
1,2,4-Trichlorobenzene	111
Hexachlorobutadiene	118
Naphthalene	122
TVOC ref. to Heptane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	89	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: LCS

Lab ID#: 1904584A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 11:39 AM**	

Compound	%Recovery	Method Limits
Freon 12	112	70-130
Freon 114	114	70-130
Chloromethane	96	70-130
Vinyl Chloride	103	70-130
1,3-Butadiene	95	70-130
Bromomethane	126	70-130
Chloroethane	117	70-130
Freon 11	119	70-130
Ethanol	92	70-130
Freon 113	113	70-130
1,1-Dichloroethene	115	70-130
Acetone	100	70-130
2-Propanol	98	70-130
Carbon Disulfide	96	70-130
3-Chloropropene	97	70-130
Methylene Chloride	100	70-130
Methyl tert-butyl ether	99	70-130
trans-1,2-Dichloroethene	92	70-130
Hexane	90	70-130
1,1-Dichloroethane	92	70-130
2-Butanone (Methyl Ethyl Ketone)	82	70-130
cis-1,2-Dichloroethene	94	70-130
Tetrahydrofuran	69 Q	70-130
Chloroform	85	70-130
1,1,1-Trichloroethane	89	70-130
Cyclohexane	86	70-130
Carbon Tetrachloride	88	70-130
2,2,4-Trimethylpentane	72	70-130
Benzene	93	70-130
1,2-Dichloroethane	84	70-130
Heptane	83	70-130
Trichloroethene	90	70-130
1,2-Dichloropropane	81	70-130
1,4-Dioxane	88	70-130
Bromodichloromethane	96	70-130
cis-1,3-Dichloropropene	82	70-130
4-Methyl-2-pentanone	71	70-130
Toluene	92	70-130
trans-1,3-Dichloropropene	88	70-130
1,1,2-Trichloroethane	93	70-130
Tetrachloroethene	109	70-130
2-Hexanone	77	70-130

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Client Sample ID: LCS

Lab ID#: 1904584A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 11:39 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	103	70-130
1,2-Dibromoethane (EDB)	99	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	93	70-130
m,p-Xylene	93	70-130
o-Xylene	94	70-130
Styrene	94	70-130
Bromoform	110	70-130
Cumene	94	70-130
1,1,2,2-Tetrachloroethane	95	70-130
Propylbenzene	95	70-130
4-Ethyltoluene	97	70-130
1,3,5-Trimethylbenzene	92	70-130
1,2,4-Trimethylbenzene	94	70-130
1,3-Dichlorobenzene	110	70-130
1,4-Dichlorobenzene	109	70-130
alpha-Chlorotoluene	98	70-130
1,2-Dichlorobenzene	108	70-130
1,2,4-Trichlorobenzene	103	70-130
Hexachlorobutadiene	104	70-130
Naphthalene	83	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	95	70-130
1,2-Dichloroethane-d4	80	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: LCSD

Lab ID#: 1904584A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 12:06 PM**	

Compound	%Recovery	Method Limits
Freon 12	113	70-130
Freon 114	114	70-130
Chloromethane	96	70-130
Vinyl Chloride	102	70-130
1,3-Butadiene	93	70-130
Bromomethane	125	70-130
Chloroethane	116	70-130
Freon 11	119	70-130
Ethanol	90	70-130
Freon 113	111	70-130
1,1-Dichloroethene	112	70-130
Acetone	101	70-130
2-Propanol	98	70-130
Carbon Disulfide	95	70-130
3-Chloropropene	97	70-130
Methylene Chloride	101	70-130
Methyl tert-butyl ether	99	70-130
trans-1,2-Dichloroethene	93	70-130
Hexane	91	70-130
1,1-Dichloroethane	92	70-130
2-Butanone (Methyl Ethyl Ketone)	80	70-130
cis-1,2-Dichloroethene	94	70-130
Tetrahydrofuran	72	70-130
Chloroform	87	70-130
1,1,1-Trichloroethane	89	70-130
Cyclohexane	85	70-130
Carbon Tetrachloride	90	70-130
2,2,4-Trimethylpentane	72	70-130
Benzene	94	70-130
1,2-Dichloroethane	84	70-130
Heptane	87	70-130
Trichloroethene	91	70-130
1,2-Dichloropropane	82	70-130
1,4-Dioxane	90	70-130
Bromodichloromethane	94	70-130
cis-1,3-Dichloropropene	81	70-130
4-Methyl-2-pentanone	70	70-130
Toluene	92	70-130
trans-1,3-Dichloropropene	90	70-130
1,1,2-Trichloroethane	94	70-130
Tetrachloroethene	110	70-130
2-Hexanone	79	70-130

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Client Sample ID: LCSD

Lab ID#: 1904584A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17050204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/2/19 12:06 PM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	105	70-130
1,2-Dibromoethane (EDB)	101	70-130
Chlorobenzene	99	70-130
Ethyl Benzene	98	70-130
m,p-Xylene	93	70-130
o-Xylene	96	70-130
Styrene	97	70-130
Bromoform	114	70-130
Cumene	98	70-130
1,1,2,2-Tetrachloroethane	97	70-130
Propylbenzene	98	70-130
4-Ethyltoluene	100	70-130
1,3,5-Trimethylbenzene	98	70-130
1,2,4-Trimethylbenzene	99	70-130
1,3-Dichlorobenzene	114	70-130
1,4-Dichlorobenzene	113	70-130
alpha-Chlorotoluene	103	70-130
1,2-Dichlorobenzene	113	70-130
1,2,4-Trichlorobenzene	121	70-130
Hexachlorobutadiene	116	70-130
Naphthalene	91	60-140
TVOC ref. to Heptane	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	96	70-130
1,2-Dichloroethane-d4	82	70-130
4-Bromofluorobenzene	106	70-130

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Client Sample ID: LCS

Lab ID#: 1904584A-06B

EPA METHOD TO-15 GC/MS

File Name:	**14050607**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 02:11 PM**	

Compound	%Recovery	Method Limits
Freon 12	104	70-130
Freon 114	109	70-130
Chloromethane	99	70-130
Vinyl Chloride	97	70-130
1,3-Butadiene	90	70-130
Bromomethane	107	70-130
Chloroethane	104	70-130
Freon 11	104	70-130
Ethanol	118	70-130
Freon 113	102	70-130
1,1-Dichloroethene	102	70-130
Acetone	107	70-130
2-Propanol	100	70-130
Carbon Disulfide	92	70-130
3-Chloropropene	104	70-130
Methylene Chloride	92	70-130
Methyl tert-butyl ether	103	70-130
trans-1,2-Dichloroethene	88	70-130
Hexane	102	70-130
1,1-Dichloroethane	99	70-130
2-Butanone (Methyl Ethyl Ketone)	110	70-130
cis-1,2-Dichloroethene	114	70-130
Tetrahydrofuran	99	70-130
Chloroform	100	70-130
1,1,1-Trichloroethane	98	70-130
Cyclohexane	105	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	98	70-130
Benzene	104	70-130
1,2-Dichloroethane	91	70-130
Heptane	104	70-130
Trichloroethene	101	70-130
1,2-Dichloropropane	101	70-130
1,4-Dioxane	114	70-130
Bromodichloromethane	101	70-130
cis-1,3-Dichloropropene	95	70-130
4-Methyl-2-pentanone	109	70-130
Toluene	100	70-130
trans-1,3-Dichloropropene	105	70-130
1,1,2-Trichloroethane	107	70-130
Tetrachloroethene	105	70-130
2-Hexanone	118	70-130

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Client Sample ID: LCS

Lab ID#: 1904584A-06B

EPA METHOD TO-15 GC/MS

File Name:	**14050607**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 02:11 PM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	102	70-130
1,2-Dibromoethane (EDB)	107	70-130
Chlorobenzene	103	70-130
Ethyl Benzene	101	70-130
m,p-Xylene	100	70-130
o-Xylene	104	70-130
Styrene	107	70-130
Bromoform	106	70-130
Cumene	108	70-130
1,1,2,2-Tetrachloroethane	110	70-130
Propylbenzene	105	70-130
4-Ethyltoluene	106	70-130
1,3,5-Trimethylbenzene	109	70-130
1,2,4-Trimethylbenzene	104	70-130
1,3-Dichlorobenzene	108	70-130
1,4-Dichlorobenzene	110	70-130
alpha-Chlorotoluene	119	70-130
1,2-Dichlorobenzene	110	70-130
1,2,4-Trichlorobenzene	148 Q	70-130
Hexachlorobutadiene	134 Q	70-130
Naphthalene	97	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	88	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: LCSD

Lab ID#: 1904584A-06BB

EPA METHOD TO-15 GC/MS

File Name:	**14050608**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 02:35 PM**	

Compound	%Recovery	Method Limits
Freon 12	111	70-130
Freon 114	113	70-130
Chloromethane	102	70-130
Vinyl Chloride	104	70-130
1,3-Butadiene	92	70-130
Bromomethane	114	70-130
Chloroethane	108	70-130
Freon 11	107	70-130
Ethanol	119	70-130
Freon 113	108	70-130
1,1-Dichloroethene	105	70-130
Acetone	106	70-130
2-Propanol	104	70-130
Carbon Disulfide	94	70-130
3-Chloropropene	112	70-130
Methylene Chloride	98	70-130
Methyl tert-butyl ether	109	70-130
trans-1,2-Dichloroethene	95	70-130
Hexane	108	70-130
1,1-Dichloroethane	105	70-130
2-Butanone (Methyl Ethyl Ketone)	114	70-130
cis-1,2-Dichloroethene	118	70-130
Tetrahydrofuran	102	70-130
Chloroform	102	70-130
1,1,1-Trichloroethane	104	70-130
Cyclohexane	110	70-130
Carbon Tetrachloride	104	70-130
2,2,4-Trimethylpentane	105	70-130
Benzene	104	70-130
1,2-Dichloroethane	96	70-130
Heptane	107	70-130
Trichloroethene	101	70-130
1,2-Dichloropropane	103	70-130
1,4-Dioxane	117	70-130
Bromodichloromethane	103	70-130
cis-1,3-Dichloropropene	101	70-130
4-Methyl-2-pentanone	118	70-130
Toluene	103	70-130
trans-1,3-Dichloropropene	107	70-130
1,1,2-Trichloroethane	108	70-130
Tetrachloroethene	106	70-130
2-Hexanone	122	70-130

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Client Sample ID: LCSD

Lab ID#: 1904584A-06BB

EPA METHOD TO-15 GC/MS

File Name:	**14050608**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/6/19 02:35 PM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	105	70-130
1,2-Dibromoethane (EDB)	106	70-130
Chlorobenzene	106	70-130
Ethyl Benzene	104	70-130
m,p-Xylene	107	70-130
o-Xylene	105	70-130
Styrene	109	70-130
Bromoform	109	70-130
Cumene	110	70-130
1,1,2,2-Tetrachloroethane	112	70-130
Propylbenzene	109	70-130
4-Ethyltoluene	109	70-130
1,3,5-Trimethylbenzene	113	70-130
1,2,4-Trimethylbenzene	112	70-130
1,3-Dichlorobenzene	113	70-130
1,4-Dichlorobenzene	114	70-130
alpha-Chlorotoluene	126	70-130
1,2-Dichlorobenzene	116	70-130
1,2,4-Trichlorobenzene	160 Q	70-130
Hexachlorobutadiene	137 Q	70-130
Naphthalene	104	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	89	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

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5/8/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1904584B

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 4/25/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

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WORK ORDER #: 1904584B

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75 603 005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	04/25/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	05/08/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-042419	Modified ASTM D-1946	4.7 "Hg	5.4 psi
02A	TOX-100-IN-042419	Modified ASTM D-1946	4.3 "Hg	5.1 psi
03A	COMBINED-INFLUENT-042419	Modified ASTM D-1946	4.3 "Hg	5.4 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: [redacted] DATE: 05/08/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
PARS Environmental
Workorder# 1904584B

Three Client Canister samples were received on April 25, 2019. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane in air using GC/FID. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: TOX-100-OUT-042419

Lab ID#: 1904584B-01A

No Detections Were Found.

Client Sample ID: TOX-100-IN-042419

Lab ID#: 1904584B-02A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.24

Client Sample ID: COMBINED-INFLUENT-042419

Lab ID#: 1904584B-03A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.74

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Client Sample ID: TOX-100-OUT-042419

Lab ID#: 1904584B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042911**	**Date of Collection:**	**4/24/19 12:20:00 PM**
Dil. Factor:	**1.62**	**Date of Analysis:**	**4/29/19 07:32 PM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	Not Detected

Container Type: Client Canister

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Client Sample ID: TOX-100-IN-042419

Lab ID#: 1904584B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042912**	**Date of Collection: 4/24/19 12:30:00 PM**	
Dil. Factor:	**1.57**	**Date of Analysis: 4/29/19 08:05 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.24

Container Type: Client Canister

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Client Sample ID: COMBINED-INFLUENT-042419

Lab ID#: 1904584B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042913**	**Date of Collection:**	**4/24/19 12:45:00 PM**
Dil. Factor:	**1.60**	**Date of Analysis:**	**4/29/19 08:30 PM**

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.74

Container Type: Client Canister

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Client Sample ID: Lab Blank

Lab ID#: 1904584B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042905**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 03:57 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1904584B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042902**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/29/19 02:43 PM**	

Compound	%Recovery	Method Limits
Methane	101	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1904584B-05AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10042924**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 4/30/19 12:00 PM**	

Compound	%Recovery	Method Limits
Methane	102	85-115

Container Type: NA - Not Applicable

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6/13/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1905655A

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 5/31/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1905655A

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	05/31/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	06/13/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-053019	TO-15	3.0 "Hg	5 psi
02A	TOX-100-IN-053019	TO-15	4.5 "Hg	5 psi
03A	Combined Influent-053019	TO-15	4.5 "Hg	5 psi
04A	Lab Blank	TO-15	NA	NA
04B	Lab Blank	TO-15	NA	NA
05A	CCV	TO-15	NA	NA
05B	CCV	TO-15	NA	NA
06A	LCS	TO-15	NA	NA
06AA	LCSD	TO-15	NA	NA
06B	LCS	TO-15	NA	NA
06BB	LCSD	TO-15	NA	NA

CERTIFIED BY: [redacted] DATE: 06/13/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
EPA Method TO-15
PARS Environmental
Workorder# 1905655A

Three 6 Liter Summa Canister samples were received on May 31, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The TVOC (Total Volatile Organic Compounds) concentration was calculated by taking the total area counts in the sample and quantitating the area based on the response factor of Heptane.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on samples TOX-100-IN-053019 and Combined Influent-053019 due to the presence of high level target species.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample Combined Influent-053019 was outside laboratory control limits due to high level matrix interference. The surrogate recovery is flagged.

The Relative Percent Difference (RPD) of the LCS/LCSD analyzed on 6/4/19 exceeded acceptance limits for Naphthalene.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: TOX-100-OUT-053019

Lab ID#: 1905655A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Acetone	7.4	8.5	18	20
Trichloroethene	0.74	0.76	4.0	4.1

Client Sample ID: TOX-100-IN-053019

Lab ID#: 1905655A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	40	21000	140	74000
Cyclohexane	40	19000	140	66000
2,2,4-Trimethylpentane	40	5700	180	26000
Benzene	40	2600	130	8300
Heptane	40	14000	160	57000
Toluene	40	110	150	410
Ethyl Benzene	40	790	170	3400
m,p-Xylene	40	1500	170	6700
o-Xylene	40	150	170	640
Cumene	40	100	190	510
Propylbenzene	40	100	190	500
4-Ethyltoluene	40	340	190	1700
1,3,5-Trimethylbenzene	40	240	190	1200
1,2,4-Trimethylbenzene	40	400	190	2000
TVOC ref. to Heptane	790	460000	3200	1900000

Client Sample ID: Combined Influent-053019

Lab ID#: 1905655A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	66	60000	230	210000
Cyclohexane	66	52000	230	180000
2,2,4-Trimethylpentane	66	16000	310	73000
Benzene	66	6400	210	21000
Heptane	66	33000	270	140000
Toluene	66	180	250	690

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: Combined Influent-053019

Lab ID#: 1905655A-03A

Ethyl Benzene	66	890	290	3900
m,p-Xylene	66	1600	290	6800
o-Xylene	66	140	290	600
Cumene	66	82	320	400
4-Ethyltoluene	66	130	320	650
1,3,5-Trimethylbenzene	66	93	320	460
1,2,4-Trimethylbenzene	66	98	320	480
TVOC ref. to Heptane	1300	1000000	5400	4100000

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Client Sample ID: TOX-100-OUT-053019

Lab ID#: 1905655A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060319**	**Date of Collection:**	**5/30/19 10:35:00 AM**
Dil. Factor:	**1.49**	**Date of Analysis:**	**6/3/19 11:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.74	Not Detected	3.7	Not Detected
Freon 114	0.74	Not Detected	5.2	Not Detected
Chloromethane	7.4	Not Detected	15	Not Detected
Vinyl Chloride	0.74	Not Detected	1.9	Not Detected
1,3-Butadiene	0.74	Not Detected	1.6	Not Detected
Bromomethane	7.4	Not Detected	29	Not Detected
Chloroethane	3.0	Not Detected	7.9	Not Detected
Freon 11	0.74	Not Detected	4.2	Not Detected
Ethanol	3.0	Not Detected	5.6	Not Detected
Freon 113	0.74	Not Detected	5.7	Not Detected
1,1-Dichloroethene	0.74	Not Detected	3.0	Not Detected
Acetone	7.4	8.5	18	20
2-Propanol	3.0	Not Detected	7.3	Not Detected
Carbon Disulfide	3.0	Not Detected	9.3	Not Detected
3-Chloropropene	3.0	Not Detected	9.3	Not Detected
Methylene Chloride	7.4	Not Detected	26	Not Detected
Methyl tert-butyl ether	3.0	Not Detected	11	Not Detected
trans-1,2-Dichloroethene	0.74	Not Detected	3.0	Not Detected
Hexane	0.74	Not Detected	2.6	Not Detected
1,1-Dichloroethane	0.74	Not Detected	3.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.0	Not Detected	8.8	Not Detected
cis-1,2-Dichloroethene	0.74	Not Detected	3.0	Not Detected
Tetrahydrofuran	0.74	Not Detected	2.2	Not Detected
Chloroform	0.74	Not Detected	3.6	Not Detected
1,1,1-Trichloroethane	0.74	Not Detected	4.1	Not Detected
Cyclohexane	0.74	Not Detected	2.6	Not Detected
Carbon Tetrachloride	0.74	Not Detected	4.7	Not Detected
2,2,4-Trimethylpentane	0.74	Not Detected	3.5	Not Detected
Benzene	0.74	Not Detected	2.4	Not Detected
1,2-Dichloroethane	0.74	Not Detected	3.0	Not Detected
Heptane	0.74	Not Detected	3.0	Not Detected
Trichloroethene	0.74	0.76	4.0	4.1
1,2-Dichloropropane	0.74	Not Detected	3.4	Not Detected
1,4-Dioxane	3.0	Not Detected	11	Not Detected
Bromodichloromethane	0.74	Not Detected	5.0	Not Detected
cis-1,3-Dichloropropene	0.74	Not Detected	3.4	Not Detected
4-Methyl-2-pentanone	0.74	Not Detected	3.0	Not Detected
Toluene	0.74	Not Detected	2.8	Not Detected
trans-1,3-Dichloropropene	0.74	Not Detected	3.4	Not Detected
1,1,2-Trichloroethane	0.74	Not Detected	4.1	Not Detected
Tetrachloroethene	0.74	Not Detected	5.0	Not Detected
2-Hexanone	3.0	Not Detected	12	Not Detected

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Client Sample ID: TOX-100-OUT-053019

Lab ID#: 1905655A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060319**	**Date of Collection:**	**5/30/19 10:35:00 AM**
Dil. Factor:	**1.49**	**Date of Analysis:**	**6/3/19 11:50 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.74	Not Detected	6.3	Not Detected
1,2-Dibromoethane (EDB)	0.74	Not Detected	5.7	Not Detected
Chlorobenzene	0.74	Not Detected	3.4	Not Detected
Ethyl Benzene	0.74	Not Detected	3.2	Not Detected
m,p-Xylene	0.74	Not Detected	3.2	Not Detected
o-Xylene	0.74	Not Detected	3.2	Not Detected
Styrene	0.74	Not Detected	3.2	Not Detected
Bromoform	0.74	Not Detected	7.7	Not Detected
Cumene	0.74	Not Detected	3.7	Not Detected
1,1,2,2-Tetrachloroethane	0.74	Not Detected	5.1	Not Detected
Propylbenzene	0.74	Not Detected	3.7	Not Detected
4-Ethyltoluene	0.74	Not Detected	3.7	Not Detected
1,3,5-Trimethylbenzene	0.74	Not Detected	3.7	Not Detected
1,2,4-Trimethylbenzene	0.74	Not Detected	3.7	Not Detected
1,3-Dichlorobenzene	0.74	Not Detected	4.5	Not Detected
1,4-Dichlorobenzene	0.74	Not Detected	4.5	Not Detected
alpha-Chlorotoluene	0.74	Not Detected	3.8	Not Detected
1,2-Dichlorobenzene	0.74	Not Detected	4.5	Not Detected
1,2,4-Trichlorobenzene	3.0	Not Detected	22	Not Detected
Hexachlorobutadiene	3.0	Not Detected	32	Not Detected
Naphthalene	3.0	Not Detected	16	Not Detected
TVOC ref. to Heptane	15	Not Detected	61	Not Detected

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	100	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: TOX-100-IN-053019

Lab ID#: 1905655A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14060434**	**Date of Collection:**	**5/30/19 10:58:00 AM**
Dil. Factor:	**7.90**	**Date of Analysis:**	**6/5/19 07:26 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	40	Not Detected	200	Not Detected
Freon 114	40	Not Detected	280	Not Detected
Chloromethane	160	Not Detected	330	Not Detected
Vinyl Chloride	40	Not Detected	100	Not Detected
1,3-Butadiene	40	Not Detected	87	Not Detected
Bromomethane	160	Not Detected	610	Not Detected
Chloroethane	160	Not Detected	420	Not Detected
Freon 11	40	Not Detected	220	Not Detected
Ethanol	160	Not Detected	300	Not Detected
Freon 113	40	Not Detected	300	Not Detected
1,1-Dichloroethene	40	Not Detected	160	Not Detected
Acetone	160	Not Detected	380	Not Detected
2-Propanol	160	Not Detected	390	Not Detected
Carbon Disulfide	160	Not Detected	490	Not Detected
3-Chloropropene	160	Not Detected	490	Not Detected
Methylene Chloride	160	Not Detected	550	Not Detected
Methyl tert-butyl ether	40	Not Detected	140	Not Detected
trans-1,2-Dichloroethene	40	Not Detected	160	Not Detected
Hexane	40	21000	140	74000
1,1-Dichloroethane	40	Not Detected	160	Not Detected
2-Butanone (Methyl Ethyl Ketone)	160	Not Detected	460	Not Detected
cis-1,2-Dichloroethene	40	Not Detected	160	Not Detected
Tetrahydrofuran	40	Not Detected	120	Not Detected
Chloroform	40	Not Detected	190	Not Detected
1,1,1-Trichloroethane	40	Not Detected	220	Not Detected
Cyclohexane	40	19000	140	66000
Carbon Tetrachloride	40	Not Detected	250	Not Detected
2,2,4-Trimethylpentane	40	5700	180	26000
Benzene	40	2600	130	8300
1,2-Dichloroethane	40	Not Detected	160	Not Detected
Heptane	40	14000	160	57000
Trichloroethene	40	Not Detected	210	Not Detected
1,2-Dichloropropane	40	Not Detected	180	Not Detected
1,4-Dioxane	160	Not Detected	570	Not Detected
Bromodichloromethane	40	Not Detected	260	Not Detected
cis-1,3-Dichloropropene	40	Not Detected	180	Not Detected
4-Methyl-2-pentanone	40	Not Detected	160	Not Detected
Toluene	40	110	150	410
trans-1,3-Dichloropropene	40	Not Detected	180	Not Detected
1,1,2-Trichloroethane	40	Not Detected	220	Not Detected
Tetrachloroethene	40	Not Detected	270	Not Detected
2-Hexanone	160	Not Detected	650	Not Detected

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Client Sample ID: TOX-100-IN-053019

Lab ID#: 1905655A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14060434**	**Date of Collection:**	**5/30/19 10:58:00 AM**
Dil. Factor:	**7.90**	**Date of Analysis:**	**6/5/19 07:26 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	40	Not Detected	340	Not Detected
1,2-Dibromoethane (EDB)	40	Not Detected	300	Not Detected
Chlorobenzene	40	Not Detected	180	Not Detected
Ethyl Benzene	40	790	170	3400
m,p-Xylene	40	1500	170	6700
o-Xylene	40	150	170	640
Styrene	40	Not Detected	170	Not Detected
Bromoform	40	Not Detected	410	Not Detected
Cumene	40	100	190	510
1,1,2,2-Tetrachloroethane	40	Not Detected	270	Not Detected
Propylbenzene	40	100	190	500
4-Ethyltoluene	40	340	190	1700
1,3,5-Trimethylbenzene	40	240	190	1200
1,2,4-Trimethylbenzene	40	400	190	2000
1,3-Dichlorobenzene	40	Not Detected	240	Not Detected
1,4-Dichlorobenzene	40	Not Detected	240	Not Detected
alpha-Chlorotoluene	40	Not Detected	200	Not Detected
1,2-Dichlorobenzene	40	Not Detected	240	Not Detected
1,2,4-Trichlorobenzene	160	Not Detected	1200	Not Detected
Hexachlorobutadiene	160	Not Detected	1700	Not Detected
Naphthalene	160	Not Detected	830	Not Detected
TVOC ref. to Heptane	790	460000	3200	1900000

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	120	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: Combined Influent-053019

Lab ID#: 1905655A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14060435**	**Date of Collection:**	**5/30/19 11:09:00 AM**
Dil. Factor:	**13.2**	**Date of Analysis:**	**6/5/19 08:00 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	66	Not Detected	330	Not Detected
Freon 114	66	Not Detected	460	Not Detected
Chloromethane	260	Not Detected	540	Not Detected
Vinyl Chloride	66	Not Detected	170	Not Detected
1,3-Butadiene	66	Not Detected	150	Not Detected
Bromomethane	260	Not Detected	1000	Not Detected
Chloroethane	260	Not Detected	700	Not Detected
Freon 11	66	Not Detected	370	Not Detected
Ethanol	260	Not Detected	500	Not Detected
Freon 113	66	Not Detected	500	Not Detected
1,1-Dichloroethene	66	Not Detected	260	Not Detected
Acetone	260	Not Detected	630	Not Detected
2-Propanol	260	Not Detected	650	Not Detected
Carbon Disulfide	260	Not Detected	820	Not Detected
3-Chloropropene	260	Not Detected	830	Not Detected
Methylene Chloride	260	Not Detected	920	Not Detected
Methyl tert-butyl ether	66	Not Detected	240	Not Detected
trans-1,2-Dichloroethene	66	Not Detected	260	Not Detected
Hexane	66	60000	230	210000
1,1-Dichloroethane	66	Not Detected	270	Not Detected
2-Butanone (Methyl Ethyl Ketone)	260	Not Detected	780	Not Detected
cis-1,2-Dichloroethene	66	Not Detected	260	Not Detected
Tetrahydrofuran	66	Not Detected	190	Not Detected
Chloroform	66	Not Detected	320	Not Detected
1,1,1-Trichloroethane	66	Not Detected	360	Not Detected
Cyclohexane	66	52000	230	180000
Carbon Tetrachloride	66	Not Detected	420	Not Detected
2,2,4-Trimethylpentane	66	16000	310	73000
Benzene	66	6400	210	21000
1,2-Dichloroethane	66	Not Detected	270	Not Detected
Heptane	66	33000	270	140000
Trichloroethene	66	Not Detected	350	Not Detected
1,2-Dichloropropane	66	Not Detected	300	Not Detected
1,4-Dioxane	260	Not Detected	950	Not Detected
Bromodichloromethane	66	Not Detected	440	Not Detected
cis-1,3-Dichloropropene	66	Not Detected	300	Not Detected
4-Methyl-2-pentanone	66	Not Detected	270	Not Detected
Toluene	66	180	250	690
trans-1,3-Dichloropropene	66	Not Detected	300	Not Detected
1,1,2-Trichloroethane	66	Not Detected	360	Not Detected
Tetrachloroethene	66	Not Detected	450	Not Detected
2-Hexanone	260	Not Detected	1100	Not Detected

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Client Sample ID: Combined Influent-053019

Lab ID#: 1905655A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14060435**	**Date of Collection:**	**5/30/19 11:09:00 AM**
Dil. Factor:	**13.2**	**Date of Analysis:**	**6/5/19 08:00 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	66	Not Detected	560	Not Detected
1,2-Dibromoethane (EDB)	66	Not Detected	510	Not Detected
Chlorobenzene	66	Not Detected	300	Not Detected
Ethyl Benzene	66	890	290	3900
m,p-Xylene	66	1600	290	6800
o-Xylene	66	140	290	600
Styrene	66	Not Detected	280	Not Detected
Bromoform	66	Not Detected	680	Not Detected
Cumene	66	82	320	400
1,1,2,2-Tetrachloroethane	66	Not Detected	450	Not Detected
Propylbenzene	66	Not Detected	320	Not Detected
4-Ethyltoluene	66	130	320	650
1,3,5-Trimethylbenzene	66	93	320	460
1,2,4-Trimethylbenzene	66	98	320	480
1,3-Dichlorobenzene	66	Not Detected	400	Not Detected
1,4-Dichlorobenzene	66	Not Detected	400	Not Detected
alpha-Chlorotoluene	66	Not Detected	340	Not Detected
1,2-Dichlorobenzene	66	Not Detected	400	Not Detected
1,2,4-Trichlorobenzene	260	Not Detected	2000	Not Detected
Hexachlorobutadiene	260	Not Detected	2800	Not Detected
Naphthalene	260	Not Detected	1400	Not Detected
TVOC ref. to Heptane	1300	1000000	5400	4100000

Q = Exceeds Quality Control limits.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	139 Q	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	97	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1905655A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060305**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 11:04 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.50	Not Detected	2.5	Not Detected
Freon 114	0.50	Not Detected	3.5	Not Detected
Chloromethane	5.0	Not Detected	10	Not Detected
Vinyl Chloride	0.50	Not Detected	1.3	Not Detected
1,3-Butadiene	0.50	Not Detected	1.1	Not Detected
Bromomethane	5.0	Not Detected	19	Not Detected
Chloroethane	2.0	Not Detected	5.3	Not Detected
Freon 11	0.50	Not Detected	2.8	Not Detected
Ethanol	2.0	Not Detected	3.8	Not Detected
Freon 113	0.50	Not Detected	3.8	Not Detected
1,1-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Acetone	5.0	Not Detected	12	Not Detected
2-Propanol	2.0	Not Detected	4.9	Not Detected
Carbon Disulfide	2.0	Not Detected	6.2	Not Detected
3-Chloropropene	2.0	Not Detected	6.3	Not Detected
Methylene Chloride	5.0	Not Detected	17	Not Detected
Methyl tert-butyl ether	2.0	Not Detected	7.2	Not Detected
trans-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Hexane	0.50	Not Detected	1.8	Not Detected
1,1-Dichloroethane	0.50	Not Detected	2.0	Not Detected
2-Butanone (Methyl Ethyl Ketone)	2.0	Not Detected	5.9	Not Detected
cis-1,2-Dichloroethene	0.50	Not Detected	2.0	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Chloroform	0.50	Not Detected	2.4	Not Detected
1,1,1-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Cyclohexane	0.50	Not Detected	1.7	Not Detected
Carbon Tetrachloride	0.50	Not Detected	3.1	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Benzene	0.50	Not Detected	1.6	Not Detected
1,2-Dichloroethane	0.50	Not Detected	2.0	Not Detected
Heptane	0.50	Not Detected	2.0	Not Detected
Trichloroethene	0.50	Not Detected	2.7	Not Detected
1,2-Dichloropropane	0.50	Not Detected	2.3	Not Detected
1,4-Dioxane	2.0	Not Detected	7.2	Not Detected
Bromodichloromethane	0.50	Not Detected	3.4	Not Detected
cis-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
4-Methyl-2-pentanone	0.50	Not Detected	2.0	Not Detected
Toluene	0.50	Not Detected	1.9	Not Detected
trans-1,3-Dichloropropene	0.50	Not Detected	2.3	Not Detected
1,1,2-Trichloroethane	0.50	Not Detected	2.7	Not Detected
Tetrachloroethene	0.50	Not Detected	3.4	Not Detected
2-Hexanone	2.0	Not Detected	8.2	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1905655A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060305**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 11:04 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.50	Not Detected	4.2	Not Detected
1,2-Dibromoethane (EDB)	0.50	Not Detected	3.8	Not Detected
Chlorobenzene	0.50	Not Detected	2.3	Not Detected
Ethyl Benzene	0.50	Not Detected	2.2	Not Detected
m,p-Xylene	0.50	Not Detected	2.2	Not Detected
o-Xylene	0.50	Not Detected	2.2	Not Detected
Styrene	0.50	Not Detected	2.1	Not Detected
Bromoform	0.50	Not Detected	5.2	Not Detected
Cumene	0.50	Not Detected	2.4	Not Detected
1,1,2,2-Tetrachloroethane	0.50	Not Detected	3.4	Not Detected
Propylbenzene	0.50	Not Detected	2.4	Not Detected
4-Ethyltoluene	0.50	Not Detected	2.4	Not Detected
1,3,5-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,2,4-Trimethylbenzene	0.50	Not Detected	2.4	Not Detected
1,3-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,4-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
alpha-Chlorotoluene	0.50	Not Detected	2.6	Not Detected
1,2-Dichlorobenzene	0.50	Not Detected	3.0	Not Detected
1,2,4-Trichlorobenzene	2.0	Not Detected	15	Not Detected
Hexachlorobutadiene	2.0	Not Detected	21	Not Detected
Naphthalene	2.0	Not Detected	10	Not Detected
TVOC ref. to Heptane	10	Not Detected	41	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
1,2-Dichloroethane-d4	102	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1905655A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14060407**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 10:57 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	20	Not Detected	78	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	20	Not Detected	69	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1905655A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14060407**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 10:57 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected
TVOC ref. to Heptane	100	Not Detected	410	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	96	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: CCV

Lab ID#: 1905655A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060302**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 09:28 AM**

Compound	%Recovery
Freon 12	109
Freon 114	108
Chloromethane	112
Vinyl Chloride	114
1,3-Butadiene	110
Bromomethane	118
Chloroethane	113
Freon 11	105
Ethanol	105
Freon 113	104
1,1-Dichloroethene	110
Acetone	113
2-Propanol	105
Carbon Disulfide	109
3-Chloropropene	109
Methylene Chloride	106
Methyl tert-butyl ether	104
trans-1,2-Dichloroethene	112
Hexane	111
1,1-Dichloroethane	110
2-Butanone (Methyl Ethyl Ketone)	106
cis-1,2-Dichloroethene	112
Tetrahydrofuran	108
Chloroform	109
1,1,1-Trichloroethane	108
Cyclohexane	107
Carbon Tetrachloride	104
2,2,4-Trimethylpentane	107
Benzene	110
1,2-Dichloroethane	110
Heptane	108
Trichloroethene	105
1,2-Dichloropropane	105
1,4-Dioxane	102
Bromodichloromethane	108
cis-1,3-Dichloropropene	103
4-Methyl-2-pentanone	100
Toluene	105
trans-1,3-Dichloropropene	108
1,1,2-Trichloroethane	102
Tetrachloroethene	101
2-Hexanone	99

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Client Sample ID: CCV

Lab ID#: 1905655A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 09:28 AM**	

Compound	%Recovery
Dibromochloromethane	105
1,2-Dibromoethane (EDB)	100
Chlorobenzene	99
Ethyl Benzene	99
m,p-Xylene	101
o-Xylene	101
Styrene	106
Bromoform	105
Cumene	104
1,1,2,2-Tetrachloroethane	101
Propylbenzene	103
4-Ethyltoluene	102
1,3,5-Trimethylbenzene	100
1,2,4-Trimethylbenzene	103
1,3-Dichlorobenzene	101
1,4-Dichlorobenzene	102
alpha-Chlorotoluene	106
1,2-Dichlorobenzene	99
1,2,4-Trichlorobenzene	101
Hexachlorobutadiene	98
Naphthalene	96
TVOC ref. to Heptane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	105	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: CCV

Lab ID#: 1905655A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14060403**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 09:05 AM**

Compound	%Recovery
Freon 12	88
Freon 114	90
Chloromethane	88
Vinyl Chloride	87
1,3-Butadiene	89
Bromomethane	102
Chloroethane	101
Freon 11	96
Ethanol	91
Freon 113	96
1,1-Dichloroethene	91
Acetone	109
2-Propanol	85
Carbon Disulfide	87
3-Chloropropene	104
Methylene Chloride	93
Methyl tert-butyl ether	97
trans-1,2-Dichloroethene	92
Hexane	86
1,1-Dichloroethane	99
2-Butanone (Methyl Ethyl Ketone)	89
cis-1,2-Dichloroethene	98
Tetrahydrofuran	79
Chloroform	102
1,1,1-Trichloroethane	97
Cyclohexane	90
Carbon Tetrachloride	99
2,2,4-Trimethylpentane	90
Benzene	104
1,2-Dichloroethane	88
Heptane	91
Trichloroethene	104
1,2-Dichloropropane	93
1,4-Dioxane	83
Bromodichloromethane	92
cis-1,3-Dichloropropene	90
4-Methyl-2-pentanone	82
Toluene	106
trans-1,3-Dichloropropene	91
1,1,2-Trichloroethane	95
Tetrachloroethene	106
2-Hexanone	76

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Client Sample ID: CCV
Lab ID#: 1905655A-05B
EPA METHOD TO-15 GC/MS

File Name:	**14060403**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 09:05 AM**	

Compound	%Recovery
Dibromochloromethane	93
1,2-Dibromoethane (EDB)	93
Chlorobenzene	93
Ethyl Benzene	108
m,p-Xylene	104
o-Xylene	106
Styrene	86
Bromoform	92
Cumene	92
1,1,2,2-Tetrachloroethane	96
Propylbenzene	92
4-Ethyltoluene	92
1,3,5-Trimethylbenzene	102
1,2,4-Trimethylbenzene	100
1,3-Dichlorobenzene	99
1,4-Dichlorobenzene	101
alpha-Chlorotoluene	82
1,2-Dichlorobenzene	101
1,2,4-Trichlorobenzene	119
Hexachlorobutadiene	117
Naphthalene	68
TVOC ref. to Heptane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	94	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: LCS

Lab ID#: 1905655A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 10:09 AM**	

Compound	%Recovery	Method Limits
Freon 12	103	70-130
Freon 114	108	70-130
Chloromethane	91	70-130
Vinyl Chloride	110	70-130
1,3-Butadiene	102	70-130
Bromomethane	112	70-130
Chloroethane	115	70-130
Freon 11	102	70-130
Ethanol	102	70-130
Freon 113	97	70-130
1,1-Dichloroethene	104	70-130
Acetone	106	70-130
2-Propanol	102	70-130
Carbon Disulfide	90	70-130
3-Chloropropene	100	70-130
Methylene Chloride	103	70-130
Methyl tert-butyl ether	98	70-130
trans-1,2-Dichloroethene	91	70-130
Hexane	108	70-130
1,1-Dichloroethane	104	70-130
2-Butanone (Methyl Ethyl Ketone)	101	70-130
cis-1,2-Dichloroethene	116	70-130
Tetrahydrofuran	100	70-130
Chloroform	103	70-130
1,1,1-Trichloroethane	100	70-130
Cyclohexane	102	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	103	70-130
Benzene	104	70-130
1,2-Dichloroethane	104	70-130
Heptane	101	70-130
Trichloroethene	99	70-130
1,2-Dichloropropane	101	70-130
1,4-Dioxane	92	70-130
Bromodichloromethane	103	70-130
cis-1,3-Dichloropropene	91	70-130
4-Methyl-2-pentanone	94	70-130
Toluene	97	70-130
trans-1,3-Dichloropropene	101	70-130
1,1,2-Trichloroethane	98	70-130
Tetrachloroethene	96	70-130
2-Hexanone	93	70-130

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Client Sample ID: LCS

Lab ID#: 1905655A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 10:09 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	101	70-130
1,2-Dibromoethane (EDB)	96	70-130
Chlorobenzene	96	70-130
Ethyl Benzene	93	70-130
m,p-Xylene	97	70-130
o-Xylene	99	70-130
Styrene	101	70-130
Bromoform	101	70-130
Cumene	98	70-130
1,1,2,2-Tetrachloroethane	96	70-130
Propylbenzene	99	70-130
4-Ethyltoluene	98	70-130
1,3,5-Trimethylbenzene	94	70-130
1,2,4-Trimethylbenzene	98	70-130
1,3-Dichlorobenzene	96	70-130
1,4-Dichlorobenzene	97	70-130
alpha-Chlorotoluene	100	70-130
1,2-Dichlorobenzene	95	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	100	70-130
Naphthalene	85	60-140
TVOC ref. to Heptane	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
1,2-Dichloroethane-d4	107	70-130
4-Bromofluorobenzene	95	70-130

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Client Sample ID: LCSD

Lab ID#: 1905655A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 10:36 AM**	

Compound	%Recovery	Method Limits
Freon 12	102	70-130
Freon 114	105	70-130
Chloromethane	91	70-130
Vinyl Chloride	111	70-130
1,3-Butadiene	102	70-130
Bromomethane	112	70-130
Chloroethane	110	70-130
Freon 11	102	70-130
Ethanol	103	70-130
Freon 113	96	70-130
1,1-Dichloroethene	104	70-130
Acetone	105	70-130
2-Propanol	101	70-130
Carbon Disulfide	90	70-130
3-Chloropropene	99	70-130
Methylene Chloride	101	70-130
Methyl tert-butyl ether	98	70-130
trans-1,2-Dichloroethene	91	70-130
Hexane	108	70-130
1,1-Dichloroethane	104	70-130
2-Butanone (Methyl Ethyl Ketone)	101	70-130
cis-1,2-Dichloroethene	114	70-130
Tetrahydrofuran	98	70-130
Chloroform	101	70-130
1,1,1-Trichloroethane	99	70-130
Cyclohexane	104	70-130
Carbon Tetrachloride	98	70-130
2,2,4-Trimethylpentane	102	70-130
Benzene	105	70-130
1,2-Dichloroethane	102	70-130
Heptane	100	70-130
Trichloroethene	101	70-130
1,2-Dichloropropane	99	70-130
1,4-Dioxane	94	70-130
Bromodichloromethane	103	70-130
cis-1,3-Dichloropropene	93	70-130
4-Methyl-2-pentanone	95	70-130
Toluene	97	70-130
trans-1,3-Dichloropropene	102	70-130
1,1,2-Trichloroethane	97	70-130
Tetrachloroethene	99	70-130
2-Hexanone	94	70-130

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Client Sample ID: LCSD

Lab ID#: 1905655A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17060304**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 10:36 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	102	70-130
1,2-Dibromoethane (EDB)	97	70-130
Chlorobenzene	95	70-130
Ethyl Benzene	95	70-130
m,p-Xylene	98	70-130
o-Xylene	100	70-130
Styrene	104	70-130
Bromoform	101	70-130
Cumene	99	70-130
1,1,2,2-Tetrachloroethane	97	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	99	70-130
1,3,5-Trimethylbenzene	97	70-130
1,2,4-Trimethylbenzene	100	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	97	70-130
alpha-Chlorotoluene	101	70-130
1,2-Dichlorobenzene	97	70-130
1,2,4-Trichlorobenzene	106	70-130
Hexachlorobutadiene	104	70-130
Naphthalene	87	60-140
TVOC ref. to Heptane	Not Spiked	

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	101	70-130
1,2-Dichloroethane-d4	106	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS

Lab ID#: 1905655A-06B

EPA METHOD TO-15 GC/MS

File Name:	**14060404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 09:33 AM**	

Compound	%Recovery	Method Limits
Freon 12	85	70-130
Freon 114	91	70-130
Chloromethane	86	70-130
Vinyl Chloride	86	70-130
1,3-Butadiene	84	70-130
Bromomethane	88	70-130
Chloroethane	109	70-130
Freon 11	97	70-130
Ethanol	88	70-130
Freon 113	95	70-130
1,1-Dichloroethene	92	70-130
Acetone	111	70-130
2-Propanol	86	70-130
Carbon Disulfide	76	70-130
3-Chloropropene	94	70-130
Methylene Chloride	96	70-130
Methyl tert-butyl ether	93	70-130
trans-1,2-Dichloroethene	76	70-130
Hexane	89	70-130
1,1-Dichloroethane	98	70-130
2-Butanone (Methyl Ethyl Ketone)	85	70-130
cis-1,2-Dichloroethene	108	70-130
Tetrahydrofuran	79	70-130
Chloroform	98	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	93	70-130
Carbon Tetrachloride	101	70-130
2,2,4-Trimethylpentane	94	70-130
Benzene	100	70-130
1,2-Dichloroethane	86	70-130
Heptane	97	70-130
Trichloroethene	100	70-130
1,2-Dichloropropane	90	70-130
1,4-Dioxane	80	70-130
Bromodichloromethane	90	70-130
cis-1,3-Dichloropropene	83	70-130
4-Methyl-2-pentanone	73	70-130
Toluene	104	70-130
trans-1,3-Dichloropropene	89	70-130
1,1,2-Trichloroethane	93	70-130
Tetrachloroethene	104	70-130
2-Hexanone	61 Q	70-130

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Client Sample ID: LCS

Lab ID#: 1905655A-06B

EPA METHOD TO-15 GC/MS

File Name:	**14060404**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 09:33 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	93	70-130
1,2-Dibromoethane (EDB)	93	70-130
Chlorobenzene	92	70-130
Ethyl Benzene	108	70-130
m,p-Xylene	108	70-130
o-Xylene	112	70-130
Styrene	94	70-130
Bromoform	97	70-130
Cumene	95	70-130
1,1,2,2-Tetrachloroethane	100	70-130
Propylbenzene	95	70-130
4-Ethyltoluene	94	70-130
1,3,5-Trimethylbenzene	104	70-130
1,2,4-Trimethylbenzene	98	70-130
1,3-Dichlorobenzene	104	70-130
1,4-Dichlorobenzene	104	70-130
alpha-Chlorotoluene	94	70-130
1,2-Dichlorobenzene	108	70-130
1,2,4-Trichlorobenzene	129	70-130
Hexachlorobutadiene	134 Q	70-130
Naphthalene	82	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	95	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	100	70-130

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Client Sample ID: LCSD

Lab ID#: 1905655A-06BB

EPA METHOD TO-15 GC/MS

File Name:	**14060405**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 10:00 AM**	

Compound	%Recovery	Method Limits
Freon 12	87	70-130
Freon 114	91	70-130
Chloromethane	87	70-130
Vinyl Chloride	87	70-130
1,3-Butadiene	83	70-130
Bromomethane	110	70-130
Chloroethane	113	70-130
Freon 11	97	70-130
Ethanol	89	70-130
Freon 113	93	70-130
1,1-Dichloroethene	89	70-130
Acetone	108	70-130
2-Propanol	85	70-130
Carbon Disulfide	74	70-130
3-Chloropropene	98	70-130
Methylene Chloride	93	70-130
Methyl tert-butyl ether	97	70-130
trans-1,2-Dichloroethene	74	70-130
Hexane	89	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	82	70-130
cis-1,2-Dichloroethene	107	70-130
Tetrahydrofuran	79	70-130
Chloroform	96	70-130
1,1,1-Trichloroethane	96	70-130
Cyclohexane	93	70-130
Carbon Tetrachloride	97	70-130
2,2,4-Trimethylpentane	91	70-130
Benzene	99	70-130
1,2-Dichloroethane	88	70-130
Heptane	97	70-130
Trichloroethene	101	70-130
1,2-Dichloropropane	90	70-130
1,4-Dioxane	80	70-130
Bromodichloromethane	90	70-130
cis-1,3-Dichloropropene	83	70-130
4-Methyl-2-pentanone	74	70-130
Toluene	103	70-130
trans-1,3-Dichloropropene	91	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	105	70-130
2-Hexanone	62 Q	70-130

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Client Sample ID: LCSD

Lab ID#: 1905655A-06BB

EPA METHOD TO-15 GC/MS

File Name:	**14060405**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/4/19 10:00 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	93	70-130
1,2-Dibromoethane (EDB)	94	70-130
Chlorobenzene	92	70-130
Ethyl Benzene	108	70-130
m,p-Xylene	109	70-130
o-Xylene	114	70-130
Styrene	98	70-130
Bromoform	97	70-130
Cumene	96	70-130
1,1,2,2-Tetrachloroethane	101	70-130
Propylbenzene	100	70-130
4-Ethyltoluene	99	70-130
1,3,5-Trimethylbenzene	108	70-130
1,2,4-Trimethylbenzene	110	70-130
1,3-Dichlorobenzene	107	70-130
1,4-Dichlorobenzene	109	70-130
alpha-Chlorotoluene	101	70-130
1,2-Dichlorobenzene	111	70-130
1,2,4-Trichlorobenzene	153 Q	70-130
Hexachlorobutadiene	150 Q	70-130
Naphthalene	108	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	93	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	102	70-130

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6/13/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1905655B

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 5/31/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

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WORK ORDER #: 1905655B

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	05/31/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	06/13/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-053019	Modified ASTM D-1946	3.0 "Hg	5 psi
02A	TOX-100-IN-053019	Modified ASTM D-1946	4.5 "Hg	5 psi
03A	Combined Influent-053019	Modified ASTM D-1946	4.5 "Hg	5 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: [redacted] DATE: 06/13/19

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-15-9, UT NELAP CA0093332015-6, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2015, Expiration date: 10/17/2016.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
PARS Environmental
Workorder# 1905655B

Three 6 Liter Summa Canister samples were received on May 31, 2019. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane in air using GC/FID. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: TOX-100-OUT-053019

Lab ID#: 1905655B-01A

No Detections Were Found.

Client Sample ID: TOX-100-IN-053019

Lab ID#: 1905655B-02A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.25

Client Sample ID: Combined Influent-053019

Lab ID#: 1905655B-03A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.76

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Client Sample ID: TOX-100-OUT-053019

Lab ID#: 1905655B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10060314**	**Date of Collection: 5/30/19 10:35:00 AM**	
Dil. Factor:	**1.49**	**Date of Analysis: 6/3/19 02:09 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Methane	0.00015	Not Detected

Container Type: 6 Liter Summa Canister

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Client Sample ID: TOX-100-IN-053019

Lab ID#: 1905655B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10060315**	**Date of Collection: 5/30/19 10:58:00 AM**	
Dil. Factor:	**1.58**	**Date of Analysis: 6/3/19 02:31 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.25

Container Type: 6 Liter Summa Canister

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Client Sample ID: Combined Influent-053019

Lab ID#: 1905655B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10060316**	**Date of Collection: 5/30/19 11:09:00 AM**	
Dil. Factor:	**1.58**	**Date of Analysis: 6/3/19 02:55 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	0.76

Container Type: 6 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1905655B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10060303**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 09:18 AM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1905655B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10060302**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 08:53 AM**	

Compound	%Recovery	Method Limits
Methane	105	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1905655B-05AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10060317**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 6/3/19 03:25 PM**	

Compound	%Recovery	Method Limits
Methane	102	85-115

Container Type: NA - Not Applicable

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7/1/2019

[redacted]

PARS Environmental
1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP
Project #:
Workorder #: 1906336A

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 6/18/2019 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: [redacted] if you have any questions regarding the data in this report.

Regards,

[redacted]

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1906336A

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	215.931.4342	**P.O. #**	75603-005
FAX:	652.768.0172	**PROJECT #**	DSCP
DATE RECEIVED:	06/18/2019	**CONTACT:**	[redacted]
DATE COMPLETED:	07/01/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	TOX-100-OUT-061719	TO-15	4.0 "Hg	5 psi
02A	TOX-100-IN-061719	TO-15	4.0 "Hg	5 psi
03A	Combined Influent-061719	TO-15	4.5 "Hg	5 psi
04A	ZONE D-061719	TO-15	4.0 "Hg	5 psi
05A	Lab Blank	TO-15	NA	NA
05B	Lab Blank	TO-15	NA	NA
06A	CCV	TO-15	NA	NA
06B	CCV	TO-15	NA	NA
07A	LCS	TO-15	NA	NA
07AA	LCSD	TO-15	NA	NA
07B	LCS	TO-15	NA	NA
07BB	LCSD	TO-15	NA	NA

CERTIFIED BY: [redacted] DATE: 07/01/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8 , LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

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LABORATORY NARRATIVE
EPA Method TO-15
PARS Environmental
Workorder# 1906336A

Four 6 Liter Summa Canister samples were received on June 18, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The TVOC (Total Volatile Organic Compounds) concentration was calculated by taking the total area counts in the sample and quantitating the area based on the response factor of Heptane.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Dilution was performed on sample Combined Influent-061719 due to the presence of high level target species.

Dilution was performed on samples TOX-100-IN-061719 and ZONE D-061719 due to matrix interference.

The recovery of surrogate Toluene-d8 in sample Combined Influent-061719 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: TOX-100-OUT-061719

Lab ID#: 1906336A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
TVOC ref. to Heptane	16	570	63	2300

Client Sample ID: TOX-100-IN-061719

Lab ID#: 1906336A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	96	31000	340	110000
Cyclohexane	96	26000	330	91000
2,2,4-Trimethylpentane	96	9500	450	44000
Benzene	96	3600	310	12000
Heptane	96	19000	400	76000
Toluene	96	140	360	540
Ethyl Benzene	96	960	420	4200
m,p-Xylene	96	1800	420	7700
o-Xylene	96	200	420	860
Cumene	96	140	470	700
Propylbenzene	96	130	470	650
4-Ethyltoluene	96	260	470	1300
1,3,5-Trimethylbenzene	96	360	470	1700
1,2,4-Trimethylbenzene	96	540	470	2700
TVOC ref. to Heptane	1900	730000	7900	3000000

Client Sample ID: Combined Influent-061719

Lab ID#: 1906336A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	98	90000	350	320000
Cyclohexane	98	70000	340	240000
2,2,4-Trimethylpentane	98	25000	460	120000
Benzene	98	8800	310	28000
Heptane	98	41000	400	170000
Toluene	98	250	370	930
Ethyl Benzene	98	910	430	3900

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: Combined Influent-061719

Lab ID#: 1906336A-03A

m,p-Xylene	98	1400	430	6000
o-Xylene	98	140	430	610
1,2,4-Trimethylbenzene	98	100	480	510
TVOC ref. to Heptane	2000	1600000	8000	6500000

Client Sample ID: ZONE D-061719

Lab ID#: 1906336A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	260	59000	910	210000
Cyclohexane	260	53000	890	180000
2,2,4-Trimethylpentane	260	34000	1200	160000
Benzene	260	8200	820	26000
Heptane	260	37000	1000	150000
Toluene	260	340	970	1300
Ethyl Benzene	260	1400	1100	6300
m,p-Xylene	260	2700	1100	12000
o-Xylene	260	290	1100	1300
1,2,4-Trimethylbenzene	260	260	1300	1300
TVOC ref. to Heptane	5200	1600000	21000	6500000

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Client Sample ID: TOX-100-OUT-061719

Lab ID#: 1906336A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p062012**	**Date of Collection:**	**6/17/19 11:08:00 AM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**6/20/19 05:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.78	Not Detected	3.8	Not Detected
Freon 114	0.78	Not Detected	5.4	Not Detected
Chloromethane	7.8	Not Detected	16	Not Detected
Vinyl Chloride	0.78	Not Detected	2.0	Not Detected
1,3-Butadiene	0.78	Not Detected	1.7	Not Detected
Bromomethane	7.8	Not Detected	30	Not Detected
Chloroethane	3.1	Not Detected	8.2	Not Detected
Freon 11	0.78	Not Detected	4.4	Not Detected
Ethanol	3.1	Not Detected	5.8	Not Detected
Freon 113	0.78	Not Detected	5.9	Not Detected
1,1-Dichloroethene	0.78	Not Detected	3.1	Not Detected
Acetone	7.8	Not Detected	18	Not Detected
2-Propanol	3.1	Not Detected	7.6	Not Detected
Carbon Disulfide	3.1	Not Detected	9.6	Not Detected
3-Chloropropene	3.1	Not Detected	9.7	Not Detected
Methylene Chloride	7.8	Not Detected	27	Not Detected
Methyl tert-butyl ether	3.1	Not Detected	11	Not Detected
trans-1,2-Dichloroethene	0.78	Not Detected	3.1	Not Detected
Hexane	0.78	Not Detected	2.7	Not Detected
1,1-Dichloroethane	0.78	Not Detected	3.1	Not Detected
2-Butanone (Methyl Ethyl Ketone)	3.1	Not Detected	9.1	Not Detected
cis-1,2-Dichloroethene	0.78	Not Detected	3.1	Not Detected
Tetrahydrofuran	0.78	Not Detected	2.3	Not Detected
Chloroform	0.78	Not Detected	3.8	Not Detected
1,1,1-Trichloroethane	0.78	Not Detected	4.2	Not Detected
Cyclohexane	0.78	Not Detected	2.7	Not Detected
Carbon Tetrachloride	0.78	Not Detected	4.9	Not Detected
2,2,4-Trimethylpentane	0.78	Not Detected	3.6	Not Detected
Benzene	0.78	Not Detected	2.5	Not Detected
1,2-Dichloroethane	0.78	Not Detected	3.1	Not Detected
Heptane	0.78	Not Detected	3.2	Not Detected
Trichloroethene	0.78	Not Detected	4.2	Not Detected
1,2-Dichloropropane	0.78	Not Detected	3.6	Not Detected
1,4-Dioxane	3.1	Not Detected	11	Not Detected
Bromodichloromethane	0.78	Not Detected	5.2	Not Detected
cis-1,3-Dichloropropene	0.78	Not Detected	3.5	Not Detected
4-Methyl-2-pentanone	0.78	Not Detected	3.2	Not Detected
Toluene	0.78	Not Detected	2.9	Not Detected
trans-1,3-Dichloropropene	0.78	Not Detected	3.5	Not Detected
1,1,2-Trichloroethane	0.78	Not Detected	4.2	Not Detected
Tetrachloroethene	0.78	Not Detected	5.2	Not Detected
2-Hexanone	3.1	Not Detected	13	Not Detected

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Client Sample ID: TOX-100-OUT-061719

Lab ID#: 1906336A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**p062012**	**Date of Collection:**	**6/17/19 11:08:00 AM**
Dil. Factor:	**1.55**	**Date of Analysis:**	**6/20/19 05:40 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	0.78	Not Detected	6.6	Not Detected
1,2-Dibromoethane (EDB)	0.78	Not Detected	6.0	Not Detected
Chlorobenzene	0.78	Not Detected	3.6	Not Detected
Ethyl Benzene	0.78	Not Detected	3.4	Not Detected
m,p-Xylene	0.78	Not Detected	3.4	Not Detected
o-Xylene	0.78	Not Detected	3.4	Not Detected
Styrene	0.78	Not Detected	3.3	Not Detected
Bromoform	0.78	Not Detected	8.0	Not Detected
Cumene	0.78	Not Detected	3.8	Not Detected
1,1,2,2-Tetrachloroethane	0.78	Not Detected	5.3	Not Detected
Propylbenzene	0.78	Not Detected	3.8	Not Detected
4-Ethyltoluene	0.78	Not Detected	3.8	Not Detected
1,3,5-Trimethylbenzene	0.78	Not Detected	3.8	Not Detected
1,2,4-Trimethylbenzene	0.78	Not Detected	3.8	Not Detected
1,3-Dichlorobenzene	0.78	Not Detected	4.6	Not Detected
1,4-Dichlorobenzene	0.78	Not Detected	4.6	Not Detected
alpha-Chlorotoluene	0.78	Not Detected	4.0	Not Detected
1,2-Dichlorobenzene	0.78	Not Detected	4.6	Not Detected
1,2,4-Trichlorobenzene	3.1	Not Detected	23	Not Detected
Hexachlorobutadiene	3.1	Not Detected	33	Not Detected
Naphthalene	3.1	Not Detected	16	Not Detected
TVOC ref. to Heptane	16	570	63	2300

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
1,2-Dichloroethane-d4	109	70-130
4-Bromofluorobenzene	91	70-130

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WORK ORDER #: 1909639A

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	[redacted]	**P.O. #**	75603-005
FAX:	[redacted]	**PROJECT #**	DSCP
DATE RECEIVED:	09/30/2019	**CONTACT:**	Ausha [redacted]
DATE COMPLETED:	10/09/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	Combined Influent-092719	TO-15	4.5 "Hg	5 psi
02A	Lab Blank	TO-15	NA	NA
03A	CCV	TO-15	NA	NA
04A	LCS	TO-15	NA	NA
04AA	LCSD	TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 10/09/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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[redacted] . (800) [redacted] . FAX [redacted]

LABORATORY NARRATIVE
EPA Method TO-15
PARS Environmental
Workorder# 1909639A

One 6 Liter Summa Canister sample was received on September 30, 2019. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The TVOC (Total Volatile Organic Compounds) concentration was calculated by taking the total area counts in the sample and quantitating the area based on the response factor of Heptane.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

The recovery of surrogate 1,2-Dichloroethane-d4 in sample Combined Influent-092719 was outside laboratory control limits due to high level hydrocarbon matrix interference. The surrogate recovery is flagged.

Dilution was performed on sample Combined Influent-092719 due to the presence of high level target species.

Definition of Data Qualifying Flags

Ten qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

M - Reported value may be biased due to apparent matrix interferences.

CN - See Case Narrative.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS

Client Sample ID: Combined Influent-092719

Lab ID#: 1909639A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Hexane	40	62000	140	220000
Chloroform	40	100	190	490
Cyclohexane	40	51000	140	180000
2,2,4-Trimethylpentane	40	19000	180	87000
Benzene	40	6400	130	21000
Heptane	40	30000	160	120000
Toluene	40	230	150	860
Ethyl Benzene	40	860	170	3800
m,p-Xylene	40	1300	170	5800
o-Xylene	40	130	170	580
Cumene	40	94	190	460
Propylbenzene	40	62	190	300
4-Ethyltoluene	40	160	190	780
1,3,5-Trimethylbenzene	40	120	190	610
1,2,4-Trimethylbenzene	40	150	190	720
TVOC ref. to Heptane	790	1300000	3200	5300000

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Client Sample ID: Combined Influent-092719

Lab ID#: 1909639A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14100233**	**Date of Collection:**	**9/27/19 8:38:00 AM**
Dil. Factor:	**7.90**	**Date of Analysis:**	**10/2/19 10:43 PM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	40	Not Detected	200	Not Detected
Freon 114	40	Not Detected	280	Not Detected
Chloromethane	160	Not Detected	330	Not Detected
Vinyl Chloride	40	Not Detected	100	Not Detected
1,3-Butadiene	40	Not Detected	87	Not Detected
Bromomethane	160	Not Detected	610	Not Detected
Chloroethane	160	Not Detected	420	Not Detected
Freon 11	40	Not Detected	220	Not Detected
Ethanol	160	Not Detected	300	Not Detected
Freon 113	40	Not Detected	300	Not Detected
1,1-Dichloroethene	40	Not Detected	160	Not Detected
Acetone	160	Not Detected	380	Not Detected
2-Propanol	160	Not Detected	390	Not Detected
Carbon Disulfide	160	Not Detected	490	Not Detected
3-Chloropropene	160	Not Detected	490	Not Detected
Methylene Chloride	160	Not Detected	550	Not Detected
Methyl tert-butyl ether	40	Not Detected	140	Not Detected
trans-1,2-Dichloroethene	40	Not Detected	160	Not Detected
Hexane	40	62000	140	220000
1,1-Dichloroethane	40	Not Detected	160	Not Detected
2-Butanone (Methyl Ethyl Ketone)	160	Not Detected	460	Not Detected
cis-1,2-Dichloroethene	40	Not Detected	160	Not Detected
Tetrahydrofuran	40	Not Detected	120	Not Detected
Chloroform	40	100	190	490
1,1,1-Trichloroethane	40	Not Detected	220	Not Detected
Cyclohexane	40	51000	140	180000
Carbon Tetrachloride	40	Not Detected	250	Not Detected
2,2,4-Trimethylpentane	40	19000	180	87000
Benzene	40	6400	130	21000
1,2-Dichloroethane	40	Not Detected	160	Not Detected
Heptane	40	30000	160	120000
Trichloroethene	40	Not Detected	210	Not Detected
1,2-Dichloropropane	40	Not Detected	180	Not Detected
1,4-Dioxane	160	Not Detected	570	Not Detected
Bromodichloromethane	40	Not Detected	260	Not Detected
cis-1,3-Dichloropropene	40	Not Detected	180	Not Detected
4-Methyl-2-pentanone	40	Not Detected	160	Not Detected
Toluene	40	230	150	860
trans-1,3-Dichloropropene	40	Not Detected	180	Not Detected
1,1,2-Trichloroethane	40	Not Detected	220	Not Detected
Tetrachloroethene	40	Not Detected	270	Not Detected
2-Hexanone	160	Not Detected	650	Not Detected

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Client Sample ID: Combined Influent-092719

Lab ID#: 1909639A-01A

EPA METHOD TO-15 GC/MS

File Name:	**14100233**	**Date of Collection: 9/27/19 8:38:00 AM**	
Dil. Factor:	**7.90**	**Date of Analysis: 10/2/19 10:43 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	40	Not Detected	340	Not Detected
1,2-Dibromoethane (EDB)	40	Not Detected	300	Not Detected
Chlorobenzene	40	Not Detected	180	Not Detected
Ethyl Benzene	40	860	170	3800
m,p-Xylene	40	1300	170	5800
o-Xylene	40	130	170	580
Styrene	40	Not Detected	170	Not Detected
Bromoform	40	Not Detected	410	Not Detected
Cumene	40	94	190	460
1,1,2,2-Tetrachloroethane	40	Not Detected	270	Not Detected
Propylbenzene	40	62	190	300
4-Ethyltoluene	40	160	190	780
1,3,5-Trimethylbenzene	40	120	190	610
1,2,4-Trimethylbenzene	40	150	190	720
1,3-Dichlorobenzene	40	Not Detected	240	Not Detected
1,4-Dichlorobenzene	40	Not Detected	240	Not Detected
alpha-Chlorotoluene	40	Not Detected	200	Not Detected
1,2-Dichlorobenzene	40	Not Detected	240	Not Detected
1,2,4-Trichlorobenzene	160	Not Detected	1200	Not Detected
Hexachlorobutadiene	160	Not Detected	1700	Not Detected
Naphthalene	160	Not Detected	830	Not Detected
TVOC ref. to Heptane	790	1300000	3200	5300000

Q = Exceeds Quality Control limits.

Container Type: 6 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	207 Q	70-130
Toluene-d8	107	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1909639A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14100207**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 10:54 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	5.0	Not Detected	25	Not Detected
Freon 114	5.0	Not Detected	35	Not Detected
Chloromethane	20	Not Detected	41	Not Detected
Vinyl Chloride	5.0	Not Detected	13	Not Detected
1,3-Butadiene	5.0	Not Detected	11	Not Detected
Bromomethane	20	Not Detected	78	Not Detected
Chloroethane	20	Not Detected	53	Not Detected
Freon 11	5.0	Not Detected	28	Not Detected
Ethanol	20	Not Detected	38	Not Detected
Freon 113	5.0	Not Detected	38	Not Detected
1,1-Dichloroethene	5.0	Not Detected	20	Not Detected
Acetone	20	Not Detected	48	Not Detected
2-Propanol	20	Not Detected	49	Not Detected
Carbon Disulfide	20	Not Detected	62	Not Detected
3-Chloropropene	20	Not Detected	63	Not Detected
Methylene Chloride	20	Not Detected	69	Not Detected
Methyl tert-butyl ether	5.0	Not Detected	18	Not Detected
trans-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Hexane	5.0	Not Detected	18	Not Detected
1,1-Dichloroethane	5.0	Not Detected	20	Not Detected
2-Butanone (Methyl Ethyl Ketone)	20	Not Detected	59	Not Detected
cis-1,2-Dichloroethene	5.0	Not Detected	20	Not Detected
Tetrahydrofuran	5.0	Not Detected	15	Not Detected
Chloroform	5.0	Not Detected	24	Not Detected
1,1,1-Trichloroethane	5.0	Not Detected	27	Not Detected
Cyclohexane	5.0	Not Detected	17	Not Detected
Carbon Tetrachloride	5.0	Not Detected	31	Not Detected
2,2,4-Trimethylpentane	5.0	Not Detected	23	Not Detected
Benzene	5.0	Not Detected	16	Not Detected
1,2-Dichloroethane	5.0	Not Detected	20	Not Detected
Heptane	5.0	Not Detected	20	Not Detected
Trichloroethene	5.0	Not Detected	27	Not Detected
1,2-Dichloropropane	5.0	Not Detected	23	Not Detected
1,4-Dioxane	20	Not Detected	72	Not Detected
Bromodichloromethane	5.0	Not Detected	34	Not Detected
cis-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
4-Methyl-2-pentanone	5.0	Not Detected	20	Not Detected
Toluene	5.0	Not Detected	19	Not Detected
trans-1,3-Dichloropropene	5.0	Not Detected	23	Not Detected
1,1,2-Trichloroethane	5.0	Not Detected	27	Not Detected
Tetrachloroethene	5.0	Not Detected	34	Not Detected
2-Hexanone	20	Not Detected	82	Not Detected

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Client Sample ID: Lab Blank

Lab ID#: 1909639A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14100207**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 10:54 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Dibromochloromethane	5.0	Not Detected	42	Not Detected
1,2-Dibromoethane (EDB)	5.0	Not Detected	38	Not Detected
Chlorobenzene	5.0	Not Detected	23	Not Detected
Ethyl Benzene	5.0	Not Detected	22	Not Detected
m,p-Xylene	5.0	Not Detected	22	Not Detected
o-Xylene	5.0	Not Detected	22	Not Detected
Styrene	5.0	Not Detected	21	Not Detected
Bromoform	5.0	Not Detected	52	Not Detected
Cumene	5.0	Not Detected	24	Not Detected
1,1,2,2-Tetrachloroethane	5.0	Not Detected	34	Not Detected
Propylbenzene	5.0	Not Detected	24	Not Detected
4-Ethyltoluene	5.0	Not Detected	24	Not Detected
1,3,5-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,2,4-Trimethylbenzene	5.0	Not Detected	24	Not Detected
1,3-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,4-Dichlorobenzene	5.0	Not Detected	30	Not Detected
alpha-Chlorotoluene	5.0	Not Detected	26	Not Detected
1,2-Dichlorobenzene	5.0	Not Detected	30	Not Detected
1,2,4-Trichlorobenzene	20	Not Detected	150	Not Detected
Hexachlorobutadiene	20	Not Detected	210	Not Detected
Naphthalene	20	Not Detected	100	Not Detected
TVOC ref. to Heptane	100	Not Detected	410	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: CCV
Lab ID#: 1909639A-03A
EPA METHOD TO-15 GC/MS

File Name:	**14100202**	**Date of Collection: NA**
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 08:37 AM**

Compound	%Recovery
Freon 12	86
Freon 114	92
Chloromethane	88
Vinyl Chloride	86
1,3-Butadiene	90
Bromomethane	71
Chloroethane	76
Freon 11	101
Ethanol	109
Freon 113	93
1,1-Dichloroethene	97
Acetone	98
2-Propanol	97
Carbon Disulfide	86
3-Chloropropene	80
Methylene Chloride	98
Methyl tert-butyl ether	88
trans-1,2-Dichloroethene	87
Hexane	93
1,1-Dichloroethane	91
2-Butanone (Methyl Ethyl Ketone)	89
cis-1,2-Dichloroethene	96
Tetrahydrofuran	89
Chloroform	90
1,1,1-Trichloroethane	95
Cyclohexane	89
Carbon Tetrachloride	93
2,2,4-Trimethylpentane	92
Benzene	92
1,2-Dichloroethane	95
Heptane	81
Trichloroethene	92
1,2-Dichloropropane	91
1,4-Dioxane	91
Bromodichloromethane	94
cis-1,3-Dichloropropene	84
4-Methyl-2-pentanone	76
Toluene	88
trans-1,3-Dichloropropene	86
1,1,2-Trichloroethane	90
Tetrachloroethene	89
2-Hexanone	91

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Client Sample ID: CCV
Lab ID#: 1909639A-03A
EPA METHOD TO-15 GC/MS

File Name:	**14100202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 08:37 AM**	

Compound	%Recovery
Dibromochloromethane	88
1,2-Dibromoethane (EDB)	86
Chlorobenzene	86
Ethyl Benzene	89
m,p-Xylene	87
o-Xylene	90
Styrene	94
Bromoform	89
Cumene	90
1,1,2,2-Tetrachloroethane	86
Propylbenzene	89
4-Ethyltoluene	89
1,3,5-Trimethylbenzene	99
1,2,4-Trimethylbenzene	90
1,3-Dichlorobenzene	92
1,4-Dichlorobenzene	92
alpha-Chlorotoluene	87
1,2-Dichlorobenzene	92
1,2,4-Trichlorobenzene	74
Hexachlorobutadiene	81
Naphthalene	78
TVOC ref. to Heptane	100

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1909639A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14100203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 09:02 AM**	

Compound	%Recovery	Method Limits
Freon 12	97	70-130
Freon 114	100	70-130
Chloromethane	94	70-130
Vinyl Chloride	98	70-130
1,3-Butadiene	93	70-130
Bromomethane	83	70-130
Chloroethane	93	70-130
Freon 11	106	70-130
Ethanol	109	70-130
Freon 113	99	70-130
1,1-Dichloroethene	103	70-130
Acetone	124	70-130
2-Propanol	95	70-130
Carbon Disulfide	95	70-130
3-Chloropropene	79	70-130
Methylene Chloride	105	70-130
Methyl tert-butyl ether	90	70-130
trans-1,2-Dichloroethene	101	70-130
Hexane	102	70-130
1,1-Dichloroethane	96	70-130
2-Butanone (Methyl Ethyl Ketone)	91	70-130
cis-1,2-Dichloroethene	94	70-130
Tetrahydrofuran	90	70-130
Chloroform	97	70-130
1,1,1-Trichloroethane	99	70-130
Cyclohexane	94	70-130
Carbon Tetrachloride	101	70-130
2,2,4-Trimethylpentane	100	70-130
Benzene	93	70-130
1,2-Dichloroethane	94	70-130
Heptane	91	70-130
Trichloroethene	93	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	85	70-130
Bromodichloromethane	95	70-130
cis-1,3-Dichloropropene	92	70-130
4-Methyl-2-pentanone	69 Q	70-130
Toluene	90	70-130
trans-1,3-Dichloropropene	88	70-130
1,1,2-Trichloroethane	95	70-130
Tetrachloroethene	92	70-130
2-Hexanone	68 Q	70-130

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Client Sample ID: LCS

Lab ID#: 1909639A-04A

EPA METHOD TO-15 GC/MS

File Name:	**14100203**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 09:02 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	91	70-130
1,2-Dibromoethane (EDB)	90	70-130
Chlorobenzene	89	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	89	70-130
o-Xylene	93	70-130
Styrene	86	70-130
Bromoform	93	70-130
Cumene	92	70-130
1,1,2,2-Tetrachloroethane	90	70-130
Propylbenzene	92	70-130
4-Ethyltoluene	92	70-130
1,3,5-Trimethylbenzene	97	70-130
1,2,4-Trimethylbenzene	88	70-130
1,3-Dichlorobenzene	97	70-130
1,4-Dichlorobenzene	98	70-130
alpha-Chlorotoluene	87	70-130
1,2-Dichlorobenzene	97	70-130
1,2,4-Trichlorobenzene	89	70-130
Hexachlorobutadiene	97	70-130
Naphthalene	77	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	99	70-130

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Client Sample ID: LCSD
Lab ID#: 1909639A-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14100204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 09:27 AM**	

Compound	%Recovery	Method Limits
Freon 12	90	70-130
Freon 114	94	70-130
Chloromethane	90	70-130
Vinyl Chloride	92	70-130
1,3-Butadiene	82	70-130
Bromomethane	76	70-130
Chloroethane	87	70-130
Freon 11	102	70-130
Ethanol	103	70-130
Freon 113	95	70-130
1,1-Dichloroethene	97	70-130
Acetone	116	70-130
2-Propanol	87	70-130
Carbon Disulfide	90	70-130
3-Chloropropene	79	70-130
Methylene Chloride	97	70-130
Methyl tert-butyl ether	87	70-130
trans-1,2-Dichloroethene	98	70-130
Hexane	95	70-130
1,1-Dichloroethane	92	70-130
2-Butanone (Methyl Ethyl Ketone)	92	70-130
cis-1,2-Dichloroethene	89	70-130
Tetrahydrofuran	80	70-130
Chloroform	93	70-130
1,1,1-Trichloroethane	95	70-130
Cyclohexane	90	70-130
Carbon Tetrachloride	97	70-130
2,2,4-Trimethylpentane	94	70-130
Benzene	92	70-130
1,2-Dichloroethane	94	70-130
Heptane	87	70-130
Trichloroethene	93	70-130
1,2-Dichloropropane	91	70-130
1,4-Dioxane	85	70-130
Bromodichloromethane	98	70-130
cis-1,3-Dichloropropene	90	70-130
4-Methyl-2-pentanone	71	70-130
Toluene	89	70-130
trans-1,3-Dichloropropene	86	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	90	70-130
2-Hexanone	67 Q	70-130

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Client Sample ID: LCSD
Lab ID#: 1909639A-04AA
EPA METHOD TO-15 GC/MS

File Name:	**14100204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/2/19 09:27 AM**	

Compound	%Recovery	Method Limits
Dibromochloromethane	90	70-130
1,2-Dibromoethane (EDB)	88	70-130
Chlorobenzene	87	70-130
Ethyl Benzene	89	70-130
m,p-Xylene	86	70-130
o-Xylene	90	70-130
Styrene	87	70-130
Bromoform	94	70-130
Cumene	87	70-130
1,1,2,2-Tetrachloroethane	88	70-130
Propylbenzene	88	70-130
4-Ethyltoluene	87	70-130
1,3,5-Trimethylbenzene	92	70-130
1,2,4-Trimethylbenzene	84	70-130
1,3-Dichlorobenzene	91	70-130
1,4-Dichlorobenzene	93	70-130
alpha-Chlorotoluene	84	70-130
1,2-Dichlorobenzene	94	70-130
1,2,4-Trichlorobenzene	82	70-130
Hexachlorobutadiene	94	70-130
Naphthalene	74	60-140
TVOC ref. to Heptane	Not Spiked	

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	103	70-130

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10/8/2019

[redacted]

PARS Environmental

1128 Walnut Street, 4th Floor

Philadelphia PA 19107

Project Name: DSCP

Project #:

Workorder #: 1909639B

Dear [redacted]

The following report includes the data for the above referenced project for sample(s) received on 9/30/2019 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha [redacted] at [redacted] if you have any questions regarding the data in this report.

Regards,

Ausha [redacted]

Project Manager

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WORK ORDER #: 1909639B

Work Order Summary

CLIENT:	[redacted] ARCADIS, U.S., Inc. 1128 Walnut Street, 4th Floor Philadelphia, PA 19107	**BILL TO:**	Accounts Payable PARS Environmental Pars Environmental/Montrose PO Box 842165 Boston, MA 02284-2165
PHONE:	[redacted]	**P.O. #**	75603-005
FAX:	[redacted]	**PROJECT #**	DSCP
DATE RECEIVED:	09/30/2019	**CONTACT:**	Ausha [redacted]
DATE COMPLETED:	10/08/2019		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	Combined Influent-092719	Modified ASTM D-1946	4.5 "Hg	5 psi
02A	Lab Blank	Modified ASTM D-1946	NA	NA
03A	LCS	Modified ASTM D-1946	NA	NA
03AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 10/08/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP – E87680, LA NELAP – 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP – CA009332019-11, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics, Inc.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630
[redacted] . (800) [redacted] . FAX [redacted]

LABORATORY NARRATIVE
Modified ASTM D-1946
PARS Environmental
Workorder# 1909639B

One 6 Liter Summa Canister sample was received on September 30, 2019. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane in air using GC/FID. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	*ASTM D-1946*	*ATL Modifications*
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: Combined Influent-092719

Lab ID#: 1909639B-01A

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	1.0

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Client Sample ID: Combined Influent-092719

Lab ID#: 1909639B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10100720**	**Date of Collection: 9/27/19 8:38:00 AM**	
Dil. Factor:	**1.58**	**Date of Analysis: 10/7/19 05:17 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00016	1.0

Container Type: 6 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1909639B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10100704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/7/19 09:37 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Methane	0.00010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1909639B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10100702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/7/19 08:37 AM**	

Compound	%Recovery	Method Limits
Methane	102	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1909639B-03AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10100723**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/7/19 06:30 PM**	

Compound	%Recovery	Method Limits
Methane	97	85-115

Container Type: NA - Not Applicable

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report

Technical Report for

USACE-Philadelphia District

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

W912BU18D00003 / W912BU18F0042

SGS Job Number: JC80990

Sampling Date: 01/07/19



Report to:

USACE-Philadelphia District
100 Penn Square East
Philadelphia, PA 19107
[redacted]
ATTN: [redacted]

Total number of pages in report: 633

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Brian McGuire
General Manager

Client Service contact: [redacted]

Certifications: NJ[redacted], NY[redacted]), CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP (C[redacted]), AK (U[redacted]), AZ (AZ[redacted], PA, RI, SC, TX, UT, VA, WV, DoD ELAP (ANAB[redacted]

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EHS.US.CustomerCare@sgs.com

Table of Contents

-1-

Sections: 1 2 3 4 5 6 7 8 9 10 11

Section 1: Sample Summary 4
Section 2: Case Narrative/Conformance Summary 7
Section 3: Summary of Hits 12
Section 4: Sample Results 18
4.1: JC80990-1: PH-RW-A2(01072019) 19
4.2: JC80990-1F: PH-RW-A2(01072019) 25
4.3: JC80990-2: PH-RW-B 26
4.4: JC80990-2F: PH-RW-B 32
4.5: JC80990-3: PH-RW-B2(DUP) 33
4.6: JC80990-3F: PH-RW-B2(DUP) 39
4.7: JC80990-4: PH-RW-B2 40
4.8: JC80990-4F: PH-RW-B2 46
4.9: JC80990-5: PH-RW-A(01072019) 47
4.10: JC80990-5F: PH-RW-A(01072019) 53
4.11: JC80990-6: PH-PH-2 54
4.12: JC80990-6F: PH-PH-2 60
4.13: JC80990-7: PH-PH-21(01072019) 61
4.14: JC80990-7F: PH-PH-21(01072019) 67
4.15: JC80990-8: PH-MW-67 68
4.16: JC80990-8F: PH-MW-67 74
4.17: JC80990-9: PH-MW-66(01072019) 75
4.18: JC80990-9F: PH-MW-66(01072019) 81
4.19: JC80990-10: EB-010719 82
4.20: JC80990-10F: EB-010719 88
4.21: JC80990-11: FB-010719 89
4.22: JC80990-11F: FB-010719 95
4.23: JC80990-12: TRIP BLANK 96
Section 5: Misc. Forms 97
5.1: Certification Exceptions 98
5.2: Chain of Custody 99
5.3: Sample Tracking Chronicle 102
5.4: Internal Chain of Custody 109
5.5: QC Evaluation: DOD QSM5 Limits 132
Section 6: MS Volatiles - QC Data Summaries 138
6.1: Method Blank Summary 139
6.2: Blank Spike Summary 141
6.3: Matrix Spike/Matrix Spike Duplicate Summary 143
6.4: Instrument Performance Checks (BFB) 145
6.5: Internal Standard Area Summaries 148
6.6: Surrogate Recovery Summaries 150
6.7: Initial and Continuing Calibration Summaries 151
Section 7: MS Volatiles - Raw Data 174

Sections: 1 2 3 4 5 6 7 8 9 10 11

Table of Contents

7.1: Samples 175
7.2: Method Blanks 296
Section 8: GC Volatiles - QC Data Summaries 303
8.1: Method Blank Summary 304
8.2: Blank Spike Summary 312
8.3: Blank Spike/Blank Spike Duplicate Summary 314
8.4: Laboratory Control Sample Summary 315
8.5: Matrix Spike/Matrix Spike Duplicate Summary 319
8.6: Duplicate Summary 322
8.7: GC Identification Summaries (Hits) 326
8.8: Surrogate Recovery Summaries 332
8.9: GC Surrogate Retention Time Summaries 334
8.10: Initial and Continuing Calibration Summaries 339
Section 9: GC Volatiles - Raw Data 365
9.1: Samples 366
9.2: Method Blanks 503
Section 10: Metals Analysis - QC Data Summaries 521
10.1: Inst QC MA45963: As,Fe,Pb,Mn 522
10.2: Inst QC MA45972: Fe,Mn 550
10.3: Inst QC MA45980: Fe,Mn 583
10.4: Prep QC MP12001: As,Fe,Pb,Mn 606
10.5: Prep QC MP12002: As,Fe,Pb,Mn 615
Section 11: General Chemistry - QC Data Summaries 617
11.1: Method Blank and Spike Results Summary 618
11.2: Duplicate Results Summary 619
11.3: Matrix Spike Results Summary 620
11.4: Inst QC GN90452: Sulfate 621
11.5: Inst QC GN90791: Nitrogen, Nitrate + Nitrite 625
11.6: Inst QC GN90838: Nitrogen, Nitrate + Nitrite 629

SGS North America Inc.

Sample Summary

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
JC80990-1	01/07/19	09:56	DH	01/08/19	AQ	Ground Water	PH-RW-A2(01072019)
JC80990-1F	01/07/19	09:56	DH	01/08/19	AQ	Groundwater Filtered	PH-RW-A2(01072019)
JC80990-2	01/07/19	10:10	DH	01/08/19	AQ	Ground Water	PH-RW-B
JC80990-2F	01/07/19	10:10	DH	01/08/19	AQ	Groundwater Filtered	PH-RW-B
JC80990-3	01/07/19	11:35	DH	01/08/19	AQ	Ground Water	PH-RW-B2(DUP)
JC80990-3F	01/07/19	11:35	DH	01/08/19	AQ	Groundwater Filtered	PH-RW-B2(DUP)
JC80990-4	01/07/19	11:35	DH	01/08/19	AQ	Ground Water	PH-RW-B2
JC80990-4F	01/07/19	11:35	DH	01/08/19	AQ	Groundwater Filtered	PH-RW-B2
JC80990-5	01/07/19	11:47	DH	01/08/19	AQ	Ground Water	PH-RW-A(01072019)
JC80990-5F	01/07/19	11:47	DH	01/08/19	AQ	Groundwater Filtered	PH-RW-A(01072019)
JC80990-6	01/07/19	13:30	DH	01/08/19	AQ	Ground Water	PH-PH-2
JC80990-6F	01/07/19	13:30	DH	01/08/19	AQ	Groundwater Filtered	PH-PH-2
JC80990-7	01/07/19	13:44	DH	01/08/19	AQ	Ground Water	PH-PH-21(01072019)

Sample Summary
(continued)

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC80990-7D	01/07/19	13:44	DH	01/08/19	AQ	Water Dup/MSD	PH-PH-21(01072019)MSD
JC80990-7DF	01/07/19	13:44	DH	01/08/19	AQ	Water Dup/MSD	PH-PH-21(01072019)MSD
JC80990-7F	01/07/19	13:44	DH	01/08/19	AQ	Groundwater Filtered	PH-PH-21(01072019)
JC80990-7S	01/07/19	13:44	DH	01/08/19	AQ	Water Matrix Spike	PH-PH-21(01072019)MS
JC80990-7SF	01/07/19	13:44	DH	01/08/19	AQ	Water Matrix Spike	PH-PH-21(01072019)MS
JC80990-8	01/07/19	15:15	DH	01/08/19	AQ	Ground Water	PH-MW-67
JC80990-8F	01/07/19	15:15	DH	01/08/19	AQ	Groundwater Filtered	PH-MW-67
JC80990-9	01/07/19	15:40	DH	01/08/19	AQ	Ground Water	PH-MW-66(01072019)
JC80990-9F	01/07/19	15:40	DH	01/08/19	AQ	Groundwater Filtered	PH-MW-66(01072019)
JC80990-10	01/07/19	16:45	DH	01/08/19	AQ	Equipment Blank	EB-010719
JC80990-10F	01/07/19	16:45	DH	01/08/19	AQ	Equip Blank Filtered	EB-010719
JC80990-11	01/07/19	16:50	DH	01/08/19	AQ	Field Blank Water	FB-010719
JC80990-11F	01/07/19	16:50	DH	01/08/19	AQ	Field Blank Filtered	FB-010719

Sample Summary
(continued)

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
JC80990-12	01/07/19	16:50	DH	01/08/19	AQ	Trip Blank Water	TRIP BLANK

CASE NARRATIVE / CONFORMANCE SUMMARY

Client:	USACE-Philadelphia District	**Job No**	JC80990
Site:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphi	**Report Date**	1/22/2019 11:37:08 A

On 01/08/2019, 20 Sample(s), 1 Trip Blank(s) and 2 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 1.9 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC80990 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section. Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Please refer to certification exceptions summary for additional certification information.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

MS Volatiles By Method SW846 8260C

Matrix: AQ **Batch ID:** V2D7692

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7MS, JC80990-7MSD were used as the QC samples indicated.

Matrix: AQ **Batch ID:** V2D7694

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC80990-6MS, JC80990-6MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike Recovery(s) for Benzene are outside control limits. Outside control limits due to high level in sample relative to spike amount.
- JC80990-6: Diluted due to high concentraion of target compound.
- JC80990-8: Diluted due to high concentraion of target compound.
- JC80990-9: Diluted due to high concentraion of target compound.

GC Volatiles By Method RSK-175

Matrix: AQ **Batch ID:** GAA1617

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC80990-7DUP were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Matrix: AQ **Batch ID:** GAA1618

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC81071-2DUP were used as the QC samples indicated.

Matrix: AQ **Batch ID:** GWW5151

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC80990-7DUP were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- JC80990-3: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-4: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-9: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-6: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-7: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-8: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-1: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-5: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-2: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

Matrix: AQ **Batch ID:** GWW5152

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC81068-1DUP were used as the QC samples indicated.
- JC80990-10: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC80990-11: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

GC Volatiles By Method SW846-8011

Matrix: AQ **Batch ID:** OP17739

- All samples were extracted within the recommended method holding time.
- Sample(s) JC80990-7MS, JC80990-7MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

GC Volatiles By Method SW846-8015D (DAI)

Matrix: AQ **Batch ID:** GGH6218

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC80750-1MS, JC80750-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.

Matrix: AQ **Batch ID:** GGH6219

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7MS, JC80990-7MSD were used as the QC samples indicated.

Metals Analysis By Method SW846 6020B

Matrix: AQ **Batch ID:** MP12001

- All samples were digested within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7FMS, JC80990-7FMSD, JC80990-7FSDL, JC80990-7MS, JC80990-7MSD, JC80990-7PS, JC80990-7SDL, JC80990-7FPS were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Lead are outside control limits for sample MP12001-SD2. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- JC80990-3F for Manganese: Result confirmed with the un-digested sample.
- JC80990-4F for Manganese: Result confirmed with the un-digested sample.
- JC80990-8 for Arsenic: Elevated sample detection limit due to difficult sample matrix.
- MP12001-PS2 for Manganese: Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

Matrix: AQ **Batch ID:** MP12002

- All samples were digested within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

General Chemistry By Method EPA 300/SW846 9056A

Matrix: AQ **Batch ID:** GP18594

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7DUP, JC80990-7MS were used as the QC samples for Sulfate.

General Chemistry By Method EPA 353.2/LACHAT

Matrix: AQ **Batch ID:** GP18786

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7DUP, JC80990-7MS, JC80990-9MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

General Chemistry By Method EPA353.2/SM4500NO2B

Matrix: AQ **Batch ID:** R175614

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-1 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175615

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-2 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175616

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-3 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175617

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-4 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175618

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-5 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175619

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-6 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175620

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-7 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175621

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-8 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175622

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-9 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175623

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-10 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R175624

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC80990-11 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

General Chemistry By Method SM4500NO2 B-11

Matrix: AQ **Batch ID:** GN90373

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7DUP, JC80990-7MS were used as the QC samples for Nitrogen, Nitrite.

General Chemistry By Method SM4500S2- F-11

Matrix: AQ **Batch ID:** GN90519

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC80990-7MS, JC80990-7DUP were used as the QC samples for Sulfide.
- RPD(s) for Duplicate for Sulfide are outside control limits for sample GN90519-D1. RPD acceptable due to low duplicate and sample concentrations.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Summary of Hits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC80990-1	**PH-RW-A2(01072019)**					
Benzene		592	5.0	4.5	ug/l	SW846 8260C
Toluene		41.8	1.0	0.75	ug/l	SW846 8260C
Ethylbenzene		462	10	7.5	ug/l	SW846 8260C
Xylene (total)		788	10	7.5	ug/l	SW846 8260C
Naphthalene		353	50	20	ug/l	SW846 8260C
Isopropylbenzene		37.6	1.0	0.75	ug/l	SW846 8260C
Tert Butyl Alcohol		28.5	10	7.5	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		709	20	15	ug/l	SW846 8260C
1,3,5-Trimethylbenzene		285	20	15	ug/l	SW846 8260C
Methane		6500	22	12	ug/l	RSK-175
Ethane		1.1	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [a]		18900	250	52	ug/l	RSK-175
Arsenic		27.5	3.0	2.0	ug/l	SW846 6020B
Iron		71400	250	130	ug/l	SW846 6020B
Lead		2.5 J	3.0	2.0	ug/l	SW846 6020B
Manganese		5760	200	100	ug/l	SW846 6020B
Nitrogen, Nitrate [b]		0.10 J	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite		0.10	0.10	0.10	mg/l	EPA 353.2/LACHAT
Sulfate		1.0 J	2.0	1.0	mg/l	EPA 300/SW846 9056A
Sulfide		0.94 J	2.0	1.0	mg/l	SM4500S2- F-11
JC80990-1F	**PH-RW-A2(01072019)**					
Arsenic		25.1	3.0	2.0	ug/l	SW846 6020B
Iron		72400	250	130	ug/l	SW846 6020B
Lead		1.1 J	3.0	2.0	ug/l	SW846 6020B
Manganese		5750	200	100	ug/l	SW846 6020B
JC80990-2	**PH-RW-B**					
Benzene		5.0	0.50	0.45	ug/l	SW846 8260C
Ethylbenzene		2.2	1.0	0.75	ug/l	SW846 8260C
Xylene (total)		3.4	1.0	0.75	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		7.7	2.0	1.5	ug/l	SW846 8260C
2,2,4-Trimethylpentane		2.9 J	5.0	2.5	ug/l	SW846 8260C
Methane		644	1.1	0.60	ug/l	RSK-175
Carbon Dioxide [a]		8630	50	10	ug/l	RSK-175
Arsenic		2.8 J	3.0	2.0	ug/l	SW846 6020B
Iron		2180	50	25	ug/l	SW846 6020B
Manganese		1260	40	20	ug/l	SW846 6020B
Nitrogen, Nitrate [b]		0.17	0.11	0.11	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite		0.18	0.10	0.10	mg/l	EPA 353.2/LACHAT
Nitrogen, Nitrite		0.0088 J	0.010	0.0050	mg/l	SM4500NO2 B-11

Summary of Hits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Sulfate		41.7	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC80990-2F	**PH-RW-B**					
Arsenic		1.8 J	3.0	2.0	ug/l	SW846 6020B
Iron		1720	50	25	ug/l	SW846 6020B
Manganese		1230	40	20	ug/l	SW846 6020B
JC80990-3	**PH-RW-B2(DUP)**					
Benzene		183	0.50	0.45	ug/l	SW846 8260C
Toluene		7.4	1.0	0.75	ug/l	SW846 8260C
Ethylbenzene		58.1	1.0	0.75	ug/l	SW846 8260C
Xylene (total)		154	1.0	0.75	ug/l	SW846 8260C
Naphthalene		19.6	5.0	2.0	ug/l	SW846 8260C
Isopropylbenzene		4.0	1.0	0.75	ug/l	SW846 8260C
Tert Butyl Alcohol		16.7	10	7.5	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		90.3	2.0	1.5	ug/l	SW846 8260C
1,3,5-Trimethylbenzene		43.2	2.0	1.5	ug/l	SW846 8260C
Methane		4450	5.5	3.0	ug/l	RSK-175
Ethane		0.68	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [a]		18100	250	52	ug/l	RSK-175
Arsenic		4.0	3.0	2.0	ug/l	SW846 6020B
Iron		18300	50	25	ug/l	SW846 6020B
Lead		1.3 J	3.0	2.0	ug/l	SW846 6020B
Manganese		5010	200	100	ug/l	SW846 6020B
Sulfate		18.2	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC80990-3F	**PH-RW-B2(DUP)**					
Arsenic		3.7	3.0	2.0	ug/l	SW846 6020B
Iron		17100	50	25	ug/l	SW846 6020B
Manganese [c]		5470	200	100	ug/l	SW846 6020B
JC80990-4	**PH-RW-B2**					
Benzene		212	5.0	4.5	ug/l	SW846 8260C
Toluene		9.8	1.0	0.75	ug/l	SW846 8260C
Ethylbenzene		68.7	1.0	0.75	ug/l	SW846 8260C
Xylene (total)		173	1.0	0.75	ug/l	SW846 8260C
Naphthalene		22.0	5.0	2.0	ug/l	SW846 8260C
Isopropylbenzene		4.5	1.0	0.75	ug/l	SW846 8260C
Tert Butyl Alcohol		17.0	10	7.5	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		102	2.0	1.5	ug/l	SW846 8260C
1,3,5-Trimethylbenzene		47.6	2.0	1.5	ug/l	SW846 8260C

Summary of Hits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Methane		3380	11	6.0	ug/l	RSK-175
Ethane		0.58	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [a]		15300	250	52	ug/l	RSK-175
Arsenic		3.7	3.0	2.0	ug/l	SW846 6020B
Iron		18000	50	25	ug/l	SW846 6020B
Lead		0.65 J	3.0	2.0	ug/l	SW846 6020B
Manganese		4960	200	100	ug/l	SW846 6020B
Sulfate		18.3	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC80990-4F	**PH-RW-B2**					
Arsenic		3.3	3.0	2.0	ug/l	SW846 6020B
Iron		16200	50	25	ug/l	SW846 6020B
Manganese [c]		5470	200	100	ug/l	SW846 6020B
JC80990-5	**PH-RW-A(01072019)**					
Benzene		1980	25	23	ug/l	SW846 8260C
Toluene		80.7	10	7.5	ug/l	SW846 8260C
Ethylbenzene		327	10	7.5	ug/l	SW846 8260C
Xylene (total)		263	10	7.5	ug/l	SW846 8260C
Naphthalene		243	50	20	ug/l	SW846 8260C
Isopropylbenzene		33.4	10	7.5	ug/l	SW846 8260C
Tert Butyl Alcohol		124	100	75	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		56.5	20	15	ug/l	SW846 8260C
1,3,5-Trimethylbenzene		164	20	15	ug/l	SW846 8260C
Methane		10900	22	12	ug/l	RSK-175
Ethane		0.91	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [a]		25200	250	52	ug/l	RSK-175
Arsenic		45.5	3.0	2.0	ug/l	SW846 6020B
Iron		52300	630	310	ug/l	SW846 6020B
Lead		4.3	3.0	2.0	ug/l	SW846 6020B
Manganese		2000	50	25	ug/l	SW846 6020B
Sulfate		3.1	2.0	1.0	mg/l	EPA 300/SW846 9056A
Sulfide		2.3	2.0	1.0	mg/l	SM4500S2- F-11
JC80990-5F	**PH-RW-A(01072019)**					
Arsenic		36.9	3.0	2.0	ug/l	SW846 6020B
Iron		47300	630	310	ug/l	SW846 6020B
Manganese		1960	50	25	ug/l	SW846 6020B
JC80990-6	**PH-PH-2**					
Benzene		16500	50	45	ug/l	SW846 8260C

Summary of Hits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Toluene [d]		629	20	15	ug/l	SW846 8260C
Ethylbenzene [d]		1030	20	15	ug/l	SW846 8260C
Xylene (total) [d]		1000	20	15	ug/l	SW846 8260C
Naphthalene [d]		212	100	40	ug/l	SW846 8260C
Isopropylbenzene [d]		43.0	20	15	ug/l	SW846 8260C
Tert Butyl Alcohol [d]		353	200	150	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [d]		236	40	30	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [d]		196	40	30	ug/l	SW846 8260C
Methane		10200	22	12	ug/l	RSK-175
Ethane		1.1	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [a]		20700	250	52	ug/l	RSK-175
Arsenic		9.7	3.0	2.0	ug/l	SW846 6020B
Iron		97900	250	130	ug/l	SW846 6020B
Lead		1.8 J	3.0	2.0	ug/l	SW846 6020B
Manganese		767	20	10	ug/l	SW846 6020B
Sulfate		0.58 J	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC80990-6F	**PH-PH-2**					
Arsenic		8.2	3.0	2.0	ug/l	SW846 6020B
Iron		95200	250	130	ug/l	SW846 6020B
Manganese		723	20	10	ug/l	SW846 6020B
JC80990-7	**PH-PH-21(01072019)**					
Benzene		121	0.50	0.45	ug/l	SW846 8260C
Toluene		4.4	1.0	0.75	ug/l	SW846 8260C
Ethylbenzene		3.9	1.0	0.75	ug/l	SW846 8260C
Xylene (total)		7.4	1.0	0.75	ug/l	SW846 8260C
Isopropylbenzene		2.9	1.0	0.75	ug/l	SW846 8260C
Tert Butyl Alcohol		6.6 J	10	7.5	ug/l	SW846 8260C
Methane		5130	11	6.0	ug/l	RSK-175
Carbon Dioxide [a]		7160	50	10	ug/l	RSK-175
Arsenic		1.6 J	3.0	2.0	ug/l	SW846 6020B
Iron		6560	50	25	ug/l	SW846 6020B
Lead		4.9	3.0	2.0	ug/l	SW846 6020B
Manganese		582	20	10	ug/l	SW846 6020B
Sulfate		5.1	2.0	1.0	mg/l	EPA 300/SW846 9056A
Sulfide		0.57 J	2.0	1.0	mg/l	SM4500S2- F-11
JC80990-7F	**PH-PH-21(01072019)**					
Arsenic		1.3 J	3.0	2.0	ug/l	SW846 6020B
Iron		4580	50	25	ug/l	SW846 6020B
Manganese		554	20	10	ug/l	SW846 6020B

Summary of Hits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC80990-8	**PH-MW-67**					
Benzene		15300	50	45	ug/l	SW846 8260C
Toluene [d]		2410	20	15	ug/l	SW846 8260C
Ethylbenzene [d]		2480	20	15	ug/l	SW846 8260C
Xylene (total) [d]		10100	20	15	ug/l	SW846 8260C
Naphthalene [d]		1060	100	40	ug/l	SW846 8260C
Isopropylbenzene [d]		256	20	15	ug/l	SW846 8260C
Tert Butyl Alcohol [d]		522	200	150	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		6530	200	150	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [d]		1500	40	30	ug/l	SW846 8260C
2,2,4-Trimethylpentane [d]		369	100	50	ug/l	SW846 8260C
Methane		4040	11	6.0	ug/l	RSK-175
Ethane		6.7	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [a]		12600	250	52	ug/l	RSK-175
Arsenic [e]		34.2	15	10	ug/l	SW846 6020B
Iron [e]		91900	250	130	ug/l	SW846 6020B
Lead [e]		33.3	15	10	ug/l	SW846 6020B
Manganese		7820	200	100	ug/l	SW846 6020B
Sulfate		1.7 J	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC80990-8F	**PH-MW-67**					
Arsenic		14.0	3.0	2.0	ug/l	SW846 6020B
Iron		24400	250	130	ug/l	SW846 6020B
Lead		0.64 J	3.0	2.0	ug/l	SW846 6020B
Manganese		7870	200	100	ug/l	SW846 6020B
JC80990-9	**PH-MW-66(01072019)**					
Benzene		15100	50	45	ug/l	SW846 8260C
Toluene [d]		2490	20	15	ug/l	SW846 8260C
Ethylbenzene [d]		1400	20	15	ug/l	SW846 8260C
Xylene (total) [d]		6150	20	15	ug/l	SW846 8260C
Naphthalene [d]		383	100	40	ug/l	SW846 8260C
Isopropylbenzene [d]		46.8	20	15	ug/l	SW846 8260C
Tert Butyl Alcohol [d]		192 J	200	150	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [d]		1140	40	30	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [d]		348	40	30	ug/l	SW846 8260C
Methane		3680	11	6.0	ug/l	RSK-175
Ethane		1.5	0.23	0.12	ug/l	RSK-175
Ethene		1.3	0.31	0.16	ug/l	RSK-175
Carbon Dioxide [a]		7450	50	10	ug/l	RSK-175
Arsenic		6.8	3.0	2.0	ug/l	SW846 6020B

Summary of Hits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Iron		6840	50	25	ug/l	SW846 6020B
Lead		2.0 J	3.0	2.0	ug/l	SW846 6020B
Manganese		511	20	10	ug/l	SW846 6020B
Sulfate		89.3	2.0	1.0	mg/l	EPA 300/SW846 9056A
Sulfide		0.65 J	2.0	1.0	mg/l	SM4500S2- F-11
JC80990-9F	**PH-MW-66(01072019)**					
Arsenic		6.7	3.0	2.0	ug/l	SW846 6020B
Iron		4850	50	25	ug/l	SW846 6020B
Manganese		553	20	10	ug/l	SW846 6020B
JC80990-10	**EB-010719**					
Methane		0.29	0.11	0.060	ug/l	RSK-175
Carbon Dioxide [a]		187	50	10	ug/l	RSK-175
Manganese		1.3 J	4.0	2.0	ug/l	SW846 6020B
JC80990-10F	**EB-010719**					
Manganese		1.2 J	4.0	2.0	ug/l	SW846 6020B
JC80990-11	**FB-010719**					
Methane		0.26	0.11	0.060	ug/l	RSK-175
Carbon Dioxide [a]		357	50	10	ug/l	RSK-175
Manganese		1.2 J	4.0	2.0	ug/l	SW846 6020B
JC80990-11F	**FB-010719**					
Manganese		1.6 J	4.0	2.0	ug/l	SW846 6020B
JC80990-12	**TRIP BLANK**					

No hits reported in this sample.

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
(c) Result confirmed with the un-digested sample.
(d) Diluted due to high concentraion of target compound.
(e) Elevated sample detection limit due to difficult sample matrix.

Sample Results

Report of Analysis

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180823.D	1	01/09/19 13:43	EH	n/a	n/a	V2D7692
Run #2	2D180868.D	10	01/10/19 13:19	EH	n/a	n/a	V2D7694

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	592 [a]	5.0	4.5	4.3	ug/l	
108-88-3	Toluene	41.8	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	462 [a]	10	7.5	6.0	ug/l	
1330-20-7	Xylene (total)	788 [a]	10	7.5	5.9	ug/l	
91-20-3	Naphthalene	353 [a]	50	20	9.8	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	37.6	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	28.5	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	709 [a]	20	15	10	ug/l	
108-67-8	1,3,5-Trimethylbenzene	285 [a]	20	15	10	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%	98%	80-120%
17060-07-0	1,2-Dichloroethane-D4	101%	100%	81-124%
2037-26-5	Toluene-D8	97%	98%	80-120%
460-00-4	4-Bromofluorobenzene	98%	94%	80-120%

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116732.D	1	01/09/19 11:23	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	105%		56-145%
111-27-3	Hexanol	73%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30933.D	1	01/10/19 18:28	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	77%		20-144%
3017-95-6	2-Bromo-1-chloropropane	81%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70306.D	1	01/10/19 09:49	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134883.D	5	01/10/19 10:21	PC	n/a	n/a	GWW5151
Run #3	AA70307.D	200	01/10/19 10:19	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	6500 [b]	22	12	12	ug/l	
74-84-0	Ethane	1.1	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	ND	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	18900 [c]	250	52	22	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	27.5	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	71400	250	130	93	ug/l	10	01/09/19	01/11/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	2.5 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	5760	200	100	32	ug/l	100	01/09/19	01/11/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45972
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 J	0.11	0.11	0.093	mg/l	1	01/17/19 16:09	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10	0.10	0.10	0.090	mg/l	1	01/17/19 16:09	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 21:50	LS	SM4500NO2 B-11
Sulfate	1.0 J	2.0	1.0	0.38	mg/l	1	01/10/19 18:32	NV	EPA 300/SW846 9056A
Sulfide	0.94 J	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A2(01072019)		
Lab Sample ID:	JC80990-1F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	25.1	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	72400	250	130	93	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	1.1 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	5750	200	100	32	ug/l	100	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180865.D	1	01/10/19 11:50	EH	n/a	n/a	V2D7694
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	5.0	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	2.2	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	3.4	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	7.7	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.9	5.0	2.5	1.0	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%		80-120%
17060-07-0	1,2-Dichloroethane-D4	101%		81-124%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	93%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116733.D	1	01/09/19 11:41	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	111%		56-145%
111-27-3	Hexanol	80%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30934.D	1	01/10/19 18:47	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.020	0.010	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	79%		20-144%
3017-95-6	2-Bromo-1-chloropropane	86%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70308.D	1	01/10/19 10:32	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134885.D	1	01/10/19 10:57	PC	n/a	n/a	GWW5151
Run #3	AA70309.D	10	01/10/19 10:47	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	644 [b]	1.1	0.60	0.60	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	8630 [c]	50	10	4.4	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.8 J	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	2180	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	1260	40	20	6.3	ug/l	20	01/09/19	01/11/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45972
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.17	0.11	0.11	0.093	mg/l	1	01/17/19 16:10	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.18	0.10	0.10	0.090	mg/l	1	01/17/19 16:10	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0088 J	0.010	0.0050	0.0030	mg/l	1	01/08/19 21:50	LS	SM4500NO2 B-11
Sulfate	41.7	2.0	1.0	0.38	mg/l	1	01/10/19 18:56	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B		
Lab Sample ID:	JC80990-2F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	1.8 J	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	1720	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	1230	40	20	6.3	ug/l	20	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(DUP)		
Lab Sample ID:	JC80990-3	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180866.D	1	01/10/19 12:19	EH	n/a	n/a	V2D7694
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	183	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	7.4	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	58.1	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	154	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	19.6	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	4.0	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	16.7	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	90.3	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	43.2	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%		80-120%
17060-07-0	1,2-Dichloroethane-D4	99%		81-124%
2037-26-5	Toluene-D8	97%		80-120%
460-00-4	4-Bromofluorobenzene	94%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(DUP)		
Lab Sample ID:	JC80990-3	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116734.D	1	01/09/19 12:00	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	120%		56-145%
111-27-3	Hexanol	85%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(DUP)		
Lab Sample ID:	JC80990-3	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30935.D	1	01/10/19 19:06	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.020	0.010	0.0054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	77%		20-144%
3017-95-6	2-Bromo-1-chloropropane	81%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(DUP)		
Lab Sample ID:	JC80990-3	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70310.D	1	01/10/19 11:00	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134886.D	5	01/10/19 11:14	PC	n/a	n/a	GWW5151
Run #3	AA70311.D	50	01/10/19 11:13	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	4450 [b]	5.5	3.0	3.0	ug/l	
74-84-0	Ethane	0.68	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	18100 [c]	250	52	22	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: PH-RW-B2(DUP)
Lab Sample ID: JC80990-3 **Date Sampled:** 01/07/19
Matrix: AQ - Ground Water **Date Received:** 01/08/19
Percent Solids: n/a
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	4.0	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	18300	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	1.3 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	5010	200	100	32	ug/l	100	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B2(DUP)		
Lab Sample ID:	JC80990-3	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:11	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:11	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 21:50	LS	SM4500NO2 B-11
Sulfate	18.2	2.0	1.0	0.38	mg/l	1	01/10/19 19:20	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B2(DUP)		
Lab Sample ID:	JC80990-3F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	3.7	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	17100	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese [a]	5470	200	100	32	ug/l	100	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

(a) Result confirmed with the un-digested sample.

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2		
Lab Sample ID:	JC80990-4	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180822.D	1	01/09/19 13:13	EH	n/a	n/a	V2D7692
Run #2	2D180870.D	10	01/10/19 14:18	EH	n/a	n/a	V2D7694

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	212 [a]	5.0	4.5	4.3	ug/l	
108-88-3	Toluene	9.8	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	68.7	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	173	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	22.0	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	4.5	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	17.0	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	102	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	47.6	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%	98%	80-120%
17060-07-0	1,2-Dichloroethane-D4	101%	99%	81-124%
2037-26-5	Toluene-D8	97%	98%	80-120%
460-00-4	4-Bromofluorobenzene	94%	95%	80-120%

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2		
Lab Sample ID:	JC80990-4	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116735.D	1	01/09/19 12:18	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	110%		56-145%
111-27-3	Hexanol	86%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID: PH-RW-B2
Lab Sample ID: JC80990-4 **Date Sampled:** 01/07/19
Matrix: AQ - Ground Water **Date Received:** 01/08/19
Method: SW846-8011 SW846 8011 **Percent Solids:** n/a
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30936.D	1	01/10/19 19:24	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	78%		20-144%
3017-95-6	2-Bromo-1-chloropropane	82%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2		
Lab Sample ID:	JC80990-4	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70312.D	1	01/10/19 11:29	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134887.D	5	01/10/19 11:30	PC	n/a	n/a	GWW5151
Run #3	AA70313.D	100	01/10/19 11:42	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	3380 [b]	11	6.0	6.0	ug/l	
74-84-0	Ethane	0.58	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	15300 [c]	250	52	22	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-B2		
Lab Sample ID:	JC80990-4	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	3.7	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	18000	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	0.65 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	4960	200	100	32	ug/l	100	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B2		
Lab Sample ID:	JC80990-4	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:13	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:13	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 21:50	LS	SM4500NO2 B-11
Sulfate	18.3	2.0	1.0	0.38	mg/l	1	01/10/19 19:44	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B2		
Lab Sample ID:	JC80990-4F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	3.3	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	16200	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese [a]	5470	200	100	32	ug/l	100	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

(a) Result confirmed with the un-digested sample.

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(01072019)		
Lab Sample ID:	JC80990-5	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180830.D	10	01/09/19 17:10	EH	n/a	n/a	V2D7692
Run #2	2D180869.D	50	01/10/19 13:48	EH	n/a	n/a	V2D7694

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	1980 [a]	25	23	21	ug/l	
108-88-3	Toluene	80.7	10	7.5	5.3	ug/l	
100-41-4	Ethylbenzene	327	10	7.5	6.0	ug/l	
1330-20-7	Xylene (total)	263	10	7.5	5.9	ug/l	
91-20-3	Naphthalene	243	50	20	9.8	ug/l	
107-06-2	1,2-Dichloroethane	7.5 U	10	7.5	6.0	ug/l	
98-82-8	Isopropylbenzene	33.4	10	7.5	6.5	ug/l	
1634-04-4	Methyl Tert Butyl Ether	7.5 U	10	7.5	5.1	ug/l	
75-65-0	Tert Butyl Alcohol	124	100	75	58	ug/l	
95-63-6	1,2,4-Trimethylbenzene	56.5	20	15	10	ug/l	
108-67-8	1,3,5-Trimethylbenzene	164	20	15	10	ug/l	
540-84-1	2,2,4-Trimethylpentane	25 U	50	25	10	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	96%	99%	80-120%
17060-07-0	1,2-Dichloroethane-D4	100%	101%	81-124%
2037-26-5	Toluene-D8	100%	98%	80-120%
460-00-4	4-Bromofluorobenzene	94%	93%	80-120%

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(01072019)		
Lab Sample ID:	JC80990-5	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116736.D	1	01/09/19 12:37	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	108%		56-145%
111-27-3	Hexanol	92%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(01072019)		
Lab Sample ID:	JC80990-5	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30937.D	1	01/10/19 19:43	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	68%		20-144%
3017-95-6	2-Bromo-1-chloropropane	73%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(01072019)		
Lab Sample ID:	JC80990-5	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70314.D	1	01/10/19 11:54	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134888.D	5	01/10/19 11:48	PC	n/a	n/a	GWW5151
Run #3	AA70315.D	200	01/10/19 13:03	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	10900 [b]	22	12	12	ug/l	
74-84-0	Ethane	0.91	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	25200 [c]	250	52	22	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: PH-RW-A(01072019)
Lab Sample ID: JC80990-5 **Date Sampled:** 01/07/19
Matrix: AQ - Ground Water **Date Received:** 01/08/19
Percent Solids: n/a
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	45.5	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	52300	630	310	230	ug/l	25	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	4.3	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	2000	50	25	7.9	ug/l	25	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A(01072019)		
Lab Sample ID:	JC80990-5	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:14	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:14	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 21:50	LS	SM4500NO2 B-11
Sulfate	3.1	2.0	1.0	0.38	mg/l	1	01/10/19 20:08	NV	EPA 300/SW846 9056A
Sulfide	2.3	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A(01072019)		
Lab Sample ID:	JC80990-5F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	36.9	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	47300	630	310	230	ug/l	25	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	1960	50	25	7.9	ug/l	25	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	2D180871.D	20	01/10/19 14:48	EH	n/a	n/a	V2D7694
Run #2	2D180828.D	100	01/09/19 16:11	EH	n/a	n/a	V2D7692

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	16500 [b]	50	45	43	ug/l	
108-88-3	Toluene	629	20	15	11	ug/l	
100-41-4	Ethylbenzene	1030	20	15	12	ug/l	
1330-20-7	Xylene (total)	1000	20	15	12	ug/l	
91-20-3	Naphthalene	212	100	40	20	ug/l	
107-06-2	1,2-Dichloroethane	15 U	20	15	12	ug/l	
98-82-8	Isopropylbenzene	43.0	20	15	13	ug/l	
1634-04-4	Methyl Tert Butyl Ether	15 U	20	15	10	ug/l	
75-65-0	Tert Butyl Alcohol	353	200	150	120	ug/l	
95-63-6	1,2,4-Trimethylbenzene	236	40	30	20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	196	40	30	20	ug/l	
540-84-1	2,2,4-Trimethylpentane	50 U	100	50	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%	97%	80-120%
17060-07-0	1,2-Dichloroethane-D4	104%	100%	81-124%
2037-26-5	Toluene-D8	98%	98%	80-120%
460-00-4	4-Bromofluorobenzene	94%	95%	80-120%

(a) Diluted due to high concentraion of target compound.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116737.D	1	01/09/19 12:55	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	97%		56-145%
111-27-3	Hexanol	102%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30940.D	1	01/10/19 20:39	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.020	0.010	0.0054	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	75%		20-144%
3017-95-6	2-Bromo-1-chloropropane	72%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70316.D	1	01/10/19 13:16	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134889.D	5	01/10/19 13:05	PC	n/a	n/a	GWW5151
Run #3	AA70319.D	200	01/10/19 14:02	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	10200 [b]	22	12	12	ug/l	
74-84-0	Ethane	1.1	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	20700 [c]	250	52	22	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	9.7	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	97900	250	130	93	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	1.8 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	767	20	10	3.2	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:15	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:15	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 21:50	LS	SM4500NO2 B-11
Sulfate	0.58 J	2.0	1.0	0.38	mg/l	1	01/10/19 21:20	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-2		
Lab Sample ID:	JC80990-6F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	8.2	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	95200	250	130	93	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	723	20	10	3.2	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180821.D	1	01/09/19 12:44	EH	n/a	n/a	V2D7692
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	121	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	4.4	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	3.9	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	7.4	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	2.9	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	6.6	10	7.5	5.8	ug/l	J
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-120%
17060-07-0	1,2-Dichloroethane-D4	101%		81-124%
2037-26-5	Toluene-D8	97%		80-120%
460-00-4	4-Bromofluorobenzene	94%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116745.D	1	01/11/19 07:13	XPL	n/a	n/a	GGH6219
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	90%		56-145%
111-27-3	Hexanol	80%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30941.D	1	01/10/19 20:58	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	93%		20-144%
3017-95-6	2-Bromo-1-chloropropane	90%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70320.D	1	01/10/19 14:20	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134891.D	1	01/10/19 13:50	PC	n/a	n/a	GWW5151
Run #3	AA70322.D	100	01/10/19 14:49	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	5130 [b]	11	6.0	6.0	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	7160 [c]	50	10	4.4	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	1.6 J	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	6560	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	4.9	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	582	20	10	3.2	ug/l	10	01/09/19	01/11/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45972
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:16	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:16	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 22:00	LS	SM4500NO2 B-11
Sulfate	5.1	2.0	1.0	0.38	mg/l	1	01/10/19 22:32	NV	EPA 300/SW846 9056A
Sulfide	0.57 J	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-21(01072019)		
Lab Sample ID:	JC80990-7F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	1.3 J	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	4580	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	554	20	10	3.2	ug/l	10	01/09/19	01/11/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45972
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	2D180873.D	20	01/10/19 15:47	EH	n/a	n/a	V2D7694
Run #2	2D180829.D	100	01/09/19 16:40	EH	n/a	n/a	V2D7692

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	15300 [b]	50	45	43	ug/l	
108-88-3	Toluene	2410	20	15	11	ug/l	
100-41-4	Ethylbenzene	2480	20	15	12	ug/l	
1330-20-7	Xylene (total)	10100	20	15	12	ug/l	
91-20-3	Naphthalene	1060	100	40	20	ug/l	
107-06-2	1,2-Dichloroethane	15 U	20	15	12	ug/l	
98-82-8	Isopropylbenzene	256	20	15	13	ug/l	
1634-04-4	Methyl Tert Butyl Ether	15 U	20	15	10	ug/l	
75-65-0	Tert Butyl Alcohol	522	200	150	120	ug/l	
95-63-6	1,2,4-Trimethylbenzene	6530 [b]	200	150	100	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1500	40	30	20	ug/l	
540-84-1	2,2,4-Trimethylpentane	369	100	50	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	99%	98%	80-120%
17060-07-0	1,2-Dichloroethane-D4	103%	102%	81-124%
2037-26-5	Toluene-D8	99%	100%	80-120%
460-00-4	4-Bromofluorobenzene	97%	95%	80-120%

(a) Diluted due to high concentraion of target compound.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116748.D	1	01/11/19 08:08	XPL	n/a	n/a	GGH6219
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	109%		56-145%
111-27-3	Hexanol	121%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30942.D	1	01/10/19 21:17	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	68%		20-144%
3017-95-6	2-Bromo-1-chloropropane	90%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70323.D	1	01/10/19 15:03	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134894.D	5	01/10/19 14:44	PC	n/a	n/a	GWW5151
Run #3	AA70324.D	100	01/10/19 15:18	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	4040 [b]	11	6.0	6.0	ug/l	
74-84-0	Ethane	6.7	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	12600 [c]	250	52	22	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic [a]	34.2	15	10	4.7	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron [a]	91900	250	130	93	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead [a]	33.3	15	10	2.6	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	7820	200	100	32	ug/l	20	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

(a) Elevated sample detection limit due to difficult sample matrix.

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:17	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:17	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 22:00	LS	SM4500NO2 B-11
Sulfate	1.7 J	2.0	1.0	0.38	mg/l	1	01/10/19 22:56	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-67		
Lab Sample ID:	JC80990-8F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	14.0	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	24400	250	130	93	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]
Lead	0.64 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	7870	200	100	32	ug/l	100	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	2D180872.D	20	01/10/19 15:18	EH	n/a	n/a	V2D7694
Run #2	2D180827.D	100	01/09/19 15:41	EH	n/a	n/a	V2D7692

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	15100 [b]	50	45	43	ug/l	
108-88-3	Toluene	2490	20	15	11	ug/l	
100-41-4	Ethylbenzene	1400	20	15	12	ug/l	
1330-20-7	Xylene (total)	6150	20	15	12	ug/l	
91-20-3	Naphthalene	383	100	40	20	ug/l	
107-06-2	1,2-Dichloroethane	15 U	20	15	12	ug/l	
98-82-8	Isopropylbenzene	46.8	20	15	13	ug/l	
1634-04-4	Methyl Tert Butyl Ether	15 U	20	15	10	ug/l	
75-65-0	Tert Butyl Alcohol	192	200	150	120	ug/l	J
95-63-6	1,2,4-Trimethylbenzene	1140	40	30	20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	348	40	30	20	ug/l	
540-84-1	2,2,4-Trimethylpentane	50 U	100	50	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	98%	97%	80-120%
17060-07-0	1,2-Dichloroethane-D4	104%	100%	81-124%
2037-26-5	Toluene-D8	98%	98%	80-120%
460-00-4	4-Bromofluorobenzene	93%	93%	80-120%

(a) Diluted due to high concentraion of target compound.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116749.D	1	01/11/19 08:27	XPL	n/a	n/a	GGH6219
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	98%		56-145%
111-27-3	Hexanol	85%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30943.D	1	01/10/19 21:36	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0097 U	0.019	0.0097	0.0052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	66%		20-144%
3017-95-6	2-Bromo-1-chloropropane	72%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70325.D	1	01/10/19 15:44	PC	n/a	n/a	GAA1617
Run #2 [a]	WW134896.D	1	01/10/19 15:41	PC	n/a	n/a	GWW5151
Run #3	AA70326.D	100	01/10/19 16:02	PC	n/a	n/a	GAA1617

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	3680 [b]	11	6.0	6.0	ug/l	
74-84-0	Ethane	1.5	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	1.3	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	7450 [c]	50	10	4.4	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	6.8	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	6840	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 J	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	511	20	10	3.2	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9	**Date Sampled:**	01/07/19
Matrix:	AQ - Ground Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:18	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:18	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 22:00	LS	SM4500NO2 B-11
Sulfate	89.3	2.0	1.0	0.38	mg/l	1	01/10/19 23:19	NV	EPA 300/SW846 9056A
Sulfide	0.65 J	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-66(01072019)		
Lab Sample ID:	JC80990-9F	**Date Sampled:**	01/07/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	6.7	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Iron	4850	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [3]
Manganese	553	20	10	3.2	ug/l	10	01/09/19	01/14/19	ZC	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA45963
(2) Instrument QC Batch: MA45980
(3) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10	**Date Sampled:**	01/07/19
Matrix:	AQ - Equipment Blank	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180864.D	1	01/10/19 11:20	EH	n/a	n/a	V2D7694
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-120%
17060-07-0	1,2-Dichloroethane-D4	100%		81-124%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	96%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10	**Date Sampled:**	01/07/19
Matrix:	AQ - Equipment Blank	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116739.D	1	01/09/19 13:32	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	113%		56-145%
111-27-3	Hexanol	85%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10	**Date Sampled:**	01/07/19
Matrix:	AQ - Equipment Blank	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30944.D	1	01/10/19 21:54	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	89%		20-144%
3017-95-6	2-Bromo-1-chloropropane	88%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10	**Date Sampled:**	01/07/19
Matrix:	AQ - Equipment Blank	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70333.D	1	01/11/19 09:49	PC	n/a	n/a	GAA1618
Run #2 [a]	WW134902.D	1	01/11/19 09:49	PC	n/a	n/a	GWW5152

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	0.29	0.11	0.060	0.060	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	187 [b]	50	10	4.4	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10	**Date Sampled:**	01/07/19
Matrix:	AQ - Equipment Blank	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Manganese	1.3 J	4.0	2.0	0.63	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA45963
(2) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10	**Date Sampled:**	01/07/19
Matrix:	AQ - Equipment Blank	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:19	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:19	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 22:00	LS	SM4500NO2 B-11
Sulfate	1.0 U	2.0	1.0	0.38	mg/l	1	01/10/19 23:43	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	EB-010719		
Lab Sample ID:	JC80990-10F	**Date Sampled:**	01/07/19
Matrix:	AQ - Equip Blank Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Manganese	1.2 J	4.0	2.0	0.63	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA45963
(2) Prep QC Batch: MP12001

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-010719		
Lab Sample ID:	JC80990-11	**Date Sampled:**	01/07/19
Matrix:	AQ - Field Blank Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180863.D	1	01/10/19 10:51	EH	n/a	n/a	V2D7694
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-120%
17060-07-0	1,2-Dichloroethane-D4	100%		81-124%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	95%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-010719		
Lab Sample ID:	JC80990-11	**Date Sampled:**	01/07/19
Matrix:	AQ - Field Blank Water	**Date Received:**	01/08/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH116738.D	1	01/09/19 13:13	XPL	n/a	n/a	GGH6218
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	107%		56-145%
111-27-3	Hexanol	81%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-010719		
Lab Sample ID:	JC80990-11	**Date Sampled:**	01/07/19
Matrix:	AQ - Field Blank Water	**Date Received:**	01/08/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G30945.D	1	01/10/19 22:13	VDT	01/10/19 13:45	OP17739	G7G1085
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.020	0.010	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	86%		20-144%
3017-95-6	2-Bromo-1-chloropropane	84%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-010719		
Lab Sample ID:	JC80990-11	**Date Sampled:**	01/07/19
Matrix:	AQ - Field Blank Water	**Date Received:**	01/08/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA70334.D	1	01/11/19 10:02	PC	n/a	n/a	GAA1618
Run #2 [a]	WW134903.D	1	01/11/19 10:07	PC	n/a	n/a	GWW5152

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	0.26	0.11	0.060	0.060	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	357 [b]	50	10	4.4	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: FB-010719
Lab Sample ID: JC80990-11
Matrix: AQ - Field Blank Water
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Date Sampled: 01/07/19
Date Received: 01/08/19
Percent Solids: n/a

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Manganese	1.2 J	4.0	2.0	0.63	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA45963
(2) Prep QC Batch: MP12002

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	FB-010719		
Lab Sample ID:	JC80990-11	**Date Sampled:**	01/07/19
Matrix:	AQ - Field Blank Water	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.11 U	0.11	0.11	0.093	mg/l	1	01/17/19 16:23	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.10 U	0.10	0.10	0.090	mg/l	1	01/17/19 16:23	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	01/08/19 22:00	LS	SM4500NO2 B-11
Sulfate	1.0 U	2.0	1.0	0.38	mg/l	1	01/11/19 00:07	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	01/11/19 15:40	ST	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	FB-010719		
Lab Sample ID:	JC80990-11F	**Date Sampled:**	01/07/19
Matrix:	AQ - Field Blank Filtered	**Date Received:**	01/08/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]
Manganese	1.6 J	4.0	2.0	0.63	ug/l	2	01/09/19	01/10/19	ZC	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA45963
(2) Prep QC Batch: MP12002

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	JC80990-12	**Date Sampled:**	01/07/19
Matrix:	AQ - Trip Blank Water	**Date Received:**	01/08/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2D180862.D	1	01/10/19 10:21	EH	n/a	n/a	V2D7694
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	100%		80-120%
17060-07-0	1,2-Dichloroethane-D4	101%		81-124%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	95%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody
- Sample Tracking Chronicle
- Internal Chain of Custody
- QC Evaluation: DOD QSM5 Limits

Parameter Certification Exceptions

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

The following parameters included in this report are exceptions to NELAC certification.
The certification status of each is indicated below.

Parameter	CAS#	Method	Mat	Certification Status
2,2,4-Trimethylpentane	540-84-1	SW846 8260C	AQ	SGS is not certified for this parameter.[a]

(a) Lab cert for analyte not supported by NJDEP, OQA. Only methods/analytes required for reporting by the State of NJ can be certified in NJ. Use of this analyte for compliance must be verified through the appropriate regulatory office.

Certification exceptions shown are based on the New Jersey DEP certifications. Applicability in other states may vary. Please contact your laboratory representative if additional information is required for a specific regulatory program.

SGS ACCUTEST

GW EB FB WB

CHAIN OF CUSTODY

SGS Accutest - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.accutest.com

PAGE 1 OF 2

E

FED-EX Tracking #: | Bottle Order Control #:
SGS Accutest Quote #: | SGS Accutest Job #: JC80990

Client / Reporting Information

Company Name: USACE
Street Address: 100 PENN SQ EAST
City: PHILA State: PA Zip: 19107
Project Contact: JOE LOEPER E-mail:
Phone #: 215-656-6545 Fax #:
Sampler(s) Name(s): ARCADIS / PARS Phone #:

Project Information

Project Name: DSCP
Street: 2990 D, S. 20TH ST.
City: PHILA State: PA
Project #:
Client Purchase Order #:
Project Manager: JOE LOEPER

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB-Field Blank
EB-Equipment Blank
RB- Rinse Blank
TB-Trip Blank

SGS Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	TEST CODE: Total Metals (As,Pb,Mn,Fe)	S	SO4	XN030	VRSK175C02	VRSK175DGMEE	Diss Metals (As,Pb,Mn,Fe)	D8015ETHL	V8011EDB	V8260 PAL3-TMS, VMS+TGA, VMS+224TM VMS+MTBE		LAB USE ONLY
1F	PH-RW-A2 (01072019)		1-7-19	0956	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		A36
2F	PH-RW-B		1-7-19	1010	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		M19
3F	PH-RW-B2 (DUP)		1-7-19	1135	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		V147
4F	PH-RW-B2		1-7-19	1135	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		V148
5F	PH-RW-A (01072019)		1-7-19	1147	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		V149
6F	PH-PH-2		1-7-19	1330	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		V150
	PH-PH-21 (01072019)		1-7-19	1344	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		
7F	PH-PH-21 (01072019)MS		1-7-19	1344	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		
	PH-PH-21 (01072019)MSD		1-7-19	1344	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		
8F	PH-MW-67		1-7-19	1515	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		
9F	PH-MW-66 (01072019)		1-7-19	1540	DH	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X		
10F	EB-010719		1-7-19	1645	DH	FB	18	9	2	2	1	4				X	X	X	X	X	X	X	X	X	X		

Turnaround Time (Business days)

Approved By (SGS Accutest PM): / Date:

- [x] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day RUSH
- [ ] 2 Day RUSH
- [ ] 1 Day RUSH
- [ ] other

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [x] NJ Reduced
- [ ] Commercial "C"
- [ ] NJ Data of Known Quality Protocol Reporting
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [ ] Other

Commercial "A" = Results Only, Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

PDF DATA PACKAGE ONLY

INITIAL ASSESSMENT 26 (H)

LABEL VERIFICATION
Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		1-8-19 1135	1	2	1/9/19 1425	2
3		1/9/19 1910	3	4	Date Time:	4
5	Relinquished by:	Date Time:	5	Custody Seal #	[ ] Intact [ ] Not intact	Preserved where applicable [ ] On Ice: 1.4, 1.4, 2.2

5.2 5

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PAGE 2 OF 2

FED-EX Tracking #:
Bottle Order Control #:
SGS Accutest Quote #:
SGS Accutest Job #: JC80990

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Company Name: USACE
Street Address: 100 PENN SQ EAST
City: PHILA State: PA Zip: 19107
Project Contact: JOE LOEPER E-mail:
Phone #: 215-656-6545 Fax #:
Sampler(s) Name(s): ARCADIS / PARS Phone #:

Project Information

Project Name: DSCP
Street: 2990 B, S. 20TH ST.
City: PHILA State: PA
Project #:
Client Purchase Order #:
Project Manager: JOE LOEPER

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis

Matrix Codes: DW - Drinking Water; GW - Ground Water; WW - Water; SW - Surface Water; SO - Soil; SL - Sludge; SED-Sediment; OI - Oil; LIQ - Other Liquid; AIR - Air; SOL - Other Solid; WP - Wipe; FB-Field Blank; EB-Equipment Blank; RB- Rinse Blank; TB-Trip Blank

SGS Accutest Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Matrix	# of bottles	HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	VOA 260 PAL STMS, VMS+TBA, VMS, 2247m VMS+MTBE	VASK175002	VASK175DGMEE	0155 METALS (As, Pb, Mn, Fe)	TOTAL METALS (As, Pb, Mn, Fe)	08015 ETHL	V8011 EDB	S	SO4	XNO3O	LAB USE ONLY
11F	FB-010719		1-7-19	1650	DH	FB	17	8	2	2	1	4				X	X	X	X	X	X	X	X	X	X	
12	TRIP BLANK		1-3-19	0700	-	TB	84	4								X										

Turnaround Time (Business days)

- [x] Std. 10 Business Days
- [ ] 5 Day RUSH
- [ ] 3 Day RUSH
- [ ] 2 Day RUSH
- [ ] 1 Day RUSH
- [ ] other

Approved By (SGS Accutest PM): / Date:

Emergency & Rush T/A data available VIA Lablink

Data Deliverable Information

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [ ] FULLT1 (Level 3+4)
- [x] NJ Reduced
- [ ] Commercial "C"
- [ ] NJ Data of Known Quality Protocol Reporting
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] State Forms
- [ ] EDD Format
- [ ] Other

Commercial "A" = Results Only, Commercial "B" = Results + QC Summary
NJ Reduced = Results + QC Summary + Partial Raw data

Comments / Special Instructions

POF DATA PACKAGE ONLY

Sample inventory is verified upon receipt in the Laboratory

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		1-8-19 1135		2	1/9/19 1425	2
3		1/9/19 1910	3	4		4
5			5	Custody Seal #	☐ Intact ☐ Not Intact	Preserved where applicable ☐ On Ice ☐ Cooler Temp 1.9 1.4, 2.2 °C

5.2 5

SGS Sample Receipt Summary

Job Number: JC80990 **Client:** USACE-PHILADELPHIA DISTRICT **Project:** DEFENSE SUPPLY CENTER (DSCP), 2990 SO

Date / Time Received: 1/8/2019 6:10:00 PM **Delivery Method:** **Airbill #'s:**

Cooler Temps (Raw Measured) °C: Cooler 1: (1.9); Cooler 2: (1.4); Cooler 3: (2.2);

Cooler Temps (Corrected) °C: Cooler 1: (1.6); Cooler 2: (1.1); Cooler 3: (1.9);

Cooler Security	Y	N		Y	N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	N
1. Temp criteria achieved:	☑	☐
2. Cooler temp verification:	IR Gun	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	3	

Quality Control Preservation	Y	N	N/A
1. Trip Blank present / cooler:	☑	☐	☐
2. Trip Blank listed on COC:	☑	☐	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y	N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Test Strip Lot #s: pH 1-12: 206717 pH 12+: 208717 Other: (Specify)

Comments

SM089-03
Rev. Date 12/7/17

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-1	Collected: 07-JAN-19 09:56 By: DH		Received: 08-JAN-19 By: AS			
PH-RW-A2(01072019)						
JC80990-1	SM4500NO2 B-11	08-JAN-19 21:50	LS			NO2
JC80990-1	SW846-8015D (DAI)	09-JAN-19 11:23	XPL			D8015ETHL
JC80990-1	SW846 8260C	09-JAN-19 13:43	EH			V8260PALGTMB
JC80990-1	RSK-175	10-JAN-19 09:49	PC			VRSK175DGMEE
JC80990-1	RSK-175	10-JAN-19 10:19	PC			VRSK175DGMEE
JC80990-1	RSK-175	10-JAN-19 10:21	PC			VRSK175CO2
JC80990-1	SW846 8260C	10-JAN-19 13:19	EH			V8260PALGTMB
JC80990-1	SW846-8011	10-JAN-19 18:28	VDT	10-JAN-19	CC	V8011EDB
JC80990-1	EPA 300/SW846 9056A	10-JAN-19 18:32	NV	10-JAN-19	NV	SO4
JC80990-1	SW846 6020B	10-JAN-19 20:27	ZC	09-JAN-19	TG	ASMS,PBMS
JC80990-1	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-1	SW846 6020B	11-JAN-19 18:06	ZC	09-JAN-19	TG	FEMS
JC80990-1	SW846 6020B	11-JAN-19 18:11	ZC	09-JAN-19	TG	MNMS
JC80990-1	EPA353.2/SM4500NO2B	17-JAN-19 16:09	KI			NO3O
JC80990-1	EPA 353.2/LACHAT	17-JAN-19 16:09	KI	17-JAN-19	KI	NO32
JC80990-2	Collected: 07-JAN-19 10:10 By: DH		Received: 08-JAN-19 By: AS			
PH-RW-B						
JC80990-2	SM4500NO2 B-11	08-JAN-19 21:50	LS			NO2
JC80990-2	SW846-8015D (DAI)	09-JAN-19 11:41	XPL			D8015ETHL
JC80990-2	RSK-175	10-JAN-19 10:32	PC			VRSK175DGMEE
JC80990-2	RSK-175	10-JAN-19 10:47	PC			VRSK175DGMEE
JC80990-2	RSK-175	10-JAN-19 10:57	PC			VRSK175CO2
JC80990-2	SW846 8260C	10-JAN-19 11:50	EH			V8260PALGTMB
JC80990-2	SW846-8011	10-JAN-19 18:47	VDT	10-JAN-19	CC	V8011EDB
JC80990-2	EPA 300/SW846 9056A	10-JAN-19 18:56	NV	10-JAN-19	NV	SO4
JC80990-2	SW846 6020B	10-JAN-19 20:37	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-2	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-2	SW846 6020B	11-JAN-19 18:16	ZC	09-JAN-19	TG	MNMS
JC80990-2	EPA353.2/SM4500NO2B	17-JAN-19 16:10	KI			NO3O
JC80990-2	EPA 353.2/LACHAT	17-JAN-19 16:10	KI	17-JAN-19	KI	NO32
JC80990-3	Collected: 07-JAN-19 11:35 By: DH		Received: 08-JAN-19 By: AS			
PH-RW-B2(DUP)						
JC80990-3	SM4500NO2 B-11	08-JAN-19 21:50	LS			NO2

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-3	SW846-8015D (DAI)	09-JAN-19 12:00	XPL			D8015ETHL
JC80990-3	RSK-175	10-JAN-19 11:00	PC			VRSK175DGMEE
JC80990-3	RSK-175	10-JAN-19 11:13	PC			VRSK175DGMEE
JC80990-3	RSK-175	10-JAN-19 11:14	PC			VRSK175CO2
JC80990-3	SW846 8260C	10-JAN-19 12:19	EH			V8260PALGTMB
JC80990-3	SW846-8011	10-JAN-19 19:06	VDT	10-JAN-19	CC	V8011EDB
JC80990-3	EPA 300/SW846 9056A	10-JAN-19 19:20	NV	10-JAN-19	NV	SO4
JC80990-3	SW846 6020B	10-JAN-19 20:41	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-3	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-3	SW846 6020B	14-JAN-19 14:22	ZC	09-JAN-19	TG	MNMS
JC80990-3	EPA353.2/SM4500NO2B	17-JAN-19 16:11	KI			NO3O
JC80990-3	EPA 353.2/LACHAT	17-JAN-19 16:11	KI	17-JAN-19	KI	NO32
JC80990-4	Collected: 07-JAN-19 11:35 By: DH		Received: 08-JAN-19 By: AS			
PH-RW-B2						
JC80990-4	SM4500NO2 B-11	08-JAN-19 21:50	LS			NO2
JC80990-4	SW846-8015D (DAI)	09-JAN-19 12:18	XPL			D8015ETHL
JC80990-4	SW846 8260C	09-JAN-19 13:13	EH			V8260PALGTMB
JC80990-4	RSK-175	10-JAN-19 11:29	PC			VRSK175DGMEE
JC80990-4	RSK-175	10-JAN-19 11:30	PC			VRSK175CO2
JC80990-4	RSK-175	10-JAN-19 11:42	PC			VRSK175DGMEE
JC80990-4	SW846 8260C	10-JAN-19 14:18	EH			V8260PALGTMB
JC80990-4	SW846-8011	10-JAN-19 19:24	VDT	10-JAN-19	CC	V8011EDB
JC80990-4	EPA 300/SW846 9056A	10-JAN-19 19:44	NV	10-JAN-19	NV	SO4
JC80990-4	SW846 6020B	10-JAN-19 20:56	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-4	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-4	SW846 6020B	14-JAN-19 14:27	ZC	09-JAN-19	TG	MNMS
JC80990-4	EPA353.2/SM4500NO2B	17-JAN-19 16:13	KI			NO3O
JC80990-4	EPA 353.2/LACHAT	17-JAN-19 16:13	KI	17-JAN-19	KI	NO32
JC80990-5	Collected: 07-JAN-19 11:47 By: DH		Received: 08-JAN-19 By: AS			
PH-RW-A(01072019)						
JC80990-5	SM4500NO2 B-11	08-JAN-19 21:50	LS			NO2
JC80990-5	SW846-8015D (DAI)	09-JAN-19 12:37	XPL			D8015ETHL
JC80990-5	SW846 8260C	09-JAN-19 17:10	EH			V8260PALGTMB
JC80990-5	RSK-175	10-JAN-19 11:48	PC			VRSK175CO2
JC80990-5	RSK-175	10-JAN-19 11:54	PC			VRSK175DGMEE
JC80990-5	RSK-175	10-JAN-19 13:03	PC			VRSK175DGMEE

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-5	SW846 8260C	10-JAN-19 13:48	EH			V8260PALGTMB
JC80990-5	SW846-8011	10-JAN-19 19:43	VDT	10-JAN-19	CC	V8011EDB
JC80990-5	EPA 300/SW846 9056A	10-JAN-19 20:08	NV	10-JAN-19	NV	SO4
JC80990-5	SW846 6020B	10-JAN-19 21:00	ZC	09-JAN-19	TG	ASMS,PBMS
JC80990-5	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-5	SW846 6020B	14-JAN-19 14:32	ZC	09-JAN-19	TG	FEMS,MNMS
JC80990-5	EPA353.2/SM4500NO2B	17-JAN-19 16:14	KI			NO3O
JC80990-5	EPA 353.2/LACHAT	17-JAN-19 16:14	KI	17-JAN-19	KI	NO32
JC80990-6	Collected: 07-JAN-19 13:30 By: DH		Received: 08-JAN-19 By: AS			
PH-PH-2						
JC80990-6	SM4500NO2 B-11	08-JAN-19 21:50	LS			NO2
JC80990-6	SW846-8015D (DAI)	09-JAN-19 12:55	XPL			D8015ETHL
JC80990-6	SW846 8260C	09-JAN-19 16:11	EH			V8260PALGTMB
JC80990-6	RSK-175	10-JAN-19 13:05	PC			VRSK175CO2
JC80990-6	RSK-175	10-JAN-19 13:16	PC			VRSK175DGMEE
JC80990-6	RSK-175	10-JAN-19 14:02	PC			VRSK175DGMEE
JC80990-6	SW846 8260C	10-JAN-19 14:48	EH			V8260PALGTMB
JC80990-6	SW846-8011	10-JAN-19 20:39	VDT	10-JAN-19	CC	V8011EDB
JC80990-6	SW846 6020B	10-JAN-19 21:05	ZC	09-JAN-19	TG	ASMS,PBMS
JC80990-6	EPA 300/SW846 9056A	10-JAN-19 21:20	NV	10-JAN-19	NV	SO4
JC80990-6	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-6	SW846 6020B	14-JAN-19 14:42	ZC	09-JAN-19	TG	FEMS,MNMS
JC80990-6	EPA353.2/SM4500NO2B	17-JAN-19 16:15	KI			NO3O
JC80990-6	EPA 353.2/LACHAT	17-JAN-19 16:15	KI	17-JAN-19	KI	NO32
JC80990-7	Collected: 07-JAN-19 13:44 By: DH		Received: 08-JAN-19 By: AS			
PH-PH-21(01072019)						
JC80990-7	SM4500NO2 B-11	08-JAN-19 22:00	LS			NO2
JC80990-7	SW846 8260C	09-JAN-19 12:44	EH			V8260PALGTMB
JC80990-7	RSK-175	10-JAN-19 13:50	PC			VRSK175CO2
JC80990-7	RSK-175	10-JAN-19 14:20	PC			VRSK175DGMEE
JC80990-7	RSK-175	10-JAN-19 14:49	PC			VRSK175DGMEE
JC80990-7	SW846 6020B	10-JAN-19 19:33	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-7	SW846-8011	10-JAN-19 20:58	VDT	10-JAN-19	CC	V8011EDB
JC80990-7	EPA 300/SW846 9056A	10-JAN-19 22:32	NV	10-JAN-19	NV	SO4
JC80990-7	SW846-8015D (DAI)	11-JAN-19 07:13	XPL			D8015ETHL
JC80990-7	SM4500S2- F-11	11-JAN-19 15:40	ST			S

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-7	SW846 6020B	11-JAN-19 16:44	ZC	09-JAN-19	TG	MNMS
JC80990-7	EPA353.2/SM4500NO2B	17-JAN-19 16:16	KI			NO3O
JC80990-7	EPA 353.2/LACHAT	17-JAN-19 16:16	KI	17-JAN-19	KI	NO32
JC80990-8	Collected: 07-JAN-19 15:15 By: DH		Received: 08-JAN-19 By: AS			
PH-MW-67						
JC80990-8	SM4500NO2 B-11	08-JAN-19 22:00	LS			NO2
JC80990-8	SW846 8260C	09-JAN-19 16:40	EH			V8260PALGTMB
JC80990-8	RSK-175	10-JAN-19 14:44	PC			VRSK175CO2
JC80990-8	RSK-175	10-JAN-19 15:03	PC			VRSK175DGMEE
JC80990-8	RSK-175	10-JAN-19 15:18	PC			VRSK175DGMEE
JC80990-8	SW846 8260C	10-JAN-19 15:47	EH			V8260PALGTMB
JC80990-8	SW846 6020B	10-JAN-19 21:14	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-8	SW846-8011	10-JAN-19 21:17	VDT	10-JAN-19	CC	V8011EDB
JC80990-8	EPA 300/SW846 9056A	10-JAN-19 22:56	NV	10-JAN-19	NV	SO4
JC80990-8	SW846-8015D (DAI)	11-JAN-19 08:08	XPL			D8015ETHL
JC80990-8	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-8	SW846 6020B	14-JAN-19 14:47	ZC	09-JAN-19	TG	MNMS
JC80990-8	EPA353.2/SM4500NO2B	17-JAN-19 16:17	KI			NO3O
JC80990-8	EPA 353.2/LACHAT	17-JAN-19 16:17	KI	17-JAN-19	KI	NO32
JC80990-9	Collected: 07-JAN-19 15:40 By: DH		Received: 08-JAN-19 By: AS			
PH-MW-66(01072019)						
JC80990-9	SM4500NO2 B-11	08-JAN-19 22:00	LS			NO2
JC80990-9	SW846 8260C	09-JAN-19 15:41	EH			V8260PALGTMB
JC80990-9	SW846 8260C	10-JAN-19 15:18	EH			V8260PALGTMB
JC80990-9	RSK-175	10-JAN-19 15:41	PC			VRSK175CO2
JC80990-9	RSK-175	10-JAN-19 15:44	PC			VRSK175DGMEE
JC80990-9	RSK-175	10-JAN-19 16:02	PC			VRSK175DGMEE
JC80990-9	SW846 6020B	10-JAN-19 21:19	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-9	SW846-8011	10-JAN-19 21:36	VDT	10-JAN-19	CC	V8011EDB
JC80990-9	EPA 300/SW846 9056A	10-JAN-19 23:19	NV	10-JAN-19	NV	SO4
JC80990-9	SW846-8015D (DAI)	11-JAN-19 08:27	XPL			D8015ETHL
JC80990-9	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-9	SW846 6020B	14-JAN-19 14:52	ZC	09-JAN-19	TG	MNMS
JC80990-9	EPA353.2/SM4500NO2B	17-JAN-19 16:18	KI			NO3O
JC80990-9	EPA 353.2/LACHAT	17-JAN-19 16:18	KI	17-JAN-19	KI	NO32

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-10 Collected: 07-JAN-19 16:45 By: DH EB-010719			Received: 08-JAN-19 By: AS			
JC80990-10	SM4500NO2 B-11	08-JAN-19 22:00	LS			NO2
JC80990-10	SW846-8015D (DAI)	09-JAN-19 13:32	XPL			D8015ETHL
JC80990-10	SW846 8260C	10-JAN-19 11:20	EH			V8260PALGTMB
JC80990-10	SW846 6020B	10-JAN-19 19:05	ZC	09-JAN-19	TG	ASMS,FEMS,MNMS,PBMS
JC80990-10	SW846-8011	10-JAN-19 21:54	VDT	10-JAN-19	CC	V8011EDB
JC80990-10	EPA 300/SW846 9056A	10-JAN-19 23:43	NV	10-JAN-19	NV	SO4
JC80990-10	RSK-175	11-JAN-19 09:49	PC			VRSK175CO2,VRSK175DGMEE
JC80990-10	RSK-175	11-JAN-19 09:49	PC			VRSK175CO2,VRSK175DGMEE
JC80990-10	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-10	EPA353.2/SM4500NO2B	17-JAN-19 16:19	KI			NO3O
JC80990-10	EPA 353.2/LACHAT	17-JAN-19 16:19	KI	17-JAN-19	KI	NO32
JC80990-11 Collected: 07-JAN-19 16:50 By: DH FB-010719			Received: 08-JAN-19 By: AS			
JC80990-11	SM4500NO2 B-11	08-JAN-19 22:00	LS			NO2
JC80990-11	SW846-8015D (DAI)	09-JAN-19 13:13	XPL			D8015ETHL
JC80990-11	SW846 8260C	10-JAN-19 10:51	EH			V8260PALGTMB
JC80990-11	SW846 6020B	10-JAN-19 18:46	ZC	09-JAN-19	TG	ASMS,FEMS,MNMS,PBMS
JC80990-11	SW846-8011	10-JAN-19 22:13	VDT	10-JAN-19	CC	V8011EDB
JC80990-11	EPA 300/SW846 9056A	11-JAN-19 00:07	NV	10-JAN-19	NV	SO4
JC80990-11	RSK-175	11-JAN-19 10:02	PC			VRSK175DGMEE
JC80990-11	RSK-175	11-JAN-19 10:07	PC			VRSK175CO2
JC80990-11	SM4500S2- F-11	11-JAN-19 15:40	ST			S
JC80990-11	EPA353.2/SM4500NO2B	17-JAN-19 16:23	KI			NO3O
JC80990-11	EPA 353.2/LACHAT	17-JAN-19 16:23	KI	17-JAN-19	KI	NO32
JC80990-12 Collected: 07-JAN-19 16:50 By: DH TRIP BLANK			Received: 08-JAN-19 By: AS			
JC80990-12	SW846 8260C	10-JAN-19 10:21	EH			V8260PALGTMB
JC80990-1F Collected: 07-JAN-19 09:56 By: DH PH-RW-A2(01072019)			Received: 08-JAN-19 By: AS			
JC80990-1F	SW846 6020B	10-JAN-19 21:29	ZC	09-JAN-19	TG	ASMS,PBMS

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-1F	SW846 6020B	14-JAN-19 15:08	ZC	09-JAN-19	TG	FEMS
JC80990-1F	SW846 6020B	14-JAN-19 15:13	ZC	09-JAN-19	TG	MNMS
JC80990-2F Collected: 07-JAN-19 10:10 By: DH Received: 08-JAN-19 By: AS PH-RW-B						
JC80990-2F	SW846 6020B	10-JAN-19 21:33	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-2F	SW846 6020B	14-JAN-19 15:18	ZC	09-JAN-19	TG	MNMS
JC80990-3F Collected: 07-JAN-19 11:35 By: DH Received: 08-JAN-19 By: AS PH-RW-B2(DUP)						
JC80990-3F	SW846 6020B	10-JAN-19 21:47	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-3F	SW846 6020B	14-JAN-19 15:23	ZC	09-JAN-19	TG	MNMS
JC80990-4F Collected: 07-JAN-19 11:35 By: DH Received: 08-JAN-19 By: AS PH-RW-B2						
JC80990-4F	SW846 6020B	10-JAN-19 21:52	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-4F	SW846 6020B	14-JAN-19 15:33	ZC	09-JAN-19	TG	MNMS
JC80990-5F Collected: 07-JAN-19 11:47 By: DH Received: 08-JAN-19 By: AS PH-RW-A(01072019)						
JC80990-5F	SW846 6020B	10-JAN-19 22:02	ZC	09-JAN-19	TG	ASMS,PBMS
JC80990-5F	SW846 6020B	14-JAN-19 15:43	ZC	09-JAN-19	TG	FEMS,MNMS
JC80990-6F Collected: 07-JAN-19 13:30 By: DH Received: 08-JAN-19 By: AS PH-PH-2						
JC80990-6F	SW846 6020B	10-JAN-19 22:06	ZC	09-JAN-19	TG	ASMS,PBMS
JC80990-6F	SW846 6020B	14-JAN-19 15:48	ZC	09-JAN-19	TG	FEMS,MNMS
JC80990-7F Collected: 07-JAN-19 13:44 By: DH Received: 08-JAN-19 By: AS PH-PH-21(01072019)						
JC80990-7F	SW846 6020B	10-JAN-19 20:08	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-7F	SW846 6020B	11-JAN-19 17:51	ZC	09-JAN-19	TG	MNMS

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC80990

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: W912BU18D00003 / W912BU18F0042

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC80990-8F	Collected: 07-JAN-19 15:15 By: DH			Received: 08-JAN-19 By: AS		
PH-MW-67						
JC80990-8F	SW846 6020B	10-JAN-19 22:16	ZC	09-JAN-19	TG	ASMS,PBMS
JC80990-8F	SW846 6020B	14-JAN-19 16:04	ZC	09-JAN-19	TG	FEMS
JC80990-8F	SW846 6020B	14-JAN-19 16:09	ZC	09-JAN-19	TG	MNMS
JC80990-9F	Collected: 07-JAN-19 15:40 By: DH			Received: 08-JAN-19 By: AS		
PH-MW-66(01072019)						
JC80990-9F	SW846 6020B	10-JAN-19 22:20	ZC	09-JAN-19	TG	ASMS,FEMS,PBMS
JC80990-9F	SW846 6020B	14-JAN-19 16:14	ZC	09-JAN-19	TG	MNMS
JC80990-10F	Collected: 07-JAN-19 16:45 By: DH			Received: 08-JAN-19 By: AS		
EB-010719						
JC80990-10F	SW846 6020B	10-JAN-19 19:10	ZC	09-JAN-19	TG	ASMS,FEMS,MNMS,PBMS
JC80990-11F	Collected: 07-JAN-19 16:50 By: DH			Received: 08-JAN-19 By: AS		
FB-010719						
JC80990-11F	SW846 6020B	10-JAN-19 18:51	ZC	09-JAN-19	TG	ASMS,FEMS,MNMS,PBMS

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-1.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-1.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-1.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-1.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-1.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-1.1
JC80990-1.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-1.1
JC80990-1.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-1.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-1.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-1.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-1.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-1.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-1.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-1.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-1.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-1.4	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-1.4	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-1.4	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-1.4	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-1.5	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-1.5	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-1.5	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-1.5	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-1.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-1.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-1.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-1.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-1.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-1.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-1.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-1.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-1.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-1.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-1.8	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-1.8	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-1.8	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-1.8	Paul Cordova-Wong		01/11/19 16:22	Depleted

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-1.10	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-1.10	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-1.10	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-1.10	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-1.11	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-1.11	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-1.11	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-1.11	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-1.11	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-1.11	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-1.11.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-1.11
JC80990-1.11.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-1.11
JC80990-1.11.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-1.11.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-1.11.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-1.11.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-1.11.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-1.12	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-1.12	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-1.13	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-1.13	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-1.13	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-1.13	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-1.16	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-1.16	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument
JC80990-1.16	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-1.16	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-1F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-1F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-1F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-1F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-1F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-1F.2
JC80990-1F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-1F.2
JC80990-1F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-2.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-2.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-2.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-2.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-2.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-2.1
JC80990-2.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-2.1
JC80990-2.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-2.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-2.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-2.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-2.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-2.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-2.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-2.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-2.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-2.4	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-2.4	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-2.4	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-2.4	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-2.5	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-2.5	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-2.5	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-2.5	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-2.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-2.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-2.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-2.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-2.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-2.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-2.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-2.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-2.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-2.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-2.8	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-2.8	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-2.8	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-2.8	Paul Cordova-Wong		01/11/19 16:22	Depleted

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-2.10	Secured Storage	Eddie Huang	01/10/19 10:08	Retrieve from Storage
JC80990-2.10	Eddie Huang	GCMS2D	01/10/19 10:08	Load on Instrument
JC80990-2.10	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-2.10	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-2.15	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-2.15	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-2.15	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-2.15	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-2.15	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-2.15	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-2.15.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-2.15
JC80990-2.15.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-2.15
JC80990-2.15.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-2.15.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-2.15.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-2.15.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-2.15.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-2.16	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-2.16	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-2.16	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-2.16	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-2.17	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-2.17	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-2F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-2F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-2F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-2F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-2F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-2F.2
JC80990-2F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-2F.2
JC80990-2F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-3.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-3.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-3.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-3.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-3.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-3.1
JC80990-3.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-3.1

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-3.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-3.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-3.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-3.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-3.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-3.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-3.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-3.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-3.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-3.4	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-3.4	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-3.4	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-3.4	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-3.5	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-3.5	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-3.5	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-3.5	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-3.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-3.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-3.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-3.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-3.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-3.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-3.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-3.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-3.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-3.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-3.8	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-3.8	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-3.8	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-3.8	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-3.10	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-3.10	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument
JC80990-3.10	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-3.10	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-3.11	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-3.11	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-3.12	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-3.12	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-3.12	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-3.12	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-3.12	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-3.12	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-3.12.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-3.12
JC80990-3.12.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-3.12
JC80990-3.12.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-3.12.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-3.12.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-3.12.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-3.12.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-3.16	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-3.16	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-3.16	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-3.16	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-3F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-3F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-3F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-3F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-3F.2	Secured Storage	Sierra Neuman	01/15/19 14:43	Retrieve from Storage
JC80990-3F.2	Sierra Neuman	Secured Storage	01/16/19 08:06	Return to Storage
JC80990-3F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-3F.2
JC80990-3F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-3F.2
JC80990-3F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-4.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-4.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-4.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-4.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-4.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-4.1
JC80990-4.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-4.1
JC80990-4.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-4.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-4.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-4.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-4.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-4.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-4.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-4.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-4.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-4.4	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-4.4	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-4.4	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-4.4	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-4.5	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-4.5	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-4.5	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-4.5	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-4.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-4.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-4.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-4.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-4.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-4.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-4.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-4.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-4.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-4.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-4.8	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-4.8	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-4.8	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-4.8	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-4.10	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-4.10	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-4.11	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-4.11	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-4.11	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-4.11	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-4.12	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-4.12	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-4.12	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-4.12	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-4.16	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-4.16	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-4.16	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-4.16	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-4.16	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-4.16	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-4.16.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-4.16
JC80990-4.16.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-4.16
JC80990-4.16.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-4.16.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-4.16.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-4.16.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-4.16.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-4.18	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-4.18	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-4.18	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-4.18	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-4F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-4F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-4F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-4F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-4F.2	Secured Storage	Sierra Neuman	01/15/19 14:43	Retrieve from Storage
JC80990-4F.2	Sierra Neuman	Secured Storage	01/16/19 08:06	Return to Storage
JC80990-4F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-4F.2
JC80990-4F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-4F.2
JC80990-4F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-5.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-5.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-5.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-5.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-5.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-5.1
JC80990-5.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-5.1
JC80990-5.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-5.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-5.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-5.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-5.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-5.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-5.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-5.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-5.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-5.4	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-5.4	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-5.4	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-5.4	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-5.5	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-5.5	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-5.5	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-5.5	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-5.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-5.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-5.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-5.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-5.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-5.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-5.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-5.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-5.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-5.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-5.9	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-5.9	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-5.9	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-5.9	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-5.10	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-5.10	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-5.10	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-5.10	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-5.12	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-5.12	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument
JC80990-5.12	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-5.12	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-5.17	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-5.17	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-5.17	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-5.17	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-5.17	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-5.17	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-5.17.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-5.17
JC80990-5.17.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-5.17
JC80990-5.17.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-5.17.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-5.17.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-5.17.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-5.17.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-5.18	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-5.18	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-5.19	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-5.19	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-5.19	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-5.19	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-5F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-5F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-5F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-5F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-5F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-5F.2
JC80990-5F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-5F.2
JC80990-5F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-6.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-6.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-6.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-6.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-6.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-6.1
JC80990-6.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-6.1
JC80990-6.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-6.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-6.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-6.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-6.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-6.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-6.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-6.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-6.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-6.4	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-6.4	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-6.4	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-6.4	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-6.5	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-6.5	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-6.5	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-6.5	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-6.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-6.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-6.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-6.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-6.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-6.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-6.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-6.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-6.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-6.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-6.8	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-6.8	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-6.8	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-6.8	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-6.10	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-6.10	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-6.10	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-6.10	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-6.11	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-6.11	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument
JC80990-6.11	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-6.11	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-6.12	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-6.12	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-6.15	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-6.15	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-6.15	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-6.15	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-6.15	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-6.15	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-6.15.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-6.15
JC80990-6.15.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-6.15
JC80990-6.15.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-6.15.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-6.15.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-6.15.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-6.15.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-6.19	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-6.19	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-6.19	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-6.19	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-6F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-6F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-6F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-6F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-6F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-6F.2
JC80990-6F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-6F.2
JC80990-6F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-7.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-7.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-7.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-7.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-7.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-7.1
JC80990-7.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-7.1
JC80990-7.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-7.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-7.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-7.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-7.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-7.3	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-7.3	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-7.3	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-7.3	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-7.7	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-7.7	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-7.7	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-7.7	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-7.7	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-7.7	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-7.7	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-7.7	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-7.11	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-7.11	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-7.11	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-7.11	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-7.13	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-7.13	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-7.13	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-7.13	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-7.16	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-7.16	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-7.16	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-7.16	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-7.16	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-7.17	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-7.17	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-7.17	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-7.17	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-7.17	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-7.18	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-7.18	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-7.18	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-7.18	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-7.18	Sarvadaman Tripathi		01/11/19 16:04	Depleted

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-7.20	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-7.20	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-7.20	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-7.20	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-7.20	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-7.21	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-7.21	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-7.21	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-7.21	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-7.21	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-7.27	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-7.27	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-7.27	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-7.27	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-7.37	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-7.37	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-7.37	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-7.37	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-7.45	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-7.45	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-7.45	Secured Storage	Xu Liu	01/11/19 05:54	Retrieve from Storage
JC80990-7.45	Xu Liu	Secured Storage	01/11/19 13:52	Return to Storage
JC80990-7.51	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-7.51	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-7.53	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-7.53	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-7.54	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-7.54	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-7.55	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-7.55	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-7.55	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-7.55	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-7.55.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-7.55
JC80990-7.55.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-7.55
JC80990-7.55.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-7.55.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-7.55.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-7.55.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-7.55.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-7.56	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-7.56	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-7.56	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-7.56	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-7.57	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-7.57	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-7.57	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-7.57	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-7.58	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-7.58	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-7.58	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-7.58	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-7F.4	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-7F.4	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-7F.4	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-7F.4	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-7F.4.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-7F.4
JC80990-7F.4.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-7F.4
JC80990-7F.4.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-7F.5	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-7F.5	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-7F.5	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-7F.5	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-7F.6	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-7F.6	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-7F.6	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-7F.6	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-8.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-8.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-8.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-8.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-8.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-8.1
JC80990-8.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-8.1
JC80990-8.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-8.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-8.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-8.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-8.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-8.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-8.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-8.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-8.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-8.4	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-8.4	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-8.4	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-8.4	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-8.5	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-8.5	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-8.5	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-8.5	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-8.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-8.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-8.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-8.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-8.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-8.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-8.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-8.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-8.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-8.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-8.8	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-8.8	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-8.8	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-8.8	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-8.10	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-8.10	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-8.10	Secured Storage	Xu Liu	01/11/19 05:54	Retrieve from Storage
JC80990-8.10	Xu Liu	Secured Storage	01/11/19 13:52	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-8.11	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-8.11	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-8.11	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument
JC80990-8.11	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-8.12	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-8.12	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-8.12	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-8.12	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-8.12	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-8.12	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-8.12.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-8.12
JC80990-8.12.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-8.12
JC80990-8.12.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-8.12.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-8.12.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-8.12.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-8.12.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-8.14	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-8.14	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument
JC80990-8.14	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-8.14	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-8.16	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-8.16	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-8.16	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-8.16	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-8F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-8F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-8F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-8F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-8F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-8F.2
JC80990-8F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-8F.2
JC80990-8F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-9.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-9.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-9.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-9.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-9.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-9.1
JC80990-9.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-9.1
JC80990-9.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-9.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-9.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-9.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-9.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-9.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-9.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-9.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-9.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-9.4	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-9.4	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-9.4	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-9.4	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-9.5	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-9.5	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-9.5	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-9.5	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-9.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-9.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-9.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-9.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-9.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-9.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-9.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-9.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-9.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-9.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-9.9	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-9.9	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-9.9	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-9.9	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-9.10	Secured Storage	Eddie Huang	01/09/19 12:21	Retrieve from Storage
JC80990-9.10	Eddie Huang	GCMS2D	01/09/19 12:21	Load on Instrument
JC80990-9.10	GCMS2D	Eddie Huang	01/10/19 10:07	Unload from Instrument

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-9.10	Eddie Huang	Secured Storage	01/10/19 10:07	Return to Storage
JC80990-9.11	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-9.11	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-9.11	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-9.11	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-9.14	Secured Storage	Eddie Huang	01/10/19 10:34	Retrieve from Storage
JC80990-9.14	Eddie Huang	GCMS2D	01/10/19 10:34	Load on Instrument
JC80990-9.14	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-9.14	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-9.16	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-9.16	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-9.16	Secured Storage	Xu Liu	01/11/19 05:54	Retrieve from Storage
JC80990-9.16	Xu Liu	Secured Storage	01/11/19 13:52	Return to Storage
JC80990-9.17	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-9.17	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-9.17	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-9.17	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-9.17	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-9.17	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-9.17.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-9.17
JC80990-9.17.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-9.17
JC80990-9.17.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-9.17.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-9.17.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-9.17.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-9.17.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-9F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-9F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-9F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-9F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-9F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-9F.2
JC80990-9F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-9F.2
JC80990-9F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-10.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-10.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-10.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-10.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-10.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-10.1
JC80990-10.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-10.1
JC80990-10.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-10.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-10.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-10.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-10.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-10.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-10.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-10.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-10.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-10.4	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-10.4	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-10.4	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-10.4	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-10.5	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-10.5	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-10.5	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-10.5	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-10.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-10.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-10.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-10.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-10.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-10.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-10.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-10.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-10.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-10.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-10.9	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-10.9	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-10.9	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-10.9	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-10.10	Secured Storage	Eddie Huang	01/10/19 10:08	Retrieve from Storage
JC80990-10.10	Eddie Huang	GCMS2D	01/10/19 10:08	Load on Instrument

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-10.10	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-10.10	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-10.12	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-10.12	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-10.12	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage
JC80990-10.12	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-10.12	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-10.12	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-10.12.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-10.12
JC80990-10.12.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-10.12
JC80990-10.12.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-10.12.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-10.12.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-10.12.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-10.12.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-10.14	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-10.14	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-10.17	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-10.17	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-10.17	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-10.17	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-10F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-10F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-10F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-10F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-10F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-10F.2
JC80990-10F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-10F.2
JC80990-10F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-11.1	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-11.1	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-11.1	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-11.1	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-11.1.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-11.1
JC80990-11.1.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-11.1
JC80990-11.1.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-11.3	Secured Storage	Matthew Robbins	01/14/19 18:31	Retrieve from Storage
JC80990-11.3	Matthew Robbins	Secured Staging Area	01/14/19 18:31	Return to Storage
JC80990-11.3	Secured Staging Area	Elaine Banting	01/15/19 08:41	Retrieve from Storage
JC80990-11.3	Elaine Banting	Secured Storage	01/15/19 17:29	Return to Storage
JC80990-11.3	Secured Storage	Sahara Feliciano	01/16/19 13:48	Retrieve from Storage
JC80990-11.3	Sahara Feliciano	Secured Staging Area	01/16/19 13:48	Return to Storage
JC80990-11.3	Secured Staging Area	Kimberly Ignace	01/17/19 11:51	Retrieve from Storage
JC80990-11.3	Kimberly Ignace	Secured Storage	01/17/19 17:09	Return to Storage
JC80990-11.4	Secured Storage	Matthew Robbins	01/08/19 20:14	Retrieve from Storage
JC80990-11.4	Matthew Robbins	Secured Staging Area	01/08/19 20:14	Return to Storage
JC80990-11.4	Secured Staging Area	Dave Hunkele	01/15/19 05:25	Retrieve from Storage
JC80990-11.4	Dave Hunkele	Secured Storage	01/15/19 05:32	Return to Storage
JC80990-11.5	Secured Storage	Sahara Feliciano	01/09/19 20:25	Retrieve from Storage
JC80990-11.5	Sahara Feliciano	Secured Staging Area	01/09/19 20:25	Return to Storage
JC80990-11.5	Secured Staging Area	Natasha Verma	01/10/19 11:01	Retrieve from Storage
JC80990-11.5	Natasha Verma	Secured Storage	01/10/19 17:03	Return to Storage
JC80990-11.6	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-11.6	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-11.6	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-11.6	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-11.6	Sarvadaman Tripathi		01/11/19 16:04	Depleted
JC80990-11.7	Secured Storage	Matthew Robbins	01/10/19 17:13	Retrieve from Storage
JC80990-11.7	Matthew Robbins	Secured Staging Area	01/10/19 17:13	Return to Storage
JC80990-11.7	Secured Staging Area	Mahendra Patel	01/11/19 09:10	Retrieve from Storage
JC80990-11.7	Mahendra Patel	Sarvadaman Tripathi	01/11/19 13:13	Custody Transfer
JC80990-11.7	Sarvadaman Tripathi	Secured Storage	01/11/19 16:04	Return to Storage
JC80990-11.9	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-11.9	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-11.9	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-11.9	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-11.10	Secured Storage	Eddie Huang	01/10/19 10:08	Retrieve from Storage
JC80990-11.10	Eddie Huang	GCMS2D	01/10/19 10:08	Load on Instrument
JC80990-11.10	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-11.10	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage
JC80990-11.11	Secured Storage	Sahara Feliciano	01/09/19 16:55	Retrieve from Storage
JC80990-11.11	Sahara Feliciano	Secured Staging Area	01/09/19 16:55	Return to Storage
JC80990-11.11	Secured Staging Area	Chatiyah Canaday	01/10/19 08:38	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 01/08/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC80990-11.11	Chatiyah Canaday	Secured Storage	01/10/19 15:37	Return to Storage
JC80990-11.11	Secured Storage	Chatiyah Canaday	01/10/19 16:04	Retrieve from Storage
JC80990-11.11	Chatiyah Canaday		01/10/19 16:16	Depleted
JC80990-11.11.1	Chatiyah Canaday	Organics Prep	01/10/19 12:41	Extract from JC80990-11.11
JC80990-11.11.1	Organics Prep	Chatiyah Canaday	01/10/19 16:06	Extract from JC80990-11.11
JC80990-11.11.1	Chatiyah Canaday	Extract Storage	01/10/19 16:06	Return to Storage
JC80990-11.11.1	Extract Storage	Vincent Drago	01/10/19 16:37	Retrieve from Storage
JC80990-11.11.1	Vincent Drago	GC7G	01/10/19 16:37	Load on Instrument
JC80990-11.11.1	GC7G	Vincent Drago	01/21/19 10:33	Unload from Instrument
JC80990-11.11.1	Vincent Drago	Extract Freezer	01/21/19 10:33	Return to Storage
JC80990-11.13	Secured Storage	Xu Liu	01/09/19 10:14	Retrieve from Storage
JC80990-11.13	Xu Liu	Secured Storage	01/09/19 12:25	Return to Storage
JC80990-11.15	Secured Storage	Paul Cordova-Wong	01/10/19 09:17	Retrieve from Storage
JC80990-11.15	Paul Cordova-Wong	VOA Prep Storage	01/10/19 16:21	Return to Storage
JC80990-11.15	VOA Prep Storage	Paul Cordova-Wong	01/11/19 16:22	Retrieve from Storage
JC80990-11.15	Paul Cordova-Wong		01/11/19 16:22	Depleted
JC80990-11F.2	Secured Storage	Dave Hunkele	01/09/19 07:25	Retrieve from Storage
JC80990-11F.2	Dave Hunkele	Secured Staging Area	01/09/19 07:25	Return to Storage
JC80990-11F.2	Secured Staging Area	Taylor Gorman	01/09/19 07:55	Retrieve from Storage
JC80990-11F.2	Taylor Gorman	Secured Storage	01/09/19 10:47	Return to Storage
JC80990-11F.2.1	Taylor Gorman	Metals Digestion	01/09/19 08:40	Digestate from JC80990-11F.2
JC80990-11F.2.1	Metals Digestion	Taylor Gorman	01/09/19 08:41	Digestate from JC80990-11F.2
JC80990-11F.2.1	Taylor Gorman	Metals Digestate Storage	01/09/19 08:41	Return to Storage
JC80990-12.1	Secured Storage	Eddie Huang	01/10/19 10:08	Retrieve from Storage
JC80990-12.1	Eddie Huang	GCMS2D	01/10/19 10:08	Load on Instrument
JC80990-12.1	GCMS2D	Eddie Huang	01/11/19 10:08	Unload from Instrument
JC80990-12.1	Eddie Huang	Secured Storage	01/11/19 10:08	Return to Storage

QC Evaluation: DOD QSM5 Limits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
V2D7692	SW846 8260C						
V2D7692-BS	71-43-2	Benzene	BSP	REC	98	%	79-120
V2D7692-BS	107-06-2	1,2-Dichloroethane	BSP	REC	101	%	73-128
V2D7692-BS	100-41-4	Ethylbenzene	BSP	REC	101	%	79-121
V2D7692-BS	98-82-8	Isopropylbenzene	BSP	REC	103	%	72-131
V2D7692-BS	1634-04-4	Methyl Tert Butyl Ether	BSP	REC	106	%	71-124
V2D7692-BS	91-20-3	Naphthalene	BSP	REC	115	%	61-128
V2D7692-BS	75-65-0	Tert Butyl Alcohol	BSP	REC	98	%	68-129
V2D7692-BS	108-88-3	Toluene	BSP	REC	98	%	80-121
V2D7692-BS	95-63-6	1,2,4-Trimethylbenzene	BSP	REC	103	%	76-124
V2D7692-BS	108-67-8	1,3,5-Trimethylbenzene	BSP	REC	103	%	75-124
V2D7692-BS	540-84-1	2,2,4-Trimethylpentane	BSP	REC	99	%	58-132
V2D7692-BS	1330-20-7	Xylene (total)	BSP	REC	103	%	79-121
V2D7692-BS	1868-53-7	Dibromofluoromethane	BSP	SURR	106	%	80-119
V2D7692-BS	17060-07-0	1,2-Dichloroethane-D4	BSP	SURR	104	%	81-118
V2D7692-BS	2037-26-5	Toluene-D8	BSP	SURR	99	%	89-112
V2D7692-BS	460-00-4	4-Bromofluorobenzene	BSP	SURR	96	%	85-114
JC80990-7MS	71-43-2	Benzene	MS	REC	88	%	79-120
JC80990-7MS	107-06-2	1,2-Dichloroethane	MS	REC	99	%	73-128
JC80990-7MS	100-41-4	Ethylbenzene	MS	REC	101	%	79-121
JC80990-7MS	98-82-8	Isopropylbenzene	MS	REC	105	%	72-131
JC80990-7MS	1634-04-4	Methyl Tert Butyl Ether	MS	REC	96	%	71-124
JC80990-7MS	91-20-3	Naphthalene	MS	REC	116	%	61-128
JC80990-7MS	75-65-0	Tert Butyl Alcohol	MS	REC	90	%	68-129
JC80990-7MS	108-88-3	Toluene	MS	REC	98	%	80-121
JC80990-7MS	95-63-6	1,2,4-Trimethylbenzene	MS	REC	105	%	76-124
JC80990-7MS	108-67-8	1,3,5-Trimethylbenzene	MS	REC	106	%	75-124
JC80990-7MS	540-84-1	2,2,4-Trimethylpentane	MS	REC	113	%	58-132
JC80990-7MS	1330-20-7	Xylene (total)	MS	REC	102	%	79-121
JC80990-7MS	1868-53-7	Dibromofluoromethane	MS	SURR	98	%	80-119
JC80990-7MS	17060-07-0	1,2-Dichloroethane-D4	MS	SURR	98	%	81-118
JC80990-7MS	2037-26-5	Toluene-D8	MS	SURR	97	%	89-112
JC80990-7MS	460-00-4	4-Bromofluorobenzene	MS	SURR	95	%	85-114
JC80990-7MSD	71-43-2	Benzene	MSD	REC	76	%	79-120
JC80990-7MSD	71-43-2	Benzene	MSD	RPD	4	%	20
JC80990-7MSD	107-06-2	1,2-Dichloroethane	MSD	REC	96	%	73-128
JC80990-7MSD	107-06-2	1,2-Dichloroethane	MSD	RPD	3	%	20
JC80990-7MSD	100-41-4	Ethylbenzene	MSD	REC	98	%	79-121
JC80990-7MSD	100-41-4	Ethylbenzene	MSD	RPD	3	%	20
JC80990-7MSD	98-82-8	Isopropylbenzene	MSD	REC	101	%	72-131
JC80990-7MSD	98-82-8	Isopropylbenzene	MSD	RPD	4	%	20
JC80990-7MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	REC	93	%	71-124
JC80990-7MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	RPD	3	%	20

* Sample used for QC is not from job JC80990

QC Evaluation: DOD QSM5 Limits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC80990-7MSD	91-20-3	Naphthalene	MSD	REC	108	%	61-128
JC80990-7MSD	91-20-3	Naphthalene	MSD	RPD	7	%	20
JC80990-7MSD	75-65-0	Tert Butyl Alcohol	MSD	REC	89	%	68-129
JC80990-7MSD	75-65-0	Tert Butyl Alcohol	MSD	RPD	1	%	20
JC80990-7MSD	108-88-3	Toluene	MSD	REC	96	%	80-121
JC80990-7MSD	108-88-3	Toluene	MSD	RPD	2	%	20
JC80990-7MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	REC	101	%	76-124
JC80990-7MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	RPD	4	%	20
JC80990-7MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	REC	102	%	75-124
JC80990-7MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	RPD	4	%	20
JC80990-7MSD	540-84-1	2,2,4-Trimethylpentane	MSD	REC	107	%	58-132
JC80990-7MSD	540-84-1	2,2,4-Trimethylpentane	MSD	RPD	6	%	20
JC80990-7MSD	1330-20-7	Xylene (total)	MSD	REC	98	%	79-121
JC80990-7MSD	1330-20-7	Xylene (total)	MSD	RPD	4	%	20
JC80990-7MSD	1868-53-7	Dibromofluoromethane	MSD	SURR	98	%	80-119
JC80990-7MSD	17060-07-0	1,2-Dichloroethane-D4	MSD	SURR	98	%	81-118
JC80990-7MSD	2037-26-5	Toluene-D8	MSD	SURR	98	%	89-112
JC80990-7MSD	460-00-4	4-Bromofluorobenzene	MSD	SURR	95	%	85-114
V2D7692-MB	1868-53-7	Dibromofluoromethane	MB	SURR	101	%	80-119
V2D7692-MB	17060-07-0	1,2-Dichloroethane-D4	MB	SURR	102	%	81-118
V2D7692-MB	2037-26-5	Toluene-D8	MB	SURR	97	%	89-112
V2D7692-MB	460-00-4	4-Bromofluorobenzene	MB	SURR	96	%	85-114
JC80990-1	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-1	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	101	%	81-118
JC80990-1	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC80990-1	460-00-4	4-Bromofluorobenzene	SAMP	SURR	98	%	85-114
JC80990-4	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-4	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	101	%	81-118
JC80990-4	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC80990-4	460-00-4	4-Bromofluorobenzene	SAMP	SURR	94	%	85-114
JC80990-5	1868-53-7	Dibromofluoromethane	SAMP	SURR	96	%	80-119
JC80990-5	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC80990-5	2037-26-5	Toluene-D8	SAMP	SURR	100	%	89-112
JC80990-5	460-00-4	4-Bromofluorobenzene	SAMP	SURR	94	%	85-114
JC80990-6	1868-53-7	Dibromofluoromethane	SAMP	SURR	97	%	80-119
JC80990-6	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC80990-6	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-6	460-00-4	4-Bromofluorobenzene	SAMP	SURR	95	%	85-114
JC80990-7	1868-53-7	Dibromofluoromethane	SAMP	SURR	100	%	80-119
JC80990-7	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	101	%	81-118
JC80990-7	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC80990-7	460-00-4	4-Bromofluorobenzene	SAMP	SURR	94	%	85-114
JC80990-8	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-8	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	102	%	81-118
JC80990-8	2037-26-5	Toluene-D8	SAMP	SURR	100	%	89-112

* Sample used for QC is not from job JC80990

QC Evaluation: DOD QSM5 Limits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC80990-8	460-00-4	4-Bromofluorobenzene	SAMP	SURR	95	%	85-114
JC80990-9	1868-53-7	Dibromofluoromethane	SAMP	SURR	97	%	80-119
JC80990-9	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC80990-9	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-9	460-00-4	4-Bromofluorobenzene	SAMP	SURR	93	%	85-114
V2D7694	SW846 8260C						
V2D7694-BS	71-43-2	Benzene	BSP	REC	101	%	79-120
V2D7694-BS	107-06-2	1,2-Dichloroethane	BSP	REC	101	%	73-128
V2D7694-BS	100-41-4	Ethylbenzene	BSP	REC	106	%	79-121
V2D7694-BS	98-82-8	Isopropylbenzene	BSP	REC	108	%	72-131
V2D7694-BS	1634-04-4	Methyl Tert Butyl Ether	BSP	REC	103	%	71-124
V2D7694-BS	91-20-3	Naphthalene	BSP	REC	118	%	61-128
V2D7694-BS	75-65-0	Tert Butyl Alcohol	BSP	REC	100	%	68-129
V2D7694-BS	108-88-3	Toluene	BSP	REC	103	%	80-121
V2D7694-BS	95-63-6	1,2,4-Trimethylbenzene	BSP	REC	108	%	76-124
V2D7694-BS	108-67-8	1,3,5-Trimethylbenzene	BSP	REC	109	%	75-124
V2D7694-BS	540-84-1	2,2,4-Trimethylpentane	BSP	REC	101	%	58-132
V2D7694-BS	1330-20-7	Xylene (total)	BSP	REC	107	%	79-121
V2D7694-BS	1868-53-7	Dibromofluoromethane	BSP	SURR	99	%	80-119
V2D7694-BS	17060-07-0	1,2-Dichloroethane-D4	BSP	SURR	100	%	81-118
V2D7694-BS	2037-26-5	Toluene-D8	BSP	SURR	97	%	89-112
V2D7694-BS	460-00-4	4-Bromofluorobenzene	BSP	SURR	95	%	85-114
JC80990-6MS	71-43-2	Benzene	MS	REC	-110 [a]	%	79-120
JC80990-6MS	107-06-2	1,2-Dichloroethane	MS	REC	118	%	73-128
JC80990-6MS	100-41-4	Ethylbenzene	MS	REC	84	%	79-121
JC80990-6MS	98-82-8	Isopropylbenzene	MS	REC	100	%	72-131
JC80990-6MS	1634-04-4	Methyl Tert Butyl Ether	MS	REC	97	%	71-124
JC80990-6MS	91-20-3	Naphthalene	MS	REC	113	%	61-128
JC80990-6MS	75-65-0	Tert Butyl Alcohol	MS	REC	87	%	68-129
JC80990-6MS	108-88-3	Toluene	MS	REC	87	%	80-121
JC80990-6MS	95-63-6	1,2,4-Trimethylbenzene	MS	REC	96	%	76-124
JC80990-6MS	108-67-8	1,3,5-Trimethylbenzene	MS	REC	97	%	75-124
JC80990-6MS	540-84-1	2,2,4-Trimethylpentane	MS	REC	92	%	58-132
JC80990-6MS	1330-20-7	Xylene (total)	MS	REC	94	%	79-121
JC80990-6MS	1868-53-7	Dibromofluoromethane	MS	SURR	96	%	80-119
JC80990-6MS	17060-07-0	1,2-Dichloroethane-D4	MS	SURR	99	%	81-118
JC80990-6MS	2037-26-5	Toluene-D8	MS	SURR	97	%	89-112
JC80990-6MS	460-00-4	4-Bromofluorobenzene	MS	SURR	94	%	85-114
JC80990-6MSD	71-43-2	Benzene	MSD	REC	-110 [a]	%	79-120
JC80990-6MSD	71-43-2	Benzene	MSD	RPD	0	%	20
JC80990-6MSD	107-06-2	1,2-Dichloroethane	MSD	REC	118	%	73-128
JC80990-6MSD	107-06-2	1,2-Dichloroethane	MSD	RPD	0	%	20
JC80990-6MSD	100-41-4	Ethylbenzene	MSD	REC	84	%	79-121

* Sample used for QC is not from job JC80990

QC Evaluation: DOD QSM5 Limits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC80990-6MSD	100-41-4	Ethylbenzene	MSD	RPD	0	%	20
JC80990-6MSD	98-82-8	Isopropylbenzene	MSD	REC	100	%	72-131
JC80990-6MSD	98-82-8	Isopropylbenzene	MSD	RPD	0	%	20
JC80990-6MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	REC	98	%	71-124
JC80990-6MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	RPD	0	%	20
JC80990-6MSD	91-20-3	Naphthalene	MSD	REC	114	%	61-128
JC80990-6MSD	91-20-3	Naphthalene	MSD	RPD	1	%	20
JC80990-6MSD	75-65-0	Tert Butyl Alcohol	MSD	REC	87	%	68-129
JC80990-6MSD	75-65-0	Tert Butyl Alcohol	MSD	RPD	0	%	20
JC80990-6MSD	108-88-3	Toluene	MSD	REC	87	%	80-121
JC80990-6MSD	108-88-3	Toluene	MSD	RPD	0	%	20
JC80990-6MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	REC	96	%	76-124
JC80990-6MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	RPD	0	%	20
JC80990-6MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	REC	97	%	75-124
JC80990-6MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	RPD	0	%	20
JC80990-6MSD	540-84-1	2,2,4-Trimethylpentane	MSD	REC	91	%	58-132
JC80990-6MSD	540-84-1	2,2,4-Trimethylpentane	MSD	RPD	1	%	20
JC80990-6MSD	1330-20-7	Xylene (total)	MSD	REC	93	%	79-121
JC80990-6MSD	1330-20-7	Xylene (total)	MSD	RPD	0	%	20
JC80990-6MSD	1868-53-7	Dibromofluoromethane	MSD	SURR	97	%	80-119
JC80990-6MSD	17060-07-0	1,2-Dichloroethane-D4	MSD	SURR	98	%	81-118
JC80990-6MSD	2037-26-5	Toluene-D8	MSD	SURR	97	%	89-112
JC80990-6MSD	460-00-4	4-Bromofluorobenzene	MSD	SURR	94	%	85-114
V2D7694-MB	1868-53-7	Dibromofluoromethane	MB	SURR	99	%	80-119
V2D7694-MB	17060-07-0	1,2-Dichloroethane-D4	MB	SURR	101	%	81-118
V2D7694-MB	2037-26-5	Toluene-D8	MB	SURR	98	%	89-112
V2D7694-MB	460-00-4	4-Bromofluorobenzene	MB	SURR	95	%	85-114
JC80990-1	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-1	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC80990-1	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-1	460-00-4	4-Bromofluorobenzene	SAMP	SURR	94	%	85-114
JC80990-2	1868-53-7	Dibromofluoromethane	SAMP	SURR	99	%	80-119
JC80990-2	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	101	%	81-118
JC80990-2	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-2	460-00-4	4-Bromofluorobenzene	SAMP	SURR	93	%	85-114
JC80990-3	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-3	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	99	%	81-118
JC80990-3	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC80990-3	460-00-4	4-Bromofluorobenzene	SAMP	SURR	94	%	85-114
JC80990-4	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-4	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	99	%	81-118
JC80990-4	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-4	460-00-4	4-Bromofluorobenzene	SAMP	SURR	95	%	85-114
JC80990-5	1868-53-7	Dibromofluoromethane	SAMP	SURR	99	%	80-119
JC80990-5	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	101	%	81-118

* Sample used for QC is not from job JC80990

QC Evaluation: DOD QSM5 Limits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC80990-5	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-5	460-00-4	4-Bromofluorobenzene	SAMP	SURR	93	%	85-114
JC80990-6	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-6	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	104	%	81-118
JC80990-6	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-6	460-00-4	4-Bromofluorobenzene	SAMP	SURR	94	%	85-114
JC80990-8	1868-53-7	Dibromofluoromethane	SAMP	SURR	99	%	80-119
JC80990-8	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	103	%	81-118
JC80990-8	2037-26-5	Toluene-D8	SAMP	SURR	99	%	89-112
JC80990-8	460-00-4	4-Bromofluorobenzene	SAMP	SURR	97	%	85-114
JC80990-9	1868-53-7	Dibromofluoromethane	SAMP	SURR	98	%	80-119
JC80990-9	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	104	%	81-118
JC80990-9	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-9	460-00-4	4-Bromofluorobenzene	SAMP	SURR	93	%	85-114
JC80990-10	1868-53-7	Dibromofluoromethane	SAMP	SURR	100	%	80-119
JC80990-10	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC80990-10	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-10	460-00-4	4-Bromofluorobenzene	SAMP	SURR	96	%	85-114
JC80990-11	1868-53-7	Dibromofluoromethane	SAMP	SURR	100	%	80-119
JC80990-11	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC80990-11	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-11	460-00-4	4-Bromofluorobenzene	SAMP	SURR	95	%	85-114
JC80990-12	1868-53-7	Dibromofluoromethane	SAMP	SURR	100	%	80-119
JC80990-12	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	101	%	81-118
JC80990-12	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC80990-12	460-00-4	4-Bromofluorobenzene	SAMP	SURR	95	%	85-114
MP12001	SW846 6020B						
MP12001-B1	7440-38-2	Arsenic	BSP	REC	98.1	%	84-116
MP12001-B1	7439-89-6	Iron	BSP	REC	96.3	%	87-118
MP12001-B1	7439-92-1	Lead	BSP	REC	100	%	88-115
MP12001-B1	7439-96-5	Manganese	BSP	REC	97.5	%	87-115
MP12001-S1	7440-38-2	Arsenic	MS	REC	96.3	%	84-116
MP12001-S1	7439-89-6	Iron	MS	REC	98.5	%	87-118
MP12001-S1	7439-92-1	Lead	MS	REC	101.9	%	88-115
MP12001-S1	7439-96-5	Manganese	MS	REC	85	%	87-115
MP12001-S3	7440-38-2	Arsenic	MS	REC	97.6	%	84-116
MP12001-S3	7439-89-6	Iron	MS	REC	94.5	%	87-118
MP12001-S3	7439-92-1	Lead	MS	REC	102.7	%	88-115
MP12001-S3	7439-96-5	Manganese	MS	REC	98.8	%	87-115
MP12001-S2	7440-38-2	Arsenic	MSD	REC	99.4	%	84-116
MP12001-S2	7440-38-2	Arsenic	MSD	RPD	3.1	%	20
MP12001-S2	7439-89-6	Iron	MSD	REC	98.5	%	87-118
MP12001-S2	7439-89-6	Iron	MSD	RPD	0	%	20

* Sample used for QC is not from job JC80990

QC Evaluation: DOD QSM5 Limits

Job Number: JC80990
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 01/07/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
MP12001-S2	7439-92-1	Lead	MSD	REC	105.4	%	88-115
MP12001-S2	7439-92-1	Lead	MSD	RPD	3.2	%	20
MP12001-S2	7439-96-5	Manganese	MSD	REC	88.8	%	87-115
MP12001-S2	7439-96-5	Manganese	MSD	RPD	.5	%	20
MP12001-S4	7440-38-2	Arsenic	MSD	REC	99	%	84-116
MP12001-S4	7440-38-2	Arsenic	MSD	RPD	1.4	%	20
MP12001-S4	7439-89-6	Iron	MSD	REC	95.5	%	87-118
MP12001-S4	7439-89-6	Iron	MSD	RPD	.5	%	20
MP12001-S4	7439-92-1	Lead	MSD	REC	103.6	%	88-115
MP12001-S4	7439-92-1	Lead	MSD	RPD	.8	%	20
MP12001-S4	7439-96-5	Manganese	MSD	REC	73.8 [b]	%	87-115
MP12001-S4	7439-96-5	Manganese	MSD	RPD	3.2	%	20
MP12002	SW846 6020B						
MP12002-B1	7440-38-2	Arsenic	BSP	REC	96.1	%	84-116
MP12002-B1	7439-89-6	Iron	BSP	REC	96.3	%	87-118
MP12002-B1	7439-92-1	Lead	BSP	REC	101.4	%	88-115
MP12002-B1	7439-96-5	Manganese	BSP	REC	98	%	87-115
GP18594	EPA 300/SW846 9056A						
GP18594-B1	14808-79-8	Sulfate	BSP	REC	103.1	%	87-112
GP18594-S1	14808-79-8	Sulfate	MS	REC	98	%	87-112
GP18594-D1	14808-79-8	Sulfate	DUP	RPD	2	%	15

(a) Outside control limits due to high level in sample relative to spike amount.
(b) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

* Sample used for QC is not from job JC80990

MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Internal Standard Area Summaries
- Surrogate Recovery Summaries
- Initial and Continuing Calibration Summaries

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V2D7692-MB	2D180815.D	1	01/09/19	EH	n/a	n/a	V2D7692

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC80990-1, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.50	0.43	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.60	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.51	ug/l	
91-20-3	Naphthalene	ND	5.0	0.98	ug/l	
75-65-0	Tert Butyl Alcohol	ND	10	5.8	ug/l	
108-88-3	Toluene	ND	1.0	0.53	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	ND	5.0	1.0	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.59	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	101%	80-120%
17060-07-0	1,2-Dichloroethane-D4	102%	81-124%
2037-26-5	Toluene-D8	97%	80-120%
460-00-4	4-Bromofluorobenzene	96%	80-120%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V2D7694-MB	2D180861.D	1	01/10/19	EH	n/a	n/a	V2D7694

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-8, JC80990-9, JC80990-10, JC80990-11, JC80990-12

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.50	0.43	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.60	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.51	ug/l	
91-20-3	Naphthalene	ND	5.0	0.98	ug/l	
75-65-0	Tert Butyl Alcohol	ND	10	5.8	ug/l	
108-88-3	Toluene	ND	1.0	0.53	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	ND	5.0	1.0	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.59	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	99%	80-120%
17060-07-0	1,2-Dichloroethane-D4	101%	81-124%
2037-26-5	Toluene-D8	98%	80-120%
460-00-4	4-Bromofluorobenzene	95%	80-120%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/l	

Blank Spike Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V2D7692-BS	2D180813.D	1	01/09/19	EH	n/a	n/a	V2D7692

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC80990-1, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	49.0	98	80-120
107-06-2	1,2-Dichloroethane	50	50.6	101	78-126
100-41-4	Ethylbenzene	50	50.7	101	80-120
98-82-8	Isopropylbenzene	50	51.6	103	83-120
1634-04-4	Methyl Tert Butyl Ether	50	53.1	106	80-119
91-20-3	Naphthalene	50	57.5	115	73-131
75-65-0	Tert Butyl Alcohol	250	246	98	78-126
108-88-3	Toluene	50	49.0	98	80-120
95-63-6	1,2,4-Trimethylbenzene	50	51.4	103	84-120
108-67-8	1,3,5-Trimethylbenzene	50	51.7	103	83-119
540-84-1	2,2,4-Trimethylpentane	50	49.5	99	57-154
1330-20-7	Xylene (total)	150	154	103	80-120

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	106%	80-120%
17060-07-0	1,2-Dichloroethane-D4	104%	81-124%
2037-26-5	Toluene-D8	99%	80-120%
460-00-4	4-Bromofluorobenzene	96%	80-120%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V2D7694-BS	2D180859.D	1	01/10/19	EH	n/a	n/a	V2D7694

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-8, JC80990-9, JC80990-10, JC80990-11, JC80990-12

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	50.4	101	80-120
107-06-2	1,2-Dichloroethane	50	50.6	101	78-126
100-41-4	Ethylbenzene	50	53.0	106	80-120
98-82-8	Isopropylbenzene	50	53.9	108	83-120
1634-04-4	Methyl Tert Butyl Ether	50	51.6	103	80-119
91-20-3	Naphthalene	50	58.9	118	73-131
75-65-0	Tert Butyl Alcohol	250	250	100	78-126
108-88-3	Toluene	50	51.4	103	80-120
95-63-6	1,2,4-Trimethylbenzene	50	53.8	108	84-120
108-67-8	1,3,5-Trimethylbenzene	50	54.3	109	83-119
540-84-1	2,2,4-Trimethylpentane	50	50.5	101	57-154
1330-20-7	Xylene (total)	150	160	107	80-120

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	99%	80-120%
17060-07-0	1,2-Dichloroethane-D4	100%	81-124%
2037-26-5	Toluene-D8	97%	80-120%
460-00-4	4-Bromofluorobenzene	95%	80-120%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7MS	2D180824.D	1	01/09/19	EH	n/a	n/a	V2D7692
JC80990-7MSD	2D180825.D	1	01/09/19	EH	n/a	n/a	V2D7692
JC80990-7	2D180821.D	1	01/09/19	EH	n/a	n/a	V2D7692

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC80990-1, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	121		50	165	88	50	159	76	4	54-136/10
107-06-2	1,2-Dichloroethane	1.0 U		50	49.5	99	50	47.8	96	3	72-131/11
100-41-4	Ethylbenzene	3.9		50	54.5	101	50	52.8	98	3	51-140/20
98-82-8	Isopropylbenzene	2.9		50	55.4	105	50	53.2	101	4	75-129/11
1634-04-4	Methyl Tert Butyl Ether	1.0 U		50	48.0	96	50	46.4	93	3	72-123/11
91-20-3	Naphthalene	5.0 U		50	57.9	116	50	54.2	108	7	62-141/13
75-65-0	Tert Butyl Alcohol	6.6	J	250	231	90	250	228	89	1	73-134/13
108-88-3	Toluene	4.4		50	53.6	98	50	52.4	96	2	60-135/10
95-63-6	1,2,4-Trimethylbenzene	2.0 U		50	52.3	105	50	50.3	101	4	54-143/10
108-67-8	1,3,5-Trimethylbenzene	2.0 U		50	52.9	106	50	50.9	102	4	67-133/11
540-84-1	2,2,4-Trimethylpentane	5.0 U		50	56.6	113	50	53.4	107	6	47-173/19
1330-20-7	Xylene (total)	7.4		150	160	102	150	154	98	4	56-139/20

CAS No.	Surrogate Recoveries	MS	MSD	JC80990-7	Limits
1868-53-7	Dibromofluoromethane	98%	98%	100%	80-120%
17060-07-0	1,2-Dichloroethane-D4	98%	98%	101%	81-124%
2037-26-5	Toluene-D8	97%	98%	97%	80-120%
460-00-4	4-Bromofluorobenzene	95%	95%	94%	80-120%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-6MS	2D180874.D	20	01/10/19	EH	n/a	n/a	V2D7694
JC80990-6MSD	2D180875.D	20	01/10/19	EH	n/a	n/a	V2D7694
JC80990-6 [a]	2D180871.D	20	01/10/19	EH	n/a	n/a	V2D7694

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-8, JC80990-9, JC80990-10, JC80990-11, JC80990-12

CAS No.	Compound	JC80990-6 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	15300	E	1000	14200	-110* [b]	1000	14200	-110* [b]	0	54-136/10
107-06-2	1,2-Dichloroethane	20 U		1000	1180	118	1000	1180	118	0	72-131/11
100-41-4	Ethylbenzene	1030		1000	1870	84	1000	1870	84	0	51-140/20
98-82-8	Isopropylbenzene	43.0		1000	1040	100	1000	1040	100	0	75-129/11
1634-04-4	Methyl Tert Butyl Ether	20 U		1000	972	97	1000	975	98	0	72-123/11
91-20-3	Naphthalene	212		1000	1340	113	1000	1350	114	1	62-141/13
75-65-0	Tert Butyl Alcohol	353		5000	4680	87	5000	4700	87	0	73-134/13
108-88-3	Toluene	629		1000	1500	87	1000	1500	87	0	60-135/10
95-63-6	1,2,4-Trimethylbenzene	236		1000	1200	96	1000	1200	96	0	54-143/10
108-67-8	1,3,5-Trimethylbenzene	196		1000	1170	97	1000	1170	97	0	67-133/11
540-84-1	2,2,4-Trimethylpentane	100 U		1000	921	92	1000	914	91	1	47-173/19
1330-20-7	Xylene (total)	1000		3000	3810	94	3000	3800	93	0	56-139/20

CAS No.	Surrogate Recoveries	MS	MSD	JC80990-6	Limits
1868-53-7	Dibromofluoromethane	96%	97%	98%	80-120%
17060-07-0	1,2-Dichloroethane-D4	99%	98%	104%	81-124%
2037-26-5	Toluene-D8	97%	97%	98%	80-120%
460-00-4	4-Bromofluorobenzene	94%	94%	94%	80-120%

(a) Diluted due to high concentraion of target compound.
(b) Outside control limits due to high level in sample relative to spike amount.

* = Outside of Control Limits.

Instrument Performance Check (BFB)

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	V2D7670-BFB	**Injection Date:**	12/19/18
Lab File ID:	2D180449.D	**Injection Time:**	19:10
Instrument ID:	GCMS2D		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	28386	15.6		Pass
75	30.0 - 60.0% of mass 95	79429	43.6		Pass
95	Base peak, 100% relative abundance	182122	100.0		Pass
96	5.0 - 9.0% of mass 95	12046	6.61		Pass
173	Less than 2.0% of mass 174	1377	0.76	(0.81) [a]	Pass
174	50.0 - 120.0% of mass 95	169813	93.2		Pass
175	5.0 - 9.0% of mass 174	12204	6.70	(7.19) [a]	Pass
176	95.0 - 101.0% of mass 174	166976	91.7	(98.3) [a]	Pass
177	5.0 - 9.0% of mass 176	10705	5.88	(6.41) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V2D7670-IC7670	2D180450.D	12/19/18	19:40	00:30	Initial cal 0.2
V2D7670-IC7670	2D180451.D	12/19/18	20:10	01:00	Initial cal 0.5
V2D7670-IC7670	2D180452.D	12/19/18	20:39	01:29	Initial cal 1
V2D7670-IC7670	2D180453.D	12/19/18	21:09	01:59	Initial cal 2
V2D7670-IC7670	2D180454.D	12/19/18	21:39	02:29	Initial cal 4
V2D7670-IC7670	2D180455.D	12/19/18	22:09	02:59	Initial cal 8
V2D7670-IC7670	2D180456.D	12/19/18	22:38	03:28	Initial cal 20
V2D7670-ICC7670	2D180457.D	12/19/18	23:08	03:58	Initial cal 50
V2D7670-IC7670	2D180458.D	12/19/18	23:38	04:28	Initial cal 100
V2D7670-IC7670	2D180459.D	12/20/18	00:07	04:57	Initial cal 200
V2D7670-ICV7670	2D180462.D	12/20/18	01:37	06:27	Initial cal verification 50
V2D7670-ICV7670	2D180463.D	12/20/18	02:06	06:56	Initial cal verification 50

Instrument Performance Check (BFB)

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	V2D7692-BFB	**Injection Date:**	01/09/19
Lab File ID:	2D180812.D	**Injection Time:**	06:29
Instrument ID:	GCMS2D		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	39115	16.3		Pass
75	30.0 - 60.0% of mass 95	110205	46.0		Pass
95	Base peak, 100% relative abundance	239573	100.0		Pass
96	5.0 - 9.0% of mass 95	15372	6.42		Pass
173	Less than 2.0% of mass 174	1960	0.82	(0.86) [a]	Pass
174	50.0 - 120.0% of mass 95	228672	95.4		Pass
175	5.0 - 9.0% of mass 174	16721	6.98	(7.31) [a]	Pass
176	95.0 - 101.0% of mass 174	222933	93.1	(97.5) [a]	Pass
177	5.0 - 9.0% of mass 176	14228	5.94	(6.38) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V2D7692-CC7670	2D180812.D	01/09/19	06:29	00:00	Continuing cal 20
V2D7692-BS	2D180813.D	01/09/19	07:17	00:48	Blank Spike
V2D7692-MB	2D180815.D	01/09/19	08:52	02:23	Method Blank
ZZZZZZ	2D180816.D	01/09/19	09:45	03:16	(unrelated sample)
ZZZZZZ	2D180817.D	01/09/19	10:15	03:46	(unrelated sample)
JC80990-7	2D180821.D	01/09/19	12:44	06:15	PH-PH-21(01072019)
JC80990-4	2D180822.D	01/09/19	13:13	06:44	PH-RW-B2
JC80990-1	2D180823.D	01/09/19	13:43	07:14	PH-RW-A2(01072019)
JC80990-7MS	2D180824.D	01/09/19	14:13	07:44	Matrix Spike
JC80990-7MSD	2D180825.D	01/09/19	14:42	08:13	Matrix Spike Duplicate
JC80990-9	2D180827.D	01/09/19	15:41	09:12	PH-MW-66(01072019)
JC80990-6	2D180828.D	01/09/19	16:11	09:42	PH-PH-2
JC80990-8	2D180829.D	01/09/19	16:40	10:11	PH-MW-67
JC80990-5	2D180830.D	01/09/19	17:10	10:41	PH-RW-A(01072019)
V2D7692-ECC7670	2D180832.D	01/09/19	18:09	11:40	Ending cal 20

Instrument Performance Check (BFB)

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	V2D7694-BFB	**Injection Date:**	01/10/19
Lab File ID:	2D180858.D	**Injection Time:**	07:18
Instrument ID:	GCMS2D		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	37101	15.7		Pass
75	30.0 - 60.0% of mass 95	107603	45.5		Pass
95	Base peak, 100% relative abundance	236736	100.0		Pass
96	5.0 - 9.0% of mass 95	15465	6.53		Pass
173	Less than 2.0% of mass 174	1953	0.82	(0.88) [a]	Pass
174	50.0 - 120.0% of mass 95	221739	93.7		Pass
175	5.0 - 9.0% of mass 174	16496	6.97	(7.44) [a]	Pass
176	95.0 - 101.0% of mass 174	217152	91.7	(97.9) [a]	Pass
177	5.0 - 9.0% of mass 176	13941	5.89	(6.42) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V2D7694-CC7670	2D180858.D	01/10/19	07:18	00:00	Continuing cal 20
V2D7694-BS	2D180859.D	01/10/19	08:28	01:10	Blank Spike
V2D7694-MB	2D180861.D	01/10/19	09:40	02:22	Method Blank
JC80990-12	2D180862.D	01/10/19	10:21	03:03	TRIP BLANK
JC80990-11	2D180863.D	01/10/19	10:51	03:33	FB-010719
JC80990-10	2D180864.D	01/10/19	11:20	04:02	EB-010719
JC80990-2	2D180865.D	01/10/19	11:50	04:32	PH-RW-B
JC80990-3	2D180866.D	01/10/19	12:19	05:01	PH-RW-B2(DUP)
JC80990-1	2D180868.D	01/10/19	13:19	06:01	PH-RW-A2(01072019)
JC80990-5	2D180869.D	01/10/19	13:48	06:30	PH-RW-A(01072019)
JC80990-4	2D180870.D	01/10/19	14:18	07:00	PH-RW-B2
JC80990-6	2D180871.D	01/10/19	14:48	07:30	PH-PH-2
JC80990-9	2D180872.D	01/10/19	15:18	08:00	PH-MW-66(01072019)
JC80990-8	2D180873.D	01/10/19	15:47	08:29	PH-MW-67
JC80990-6MS	2D180874.D	01/10/19	16:17	08:59	Matrix Spike
JC80990-6MSD	2D180875.D	01/10/19	16:47	09:29	Matrix Spike Duplicate
V2D7694-ECC7670	2D180878.D	01/10/19	18:15	10:57	Ending cal 20

Internal Standard Area Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	V2D7692-CC7670	**Injection Date:**	01/09/19
Lab File ID:	2D180812.D	**Injection Time:**	06:29
Instrument ID:	GCMS2D	**Method:**	SW846 8260C

	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
Check Std	198559	7.29	653293	9.98	897039	11.13	885690	15.35	487532	18.17
Upper Limit [a]	397118	7.79	1306586	10.48	1794078	11.63	1771380	15.85	975064	18.67
Lower Limit [b]	99280	6.79	326647	9.48	448520	10.63	442845	14.85	243766	17.67

Lab Sample ID	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
V2D7692-BS	195147	7.29	626954	9.98	870441	11.13	858805	15.35	471762	18.16
V2D7692-MB	191374	7.29	668765	9.98	909192	11.13	876449	15.35	464601	18.16
ZZZZZZ	223238	7.28	680096	9.98	924404	11.13	895162	15.35	482786	18.16
ZZZZZZ	200672	7.28	665394	9.98	892651	11.13	872721	15.35	436981	18.17
JC80990-7	231471	7.29	685778	9.98	918048	11.13	905254	15.35	496790	18.17
JC80990-4	239729	7.29	660564	9.98	876996	11.13	872712	15.35	479062	18.17
JC80990-1	322050	7.27	659745	9.98	879067	11.13	861324	15.35	461495	18.17
JC80990-7MS	216391	7.28	684013	9.98	919483	11.13	900785	15.35	491152	18.17
JC80990-7MSD	225106	7.28	701352	9.98	941509	11.13	916435	15.35	498310	18.16
JC80990-9	224498	7.28	757781	9.98	1007416	11.13	975320	15.35	540008	18.16
JC80990-6	228589	7.28	772630	9.98	1015550	11.13	986611	15.35	533990	18.16
JC80990-8	231911	7.28	759840	9.98	998712	11.13	950313	15.35	526239	18.16
JC80990-5	248493	7.28	764978	9.98	1011593	11.13	973972	15.35	540758	18.16
V2D7692-ECC7670	225325	7.28	760842	9.98	1021060	11.13	985422	15.35	534800	18.16

IS 1 = Tert Butyl Alcohol-D9
IS 2 = Pentafluorobenzene
IS 3 = 1,4-Difluorobenzene
IS 4 = Chlorobenzene-D5
IS 5 = 1,4-Dichlorobenzene-d4

(a) Upper Limit = +100% of check standard area; Retention time +0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.

Internal Standard Area Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	V2D7694-CC7670	**Injection Date:**	01/10/19
Lab File ID:	2D180858.D	**Injection Time:**	07:18
Instrument ID:	GCMS2D	**Method:**	SW846 8260C

	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
Check Std	196653	7.27	710555	9.98	950648	11.12	925812	15.35	501478	18.16
Upper Limit [a]	393306	7.77	1421110	10.48	1901296	11.62	1851624	15.85	1002956	18.66
Lower Limit [b]	98327	6.77	355278	9.48	475324	10.62	462906	14.85	250739	17.66
Lab Sample ID	**IS 1 AREA**	**RT**	**IS 2 AREA**	**RT**	**IS 3 AREA**	**RT**	**IS 4 AREA**	**RT**	**IS 5 AREA**	**RT**
V2D7694-BS	187992	7.27	694385	9.97	937818	11.12	902468	15.34	484551	18.16
V2D7694-MB	188785	7.28	707549	9.97	956305	11.12	915285	15.35	487870	18.16
JC80990-12	199055	7.28	718034	9.97	971540	11.12	925119	15.34	490006	18.16
JC80990-11	198132	7.28	702511	9.97	961271	11.12	912114	15.35	485471	18.16
JC80990-10	198203	7.27	706736	9.98	961290	11.12	914377	15.35	484844	18.16
JC80990-2	201807	7.28	704826	9.97	950921	11.12	914899	15.35	505056	18.16
JC80990-3	221784	7.27	688155	9.98	920040	11.12	901572	15.35	485327	18.16
JC80990-1	212997	7.28	712443	9.97	953854	11.12	928428	15.35	505387	18.16
JC80990-5	208496	7.28	730156	9.97	978618	11.12	945999	15.35	519645	18.16
JC80990-4	210801	7.27	729249	9.97	987254	11.12	958320	15.34	519057	18.16
JC80990-6 [c]	246230	7.27	732659	9.97	946716	11.12	938628	15.34	511895	18.16
JC80990-9 [c]	250364	7.27	717665	9.97	924533	11.12	919236	15.34	503114	18.16
JC80990-8 [c]	231177	7.27	694886	9.97	897940	11.12	851120	15.34	466242	18.16
JC80990-6MS	225896	7.26	679340	9.97	891201	11.12	881509	15.34	486153	18.16
JC80990-6MSD	232563	7.27	692446	9.97	907697	11.12	893975	15.34	487766	18.16
V2D7694-ECC767	209244	7.27	739057	9.97	983796	11.11	944600	15.34	511118	18.15

IS 1 = Tert Butyl Alcohol-D9
IS 2 = Pentafluorobenzene
IS 3 = 1,4-Difluorobenzene
IS 4 = Chlorobenzene-D5
IS 5 = 1,4-Dichlorobenzene-d4

(a) Upper Limit = +100% of check standard area; Retention time +0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.
(c) Diluted due to high concentraion of target compound.

Surrogate Recovery Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846 8260C **Matrix:** AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1	S2	S3	S4
JC80990-1	2D180868.D	98	100	98	94
JC80990-1	2D180823.D	98	101	97	98
JC80990-2	2D180865.D	99	101	98	93
JC80990-3	2D180866.D	98	99	97	94
JC80990-4	2D180870.D	98	99	98	95
JC80990-4	2D180822.D	98	101	97	94
JC80990-5	2D180869.D	99	101	98	93
JC80990-5	2D180830.D	96	100	100	94
JC80990-6	2D180871.D	98	104	98	94
JC80990-6	2D180828.D	97	100	98	95
JC80990-7	2D180821.D	100	101	97	94
JC80990-8	2D180873.D	99	103	99	97
JC80990-8	2D180829.D	98	102	100	95
JC80990-9	2D180872.D	98	104	98	93
JC80990-9	2D180827.D	97	100	98	93
JC80990-10	2D180864.D	100	100	98	96
JC80990-11	2D180863.D	100	100	98	95
JC80990-12	2D180862.D	100	101	98	95
JC80990-6MS	2D180874.D	96	99	97	94
JC80990-6MSD	2D180875.D	97	98	97	94
JC80990-7MS	2D180824.D	98	98	97	95
JC80990-7MSD	2D180825.D	98	98	98	95
V2D7692-BS	2D180813.D	106	104	99	96
V2D7692-MB	2D180815.D	101	102	97	96
V2D7694-BS	2D180859.D	99	100	97	95
V2D7694-MB	2D180861.D	99	101	98	95

Surrogate Compounds	Recovery Limits
S1 = Dibromofluoromethane	80-120%
S2 = 1,2-Dichloroethane-D4	81-124%
S3 = Toluene-D8	80-120%
S4 = 4-Bromofluorobenzene	80-120%

Initial Calibration Summary

Job Number: JC80990 **Sample:** V2D7670-ICC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180457.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report MS2D

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
Last Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

Calibration Files
1 =2D180452.D 2 =2D180453.D 100 =2D180458.D 50 =2D180457.D
20 =2D180456.D 200 =2D180459.D 4 =2D180454.D 0.5 =2D180451.D
8 =2D180455.D 0.2 =2D180450.D = =

Compound	1	2	100	50	20	200	4	0.5	8	0.2	Avg	%RSD
1) I tert butyl alcohol-d9 ----------ISTD----------												
2) tertiary butyl alcohol	0.854	0.941	0.992	1.007	0.988	1.020	0.973		0.981		0.970	5.38
3) ethanol	0.145	0.107	0.089	0.090	0.090	0.083	0.098		0.094		0.099	19.96
4) 1,4-dioxane	0.096	0.101	0.117	0.117	0.114	0.120	0.103		0.110		0.110	7.95
5) I pentafluorobenzene ----------ISTD----------												
6) chlorodifluoromethane	0.446	0.460	0.466	0.461	0.453	0.448	0.436	0.493	0.438		0.456	3.83
7) dichlorodifluoromethane	0.421	0.420	0.554	0.507	0.498	0.501	0.445		0.495		0.480	9.78
8) chloromethane	0.519	0.455	0.524	0.474	0.479	0.482	0.465	0.556	0.485		0.493	6.64
9) vinyl chloride	0.411	0.399	0.470	0.452	0.447	0.444	0.406	0.371	0.451	0.360	0.421	8.86
10) 1,3-butadiene	0.343	0.333	0.290	0.339	0.337	0.316	0.324	0.314	0.323		0.324	5.04
11) bromomethane	0.291	0.282	0.304	0.287	0.296	0.239	0.277		0.298		0.284	7.10
12) chloroethane	0.238	0.218	0.248	0.231	0.235	0.202	0.225	0.241	0.243		0.231	6.19
13) trichlorofluoromethane	0.460	0.455	0.560	0.506	0.503	0.489	0.473	0.399	0.511		0.484	9.31
14) vinyl bromide	0.245	0.250	0.301	0.269	0.269	0.256	0.248	0.224	0.275	0.219	0.256	9.51
15) ethyl ether	0.162	0.174	0.167	0.170	0.173	0.164	0.169	0.158	0.168		0.167	2.99
16) acrolein			0.056	0.055	0.056	0.053	0.065		0.059		0.057	7.56
17) 1,1-dichloroethene	0.355	0.349	0.324	0.355	0.349	0.340	0.342	0.340	0.345		0.344	2.80
18) freon 113	0.274	0.266	0.273	0.293	0.283	0.283	0.277	0.233	0.284		0.274	6.36
19) 2-chloropropane			0.640	0.558	0.560	0.565	0.526	0.570		0.544	0.566	6.34
20) acetone	0.028	0.027	0.026	0.027	0.027	0.026	0.027		0.026		0.027	2.78
21) acetonitrile	0.050	0.047	0.041	0.040	0.042	0.040	0.044		0.042		0.043	8.16
22) iodomethane	0.613	0.592	0.604	0.598	0.599	0.576	0.585	0.531	0.574	0.465	0.574	7.72
23) carbon disulfide												

Job Number: JC80990 **Sample:** V2D7670-ICC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180457.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

```
          1.031 0.976 1.047 1.015 1.000 0.991 0.973 0.968 0.952 1.100  1.005    4.42
24)  methylene chloride
          0.399 0.382 0.386 0.385 0.392 0.373 0.384 0.383 0.377 0.396  0.386    2.07
25)  methyl acetate
          0.309 0.279 0.247 0.250 0.257 0.253 0.263       0.254        0.264    7.81
26)  methyl tert butyl ether
          1.007 0.966 0.971 0.961 0.981 0.924 0.958 0.893 0.954 0.947  0.956    3.24
27)  trans-1,2-dichloroethene
          0.369 0.377 0.365 0.370 0.377 0.354 0.369 0.349 0.361 0.369  0.366    2.45
28)  hexane
          0.577 0.557 0.589 0.590 0.586 0.570 0.577 0.577 0.565 0.552  0.574    2.28
29)  di-isopropyl ether
          1.323 1.249 1.242 1.251 1.279 1.174 1.253 1.222 1.237 1.302  1.253    3.32
30)  2-butanone
          0.030 0.030 0.035 0.034 0.035 0.034 0.032       0.034        0.033    6.62
31)  1,1-dichloroethane
          0.681 0.648 0.642 0.655 0.666 0.626 0.650 0.621 0.638 0.643  0.647    2.73
32)  chloroprene
          0.520 0.504 0.519 0.528 0.524 0.505 0.510 0.474 0.502 0.459  0.505    4.36
33)  acrylonitrile
          0.108 0.107 0.123 0.120 0.124 0.123 0.114       0.115        0.117    5.92
34)  vinyl acetate
                0.050 0.065 0.057 0.058 0.054 0.052       0.058        0.056    8.58
35)  ethyl tert-butyl ether
          1.210 1.162 1.179 1.162 1.190 1.122 1.160 1.050 1.151 1.079  1.146    4.33
36)  ethyl acetate
          0.037 0.041 0.045 0.045 0.049 0.043 0.043       0.045        0.044    7.84
37)  2,2-dichloropropane
          0.544 0.510 0.481 0.483 0.490 0.446 0.514 0.536 0.489 0.620  0.511    9.31
38)  cis-1,2-dichloroethene
          0.413 0.410 0.407 0.415 0.418 0.397 0.421 0.385 0.405 0.428  0.410    3.03
39)  propionitrile
          0.043 0.045 0.046 0.046 0.046 0.045 0.045 0.036 0.045        0.044    7.00
40)  tert-Butyl Formate
          0.294 0.281 0.305 0.278 0.280 0.278 0.276 0.251 0.274        0.280    5.31
41)  bromochloromethane
          0.210 0.201 0.203 0.202 0.208 0.200 0.203 0.177 0.202 0.172  0.198    6.36
42)  tetrahydrofuran
          0.053 0.047 0.041 0.041 0.044 0.040 0.044 0.048 0.041        0.044    9.27
43)  chloroform
          0.701 0.647 0.623 0.636 0.648 0.610 0.636 0.664 0.622 0.788  0.658    7.95
44)  dibromofluoromethane (s)
          0.412 0.414 0.415 0.414 0.418 0.415 0.418 0.413 0.417 0.412  0.415    0.58
45)  methacrylonitrile
          0.130 0.120 0.136 0.135 0.136 0.137 0.126       0.135        0.132    4.58
46)  1,1,1-trichloroethane
          0.566 0.523 0.547 0.542 0.543 0.522 0.526 0.502 0.525 0.500  0.530    3.84
47)  cyclohexane
          0.513 0.483 0.579 0.534 0.535 0.516 0.505 0.481 0.540 0.492  0.518    5.83
48)  1,1-dichloropropene
          0.483 0.481 0.486 0.489 0.484 0.471 0.480 0.473 0.470 0.402  0.472    5.34
49)  isobutyl alcohol
          0.017 0.016 0.014 0.013 0.014 0.014 0.015       0.015        0.015    9.97
50)  carbon tetrachloride
          0.480 0.460 0.478 0.477 0.473 0.455 0.460 0.440 0.457 0.449  0.463    2.94
51)  tert-amyl alcohol
          0.016 0.014 0.016 0.015 0.016 0.015 0.015       0.015        0.015    4.15

52) I   1,4-difluorobenzene   ----------------ISTD---------------------
53)  1,2-dichloroethane-d4 (s)
```

Job Number: JC80990 **Sample:** V2D7670-ICC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180457.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

0.311 0.308 0.302 0.304 0.307 0.300 0.309 0.312 0.310 0.310 0.307 1.33

54) benzene
1.157 1.085 1.060 1.092 1.104 1.002 1.079 1.068 1.068 1.169 1.088 4.40

55) iso-octane
1.068 0.976 1.040 1.032 1.047 0.960 1.030 0.999 1.014 0.975 1.014 3.51

56) tert-amyl methyl ether
0.876 0.826 0.806 0.814 0.840 0.750 0.842 0.819 0.822 0.796 0.819 4.01

57) heptane
0.209 0.196 0.205 0.204 0.202 0.197 0.206 0.200 0.198 0.202 2.23

58) isopropyl acetate
0.039 0.047 0.052 0.053 0.053 0.051 0.047 0.052 0.049 9.69

59) 1,2-dichloroethane
0.411 0.352 0.320 0.327 0.332 0.310 0.339 0.328 0.340 9.21

60) n-butyl alcohol
0.006 0.006 0.007 0.007 0.007 0.007 0.006 0.005 0.006 0.006 7.31

61) ethyl acrylate
0.295 0.279 0.306 0.303 0.305 0.302 0.292 0.235 0.296 0.290 7.78

62) trichloroethene
0.297 0.288 0.297 0.301 0.302 0.294 0.291 0.257 0.283 0.261 0.287 5.59

63) 2-nitropropane
0.059 0.054 0.051 0.051 0.051 0.051 0.052 0.050 0.052 5.50

64) 2-chloroethyl vinyl ether
0.168 0.162 0.165 0.166 0.172 0.156 0.161 0.143 0.163 0.138 0.159 6.79

65) methyl methacrylate
0.151 0.155 0.167 0.165 0.166 0.166 0.156 0.139 0.158 0.158 5.91

66) 1,2-dichloropropane
0.280 0.280 0.275 0.283 0.283 0.269 0.277 0.258 0.276 0.241 0.272 4.88

67) dibromomethane
0.163 0.158 0.166 0.167 0.167 0.164 0.167 0.139 0.162 0.161 5.55

68) methylcyclohexane
0.488 0.475 0.502 0.500 0.503 0.474 0.490 0.453 0.480 0.408 0.477 6.06

69) bromodichloromethane
0.353 0.335 0.360 0.364 0.360 0.359 0.338 0.337 0.343 0.362 0.351 3.27

70) epichlorohydrin
0.024 0.023 0.024 0.024 0.023 0.024 0.023 0.024 0.024 0.96

71) cis-1,3-dichloropropene
0.445 0.430 0.455 0.454 0.456 0.446 0.434 0.387 0.427 0.393 0.433 5.69

72) 4-methyl-2-pentanone
0.097 0.091 0.092 0.092 0.094 0.088 0.091 0.076 0.092 0.086 0.090 6.29

73) 3-methyl-1-butanol
0.010 0.011 0.011 0.011 0.011 0.010 0.010 0.009 0.011 0.010 5.16

74) I chlorobenzene-d5 ----------ISTD----------

75) toluene-d8 (s)
1.200 1.217 1.192 1.198 1.206 1.178 1.211 1.208 1.212 1.207 1.203 0.95

76) toluene
0.736 0.704 0.689 0.709 0.719 0.659 0.714 0.657 0.690 0.762 0.704 4.59

77) trans-1,3-dichloropropene
0.386 0.383 0.410 0.415 0.409 0.409 0.382 0.330 0.380 0.364 0.387 6.76

78) ethyl methacrylate
0.340 0.349 0.349 0.352 0.353 0.343 0.331 0.284 0.340 0.288 0.333 7.68

79) 1,1,2-trichloroethane
0.230 0.218 0.216 0.218 0.219 0.211 0.214 0.191 0.214 0.168 0.210 8.36

80) tetrachloroethene
0.285 0.277 0.272 0.279 0.278 0.258 0.277 0.262 0.269 0.234 0.269 5.54

81) 1,3-dichloropropane
0.415 0.406 0.405 0.413 0.416 0.391 0.411 0.371 0.406 0.377 0.401 4.00

82) 2-hexanone
0.086 0.086 0.091 0.093 0.093 0.089 0.088 0.070 0.090 0.087 8.18

83) butyl acetate

0.164 0.176 0.173 0.173 0.179 0.172 0.170 0.152 0.176 0.128 0.166 9.36

84) dibromochloromethane
0.276 0.281 0.304 0.305 0.298 0.302 0.285 0.273 0.285 0.297 0.291 4.12

85) 1,2-dibromoethane
0.281 0.290 0.302 0.302 0.303 0.295 0.287 0.273 0.293 0.256 0.288 5.13

86) n-butyl ether
1.273 1.185 1.217 1.252 1.268 1.142 1.213 1.154 1.218 1.167 1.209 3.84

87) chlorobenzene
0.847 0.820 0.799 0.823 0.832 0.764 0.819 0.774 0.798 0.799 0.807 3.19

88) 1,1,1,2-tetrachloroethane
0.306 0.301 0.303 0.308 0.308 0.289 0.303 0.278 0.295 0.274 0.297 4.12

89) ethylbenzene
1.422 1.344 1.320 1.362 1.384 1.246 1.366 1.259 1.353 1.360 1.341 4.02

90) m,p-xylene
1.072 1.044 0.982 1.038 1.061 0.909 1.053 0.981 1.035 1.025 1.020 4.83

91) o-xylene
0.535 0.536 0.508 0.525 0.546 0.465 0.529 0.499 0.532 0.489 0.517 4.95

92) styrene
0.881 0.879 0.859 0.894 0.921 0.795 0.885 0.816 0.886 0.865 0.868 4.31

93) butyl acrylate
0.494 0.500 0.545 0.547 0.543 0.536 0.502 0.437 0.512 0.502 0.512 6.57

94) n-amyl acetate
0.192 0.184 0.194 0.194 0.197 0.194 0.189 0.189 0.192 2.10

95) bromoform
0.202 0.196 0.223 0.219 0.211 0.221 0.199 0.177 0.200 0.167 0.201 9.13

96) isopropylbenzene
1.376 1.355 1.340 1.367 1.398 1.246 1.376 1.260 1.363 1.337 1.342 3.75

97) cis-1,4-dichloro-2-butene
0.092 0.113 0.109 0.106 0.113 0.092 0.099 0.103 8.86

98) I 1,4-dichlorobenzene-d ----------ISTD----------

99) 4-bromofluorobenzene (s)
0.891 0.884 0.861 0.879 0.878 0.926 0.876 0.897 0.883 0.887 0.886 1.92

100) bromobenzene
0.778 0.743 0.719 0.752 0.753 0.722 0.743 0.743 0.731 0.727 0.741 2.36

101) 1,1,2,2-tetrachloroethane
0.670 0.635 0.623 0.627 0.635 0.641 0.626 0.583 0.625 0.624 0.629 3.40

102) trans-1,4-dichloro-2-butene
0.116 0.137 0.137 0.132 0.142 0.127 0.125 0.131 6.82

103) 1,2,3-trichloropropane
0.176 0.168 0.159 0.164 0.168 0.160 0.170 0.148 0.164 0.164 4.80

104) n-propylbenzene
3.083 2.944 2.908 3.023 3.068 2.875 3.017 2.790 2.945 2.903 2.956 3.11

105) 2-chlorotoluene
0.685 0.652 0.649 0.661 0.678 0.656 0.656 0.606 0.656 0.642 0.654 3.29

106) 4-chlorotoluene
1.941 1.789 1.731 1.802 1.814 1.774 1.791 1.709 1.763 1.711 1.783 3.76

107) 1,3,5-trimethylbenzene
2.184 2.107 2.091 2.174 2.195 2.034 2.103 2.031 2.119 1.978 2.102 3.41

108) tert-butylbenzene
1.939 1.867 1.826 1.897 1.903 1.827 1.873 1.860 1.874 2.05

109) 1,2,4-trimethylbenzene
2.224 2.113 2.106 2.186 2.229 2.097 2.143 2.075 2.135 2.047 2.136 2.86

110) sec-butylbenzene
2.868 2.752 2.719 2.838 2.859 2.683 2.813 2.611 2.770 2.636 2.755 3.32

111) 1,3-dichlorobenzene
1.400 1.336 1.298 1.340 1.372 1.246 1.333 1.270 1.317 1.293 1.321 3.48

112) p-isopropyltoluene
2.386 2.265 2.312 2.396 2.420 2.213 2.342 2.193 2.332 2.302 2.316 3.26

113) 1,4-dichlorobenzene

Job Number: JC80990 **Sample:** V2D7670-ICC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180457.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

```
           1.420 1.334 1.332 1.363 1.366 1.313 1.339 1.324 1.303        1.344    2.62
114)  1,2-dichlorobenzene
           1.383 1.305 1.322 1.342 1.366 1.256 1.307 1.252 1.304 1.297  1.314    3.21
115)  benzyl chloride
           1.187 1.163 1.262 1.275 1.255 1.254 1.134 1.078 1.161 1.213  1.198    5.42
116)  n-butylbenzene
           1.160 1.097 1.190 1.214 1.209 1.116 1.123 0.997 1.134 1.022  1.126    6.50
117)  1,2-dibromo-3-chloropropane
           0.123 0.130 0.155 0.150 0.145 0.161 0.130       0.134        0.141    9.69
118)  nitrobenzene
           0.024 0.023 0.034 0.030 0.025       0.021       0.023        0.026   18.92
119)  1,3,5-trichlorobenzene
           1.127 1.070 1.164 1.171 1.152 1.137 1.049 0.947 1.083 1.005  1.090    6.78
120)  hexachlorobutadiene
           0.632 0.638 0.550 0.556 0.570 0.532 0.525 0.489 0.526 0.492  0.551    9.29
121)  naphthalene
           1.606 1.561 2.013 1.977 1.917 2.029 1.600       1.690        1.799   11.31
122)  2-ethylhexyl acrylate
                       0.530 0.482 0.406 0.590             0.348        0.471   20.43
            ---- Linear regression ----  Coefficient =  0.9956
              Response Ratio = -0.01026 + 0.57905 *A

123)  1,2,4-trichlorobenzene
           0.829 0.819 1.010 0.985 0.949 1.005 0.817       0.846        0.907    9.67
124)  1,2,3-trichlorobenzene
           0.772 0.774 0.908 0.890 0.878 0.908 0.754 0.712 0.783 0.710  0.809    9.80
125)  hexachloroethane
           0.469 0.433 0.474 0.479 0.465 0.469 0.440       0.441        0.459    3.89
126)  2-methylnaphthalene
                       0.997 0.887 0.766 1.100             0.584        0.867   23.21
            ---- Linear regression ----  Coefficient =  0.9962
              Response Ratio = -0.05187 + 1.08481 *A

127)  bis(chloromethyl)ether
                                                                        0.000   -1.00
128)  ethylenimine
                                                                        0.000   -1.00
 ---------------------------------------------------------------------------
 (#) = Out of Range  ###  Number of calibration levels exceeded format  ###

          M2D7670.M         Thu Dec 20 13:44:54 2018   GCMS2D
```

Initial Calibration Verification

Job Number: JC80990 **Sample:** V2D7670-ICV7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180462.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\V2D7670\2D180462.D Vial: 14
Acq On : 20 Dec 2018 1:37 am Operator: juntaep
Sample : ICV7670-50 Inst : MS2D
Misc : MS29918,V2D7670,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C, DB624 60m x 0.25mm x 1.4um
Last Update : Thu Dec 20 13:34:34 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1 I	tert butyl alcohol-d9	1.000	1.000	0.0	94	0.00	7.26
2	tertiary butyl alcohol	0.970	1.000	-3.1	93	0.00	7.39
3	ethanol	0.099	0.090	9.1	94	0.00	5.89
4	1,4-dioxane	0.110	0.120	-9.1	95	0.00	12.04
5 I	pentafluorobenzene	1.000	1.000	0.0	99	0.00	9.96
6	chlorodifluoromethane	0.456	0.439	3.7	95	0.00	3.83
7	dichlorodifluoromethane	0.480	0.491	-2.3	96	0.01	3.82
8	chloromethane	0.493	0.433	12.2	91	0.00	4.21
9	vinyl chloride	0.421	0.427	-1.4	94	0.00	4.44
10	1,3-butadiene	0.324	0.353	-9.0	103	0.00	4.46
11	bromomethane	0.284	0.277	2.5	96	0.01	5.06
12	chloroethane	0.231	0.224	3.0	97	0.00	5.20
13	trichlorofluoromethane	0.484	0.499	-3.1	98	0.00	5.69
14	vinyl bromide	0.256	0.273	-6.6	101	0.00	5.56
15	ethyl ether	0.167	0.162	3.0	94	0.00	6.09
16	acrolein	0.057	0.058	-1.8	106	0.00	6.32
17	1,1-dichloroethene	0.344	0.321	6.7	90	0.00	6.52
18	freon 113	0.274	0.312	-13.9	106	0.00	6.52
19 m	2-chloropropane	0.566	0.520	8.1	92	0.00	6.28
20	acetone	0.027	0.025	7.4	93	0.00	6.57
21	acetonitrile	0.043	0.024	44.2#	58	0.00	7.02
22	iodomethane	0.574	0.641	-11.7	107	0.00	6.80
23	carbon disulfide	1.005	1.063	-5.8	104	0.00	6.93
24	methylene chloride	0.386	0.360	6.7	93	0.00	7.28
25	methyl acetate	0.264	0.215	18.6	86	0.00	7.08
26	methyl tert butyl ether	0.956	0.914	4.4	95	0.00	7.70
27	trans-1,2-dichloroethene	0.366	0.345	5.7	93	0.00	7.71
28	hexane	0.574	0.521	9.2	88	0.00	8.11
29	di-isopropyl ether	1.253	1.126	10.1	89	0.00	8.42
30	2-butanone	0.033	0.034	-3.0	98	0.00	9.23
31	1,1-dichloroethane	0.647	0.616	4.8	93	0.00	8.36
32	chloroprene	0.505	0.516	-2.2	97	0.00	8.51
33	acrylonitrile	0.117	0.126	-7.7	104	0.00	7.65
34	vinyl acetate	0.056	0.045	19.6	79	0.00	8.39
35	ethyl tert-butyl ether	1.146	1.129	1.5	96	0.00	8.97
36	ethyl acetate	0.044	0.043	2.3	95	0.00	9.29
37	2,2-dichloropropane	0.511	0.478	6.5	98	0.00	9.27
38	cis-1,2-dichloroethene	0.410	0.423	-3.2	101	0.00	9.25
39	propionitrile	0.044	0.046	-4.5	100	0.00	9.33
40	tert-Butyl Formate	0.280	0.224	20.0	80	0.00	9.79
41	bromochloromethane	0.198	0.206	-4.0	101	0.00	9.63

Job Number: JC80990 **Sample:** V2D7670-ICV7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180462.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.044	0.042	4.5	101	0.00	9.70
43		chloroform	0.658	0.651	1.1	102	0.00	9.71
44	S	dibromofluoromethane (s)	0.415	0.416	-0.2	100	0.00	9.96
45		methacrylonitrile	0.132	0.135	-2.3	99	0.00	9.57
46		1,1,1-trichloroethane	0.530	0.540	-1.9	99	0.00	10.04
47		cyclohexane	0.518	0.577	-11.4	107	0.00	10.15
48		1,1-dichloropropene	0.472	0.501	-6.1	102	0.00	10.27
49		isobutyl alcohol	0.015	0.014	6.7	101	0.00	10.30
50		carbon tetrachloride	0.463	0.487	-5.2	101	0.00	10.30
51		tert-amyl alcohol	0.015	0.016	-6.7	101	0.00	10.47
52	I	1,4-difluorobenzene	1.000	1.000	0.0	101	0.00	11.11
53	S	1,2-dichloroethane-d4 (s)	0.307	0.304	1.0	101	0.00	10.49
54		benzene	1.088	1.091	-0.3	100	0.00	10.60
55		iso-octane	1.014	1.016	-0.2	99	0.00	10.68
56		tert-amyl methyl ether	0.819	0.761	7.1	94	0.00	10.70
57		heptane	0.202	0.230	-13.9	113	0.00	10.91
58		isopropyl acetate	0.049	0.049	0.0	93	0.00	10.58
59		1,2-dichloroethane	0.340	0.327	3.8	101	0.00	10.60
60		n-butyl alcohol	0.006	0.007	-16.7	97	0.00	11.28
61		ethyl acrylate	0.290	0.305	-5.2	101	0.00	11.59
62		trichloroethene	0.287	0.311	-8.4	104	0.00	11.53
63		2-nitropropane	0.052	0.052	0.0	103	0.00	12.57
64		2-chloroethyl vinyl ether	0.159	0.173	-8.8	104	0.00	12.64
65		methyl methacrylate	0.158	0.168	-6.3	102	0.00	11.95
66		1,2-dichloropropane	0.272	0.279	-2.6	99	0.00	11.88
67		dibromomethane	0.161	0.169	-5.0	102	0.00	12.06
68		methylcyclohexane	0.477	0.493	-3.4	99	0.00	11.85
69		bromodichloromethane	0.351	0.357	-1.7	99	0.00	12.26
70		epichlorohydrin	0.024	0.024	0.0	102	0.00	12.77
71		cis-1,3-dichloropropene	0.433	0.456	-5.3	101	0.00	12.90
72		4-methyl-2-pentanone	0.090	0.092	-2.2	100	0.00	13.08
73		3-methyl-1-butanol	0.010	0.011	-10.0	99	0.00	13.10
74	I	chlorobenzene-d5	1.000	1.000	0.0	101	0.00	15.33
75	S	toluene-d8 (s)	1.203	1.205	-0.2	101	0.00	13.31
76		toluene	0.704	0.730	-3.7	104	0.00	13.41
77		trans-1,3-dichloropropene	0.387	0.395	-2.1	96	0.00	13.67
78		ethyl methacrylate	0.333	0.338	-1.5	97	0.00	13.74
79		1,1,2-trichloroethane	0.210	0.217	-3.3	101	0.00	13.95
80		tetrachloroethene	0.269	0.458	-70.3#	166	0.00	14.19
81		1,3-dichloropropane	0.401	0.418	-4.2	102	0.00	14.20
82		2-hexanone	0.087	0.090	-3.4	98	0.00	14.25
83		butyl acetate	0.166	0.168	-1.2	98	0.00	14.38
84		dibromochloromethane	0.291	0.311	-6.9	103	0.00	14.53
85		1,2-dibromoethane	0.288	0.303	-5.2	101	0.00	14.72
86	m	n-butyl ether	1.209	1.251	-3.5	101	0.00	15.38
87		chlorobenzene	0.807	0.829	-2.7	101	0.00	15.37
88		1,1,1,2-tetrachloroethane	0.297	0.312	-5.1	102	0.00	15.46
89		ethylbenzene	1.341	1.405	-4.8	104	0.00	15.48
90		m,p-xylene	1.020	1.070	-4.9	104	0.00	15.63
91		o-xylene	0.517	0.541	-4.6	104	0.00	16.18
92		styrene	0.868	0.919	-5.9	103	0.00	16.18
93		butyl acrylate	0.512	0.558	-9.0	103	0.00	16.01
94		n-amyl acetate	0.192	0.180	6.3	94	0.00	16.31
95		bromoform	0.201	0.226	-12.4	104	0.00	16.47
96		isopropylbenzene	1.342	1.409	-5.0	104	0.00	16.63
97		cis-1,4-dichloro-2-butene	0.103	0.102	1.0	94	0.00	16.70
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	102	0.00	18.15

Initial Calibration Verification

Job Number: JC80990 **Sample:** V2D7670-ICV7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180462.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99 S	4-bromofluorobenzene (s)	0.886	0.883	0.3	102	0.00	16.84
100	bromobenzene	0.741	0.759	-2.4	103	0.00	17.06
101	1,1,2,2-tetrachloroethane	0.629	0.603	4.1	98	0.00	16.97
102	trans-1,4-dichloro-2-bute	0.131	0.151	-15.3	112	0.00	17.04
103	1,2,3-trichloropropane	0.164	0.160	2.4	99	0.00	17.05
104	n-propylbenzene	2.956	3.109	-5.2	105	0.00	17.12
105	2-chlorotoluene	0.654	0.668	-2.1	103	0.00	17.26
106	4-chlorotoluene	1.783	1.876	-5.2	106	0.00	17.38
107	1,3,5-trimethylbenzene	2.102	2.206	-4.9	103	0.00	17.31
108	tert-butylbenzene	1.874	1.931	-3.0	103	0.00	17.70
109	1,2,4-trimethylbenzene	2.136	2.276	-6.6	106	0.00	17.74
110	sec-butylbenzene	2.755	2.925	-6.2	105	0.00	17.93
111	1,3-dichlorobenzene	1.321	1.374	-4.0	104	0.00	18.08
112	p-isopropyltoluene	2.316	2.474	-6.8	105	0.00	18.06
113	1,4-dichlorobenzene	1.344	1.384	-3.0	103	0.00	18.17
114	1,2-dichlorobenzene	1.314	1.359	-3.4	103	0.00	18.56
115	benzyl chloride	1.198	0.960	19.9	77	0.00	18.30
116	n-butylbenzene	1.126	1.250	-11.0	105	0.00	18.48
117	1,2-dibromo-3-chloropropa	0.141	0.147	-4.3	100	0.00	19.29
118	nitrobenzene	0.026	0.029	-11.5	97	0.00	19.48
119	1,3,5-trichlorobenzene	1.090	1.233	-13.1	107	0.00	19.47
120	hexachlorobutadiene	0.551	0.567	-2.9	104	0.00	20.17
121	naphthalene	1.799	2.006	-11.5	103	0.00	20.29
	----------	True	Calc.	% Drift	----------		
122	2-ethylhexyl acrylate	10.000	9.635	3.7	107	0.00	20.06
	----------	AvgRF	CCRF	% Dev	----------		
123	1,2,4-trichlorobenzene	0.907	1.019	-12.3	105	0.00	20.05
124 m	1,2,3-trichlorobenzene	0.809	0.905	-11.9	103	0.00	20.51
125	hexachloroethane	0.459	0.500	-8.9	106	0.00	18.82
	----------	True	Calc.	% Drift	----------		
126	2-methylnaphthalene	25.000	23.043	7.8	103	0.00	21.34
	----------	AvgRF	CCRF	% Dev	----------		
127	bis(chloromethyl)ether		----------NA----------				
128	ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2D180457.D M2D7670.M Thu Dec 20 13:43:18 2018 GCMS2D

Initial Calibration Verification

Job Number: JC80990 **Sample:** V2D7670-ICV7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180463.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\DATA\V2D7670\2D180463.D Vial: 15
Acq On : 20 Dec 2018 2:06 am Operator: juntaep
Sample : ICV7670-50 Inst : MS2D
Misc : MS29918,V2D7670,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C, DB624 60m x 0.25mm x 1.4um
Last Update : Thu Dec 20 13:34:34 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	97	0.00	7.26
2		tertiary butyl alcohol		----------NA----------				
3		ethanol		----------NA----------				
4		1,4-dioxane		----------NA----------				
5	I	pentafluorobenzene	1.000	1.000	0.0	102	0.00	9.96
6		chlorodifluoromethane		----------NA----------				
7		dichlorodifluoromethane		----------NA----------				
8		chloromethane		----------NA----------				
9		vinyl chloride		----------NA----------				
10		1,3-butadiene		----------NA----------				
11		bromomethane		----------NA----------				
12		chloroethane		----------NA----------				
13		trichlorofluoromethane		----------NA----------				
14		vinyl bromide		----------NA----------				
15		ethyl ether		----------NA----------				
16		acrolein		----------NA----------				
17		1,1-dichloroethene		----------NA----------				
18		freon 113		----------NA----------				
19	m	2-chloropropane		----------NA----------				
20		acetone		----------NA----------				
21		acetonitrile	0.043	0.034	20.9	86	0.00	7.02
22		iodomethane		----------NA----------				
23		carbon disulfide		----------NA----------				
24		methylene chloride		----------NA----------				
25		methyl acetate		----------NA----------				
26		methyl tert butyl ether		----------NA----------				
27		trans-1,2-dichloroethene		----------NA----------				
28		hexane		----------NA----------				
29		di-isopropyl ether		----------NA----------				
30		2-butanone		----------NA----------				
31		1,1-dichloroethane		----------NA----------				
32		chloroprene		----------NA----------				
33		acrylonitrile		----------NA----------				
34		vinyl acetate		----------NA----------				
35		ethyl tert-butyl ether		----------NA----------				
36		ethyl acetate		----------NA----------				
37		2,2-dichloropropane		----------NA----------				
38		cis-1,2-dichloroethene		----------NA----------				
39		propionitrile		----------NA----------				
40		tert-Butyl Formate		----------NA----------				
41		bromochloromethane		----------NA----------				

Job Number: JC80990 **Sample:** V2D7670-ICV7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180463.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran		----------NA----------					
43		chloroform		----------NA----------					
44	S	dibromofluoromethane (s)	0.415	0.419	-1.0	104	0.00	9.95	
45		methacrylonitrile		----------NA----------					
46		1,1,1-trichloroethane		----------NA----------					
47		cyclohexane		----------NA----------					
48		1,1-dichloropropene		----------NA----------					
49		isobutyl alcohol		----------NA----------					
50		carbon tetrachloride		----------NA----------					
51		tert-amyl alcohol		----------NA----------					
52	I	1,4-difluorobenzene	1.000	1.000	0.0	103	0.00	11.10	
53	S	1,2-dichloroethane-d4 (s)	0.307	0.309	-0.7	105	0.00	10.49	
54		benzene		----------NA----------					
55		iso-octane		----------NA----------					
56		tert-amyl methyl ether		----------NA----------					
57		heptane		----------NA----------					
58		isopropyl acetate		----------NA----------					
59		1,2-dichloroethane		----------NA----------					
60		n-butyl alcohol		----------NA----------					
61		ethyl acrylate		----------NA----------					
62		trichloroethene		----------NA----------					
63		2-nitropropane		----------NA----------					
64		2-chloroethyl vinyl ether		----------NA----------					
65		methyl methacrylate		----------NA----------					
66		1,2-dichloropropane		----------NA----------					
67		dibromomethane		----------NA----------					
68		methylcyclohexane		----------NA----------					
69		bromodichloromethane		----------NA----------					
70		epichlorohydrin		----------NA----------					
71		cis-1,3-dichloropropene		----------NA----------					
72		4-methyl-2-pentanone		----------NA----------					
73		3-methyl-1-butanol		----------NA----------					
74	I	chlorobenzene-d5	1.000	1.000	0.0	102	0.00	15.33	
75	S	toluene-d8 (s)	1.203	1.217	-1.2	104	0.00	13.31	
76		toluene		----------NA----------					
77		trans-1,3-dichloropropene		----------NA----------					
78		ethyl methacrylate		----------NA----------					
79		1,1,2-trichloroethane		----------NA----------					
80		tetrachloroethene	0.269	0.290	-7.8	107	0.00	14.19	
81		1,3-dichloropropane		----------NA----------					
82		2-hexanone		----------NA----------					
83		butyl acetate		----------NA----------					
84		dibromochloromethane		----------NA----------					
85		1,2-dibromoethane		----------NA----------					
86	m	n-butyl ether		----------NA----------					
87		chlorobenzene		----------NA----------					
88		1,1,1,2-tetrachloroethane		----------NA----------					
89		ethylbenzene		----------NA----------					
90		m,p-xylene		----------NA----------					
91		o-xylene		----------NA----------					
92		styrene		----------NA----------					
93		butyl acrylate		----------NA----------					
94		n-amyl acetate		----------NA----------					
95		bromoform		----------NA----------					
96		isopropylbenzene		----------NA----------					
97		cis-1,4-dichloro-2-butene		----------NA----------					
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	103	0.00	18.15	

Initial Calibration Verification

Job Number: JC80990 **Sample:** V2D7670-ICV7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180463.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99 S	4-bromofluorobenzene (s)	0.886	0.892	-0.7	105	0.00	16.84	
100	bromobenzene		----------NA----------					
101	1,1,2,2-tetrachloroethane		----------NA----------					
102	trans-1,4-dichloro-2-bute		----------NA----------					
103	1,2,3-trichloropropane		----------NA----------					
104	n-propylbenzene		----------NA----------					
105	2-chlorotoluene		----------NA----------					
106	4-chlorotoluene		----------NA----------					
107	1,3,5-trimethylbenzene		----------NA----------					
108	tert-butylbenzene		----------NA----------					
109	1,2,4-trimethylbenzene		----------NA----------					
110	sec-butylbenzene		----------NA----------					
111	1,3-dichlorobenzene		----------NA----------					
112	p-isopropyltoluene		----------NA----------					
113	1,4-dichlorobenzene		----------NA----------					
114	1,2-dichlorobenzene		----------NA----------					
115	benzyl chloride		----------NA----------					
116	n-butylbenzene		----------NA----------					
117	1,2-dibromo-3-chloropropa		----------NA----------					
118	nitrobenzene		----------NA----------					
119	1,3,5-trichlorobenzene		----------NA----------					
120	hexachlorobutadiene		----------NA----------					
121	naphthalene		----------NA----------					
	---------- True		Calc.	% Drift	----------			
122	2-ethylhexyl acrylate		----------NA----------					
	---------- AvgRF		CCRF	% Dev	----------			
123	1,2,4-trichlorobenzene		----------NA----------					
124 m	1,2,3-trichlorobenzene		----------NA----------					
125	hexachloroethane		----------NA----------					
	---------- True		Calc.	% Drift	----------			
126	2-methylnaphthalene		----------NA----------					
	---------- AvgRF		CCRF	% Dev	----------			
127	bis(chloromethyl)ether		----------NA----------					
128	ethylenimine		----------NA----------					

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2D180457.D M2D7670.M Thu Dec 20 13:43:20 2018 GCMS2D

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7692-CC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180812.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ja...19\v2d7692\2d180812.d Vial: 2
Acq On : 9 Jan 2019 6:29 am Operator: EddieH
Sample : CC7670-20 Inst : MS2D
Misc : MS31817,V2D7692,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
Last Update : Thu Dec 20 13:34:34 2018
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1 I	tert butyl alcohol-d9	1.000	1.000	0.0	117	0.03	7.29
2	tertiary butyl alcohol	0.970	0.942	2.9	112	0.03	7.42
3	ethanol	0.099	0.080	19.2	104	0.04	5.94
4	1,4-dioxane	0.110	0.105	4.5	108	0.03	12.07
5 I	pentafluorobenzene	1.000	1.000	0.0	125	0.03	9.98
6	chlorodifluoromethane	0.456	0.424	7.0	117	0.03	3.87
7	dichlorodifluoromethane	0.480	0.468	2.5	118	0.03	3.84
8	chloromethane	0.493	0.465	5.7	122	0.03	4.24
9	vinyl chloride	0.421	0.424	-0.7	119	0.03	4.46
10	1,3-butadiene	0.324	0.298	8.0	111	0.04	4.49
11	bromomethane	0.284	0.306	-7.7	130	0.04	5.09
12	chloroethane	0.231	0.237	-2.6	127	0.04	5.24
13	trichlorofluoromethane	0.484	0.559	-15.5	139	0.04	5.73
14	vinyl bromide	0.256	0.306	-19.5	143	0.03	5.59
15	ethyl ether	0.167	0.170	-1.8	123	0.03	6.12
16	acrolein	0.057	0.055	3.5	124	0.03	6.36
17	1,1-dichloroethene	0.344	0.342	0.6	123	0.03	6.54
18	freon 113	0.274	0.285	-4.0	126	0.04	6.55
19 m	2-chloropropane	0.566	0.544	3.9	121	0.03	6.31
20	acetone	0.027	0.026#	3.7	120	0.03	6.59
21	acetonitrile	0.043	0.037#	14.0	112	0.03	7.05
22	iodomethane	0.574	0.612	-6.6	128	0.03	6.82
23	carbon disulfide	1.005	1.045	-4.0	131	0.03	6.96
24	methylene chloride	0.386	0.395	-2.3	126	0.03	7.31
25	methyl acetate	0.264	0.223	15.5	109	0.03	7.11
26	methyl tert butyl ether	0.956	0.983	-2.8	126	0.03	7.73
27	trans-1,2-dichloroethene	0.366	0.365	0.3	121	0.04	7.74
28	hexane	0.574	0.480	16.4	103	0.03	8.14
29	di-isopropyl ether	1.253	1.173	6.4	115	0.03	8.44
30	2-butanone	0.033	0.032#	3.0	115	0.04	9.27
31	1,1-dichloroethane	0.647	0.642	0.8	121	0.03	8.40
32	chloroprene	0.505	0.479	5.1	115	0.03	8.54
33	acrylonitrile	0.117	0.112	4.3	113	0.04	7.68
34	vinyl acetate	0.056	0.063	-12.5	136	0.03	8.41
35	ethyl tert-butyl ether	1.146	1.145	0.1	121	0.03	9.00
36	ethyl acetate	0.044	0.041#	6.8	105	0.03	9.32
37	2,2-dichloropropane	0.511	0.547	-7.0	140	0.03	9.30
38	cis-1,2-dichloroethene	0.410	0.411	-0.2	123	0.03	9.28
39	propionitrile	0.044	0.042#	4.5	114	0.03	9.36
40	tert-Butyl Formate	0.280	0.299	-6.8	134	0.03	9.83
41	bromochloromethane	0.198	0.210	-6.1	126	0.03	9.65

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7692-CC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180812.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.044	0.038#	13.6	109	0.03	9.73
43		chloroform	0.658	0.659	-0.2	127	0.03	9.74
44	S	dibromofluoromethane (s)	0.415	0.437	-5.3	131	0.03	9.98
45		methacrylonitrile	0.132	0.128	3.0	118	0.03	9.61
46		1,1,1-trichloroethane	0.530	0.570	-7.5	131	0.03	10.07
47		cyclohexane	0.518	0.489	5.6	115	0.03	10.18
48		1,1-dichloropropene	0.472	0.466	1.3	121	0.03	10.30
49		isobutyl alcohol	0.015	0.011#	26.7#	100	0.02	10.32
50		carbon tetrachloride	0.463	0.520	-12.3	138	0.03	10.33
51		tert-amyl alcohol	0.015	0.014#	6.7	105	0.03	10.50
52	I	1,4-difluorobenzene	1.000	1.000	0.0	128	0.03	11.13
53	S	1,2-dichloroethane-d4 (s)	0.307	0.323	-5.2	135	0.03	10.51
54		benzene	1.088	1.057	2.8	123	0.03	10.63
55		iso-octane	1.014	0.944	6.9	115	0.03	10.71
56		tert-amyl methyl ether	0.819	0.810	1.1	124	0.03	10.73
57		heptane	0.202	0.186	7.9	118	0.03	10.93
58		isopropyl acetate	0.049	0.049#	0.0	117	0.03	10.60
59		1,2-dichloroethane	0.340	0.343	-0.9	133	0.03	10.63
60		n-butyl alcohol	0.006	0.005#	16.7	105	0.03	11.31
61		ethyl acrylate	0.290	0.262	9.7	110	0.03	11.62
62		trichloroethene	0.287	0.285	0.7	121	0.03	11.56
63		2-nitropropane	0.052	0.043#	17.3	109	0.02	12.59
64		2-chloroethyl vinyl ether	0.159	0.166	-4.4	124	0.02	12.66
65		methyl methacrylate	0.158	0.151	4.4	117	0.03	11.98
66		1,2-dichloropropane	0.272	0.271	0.4	123	0.03	11.90
67		dibromomethane	0.161	0.171	-6.2	131	0.03	12.09
68		methylcyclohexane	0.477	0.445	6.7	113	0.03	11.88
69		bromodichloromethane	0.351	0.370	-5.4	132	0.03	12.28
70		epichlorohydrin	0.024	0.021#	12.5	117	0.03	12.79
71		cis-1,3-dichloropropene	0.433	0.451	-4.2	127	0.03	12.93
72		4-methyl-2-pentanone	0.090	0.086	4.4	118	0.03	13.10
73		3-methyl-1-butanol	0.010	0.009#	10.0	114	0.03	13.13
74	I	chlorobenzene-d5	1.000	1.000	0.0	134	0.02	15.35
75	S	toluene-d8 (s)	1.203	1.186	1.4	131	0.03	13.33
76		toluene	0.704	0.675	4.1	125	0.03	13.43
77		trans-1,3-dichloropropene	0.387	0.400	-3.4	130	0.03	13.70
78		ethyl methacrylate	0.333	0.310	6.9	117	0.02	13.76
79		1,1,2-trichloroethane	0.210	0.209	0.5	128	0.03	13.97
80		tetrachloroethene	0.269	0.257	4.5	123	0.02	14.21
81		1,3-dichloropropane	0.401	0.405	-1.0	130	0.03	14.22
82		2-hexanone	0.087	0.081	6.9	116	0.02	14.27
83		butyl acetate	0.166	0.156	6.0	116	0.03	14.41
84		dibromochloromethane	0.291	0.305	-4.8	136	0.02	14.55
85		1,2-dibromoethane	0.288	0.297	-3.1	131	0.02	14.74
86	m	n-butyl ether	1.209	1.143	5.5	120	0.02	15.41
87		chlorobenzene	0.807	0.810	-0.4	130	0.03	15.39
88		1,1,1,2-tetrachloroethane	0.297	0.306	-3.0	132	0.03	15.48
89		ethylbenzene	1.341	1.323	1.3	128	0.02	15.50
90		m,p-xylene	1.020	1.020	0.0	128	0.02	15.65
91		o-xylene	0.517	0.520	-0.6	127	0.03	16.20
92		styrene	0.868	0.867	0.1	126	0.02	16.21
93		butyl acrylate	0.512	0.454	11.3	112	0.03	16.04
94		n-amyl acetate	0.192	0.181	5.7	123	0.03	16.33
95		bromoform	0.201	0.212	-5.5	134	0.02	16.49
96		isopropylbenzene	1.342	1.333	0.7	127	0.02	16.65
97		cis-1,4-dichloro-2-butene	0.103	0.107	-3.9	135	0.02	16.72
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	138	0.02	18.17

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7692-CC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180812.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99	S	4-bromofluorobenzene (s)	0.886	0.854	3.6	134	0.02	16.86
100		bromobenzene	0.741	0.708	4.5	129	0.02	17.08
101		1,1,2,2-tetrachloroethane	0.629	0.607	3.5	132	0.02	16.99
102		trans-1,4-dichloro-2-bute	0.131	0.122	6.9	128	0.02	17.06
103		1,2,3-trichloropropane	0.164	0.161	1.8	132	0.02	17.07
104		n-propylbenzene	2.956	2.883	2.5	129	0.02	17.15
105		2-chlorotoluene	0.654	0.638	2.4	129	0.02	17.28
106		4-chlorotoluene	1.783	1.749	1.9	133	0.02	17.40
107		1,3,5-trimethylbenzene	2.102	2.102	0.0	132	0.02	17.33
108		tert-butylbenzene	1.874	1.804	3.7	131	0.02	17.71
109		1,2,4-trimethylbenzene	2.136	2.146	-0.5	133	0.02	17.76
110		sec-butylbenzene	2.755	2.688	2.4	129	0.02	17.95
111		1,3-dichlorobenzene	1.321	1.308	1.0	131	0.02	18.11
112		p-isopropyltoluene	2.316	2.344	-1.2	133	0.02	18.08
113		1,4-dichlorobenzene	1.344	1.317	2.0	133	0.02	18.19
114		1,2-dichlorobenzene	1.314	1.312	0.2	132	0.02	18.58
115		benzyl chloride	1.198	1.323	-10.4	145	0.02	18.31
116		n-butylbenzene	1.126	1.145	-1.7	130	0.02	18.50
117		1,2-dibromo-3-chloropropa	0.141	0.133	5.7	127	0.02	19.31
118		nitrobenzene	0.026	0.023#	11.5	126	0.03	19.51
119		1,3,5-trichlorobenzene	1.090	1.197	-9.8	143	0.02	19.49
120		hexachlorobutadiene	0.551	0.547	0.7	132	0.02	20.19
121		naphthalene	1.799	1.853	-3.0	133	0.02	20.31
		----------	True	Calc.	% Drift	----------		
122		2-ethylhexyl acrylate	4.000	2.509	37.3#	80	0.02	20.08
		----------	AvgRF	CCRF	% Dev	----------		
123		1,2,4-trichlorobenzene	0.907	0.959	-5.7	139	0.02	20.06
124	m	1,2,3-trichlorobenzene	0.809	0.875	-8.2	137	0.02	20.53
125		hexachloroethane	0.459	0.445	3.1	132	0.02	18.84
		----------	True	Calc.	% Drift	----------		
126		2-methylnaphthalene	10.000	8.474	15.3	119	0.02	21.36
		----------	AvgRF	CCRF	% Dev	----------		
127		bis(chloromethyl)ether		----------NA----------				
128		ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2D180456.D M2D7670.M Wed Jan 09 22:11:05 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7692-ECC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180832.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ja...19\v2d7692\2d180832.d Vial: 22
Acq On : 9 Jan 2019 6:09 pm Operator: EddieH
Sample : ecc7670-20 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
Last Update : Thu Dec 20 13:34:34 2018
Response via : Multiple Level Calibration

Min. RRF : 0.050 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 50% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1 I	tert butyl alcohol-d9	1.000	1.000	0.0	133	0.02	7.28
2	tertiary butyl alcohol	0.970	0.869	10.4	117	0.02	7.41
3	ethanol	0.099	0.076	23.2	111	0.03	5.93
4	1,4-dioxane	0.110	0.099	10.0	115	0.03	12.07
5 I	pentafluorobenzene	1.000	1.000	0.0	146	0.02	9.98
6	chlorodifluoromethane	0.456	0.407	10.7	131	0.02	3.85
7	dichlorodifluoromethane	0.480	0.443	7.7	130	0.03	3.83
8	chloromethane	0.493	0.414	16.0	126	0.02	4.23
9	vinyl chloride	0.421	0.392	6.9	128	0.03	4.46
10	1,3-butadiene	0.324	0.316	2.5	137	0.03	4.48
11	bromomethane	0.284	0.286	-0.7	141	0.03	5.08
12	chloroethane	0.231	0.212	8.2	131	0.04	5.23
13	trichlorofluoromethane	0.484	0.499	-3.1	145	0.02	5.71
14	vinyl bromide	0.256	0.269	-5.1	146	0.02	5.58
15	ethyl ether	0.167	0.153	8.4	130	0.03	6.11
16	acrolein	0.057	0.046#	19.3	120	0.02	6.34
17	1,1-dichloroethene	0.344	0.319	7.3	133	0.02	6.54
18	freon 113	0.274	0.264	3.6	136	0.03	6.54
19 m	2-chloropropane	0.566	0.486	14.1	126	0.03	6.30
20	acetone	0.027	0.024#	11.1	129	0.03	6.59
21	acetonitrile	0.043	0.035#	18.6	122	0.03	7.05
22	iodomethane	0.574	0.552	3.8	134	0.02	6.82
23	carbon disulfide	1.005	0.936	6.9	137	0.02	6.95
24	methylene chloride	0.386	0.357	7.5	133	0.03	7.30
25	methyl acetate	0.264	0.206	22.0	117	0.03	7.11
26	methyl tert butyl ether	0.956	0.907	5.1	135	0.02	7.72
27	trans-1,2-dichloroethene	0.366	0.338	7.7	131	0.03	7.74
28	hexane	0.574	0.511	11.0	127	0.03	8.14
29	di-isopropyl ether	1.253	1.086	13.3	124	0.03	8.44
30	2-butanone	0.033	0.030#	9.1	125	0.03	9.25
31	1,1-dichloroethane	0.647	0.585	9.6	128	0.03	8.39
32	chloroprene	0.505	0.450	10.9	125	0.03	8.53
33	acrylonitrile	0.117	0.107	8.5	126	0.03	7.67
34	vinyl acetate	0.056	0.057	-1.8	142	0.02	8.41
35	ethyl tert-butyl ether	1.146	1.049	8.5	129	0.02	8.99
36	ethyl acetate	0.044	0.038#	13.6	111	0.02	9.31
37	2,2-dichloropropane	0.511	0.480	6.1	143	0.02	9.30
38	cis-1,2-dichloroethene	0.410	0.375	8.5	131	0.03	9.28
39	propionitrile	0.044	0.039#	11.4	123	0.03	9.36
40	tert-Butyl Formate	0.280	0.267	4.6	139	0.02	9.82
41	bromochloromethane	0.198	0.187	5.6	131	0.03	9.65

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7692-ECC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180832.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.044	0.036#	18.2	121	0.03	9.72
43		chloroform	0.658	0.582	11.6	131	0.02	9.73
44	S	dibromofluoromethane (s)	0.415	0.407	1.9	142	0.03	9.98
45		methacrylonitrile	0.132	0.116	12.1	125	0.03	9.60
46		1,1,1-trichloroethane	0.530	0.505	4.7	136	0.03	10.07
47		cyclohexane	0.518	0.471	9.1	128	0.03	10.17
48		1,1-dichloropropene	0.472	0.435	7.8	131	0.02	10.29
49		isobutyl alcohol	0.015	0.010#	33.3	108	0.03	10.32
50		carbon tetrachloride	0.463	0.458	1.1	141	0.03	10.32
51		tert-amyl alcohol	0.015	0.013#	13.3	114	0.03	10.50
52	I	1,4-difluorobenzene	1.000	1.000	0.0	146	0.03	11.13
53	S	1,2-dichloroethane-d4 (s)	0.307	0.302	1.6	144	0.02	10.51
54		benzene	1.088	0.986	9.4	130	0.03	10.62
55		iso-octane	1.014	0.906	10.7	126	0.02	10.70
56		tert-amyl methyl ether	0.819	0.755	7.8	131	0.02	10.72
57		heptane	0.202	0.175	13.4	126	0.02	10.93
58		isopropyl acetate	0.049	0.046#	6.1	125	0.03	10.60
59		1,2-dichloroethane	0.340	0.311	8.5	137	0.02	10.62
60		n-butyl alcohol	0.006	0.005#	16.7	112	0.02	11.30
61		ethyl acrylate	0.290	0.251	13.4	120	0.03	11.62
62		trichloroethene	0.287	0.265	7.7	128	0.03	11.56
63		2-nitropropane	0.052	0.040#	23.1	116	0.02	12.59
64		2-chloroethyl vinyl ether	0.159	0.151	5.0	129	0.02	12.66
65		methyl methacrylate	0.158	0.144	8.9	126	0.02	11.97
66		1,2-dichloropropane	0.272	0.253	7.0	130	0.03	11.90
67		dibromomethane	0.161	0.153	5.0	133	0.03	12.09
68		methylcyclohexane	0.477	0.435	8.8	126	0.03	11.88
69		bromodichloromethane	0.351	0.331	5.7	134	0.02	12.27
70		epichlorohydrin	0.024	0.020#	16.7	123	0.03	12.79
71		cis-1,3-dichloropropene	0.433	0.413	4.6	132	0.02	12.92
72		4-methyl-2-pentanone	0.090	0.083	7.8	129	0.02	13.10
73		3-methyl-1-butanol	0.010	0.009#	10.0	118	0.02	13.12
74	I	chlorobenzene-d5	1.000	1.000	0.0	149	0.02	15.35
75	S	toluene-d8 (s)	1.203	1.177	2.2	145	0.02	13.33
76		toluene	0.704	0.642	8.8	133	0.02	13.43
77		trans-1,3-dichloropropene	0.387	0.368	4.9	133	0.02	13.69
78		ethyl methacrylate	0.333	0.297	10.8	125	0.02	13.76
79		1,1,2-trichloroethane	0.210	0.196	6.7	133	0.02	13.97
80		tetrachloroethene	0.269	0.244	9.3	130	0.02	14.21
81		1,3-dichloropropane	0.401	0.376	6.2	134	0.03	14.22
82		2-hexanone	0.087	0.078	10.3	124	0.02	14.27
83		butyl acetate	0.166	0.155	6.6	129	0.02	14.40
84		dibromochloromethane	0.291	0.276	5.2	137	0.02	14.55
85		1,2-dibromoethane	0.288	0.276	4.2	136	0.02	14.74
86	m	n-butyl ether	1.209	1.109	8.3	130	0.02	15.40
87		chlorobenzene	0.807	0.756	6.3	135	0.03	15.39
88		1,1,1,2-tetrachloroethane	0.297	0.280	5.7	135	0.02	15.48
89		ethylbenzene	1.341	1.242	7.4	133	0.02	15.50
90		m,p-xylene	1.020	0.962	5.7	135	0.02	15.65
91		o-xylene	0.517	0.493	4.6	134	0.02	16.19
92		styrene	0.868	0.813	6.3	131	0.02	16.20
93		butyl acrylate	0.512	0.450	12.1	123	0.02	16.03
94		n-amyl acetate	0.192	0.178	7.3	134	0.02	16.32
95		bromoform	0.201	0.195	3.0	137	0.02	16.49
96		isopropylbenzene	1.342	1.258	6.3	134	0.02	16.65
97		cis-1,4-dichloro-2-butene	0.103	0.077	25.2	108	0.02	16.72
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	151	0.02	18.16

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7692-ECC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180832.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99 S	4-bromofluorobenzene (s)	0.886	0.840	5.2	144	0.02	16.86
100	bromobenzene	0.741	0.666	10.1	134	0.02	17.08
101	1,1,2,2-tetrachloroethane	0.629	0.572	9.1	136	0.02	16.99
102	trans-1,4-dichloro-2-bute	0.131	0.102	22.1	117	0.02	17.06
103	1,2,3-trichloropropane	0.164	0.149	9.1	134	0.02	17.07
104	n-propylbenzene	2.956	2.717	8.1	134	0.02	17.14
105	2-chlorotoluene	0.654	0.605	7.5	135	0.02	17.28
106	4-chlorotoluene	1.783	1.641	8.0	137	0.02	17.40
107	1,3,5-trimethylbenzene	2.102	1.981	5.8	136	0.02	17.33
108	tert-butylbenzene	1.874	1.718	8.3	136	0.02	17.71
109	1,2,4-trimethylbenzene	2.136	2.031	4.9	138	0.02	17.76
110	sec-butylbenzene	2.755	2.549	7.5	135	0.02	17.94
111	1,3-dichlorobenzene	1.321	1.234	6.6	136	0.02	18.10
112	p-isopropyltoluene	2.316	2.212	4.5	138	0.02	18.08
113	1,4-dichlorobenzene	1.344	1.237	8.0	137	0.02	18.19
114	1,2-dichlorobenzene	1.314	1.230	6.4	136	0.02	18.58
115	benzyl chloride	1.198	1.200	-0.2	144	0.02	18.31
116	n-butylbenzene	1.126	1.096	2.7	137	0.01	18.49
117	1,2-dibromo-3-chloropropa	0.141	0.128	9.2	133	0.02	19.31
118	nitrobenzene	0.026	0.022#	15.4	130	0.02	19.49
119	1,3,5-trichlorobenzene	1.090	1.097	-0.6	144	0.02	19.49
120	hexachlorobutadiene	0.551	0.509	7.6	135	0.02	20.18
121	naphthalene	1.799	1.790	0.5	141	0.02	20.31
	----------	True	Calc.	% Drift	----------		
122	2-ethylhexyl acrylate	4.000	3.023	24.4	115	0.02	20.08
	----------	AvgRF	CCRF	% Dev	----------		
123	1,2,4-trichlorobenzene	0.907	0.926	-2.1	147	0.02	20.06
124 m	1,2,3-trichlorobenzene	0.809	0.837	-3.5	144	0.02	20.53
125	hexachloroethane	0.459	0.415	9.6	135	0.01	18.83
	----------	True	Calc.	% Drift	----------		
126	2-methylnaphthalene	10.000	9.077	9.2	143	0.02	21.36
	----------	AvgRF	CCRF	% Dev	----------		
127	bis(chloromethyl)ether		----------NA----------				
128	ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2D180456.D M2D7670.M Wed Jan 09 22:13:49 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7694-CC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180858.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ke...kb\v2d7694\2d180858.d Vial: 2
Acq On : 10 Jan 2019 7:18 am Operator: juntaep
Sample : CC7670-20 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
Last Update : Thu Dec 20 13:34:34 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1 I	tert butyl alcohol-d9	1.000	1.000	0.0	116	0.02	7.27
2	tertiary butyl alcohol	0.970	0.972	-0.2	114	0.01	7.40
3	ethanol	0.099	0.087	12.1	111	0.03	5.93
4	1,4-dioxane	0.110	0.111	-0.9	113	0.02	12.06
5 I	pentafluorobenzene	1.000	1.000	0.0	136	0.02	9.98
6	chlorodifluoromethane	0.456	0.408	10.5	123	0.02	3.85
7	dichlorodifluoromethane	0.480	0.430	10.4	118	0.02	3.83
8	chloromethane	0.493	0.425	13.8	121	0.02	4.23
9	vinyl chloride	0.421	0.410	2.6	125	0.02	4.45
10	1,3-butadiene	0.324	0.325	-0.3	132	0.02	4.48
11	bromomethane	0.284	0.295	-3.9	136	0.03	5.08
12	chloroethane	0.231	0.232	-0.4	135	0.03	5.23
13	trichlorofluoromethane	0.484	0.527	-8.9	143	0.02	5.71
14	vinyl bromide	0.256	0.298	-16.4	151	0.03	5.58
15	ethyl ether	0.167	0.167	0.0	132	0.02	6.10
16	acrolein	0.057	0.049	14.0	120	0.03	6.35
17	1,1-dichloroethene	0.344	0.333	3.2	130	0.02	6.54
18	freon 113	0.274	0.274	0.0	132	0.03	6.54
19 m	2-chloropropane	0.566	0.566	0.0	137	0.02	6.30
20	acetone	0.027	0.024	11.1	121	0.02	6.58
21	acetonitrile	0.043	0.035	18.6	115	0.02	7.04
22	iodomethane	0.574	0.604	-5.2	138	0.02	6.81
23	carbon disulfide	1.005	1.006	-0.1	137	0.02	6.95
24	methylene chloride	0.386	0.388	-0.5	135	0.02	7.29
25	methyl acetate	0.264	0.222	15.9	117	0.02	7.10
26	methyl tert butyl ether	0.956	0.968	-1.3	134	0.02	7.72
27	trans-1,2-dichloroethene	0.366	0.366	0.0	132	0.03	7.73
28	hexane	0.574	0.488	15.0	114	0.02	8.13
29	di-isopropyl ether	1.253	1.174	6.3	125	0.02	8.43
30	2-butanone	0.033	0.032	3.0	126	0.02	9.25
31	1,1-dichloroethane	0.647	0.648	-0.2	133	0.02	8.38
32	chloroprene	0.505	0.491	2.8	128	0.02	8.53
33	acrylonitrile	0.117	0.112	4.3	123	0.02	7.66
34	vinyl acetate	0.056	0.061	-8.9	143	0.02	8.41
35	ethyl tert-butyl ether	1.146	1.134	1.0	130	0.02	8.99
36	ethyl acetate	0.044	0.042	4.5	115	0.02	9.31
37	2,2-dichloropropane	0.511	0.529	-3.5	147	0.02	9.30
38	cis-1,2-dichloroethene	0.410	0.417	-1.7	136	0.02	9.27
39	propionitrile	0.044	0.042	4.5	123	0.02	9.35
40	tert-Butyl Formate	0.280	0.293	-4.6	142	0.02	9.82
41	bromochloromethane	0.198	0.209	-5.6	137	0.02	9.64

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7694-CC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180858.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.044	0.038	13.6	118	0.02	9.72
43		chloroform	0.658	0.652	0.9	137	0.02	9.73
44	S	dibromofluoromethane (s)	0.415	0.411	1.0	134	0.02	9.97
45		methacrylonitrile	0.132	0.126	4.5	126	0.02	9.60
46		1,1,1-trichloroethane	0.530	0.557	-5.1	140	0.02	10.06
47		cyclohexane	0.518	0.491	5.2	125	0.02	10.17
48		1,1-dichloropropene	0.472	0.478	-1.3	135	0.02	10.29
49		isobutyl alcohol	0.015	0.011	26.7#	108	0.02	10.31
50		carbon tetrachloride	0.463	0.506	-9.3	146	0.03	10.32
51		tert-amyl alcohol	0.015	0.013	13.3	112	0.02	10.49
52	I	1,4-difluorobenzene	1.000	1.000	0.0	136	0.02	11.12
53	S	1,2-dichloroethane-d4 (s)	0.307	0.308	-0.3	136	0.02	10.50
54		benzene	1.088	1.080	0.7	133	0.02	10.62
55		iso-octane	1.014	0.960	5.3	124	0.02	10.70
56		tert-amyl methyl ether	0.819	0.821	-0.2	133	0.02	10.72
57		heptane	0.202	0.195	3.5	131	0.02	10.93
58		isopropyl acetate	0.049	0.051	-4.1	131	0.02	10.59
59		1,2-dichloroethane	0.340	0.348	-2.4	142	0.02	10.62
60		n-butyl alcohol	0.006	0.005	16.7	110	0.02	11.29
61		ethyl acrylate	0.290	0.276	4.8	123	0.02	11.61
62		trichloroethene	0.287	0.297	-3.5	134	0.02	11.55
63		2-nitropropane	0.052	0.046	11.5	122	0.02	12.59
64		2-chloroethyl vinyl ether	0.159	0.171	-7.5	135	0.02	12.66
65		methyl methacrylate	0.158	0.155	1.9	126	0.02	11.97
66		1,2-dichloropropane	0.272	0.283	-4.0	136	0.02	11.90
67		dibromomethane	0.161	0.172	-6.8	140	0.02	12.08
68		methylcyclohexane	0.477	0.458	4.0	123	0.02	11.87
69		bromodichloromethane	0.351	0.375	-6.8	141	0.02	12.27
70		epichlorohydrin	0.024	0.022	8.3	127	0.02	12.78
71		cis-1,3-dichloropropene	0.433	0.464	-7.2	138	0.02	12.92
72		4-methyl-2-pentanone	0.090	0.090	0.0	130	0.02	13.10
73		3-methyl-1-butanol	0.010	0.009	10.0	119	0.02	13.12
74	I	chlorobenzene-d5	1.000	1.000	0.0	140	0.02	15.35
75	S	toluene-d8 (s)	1.203	1.168	2.9	135	0.02	13.33
76		toluene	0.704	0.706	-0.3	137	0.02	13.43
77		trans-1,3-dichloropropene	0.387	0.410	-5.9	140	0.02	13.69
78		ethyl methacrylate	0.333	0.328	1.5	130	0.02	13.75
79		1,1,2-trichloroethane	0.210	0.217	-3.3	138	0.02	13.97
80		tetrachloroethene	0.269	0.267	0.7	134	0.02	14.21
81		1,3-dichloropropane	0.401	0.420	-4.7	141	0.02	14.21
82		2-hexanone	0.087	0.085	2.3	127	0.02	14.26
83		butyl acetate	0.166	0.170	-2.4	133	0.02	14.40
84		dibromochloromethane	0.291	0.310	-6.5	145	0.02	14.55
85		1,2-dibromoethane	0.288	0.310	-7.6	143	0.02	14.74
86	m	n-butyl ether	1.209	1.209	0.0	133	0.02	15.40
87		chlorobenzene	0.807	0.840	-4.1	141	0.02	15.39
88		1,1,1,2-tetrachloroethane	0.297	0.315	-6.1	142	0.02	15.48
89		ethylbenzene	1.341	1.376	-2.6	139	0.02	15.50
90		m,p-xylene	1.020	1.062	-4.1	140	0.02	15.65
91		o-xylene	0.517	0.538	-4.1	137	0.02	16.19
92		styrene	0.868	0.900	-3.7	136	0.02	16.20
93		butyl acrylate	0.512	0.489	4.5	126	0.02	16.03
94		n-amyl acetate	0.192	0.198	-3.1	140	0.02	16.32
95		bromoform	0.201	0.212	-5.5	140	0.02	16.48
96		isopropylbenzene	1.342	1.384	-3.1	138	0.02	16.65
97		cis-1,4-dichloro-2-butene	0.103	0.080	22.3#	105	0.02	16.72
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	142	0.02	18.16

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7694-CC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180858.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99 S	4-bromofluorobenzene (s)	0.886	0.835	5.8	135	0.02	16.86
100	bromobenzene	0.741	0.748	-0.9	141	0.02	17.07
101	1,1,2,2-tetrachloroethane	0.629	0.632	-0.5	141	0.02	16.99
102	trans-1,4-dichloro-2-bute	0.131	0.104	20.6#	112	0.02	17.05
103	1,2,3-trichloropropane	0.164	0.166	-1.2	140	0.02	17.07
104	n-propylbenzene	2.956	3.060	-3.5	141	0.02	17.14
105	2-chlorotoluene	0.654	0.681	-4.1	142	0.02	17.28
106	4-chlorotoluene	1.783	1.839	-3.1	144	0.02	17.40
107	1,3,5-trimethylbenzene	2.102	2.193	-4.3	142	0.01	17.32
108	tert-butylbenzene	1.874	1.900	-1.4	142	0.01	17.71
109	1,2,4-trimethylbenzene	2.136	2.246	-5.1	143	0.01	17.75
110	sec-butylbenzene	2.755	2.843	-3.2	141	0.02	17.94
111	1,3-dichlorobenzene	1.321	1.369	-3.6	141	0.02	18.10
112	p-isopropyltoluene	2.316	2.450	-5.8	143	0.02	18.08
113	1,4-dichlorobenzene	1.344	1.380	-2.7	143	0.02	18.19
114	1,2-dichlorobenzene	1.314	1.365	-3.9	142	0.02	18.58
115	benzyl chloride	1.198	1.327	-10.8	150	0.01	18.31
116	n-butylbenzene	1.126	1.220	-8.3	143	0.01	18.49
117	1,2-dibromo-3-chloropropa	0.141	0.143	-1.4	140	0.02	19.30
118	nitrobenzene	0.026	0.024	7.7	136	0.02	19.50
119	1,3,5-trichlorobenzene	1.090	1.243	-14.0	153	0.02	19.49
120	hexachlorobutadiene	0.551	0.572	-3.8	142	0.02	20.18
121	naphthalene	1.799	1.953	-8.6	144	0.02	20.31
	---------- True	Calc.	% Drift	----------			
122	2-ethylhexyl acrylate	4.000	2.764	30.9#	95	0.02	20.08
	---------- AvgRF	CCRF	% Dev	----------			
123	1,2,4-trichlorobenzene	0.907	1.001	-10.4	149	0.02	20.06
124 m	1,2,3-trichlorobenzene	0.809	0.922	-14.0	149	0.02	20.52
125	hexachloroethane	0.459	0.465	-1.3	142	0.01	18.83
	---------- True	Calc.	% Drift	----------			
126	2-methylnaphthalene	10.000	9.100	9.0	135	0.02	21.36
	---------- AvgRF	CCRF	% Dev	----------			
127	bis(chloromethyl)ether	----------NA----------					
128	ethylenimine	----------NA----------					

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2D180456.D M2D7670.M Fri Jan 11 05:15:09 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7694-ECC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180878.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ke...kb\v2d7694\2d180878.d Vial: 22
Acq On : 10 Jan 2019 6:15 pm Operator: EddieH
Sample : ecc7670-20 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1 Multiplr: 1.00
MS Integration Params: rteint.p

Method : C:\msdchem\1\METHODS\M2D7670.M (RTE Integrator)
Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
Last Update : Thu Dec 20 13:34:34 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 50% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1 I	tert butyl alcohol-d9	1.000	1.000	0.0	123	0.02	7.27
2	tertiary butyl alcohol	0.970	0.891	8.1	111	0.01	7.40
3	ethanol	0.099	0.078	21.2	106	0.01	5.91
4	1,4-dioxane	0.110	0.102	7.3	110	0.01	12.05
5 I	pentafluorobenzene	1.000	1.000	0.0	142	0.01	9.97
6	chlorodifluoromethane	0.456	0.382	16.2	120	0.02	3.85
7	dichlorodifluoromethane	0.480	0.334	30.4	95	0.03	3.83
8	chloromethane	0.493	0.352	28.6	104	0.02	4.22
9	vinyl chloride	0.421	0.335	20.4	106	0.02	4.45
10	1,3-butadiene	0.324	0.290	10.5	122	0.03	4.49
11	bromomethane	0.284	0.246	13.4	118	0.03	5.08
12	chloroethane	0.231	0.188	18.6	113	0.03	5.23
13	trichlorofluoromethane	0.484	0.454	6.2	128	0.02	5.71
14	vinyl bromide	0.256	0.244	4.7	129	0.02	5.58
15	ethyl ether	0.167	0.152	9.0	125	0.02	6.10
16	acrolein	0.057	0.048	15.8	123	0.03	6.35
17	1,1-dichloroethene	0.344	0.318	7.6	129	0.01	6.53
18	freon 113	0.274	0.268	2.2	134	0.03	6.54
19 m	2-chloropropane	0.566	0.531	6.2	133	0.02	6.29
20	acetone	0.027	0.023	14.8	118	0.02	6.58
21	acetonitrile	0.043	0.033	23.3	112	0.02	7.03
22	iodomethane	0.574	0.557	3.0	132	0.02	6.81
23	carbon disulfide	1.005	0.938	6.7	133	0.02	6.94
24	methylene chloride	0.386	0.354	8.3	128	0.02	7.29
25	methyl acetate	0.264	0.200	24.2	110	0.02	7.09
26	methyl tert butyl ether	0.956	0.891	6.8	129	0.01	7.71
27	trans-1,2-dichloroethene	0.366	0.337	7.9	127	0.02	7.72
28	hexane	0.574	0.472	17.8	114	0.02	8.12
29	di-isopropyl ether	1.253	1.076	14.1	119	0.01	8.42
30	2-butanone	0.033	0.029	12.1	117	0.02	9.24
31	1,1-dichloroethane	0.647	0.588	9.1	125	0.01	8.37
32	chloroprene	0.505	0.447	11.5	121	0.02	8.52
33	acrylonitrile	0.117	0.101	13.7	116	0.02	7.66
34	vinyl acetate	0.056	0.056	0.0	136	0.01	8.40
35	ethyl tert-butyl ether	1.146	1.049	8.5	125	0.01	8.98
36	ethyl acetate	0.044	0.037	15.9	108	0.02	9.31
37	2,2-dichloropropane	0.511	0.468	8.4	136	0.01	9.29
38	cis-1,2-dichloroethene	0.410	0.378	7.8	128	0.01	9.26
39	propionitrile	0.044	0.038	13.6	118	0.01	9.34
40	tert-Butyl Formate	0.280	0.258	7.9	130	0.00	9.81
41	bromochloromethane	0.198	0.190	4.0	129	0.01	9.63

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7694-ECC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180878.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.044	0.035	20.5	115	0.02	9.71
43		chloroform	0.658	0.585	11.1	128	0.01	9.72
44	S	dibromofluoromethane (s)	0.415	0.402	3.1	136	0.01	9.96
45		methacrylonitrile	0.132	0.112	15.2	117	0.01	9.59
46		1,1,1-trichloroethane	0.530	0.505	4.7	132	0.01	10.05
47		cyclohexane	0.518	0.464	10.4	123	0.02	10.16
48		1,1-dichloropropene	0.472	0.438	7.2	128	0.01	10.28
49		isobutyl alcohol	0.015	0.010	33.3	101	0.01	10.31
50		carbon tetrachloride	0.463	0.462	0.2	138	0.01	10.31
51		tert-amyl alcohol	0.015	0.012	20.0	105	0.01	10.48
52	I	1,4-difluorobenzene	1.000	1.000	0.0	140	0.01	11.11
53	S	1,2-dichloroethane-d4 (s)	0.307	0.300	2.3	137	0.01	10.50
54		benzene	1.088	0.992	8.8	126	0.01	10.61
55		iso-octane	1.014	0.926	8.7	124	0.00	10.69
56		tert-amyl methyl ether	0.819	0.763	6.8	128	0.01	10.71
57		heptane	0.202	0.188	6.9	131	0.01	10.92
58		isopropyl acetate	0.049	0.047	4.1	124	0.02	10.59
59		1,2-dichloroethane	0.340	0.314	7.6	133	0.01	10.61
60		n-butyl alcohol	0.006	0.005	16.7	107	0.01	11.29
61		ethyl acrylate	0.290	0.248	14.5	114	0.01	11.60
62		trichloroethene	0.287	0.273	4.9	127	0.01	11.54
63		2-nitropropane	0.052	0.043	17.3	118	0.01	12.58
64		2-chloroethyl vinyl ether	0.159	0.152	4.4	125	0.00	12.65
65		methyl methacrylate	0.158	0.144	8.9	122	0.01	11.96
66		1,2-dichloropropane	0.272	0.253	7.0	126	0.01	11.89
67		dibromomethane	0.161	0.154	4.3	129	0.01	12.07
68		methylcyclohexane	0.477	0.445	6.7	124	0.01	11.86
69		bromodichloromethane	0.351	0.337	4.0	132	0.01	12.26
70		epichlorohydrin	0.024	0.020	16.7	118	0.01	12.77
71		cis-1,3-dichloropropene	0.433	0.415	4.2	128	0.01	12.91
72		4-methyl-2-pentanone	0.090	0.082	8.9	123	0.01	13.09
73		3-methyl-1-butanol	0.010	0.009	10.0	112	0.01	13.11
74	I	chlorobenzene-d5	1.000	1.000	0.0	142	0.00	15.34
75	S	toluene-d8 (s)	1.203	1.173	2.5	139	0.01	13.32
76		toluene	0.704	0.653	7.2	129	0.01	13.42
77		trans-1,3-dichloropropene	0.387	0.378	2.3	132	0.01	13.68
78		ethyl methacrylate	0.333	0.299	10.2	121	0.01	13.75
79		1,1,2-trichloroethane	0.210	0.197	6.2	128	0.01	13.96
80		tetrachloroethene	0.269	0.251	6.7	128	0.00	14.20
81		1,3-dichloropropane	0.401	0.379	5.5	130	0.01	14.20
82		2-hexanone	0.087	0.078	10.3	119	0.00	14.25
83		butyl acetate	0.166	0.151	9.0	120	0.01	14.39
84		dibromochloromethane	0.291	0.284	2.4	135	0.00	14.53
85		1,2-dibromoethane	0.288	0.282	2.1	133	0.00	14.73
86	m	n-butyl ether	1.209	1.114	7.9	125	0.01	15.39
87		chlorobenzene	0.807	0.772	4.3	132	0.01	15.38
88		1,1,1,2-tetrachloroethane	0.297	0.290	2.4	134	0.01	15.47
89		ethylbenzene	1.341	1.271	5.2	131	0.01	15.49
90		m,p-xylene	1.020	0.980	3.9	132	0.00	15.64
91		o-xylene	0.517	0.494	4.4	129	0.01	16.18
92		styrene	0.868	0.833	4.0	129	0.00	16.19
93		butyl acrylate	0.512	0.444	13.3	116	0.01	16.02
94		n-amyl acetate	0.192	0.176	8.3	127	0.01	16.31
95		bromoform	0.201	0.196	2.5	132	0.00	16.47
96		isopropylbenzene	1.342	1.287	4.1	131	0.00	16.64
97		cis-1,4-dichloro-2-butene	0.103	0.085	17.5	114	0.01	16.71
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	144	0.00	18.15

Continuing Calibration Summary

Job Number: JC80990 **Sample:** V2D7694-ECC7670
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 2D180878.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99 S	4-bromofluorobenzene (s)	0.886	0.841	5.1	138	0.01	16.85
100	bromobenzene	0.741	0.693	6.5	133	0.00	17.06
101	1,1,2,2-tetrachloroethane	0.629	0.570	9.4	130	0.00	16.98
102	trans-1,4-dichloro-2-bute	0.131	0.105	19.8	115	0.01	17.05
103	1,2,3-trichloropropane	0.164	0.151	7.9	130	0.01	17.06
104	n-propylbenzene	2.956	2.774	6.2	131	0.00	17.13
105	2-chlorotoluene	0.654	0.616	5.8	131	0.01	17.27
106	4-chlorotoluene	1.783	1.652	7.3	131	0.00	17.39
107	1,3,5-trimethylbenzene	2.102	2.023	3.8	133	0.00	17.32
108	tert-butylbenzene	1.874	1.777	5.2	135	0.00	17.70
109	1,2,4-trimethylbenzene	2.136	2.068	3.2	134	0.00	17.75
110	sec-butylbenzene	2.755	2.619	4.9	132	0.00	17.93
111	1,3-dichlorobenzene	1.321	1.248	5.5	131	0.00	18.09
112	p-isopropyltoluene	2.316	2.257	2.5	135	0.00	18.07
113	1,4-dichlorobenzene	1.344	1.244	7.4	131	0.00	18.18
114	1,2-dichlorobenzene	1.314	1.232	6.2	130	0.00	18.57
115	benzyl chloride	1.198	1.165	2.8	134	0.00	18.30
116	n-butylbenzene	1.126	1.093	2.9	131	0.00	18.49
117	1,2-dibromo-3-chloropropa	0.141	0.131	7.1	131	0.01	19.30
118	nitrobenzene	0.026	0.020	23.1	117	0.00	19.48
119	1,3,5-trichlorobenzene	1.090	1.120	-2.8	140	0.00	19.48
120	hexachlorobutadiene	0.551	0.524	4.9	133	0.00	20.17
121	naphthalene	1.799	1.733	3.7	131	0.01	20.30
	---------- True	Calc.	% Drift	----------			
122	2-ethylhexyl acrylate	4.000	2.600	35.0	88	0.00	20.07
	---------- AvgRF	CCRF	% Dev	----------			
123	1,2,4-trichlorobenzene	0.907	0.920	-1.4	140	0.00	20.05
124 m	1,2,3-trichlorobenzene	0.809	0.828	-2.3	136	0.01	20.52
125	hexachloroethane	0.459	0.431	6.1	134	0.00	18.83
	---------- True	Calc.	% Drift	----------			
126	2-methylnaphthalene	10.000	8.226	17.7	119	0.01	21.35
	---------- AvgRF	CCRF	% Dev	----------			
127	bis(chloromethyl)ether	----------NA----------					
128	ethylenimine	----------NA----------					

(#) = Out of Range SPCC's out = 0 CCC's out = 0
2D180456.D M2D7670.M Fri Jan 11 05:15:47 2019

MS Volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180823.d
Acq On : 9 Jan 2019 1:43 pm
Operator : EddieH
Sample : JC80990-1 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 13 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:03:34 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

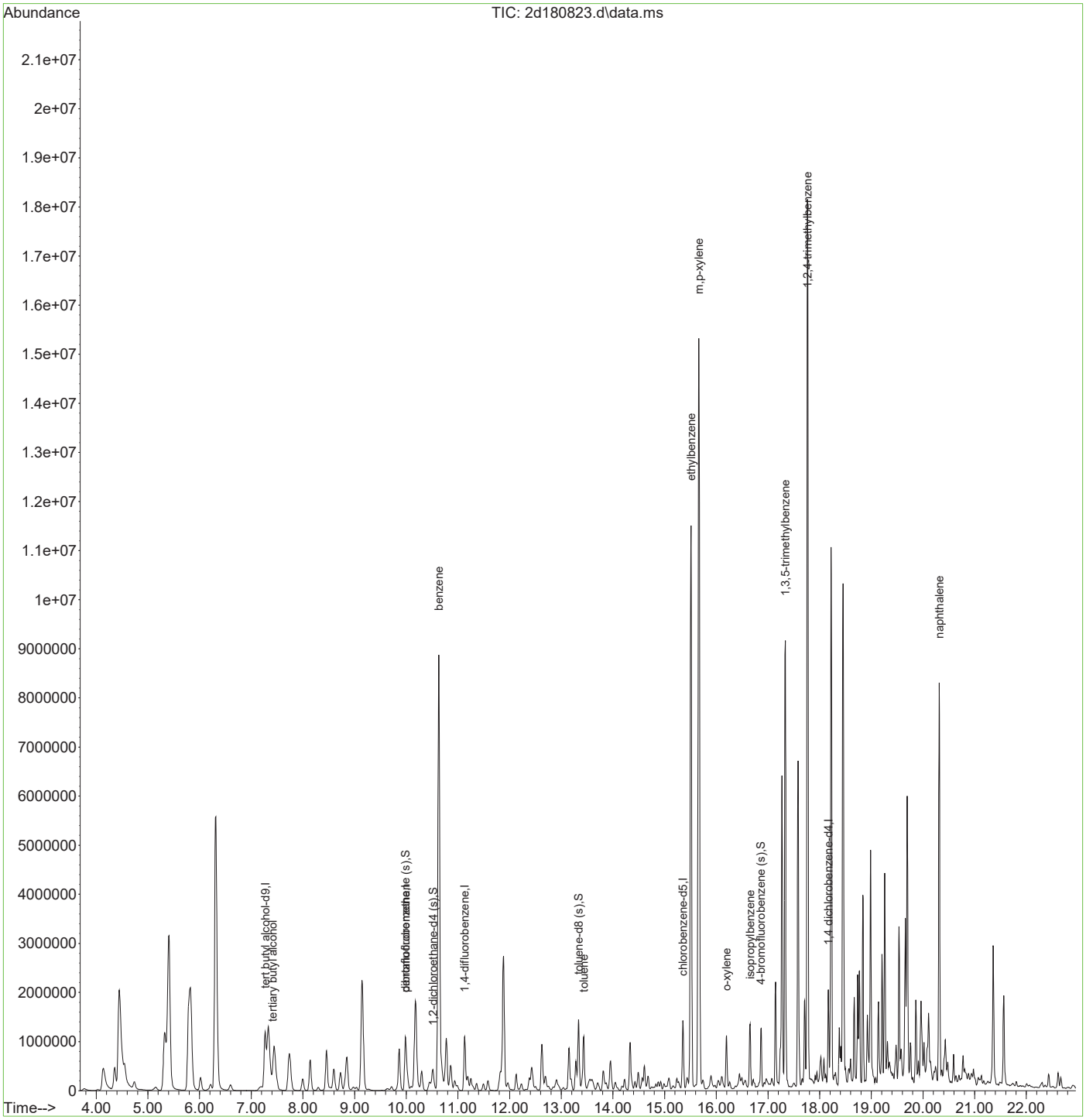
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	322050	500.00	ug/L	0.02
5) pentafluorobenzene	9.984	168	659745	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.132	114	879067	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	861324	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.168	152	461495	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.984	113	268589	49.08	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.16%			
53) 1,2-dichloroethane-d4 (s)	10.519	65	272927	50.51	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 101.02%			
75) toluene-d8 (s)	13.334	98	1008206	48.66	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.32%			
99) 4-bromofluorobenzene (s)	16.863	95	399403	48.82	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.64%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.415	59	17821	28.54	ug/L	# 1
54) benzene	10.629	78	10543416	550.98	ug/L	99
76) toluene	13.434	92	506345	41.76	ug/L	99
89) ethylbenzene	15.510	91	9603869	415.59	ug/L	100
90) m,p-xylene	15.662	91	11017894	627.19	ug/L	97
91) o-xylene	16.197	106	328948	36.97	ug/L	100
96) isopropylbenzene	16.653	105	869405	37.61	ug/L	100
107) 1,3,5-trimethylbenzene	17.335	105	5111860	263.52	ug/L	99
109) 1,2,4-trimethylbenzene	17.764	105	10837769	549.84	ug/L	99
121) naphthalene	20.313	128	6393258	385.03	ug/L	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

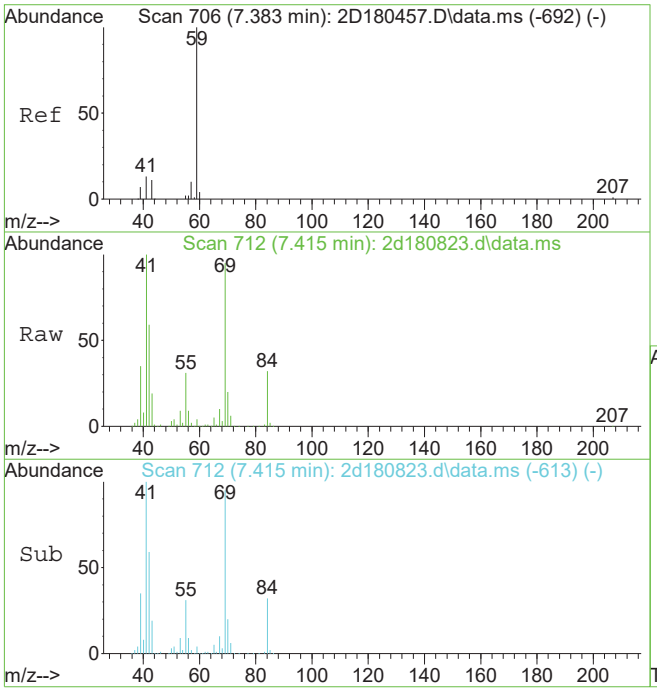
Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180823.d
Acq On : 9 Jan 2019 1:43 pm
Operator : EddieH
Sample : JC80990-1 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 13 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:03:34 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



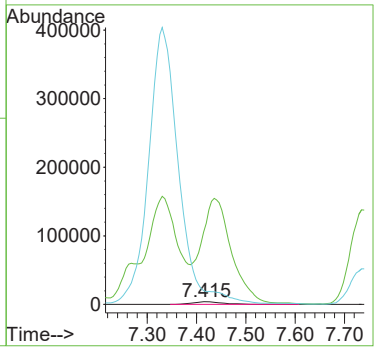
M2D7670.M Wed Jan 09 22:12:14 2019 Page: 2

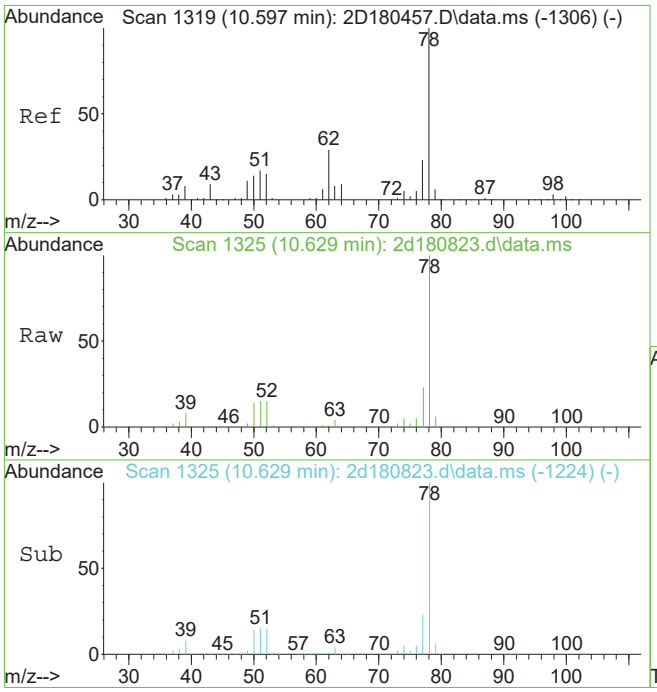


#2
tertiary butyl alcohol
Concen: 28.54 ug/L
RT: 7.415 min Scan# 712
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 59 Resp: 17821

Ion	Ratio	Lower	Upper
59	100		
41	2689.6	0.0	45.0#
43	492.3	0.0	40.6#

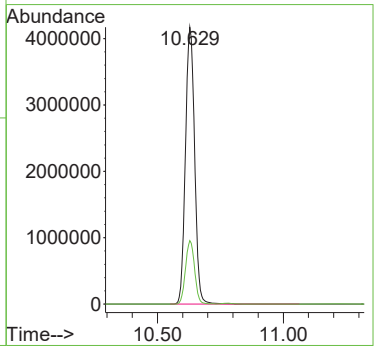


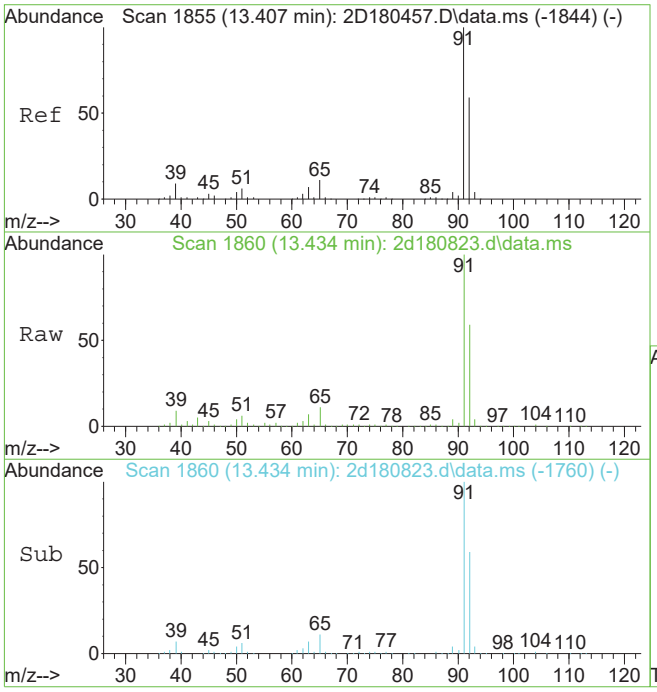


#54
benzene
Concen: 550.98 ug/L
RT: 10.629 min Scan# 1325
Delta R.T. 0.032 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 78 Resp:10543416

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

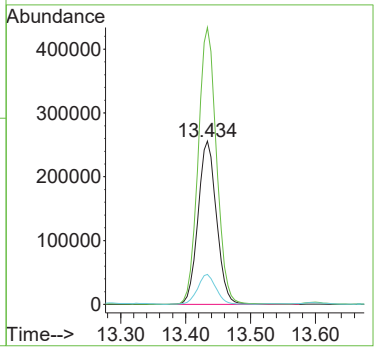


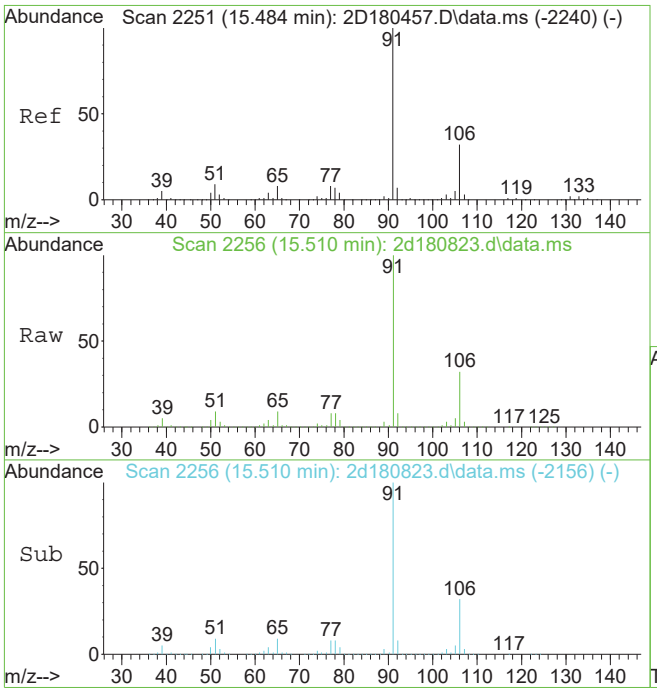


#76
toluene
Concen: 41.76 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 92 Resp: 506345

Ion	Ratio	Lower	Upper
92	100		
91	169.5	148.1	188.1
65	18.1	0.0	38.8

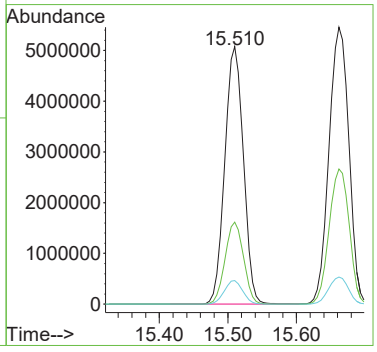


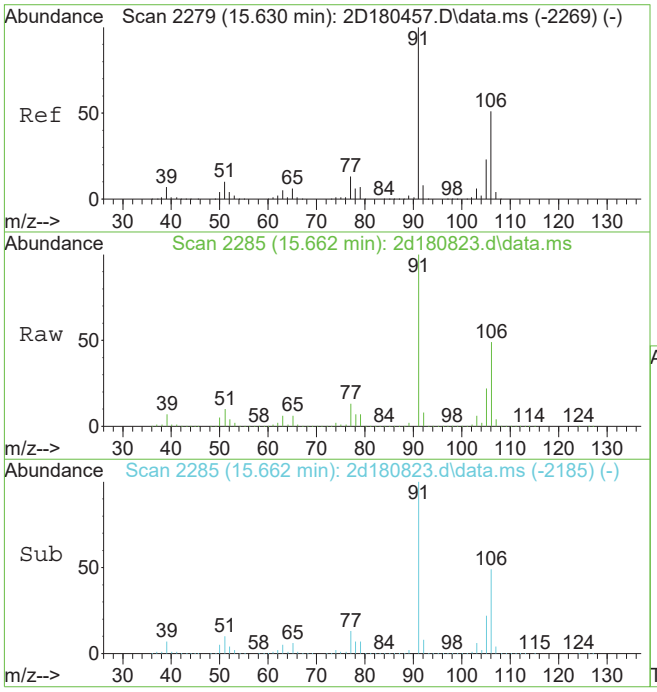


#89
ethylbenzene
Concen: 415.59 ug/L
RT: 15.510 min Scan# 2256
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 91 Resp: 9603869

Ion	Ratio	Lower	Upper
91	100		
106	31.8	1.6	61.6
51	9.1	0.0	39.0

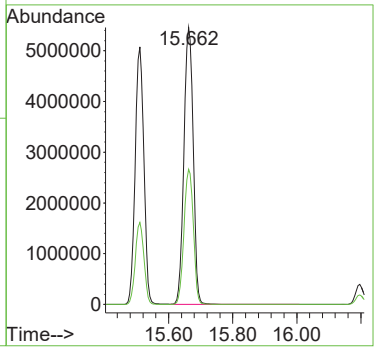


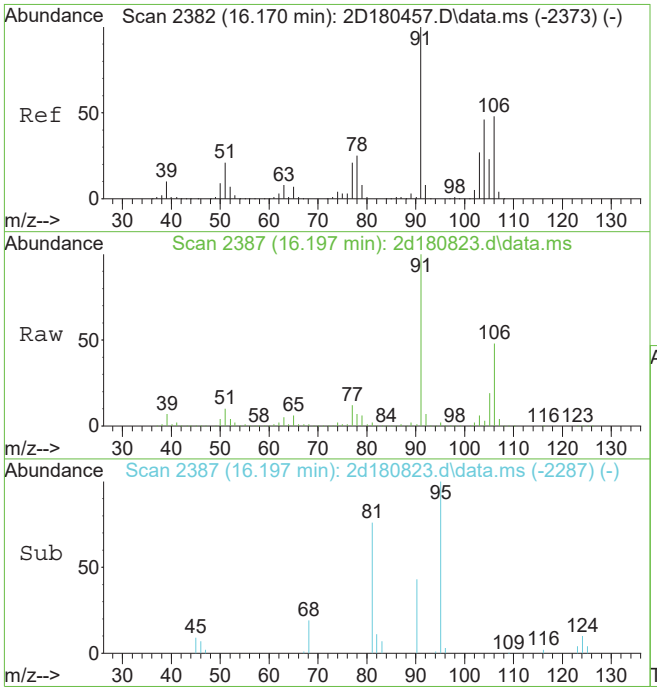


#90
m,p-xylene
Concen: 627.19 ug/L
RT: 15.662 min Scan# 2285
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 91 Resp:11017894

Ion	Ratio	Lower	Upper
91	100		
106	48.8	21.1	81.1

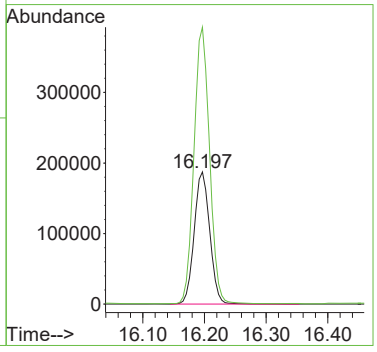


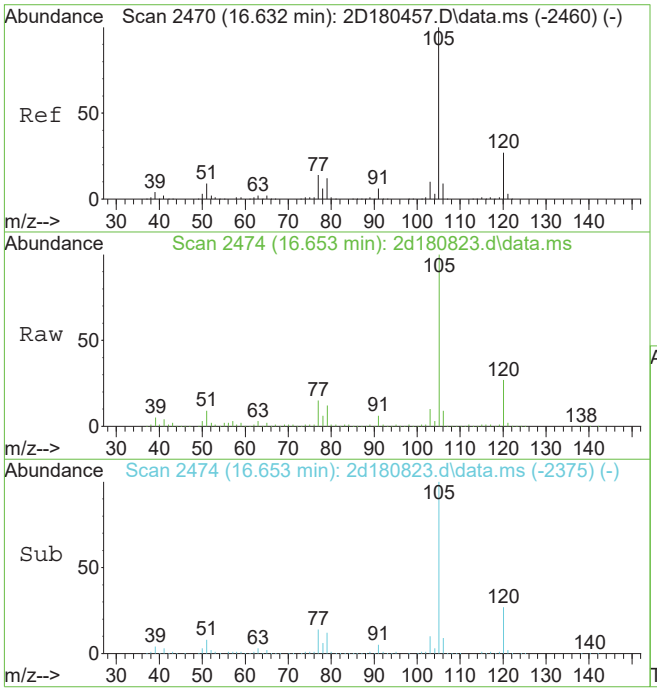


#91
o-xylene
Concen: 36.97 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:106 Resp: 328948

Ion	Ratio	Lower	Upper
106	100		
91	209.6	179.9	239.9

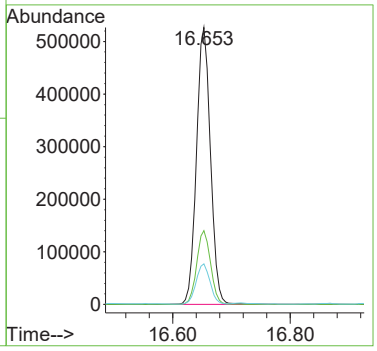


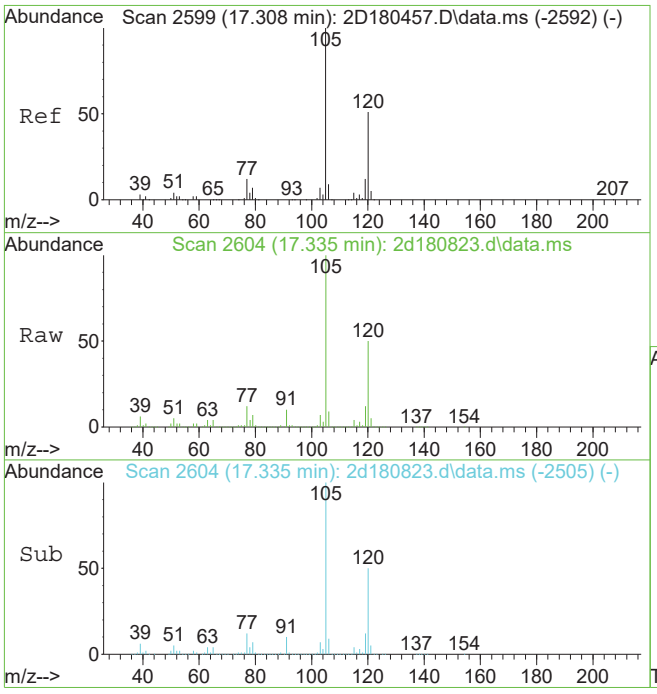


#96
isopropylbenzene
Concen: 37.61 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:105 Resp: 869405

Ion	Ratio	Lower	Upper
105	100		
120	26.6	6.7	46.7
77	14.5	0.0	34.2

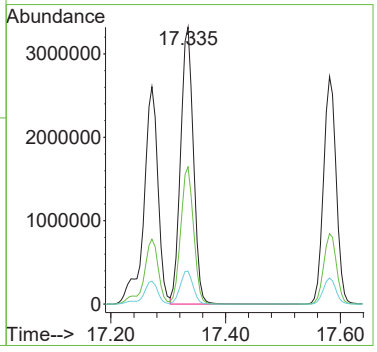


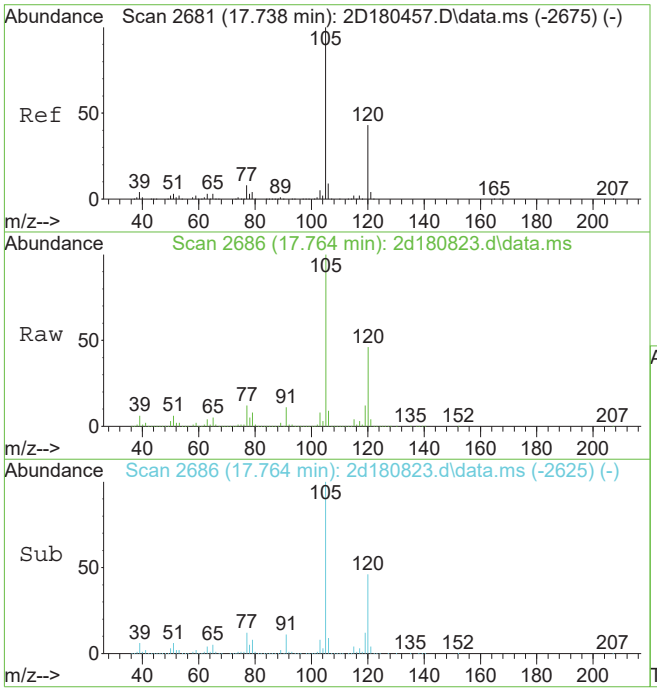


#107
1,3,5-trimethylbenzene
Concen: 263.52 ug/L
RT: 17.335 min Scan# 2604
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:105 Resp: 5111860

Ion	Ratio	Lower	Upper
105	100		
120	49.5	20.7	80.7
77	11.8	0.0	42.0

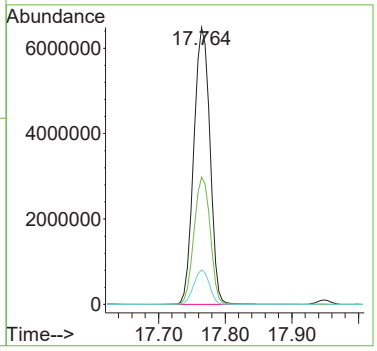


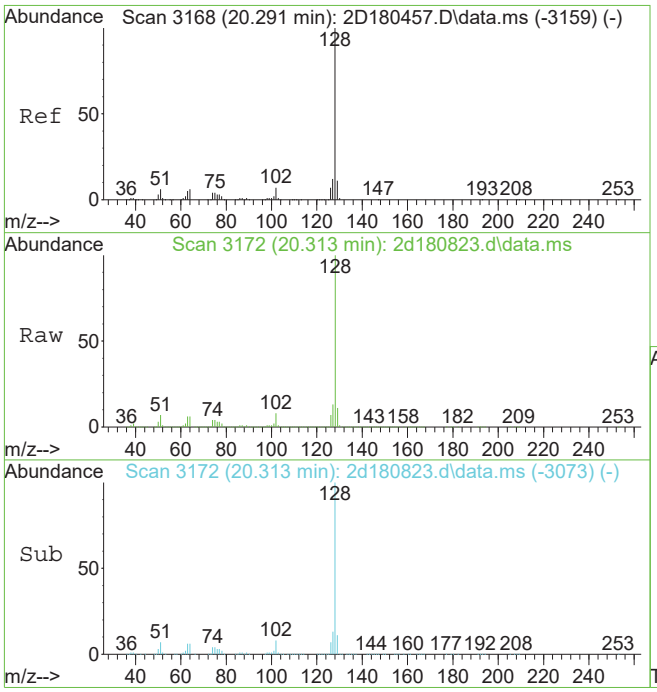


#109
1,2,4-trimethylbenzene
Concen: 549.84 ug/L
RT: 17.764 min Scan# 2686
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:105 Resp:10837769

Ion	Ratio	Lower	Upper
105	100		
120	45.9	16.7	76.7
77	12.4	0.0	41.8

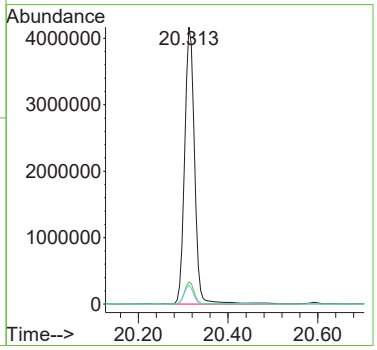




#121
naphthalene
Concen: 385.03 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:128 Resp: 6393258

Ion	Ratio	Lower	Upper
128	100		
102	8.0	0.0	37.5
51	6.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180868.d
Acq On : 10 Jan 2019 1:19 pm
Operator : EddieH
Sample : JC80990-1 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 12 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

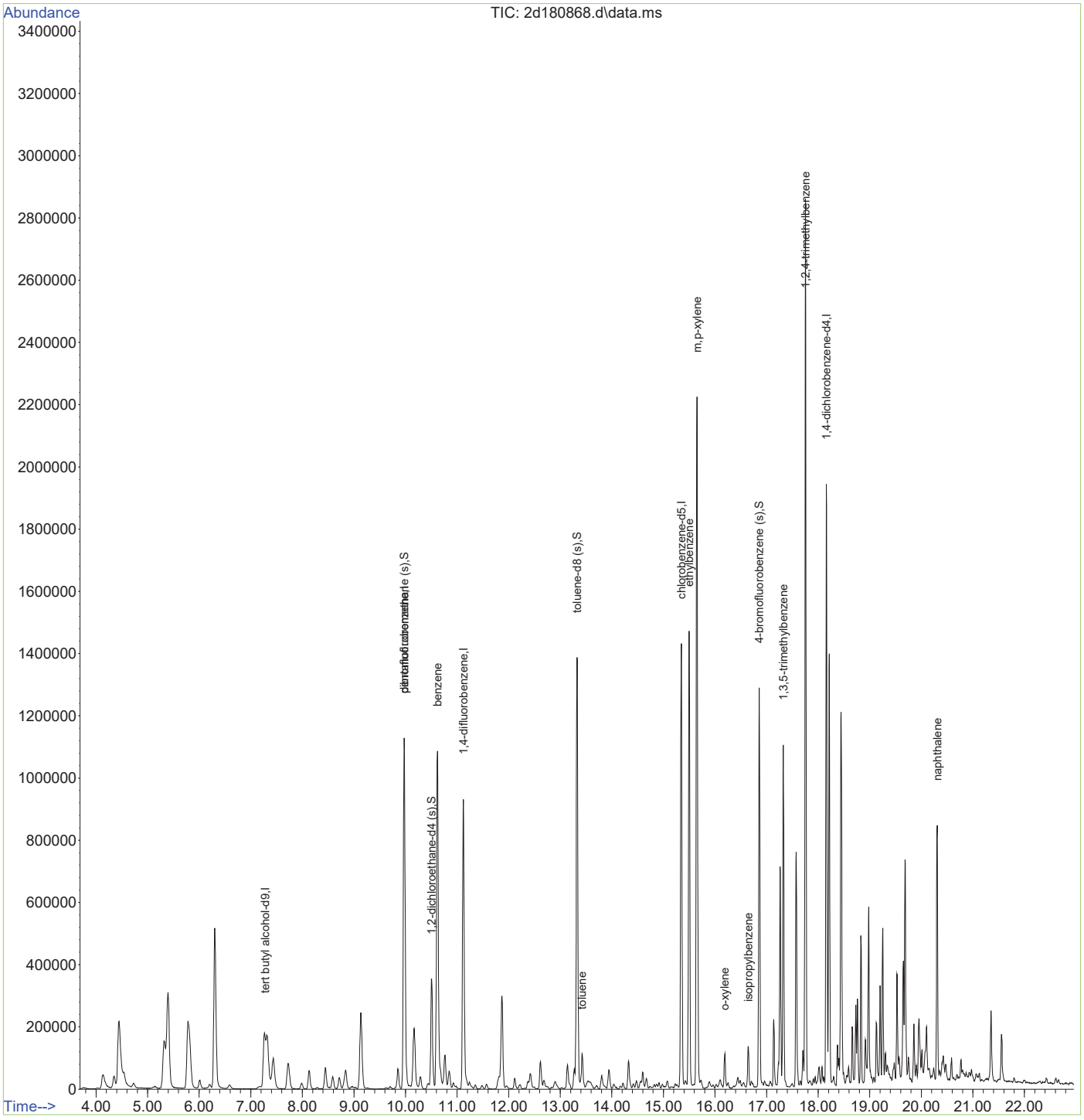
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	212997	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	712443	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	953854	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	928428	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.157	152	505387	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	288872	48.88	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.76%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	293869	50.12	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.24%			
75) toluene-d8 (s)	13.323	98	1093537	48.96	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.92%			
99) 4-bromofluorobenzene (s)	16.857	95	419230	46.79	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.58%			
Target Compounds						Qvalue
54) benzene	10.618	78	1229648	59.22	ug/L	98
76) toluene	13.423	92	51647	3.95	ug/L	98
89) ethylbenzene	15.499	91	1151718	46.24	ug/L	100
90) m,p-xylene	15.651	91	1422553	75.13	ug/L	100
91) o-xylene	16.186	106	33131	3.45	ug/L	92
96) isopropylbenzene	16.647	105	87765	3.52	ug/L	98
107) 1,3,5-trimethylbenzene	17.324	105	605963	28.52	ug/L	99
109) 1,2,4-trimethylbenzene	17.754	105	1531301	70.94	ug/L	99
121) naphthalene	20.307	128	642255	35.32	ug/L	99

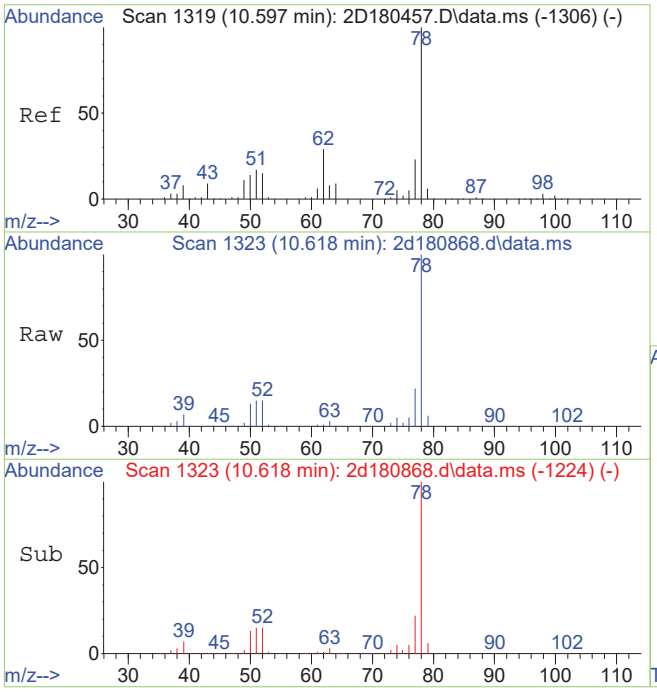
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180868.d
Acq On : 10 Jan 2019 1:19 pm
Operator : EddieH
Sample : JC80990-1 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 12 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

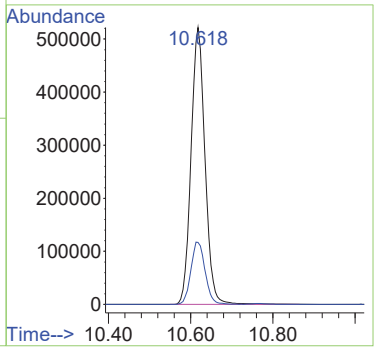


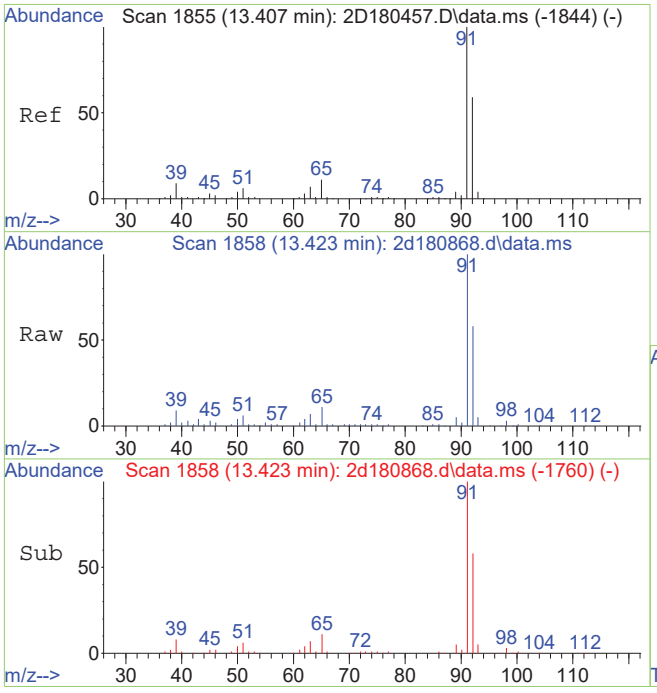


#54
benzene
Concen: 59.22 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 78 Resp: 1229648

Ion	Ratio	Lower	Upper
78	100		
77	22.4	0.0	53.2

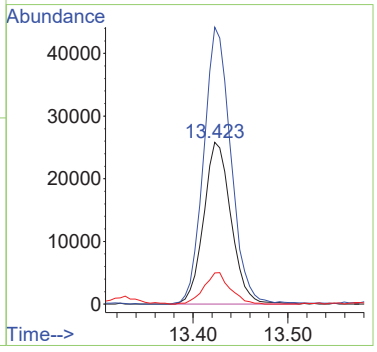


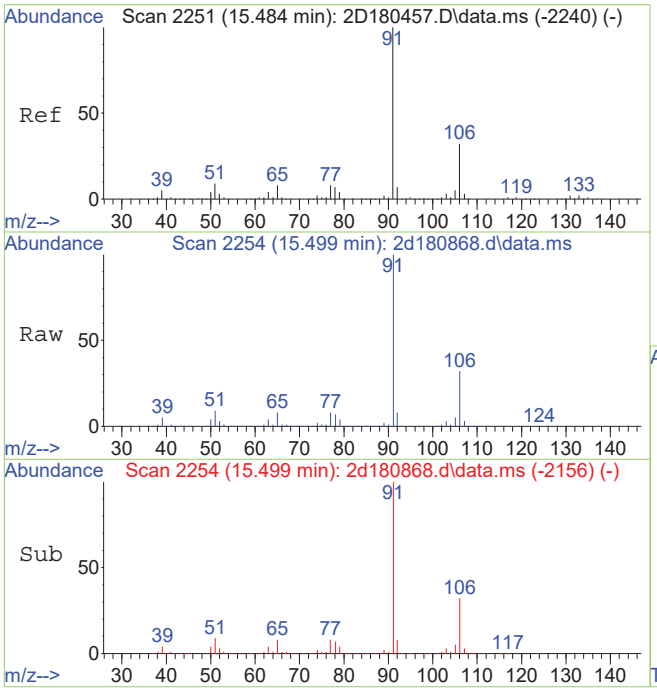


#76
toluene
Concen: 3.95 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 92 Resp: 51647

Ion	Ratio	Lower	Upper
92	100		
91	171.1	148.1	188.1
65	19.2	0.0	38.8

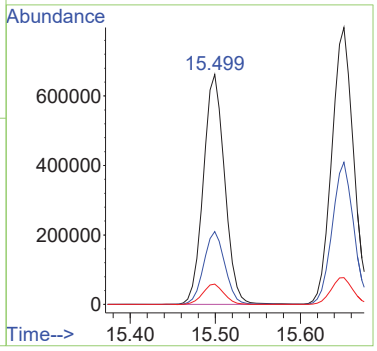


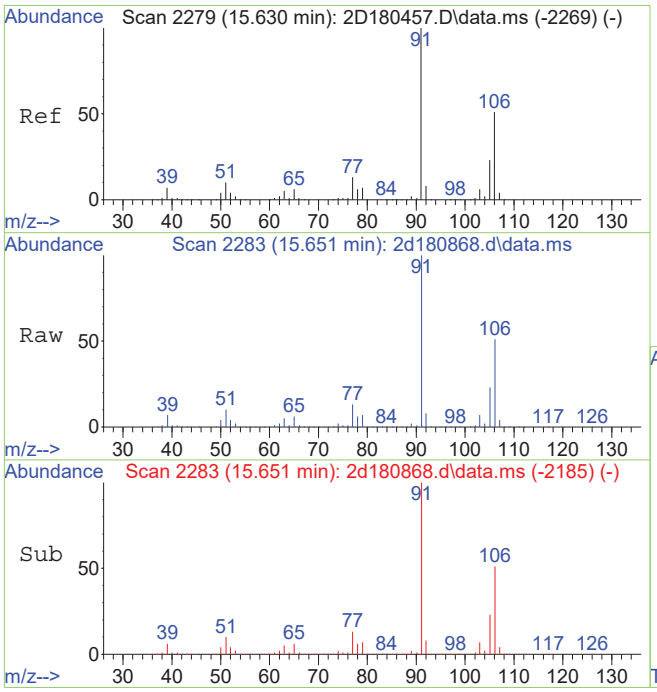


#89
ethylbenzene
Concen: 46.24 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 91 Resp: 1151718

Ion	Ratio	Lower	Upper
91	100		
106	31.7	1.6	61.6
51	8.8	0.0	39.0

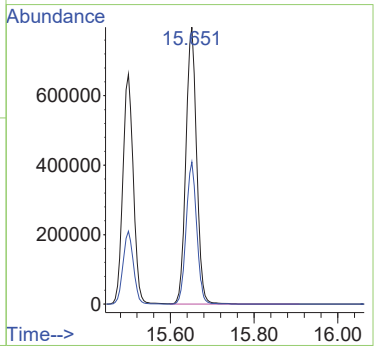


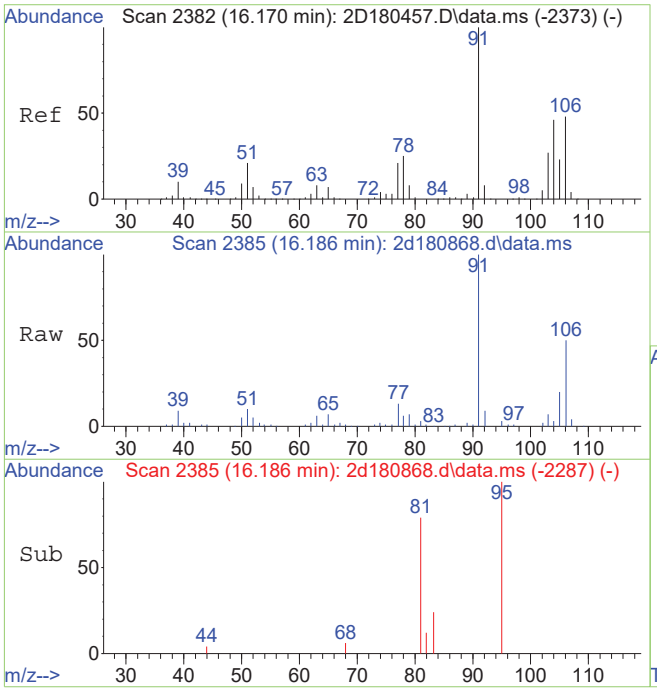


#90
m,p-xylene
Concen: 75.13 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 91 Resp: 1422553

Ion	Ratio	Lower	Upper
91	100		
106	51.3	21.1	81.1

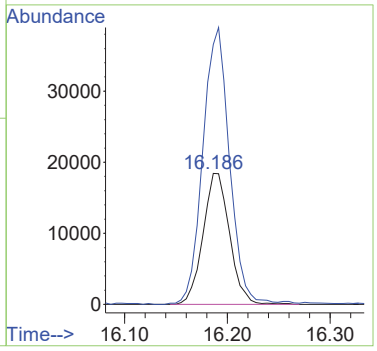


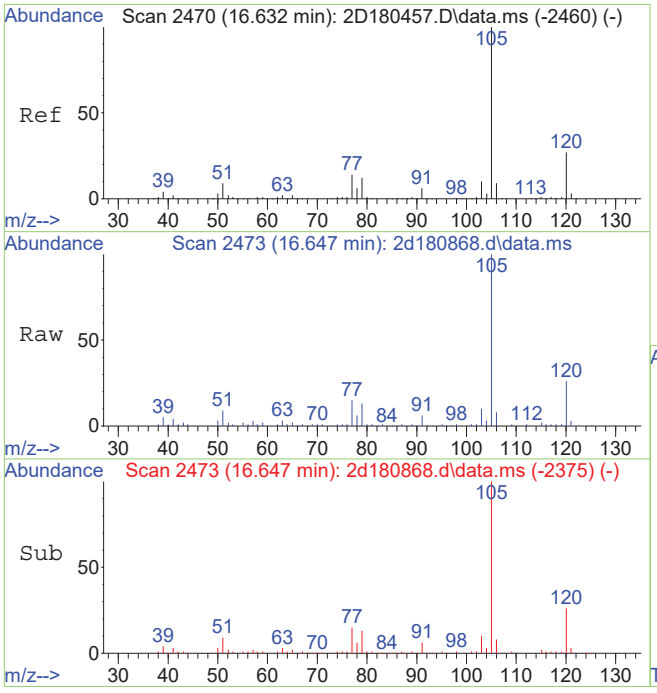


#91
o-xylene
Concen: 3.45 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:106 Resp: 33131

Ion	Ratio	Lower	Upper
106	100		
91	197.7	179.9	239.9

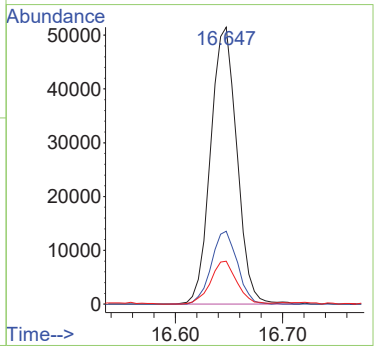


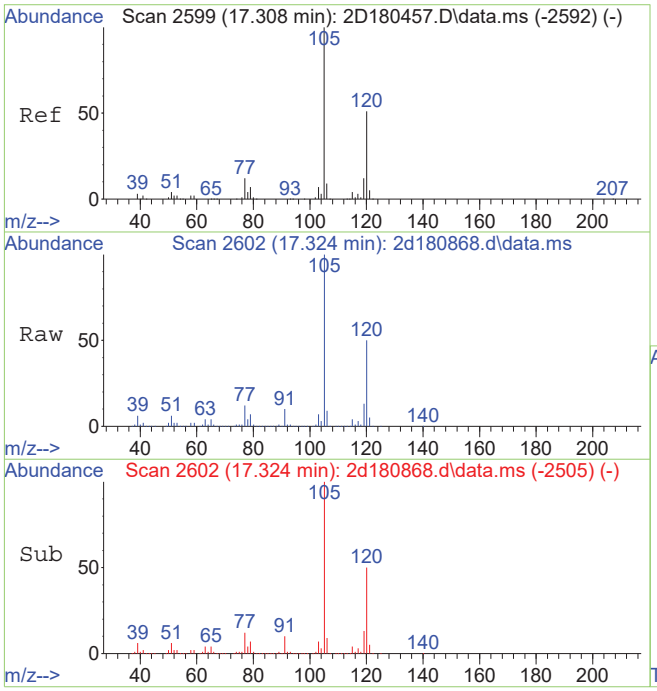


#96
isopropylbenzene
Concen: 3.52 ug/L
RT: 16.647 min Scan# 2473
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:105 Resp: 87765

Ion	Ratio	Lower	Upper
105	100		
120	26.3	6.7	46.7
77	15.5	0.0	34.2

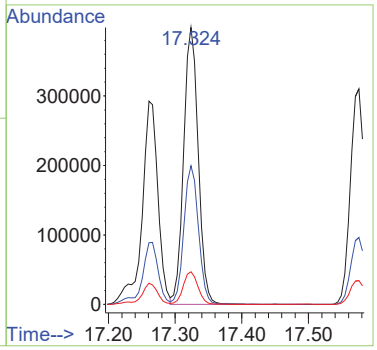


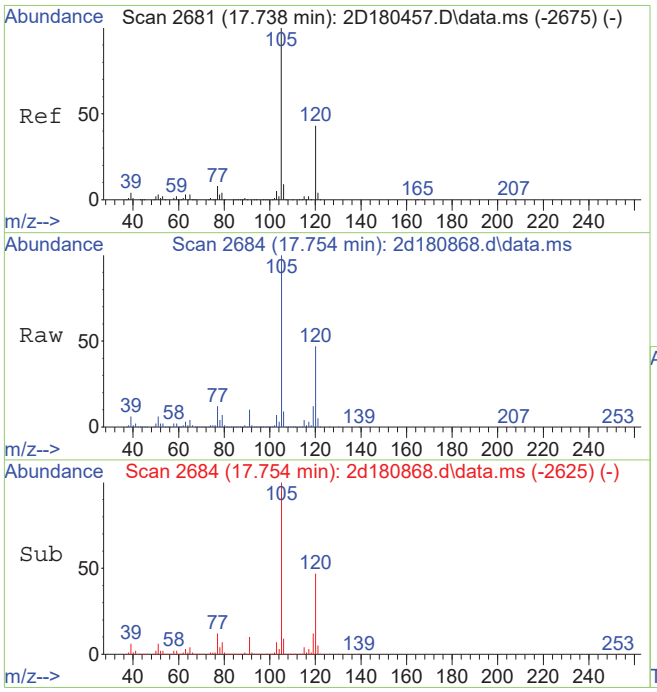


#107
1,3,5-trimethylbenzene
Concen: 28.52 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:105 Resp: 605963

Ion	Ratio	Lower	Upper
105	100		
120	50.0	20.7	80.7
77	11.7	0.0	42.0

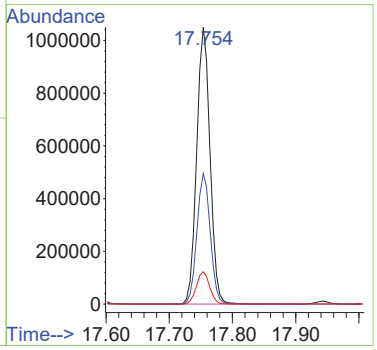


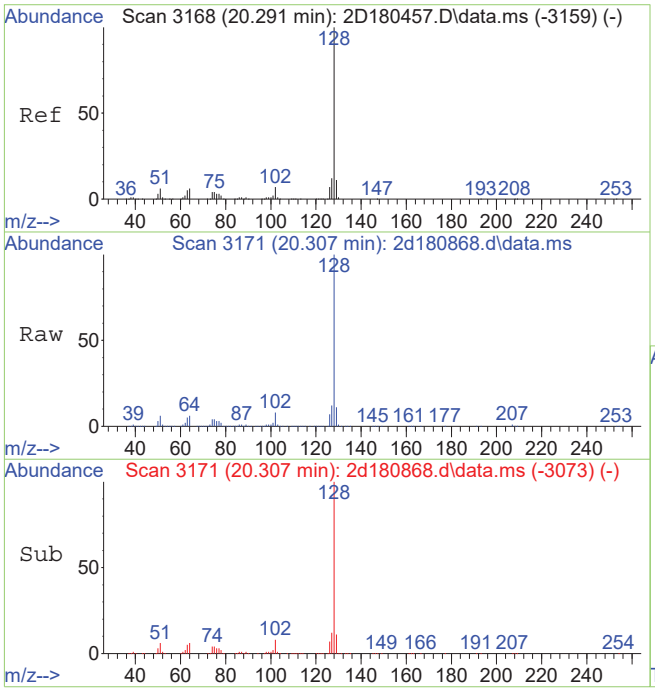


#109
1,2,4-trimethylbenzene
Concen: 70.94 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:105 Resp: 1531301

Ion	Ratio	Lower	Upper
105	100		
120	47.2	16.7	76.7
77	11.6	0.0	41.8

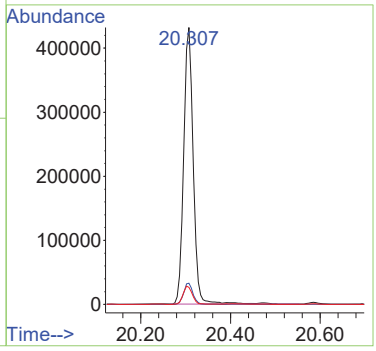




#121
naphthalene
Concen: 35.32 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:128 Resp: 642255

Ion	Ratio	Lower	Upper
128	100		
102	7.6	0.0	37.5
51	6.1	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180865.d
Acq On : 10 Jan 2019 11:50 am
Operator : EddieH
Sample : JC80990-2 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 9 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:31 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

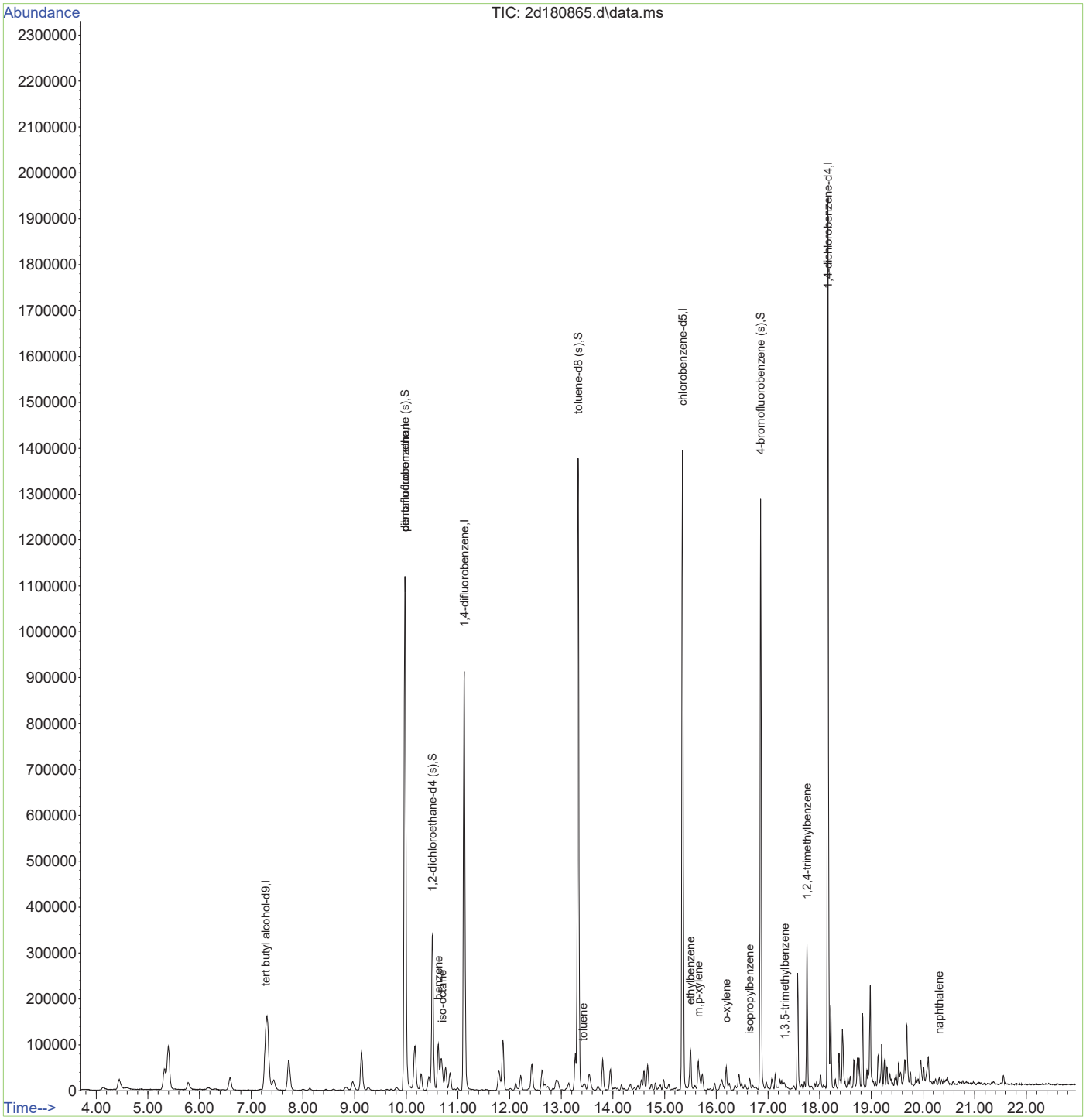
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	201807	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	704826	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	950921	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	914899	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	505056	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	290440	49.68	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.36%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	294175	50.33	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.66%			
75) toluene-d8 (s)	13.323	98	1080827	49.11	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.22%			
99) 4-bromofluorobenzene (s)	16.857	95	417511	46.63	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.26%			
Target Compounds						Qvalue
54) benzene	10.618	78	102471	4.95	ug/L	99
55) iso-octane	10.697	57	56409	2.92	ug/L	89
76) toluene	13.423	92	2966	0.23	ug/L	89
89) ethylbenzene	15.499	91	54426	2.22	ug/L	98
90) m,p-xylene	15.651	91	38181	2.05	ug/L	97
91) o-xylene	16.191	106	13251	1.40	ug/L	95
96) isopropylbenzene	16.642	105	13946	0.57	ug/L	97
107) 1,3,5-trimethylbenzene	17.329	105	3239	0.15	ug/L	91
109) 1,2,4-trimethylbenzene	17.754	105	166609	7.72	ug/L	100
121) naphthalene	20.307	128	11467	0.63	ug/L	98

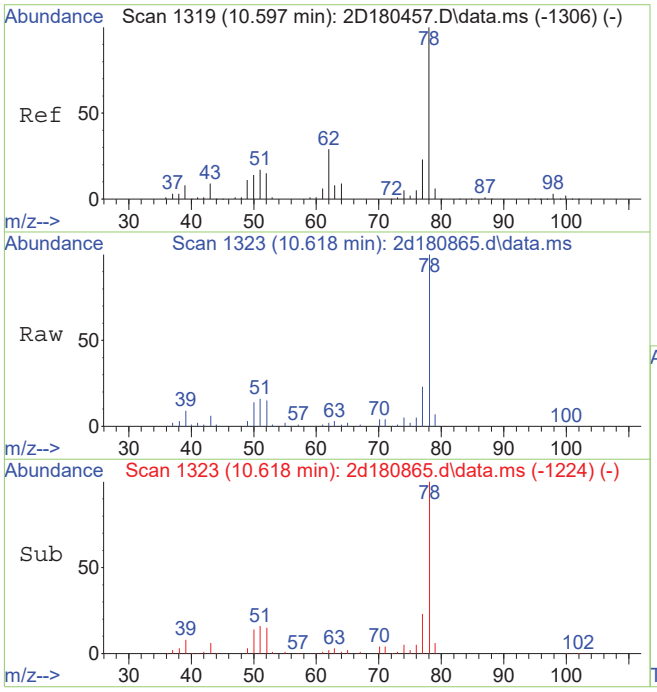
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180865.d
Acq On : 10 Jan 2019 11:50 am
Operator : EddieH
Sample : JC80990-2 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 9 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:31 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

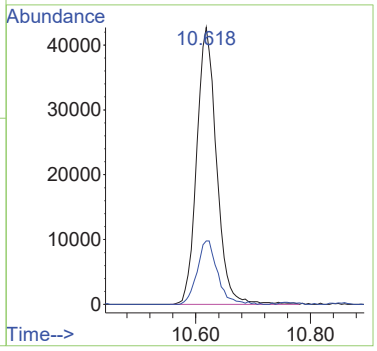


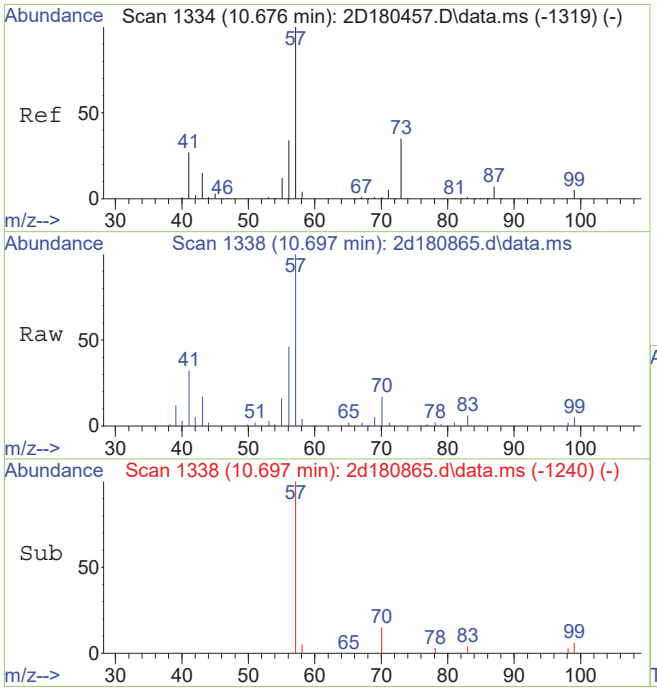


#54
benzene
Concen: 4.95 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 78 Resp: 102471

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

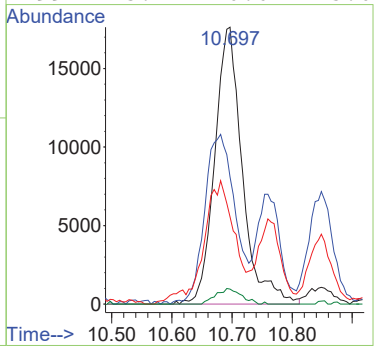


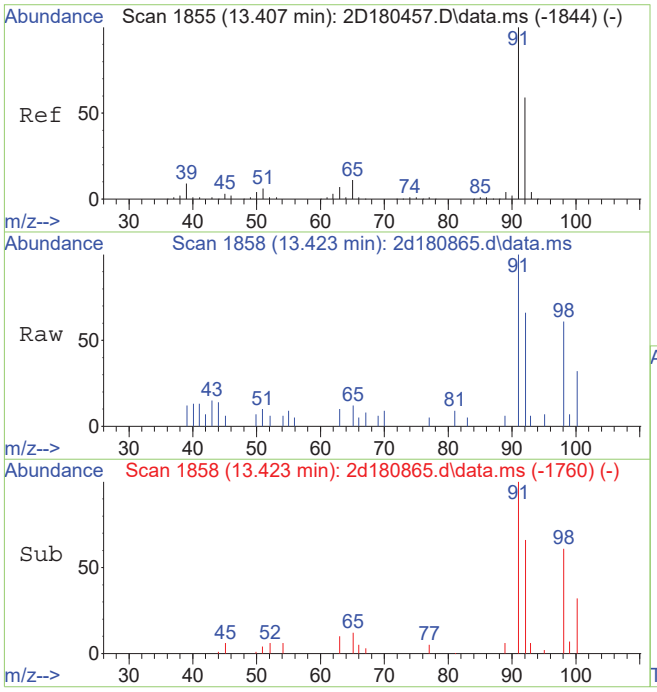


#55
iso-octane
Concen: 2.92 ug/L
RT: 10.697 min Scan# 1338
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 57 Resp: 56409

Ion	Ratio	Lower	Upper
57	100		
56	45.9	13.7	53.7
41	28.3	8.4	48.4
99	5.4	0.0	25.0

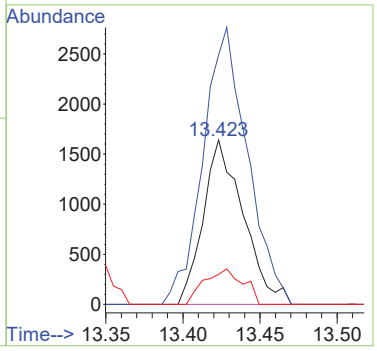


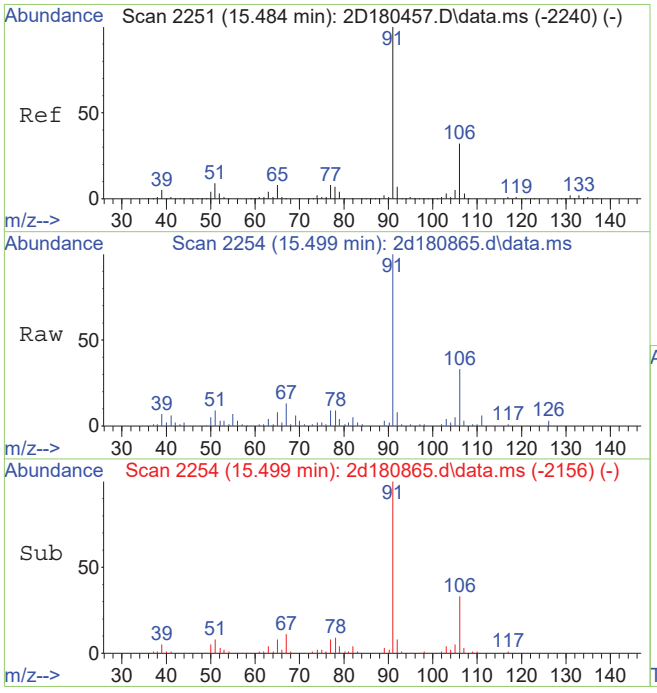


#76
toluene
Concen: 0.23 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 92 Resp: 2966

Ion	Ratio	Lower	Upper
92	100		
91	151.5	148.1	188.1
65	18.3	0.0	38.8

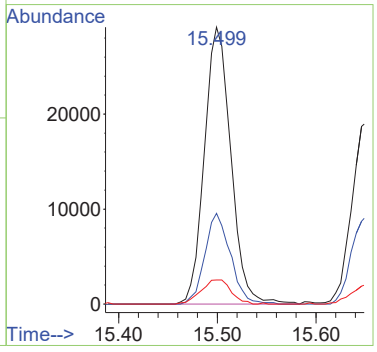


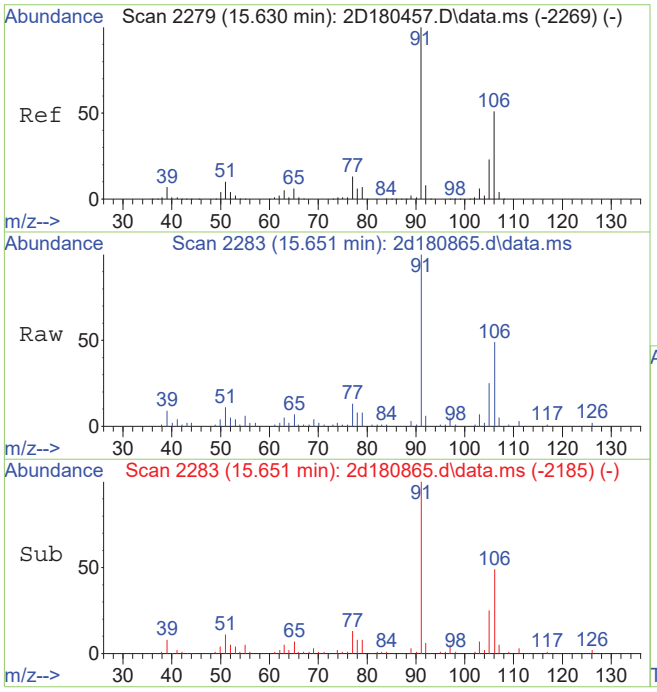


#89
ethylbenzene
Concen: 2.22 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 91 Resp: 54426

Ion	Ratio	Lower	Upper
91	100		
106	32.7	1.6	61.6
51	8.7	0.0	39.0

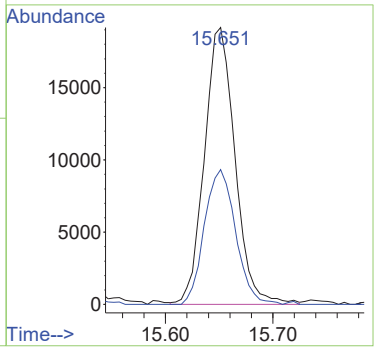


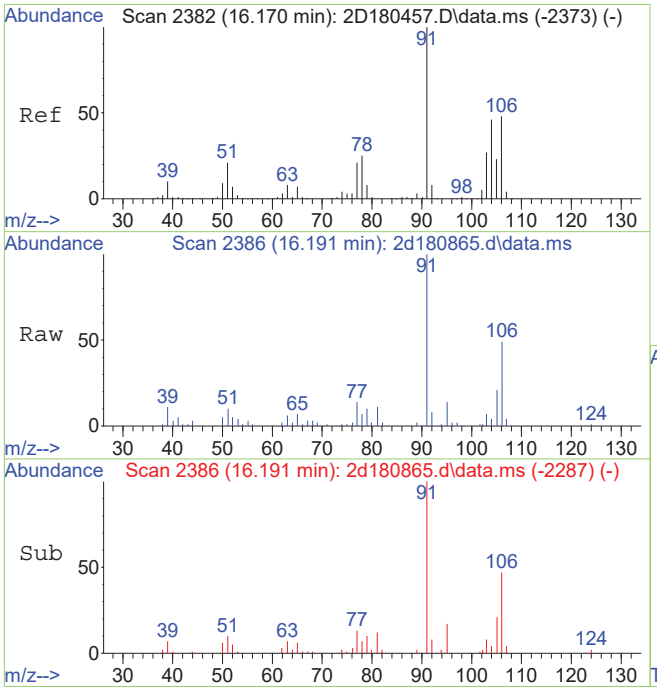


#90
m,p-xylene
Concen: 2.05 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 91 Resp: 38181

Ion	Ratio	Lower	Upper
91	100		
106	49.0	21.1	81.1

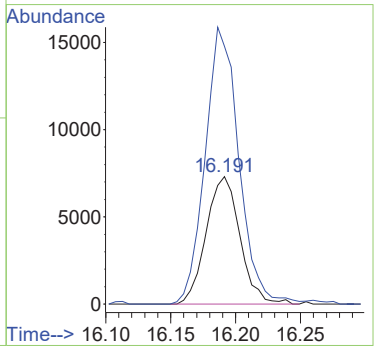


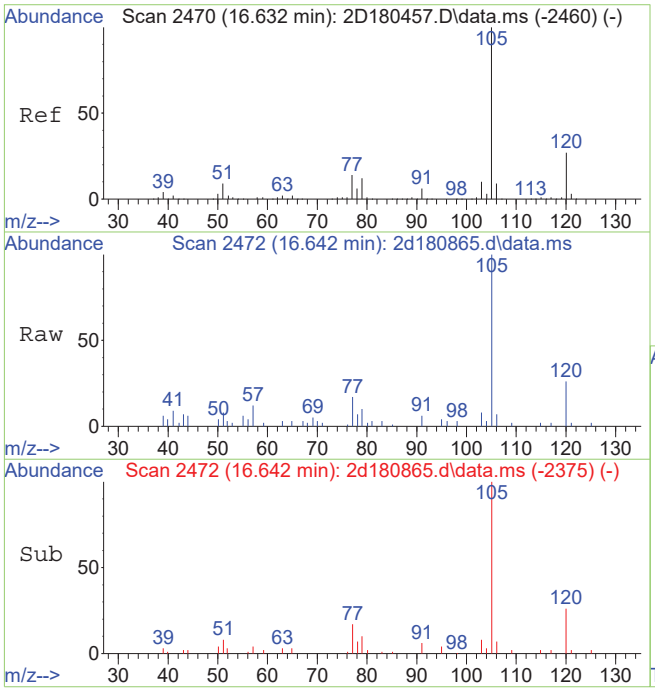


#91
o-xylene
Concen: 1.40 ug/L
RT: 16.191 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:106 Resp: 13251

Ion	Ratio	Lower	Upper
106	100		
91	202.4	179.9	239.9

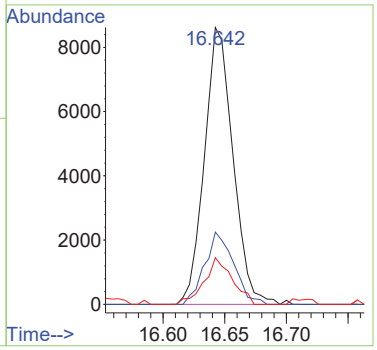


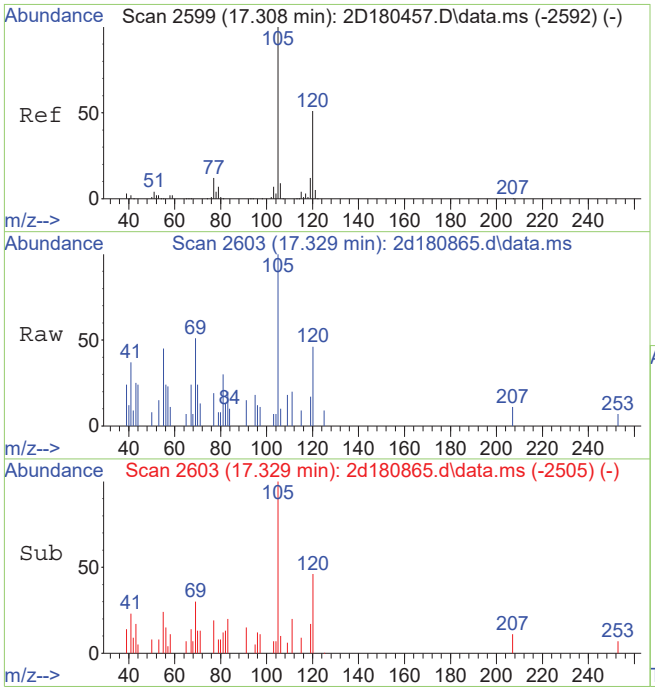


#96
isopropylbenzene
Concen: 0.57 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:105 Resp: 13946

Ion	Ratio	Lower	Upper
105	100		
120	26.0	6.7	46.7
77	16.9	0.0	34.2

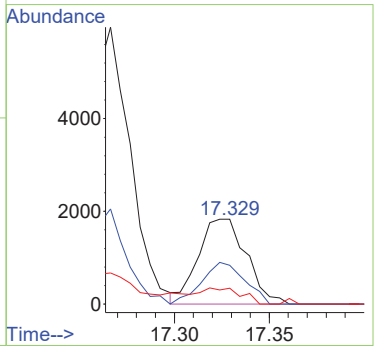


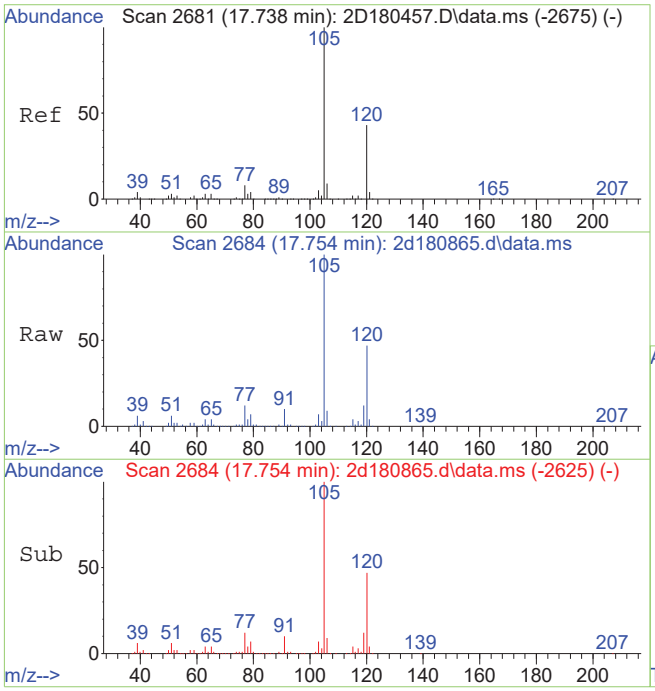


#107
1,3,5-trimethylbenzene
Concen: 0.15 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:105 Resp: 3239

Ion	Ratio	Lower	Upper
105	100		
120	45.9	20.7	80.7
77	18.8	0.0	42.0

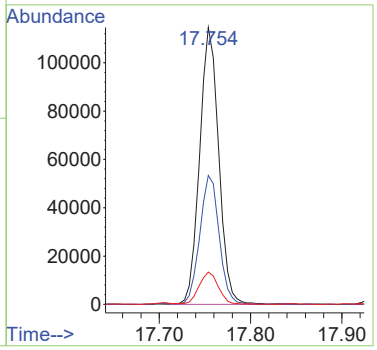


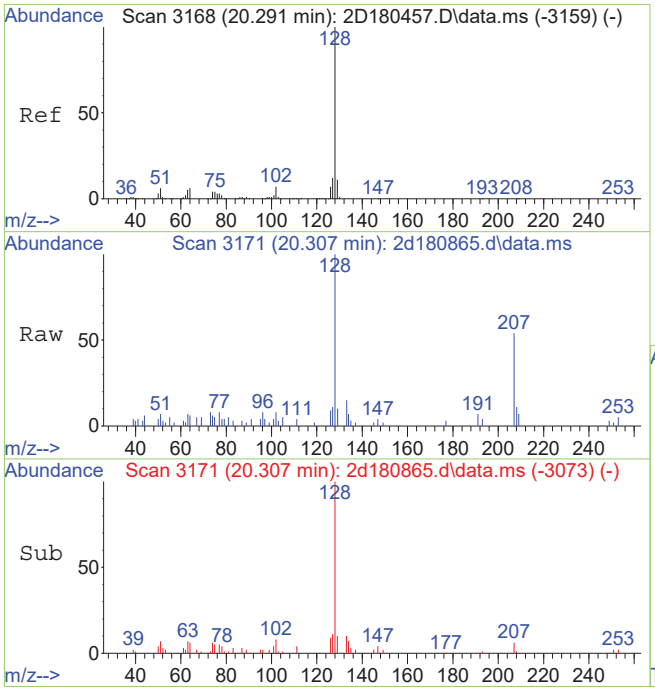


#109
1,2,4-trimethylbenzene
Concen: 7.72 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:105 Resp: 166609

Ion	Ratio	Lower	Upper
105	100		
120	46.5	16.7	76.7
77	11.5	0.0	41.8

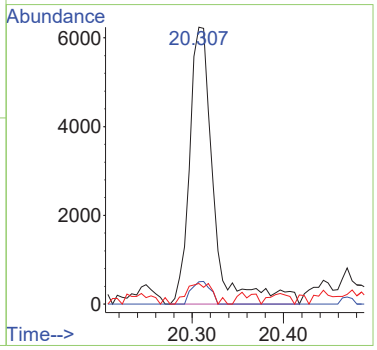




#121
naphthalene
Concen: 0.63 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:128 Resp: 11467

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.5
51	7.4	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180866.d
Acq On : 10 Jan 2019 12:19 pm
Operator : EddieH
Sample : JC80990-3 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 10 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:09 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

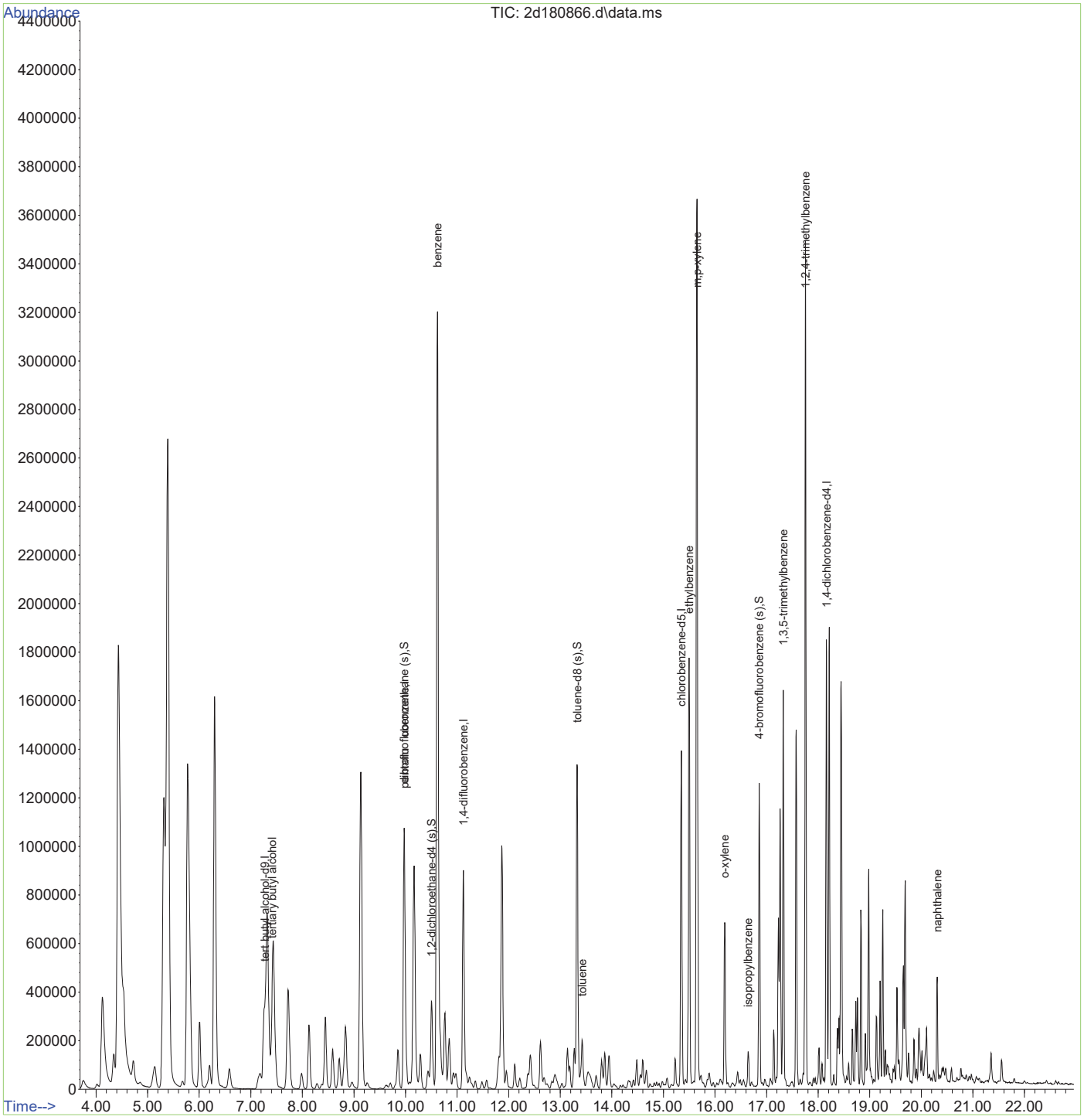
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	221784	500.00	ug/L	0.02
5) pentafluorobenzene	9.978	168	688155	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	920040	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	901572	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	485327	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	281088	49.24	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.48%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	281067	49.70	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 99.40%			
75) toluene-d8 (s)	13.329	98	1051070	48.46	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.92%			
99) 4-bromofluorobenzene (s)	16.857	95	406274	47.22	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.44%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.414	59	7192	16.72	ug/L #	1
54) benzene	10.618	78	3667351	183.12	ug/L	100
76) toluene	13.428	92	93577	7.37	ug/L	97
89) ethylbenzene	15.499	91	1404864	58.08	ug/L	99
90) m,p-xylene	15.651	91	2421411	131.68	ug/L	99
91) o-xylene	16.186	106	210245	22.57	ug/L	97
96) isopropylbenzene	16.642	105	97594	4.03	ug/L	98
107) 1,3,5-trimethylbenzene	17.324	105	881178	43.19	ug/L	99
109) 1,2,4-trimethylbenzene	17.754	105	1872016	90.31	ug/L	100
121) naphthalene	20.307	128	342356	19.61	ug/L	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

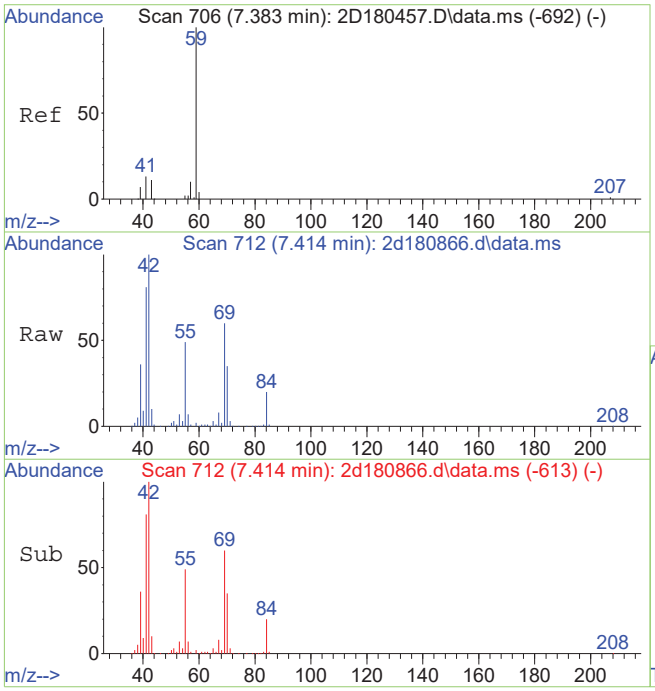
Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180866.d
Acq On : 10 Jan 2019 12:19 pm
Operator : EddieH
Sample : JC80990-3 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 10 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:09 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



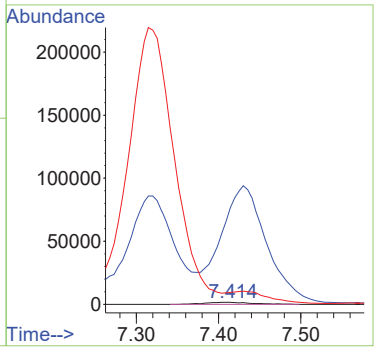
M2D7670.M Mon Jan 21 16:35:04 2019 Page: 2

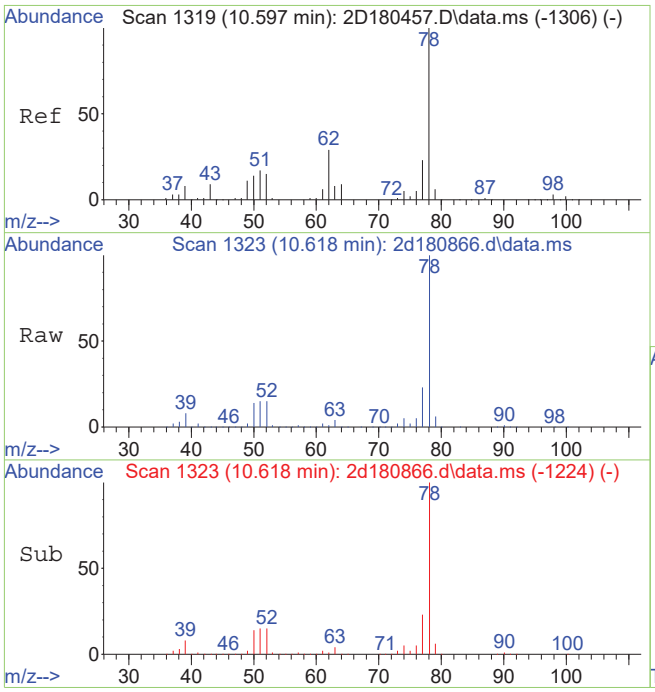


#2
tertiary butyl alcohol
Concen: 16.72 ug/L
RT: 7.414 min Scan# 712
Delta R.T. 0.021 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 59 Resp: 7192

Ion	Ratio	Lower	Upper
59	100		
41	3863.3	0.0	45.0#
43	438.0	0.0	40.6#

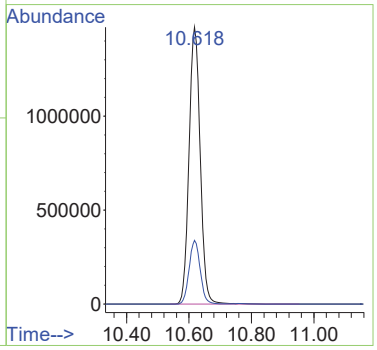


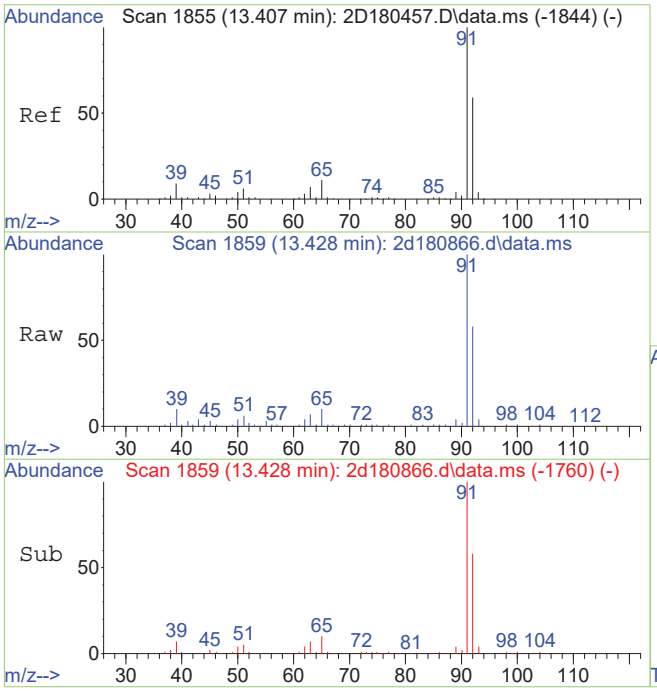


#54
benzene
Concen: 183.12 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 78 Resp: 3667351

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

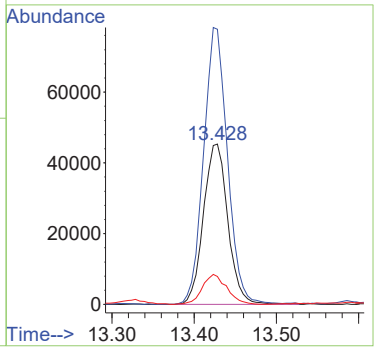


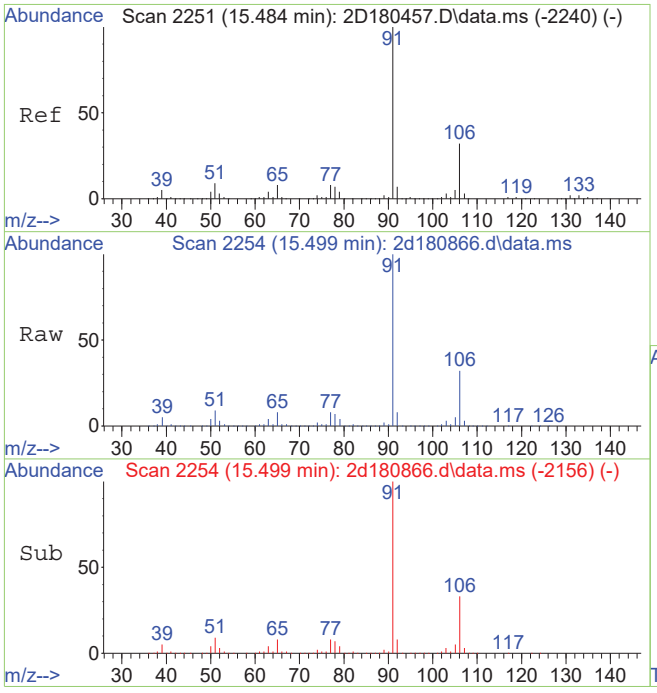


#76
toluene
Concen: 7.37 ug/L
RT: 13.428 min Scan# 1859
Delta R.T. 0.021 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 92 Resp: 93577

Ion	Ratio	Lower	Upper
92	100		
91	171.6	148.1	188.1
65	17.4	0.0	38.8

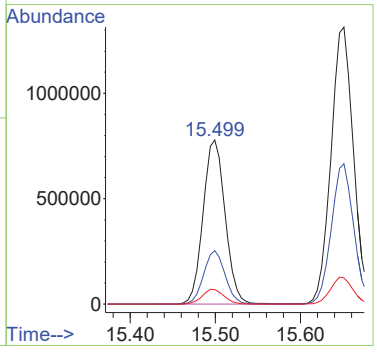


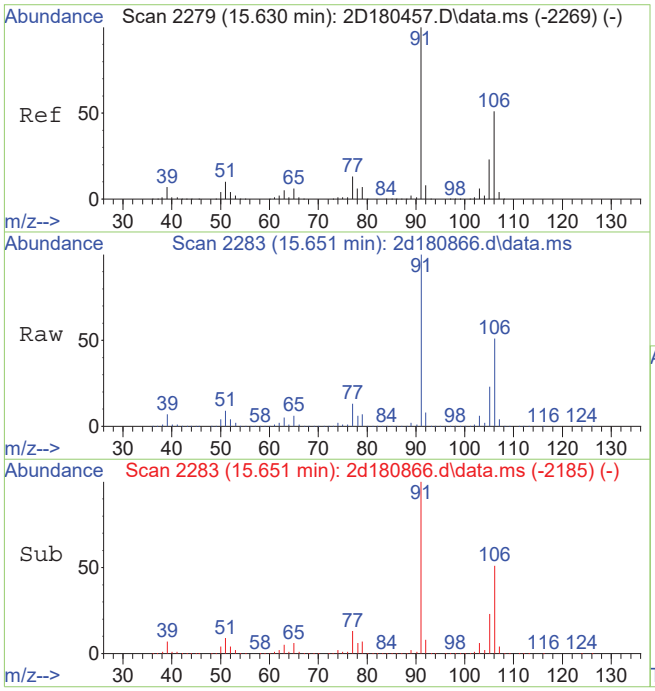


#89
ethylbenzene
Concen: 58.08 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 91 Resp: 1404864

Ion	Ratio	Lower	Upper
91	100		
106	32.5	1.6	61.6
51	8.7	0.0	39.0

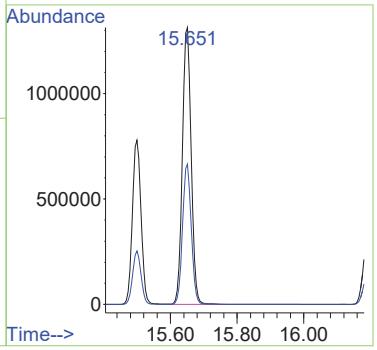


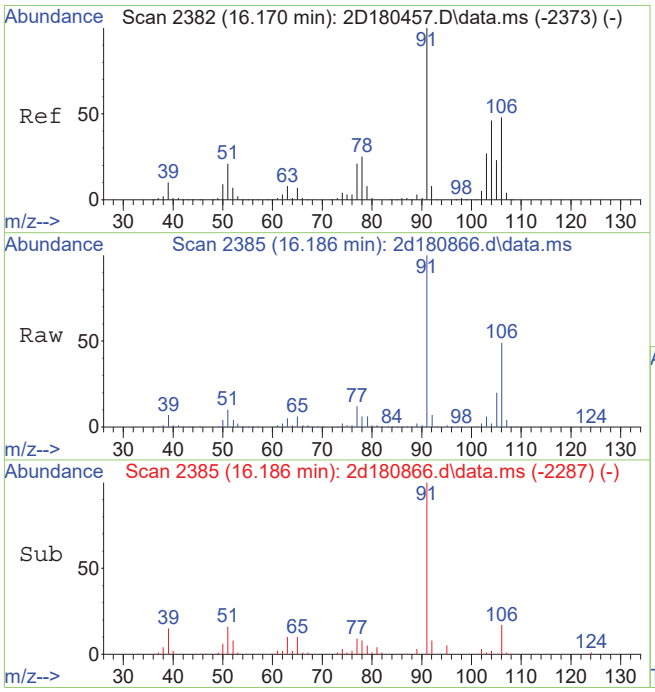


#90
m,p-xylene
Concen: 131.68 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 91 Resp: 2421411

Ion	Ratio	Lower	Upper
91	100		
106	50.7	21.1	81.1

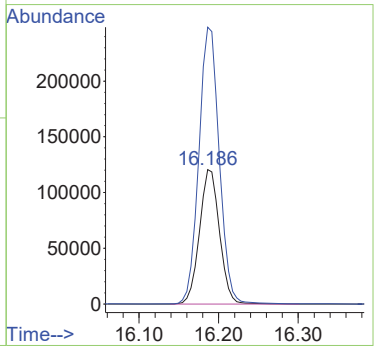


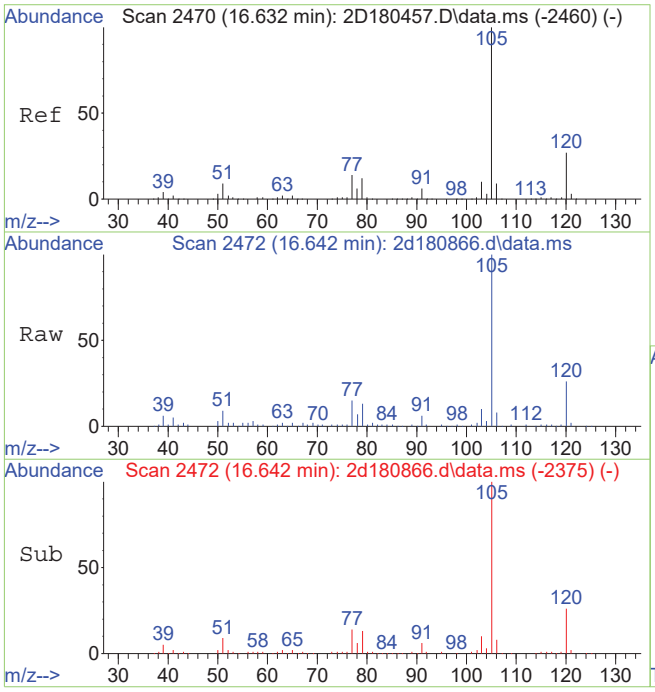


#91
o-xylene
Concen: 22.57 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:106 Resp: 210245

Ion	Ratio	Lower	Upper
106	100		
91	205.7	179.9	239.9

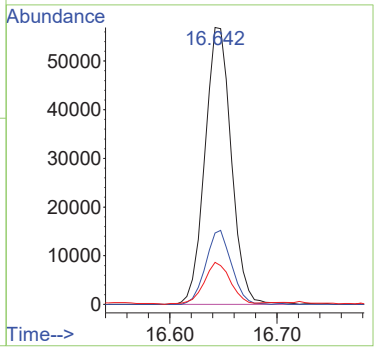


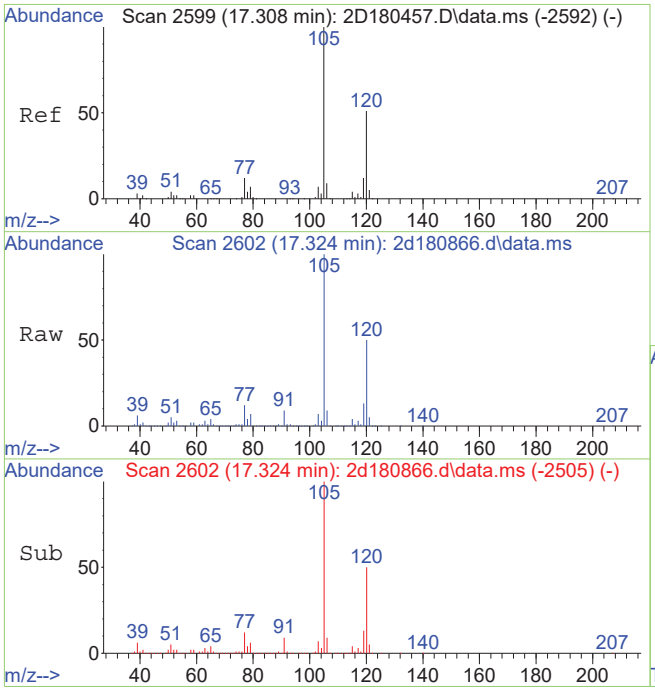


#96
isopropylbenzene
Concen: 4.03 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:105 Resp: 97594

Ion	Ratio	Lower	Upper
105	100		
120	25.8	6.7	46.7
77	14.8	0.0	34.2

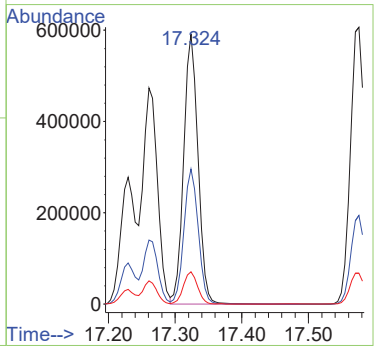


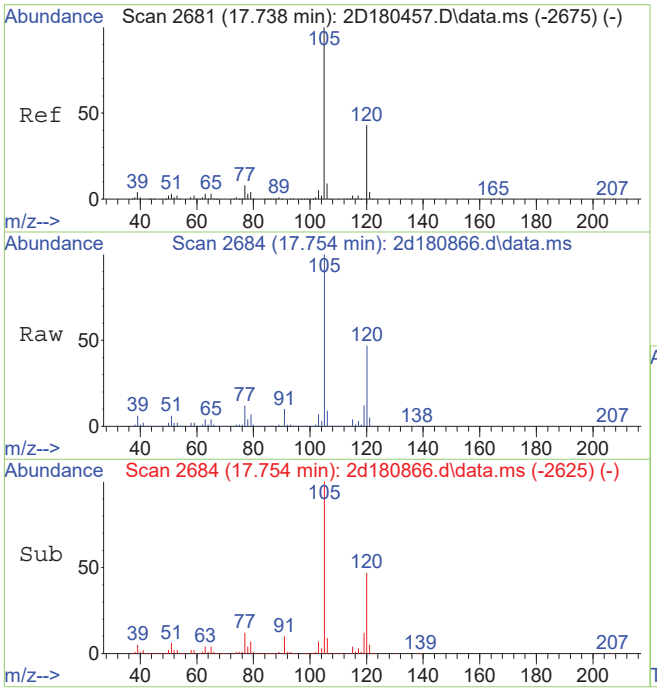


#107
1,3,5-trimethylbenzene
Concen: 43.19 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:105 Resp: 881178

Ion	Ratio	Lower	Upper
105	100		
120	50.0	20.7	80.7
77	11.9	0.0	42.0

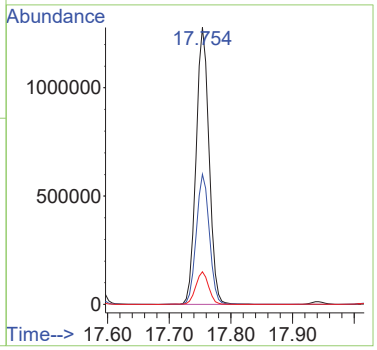


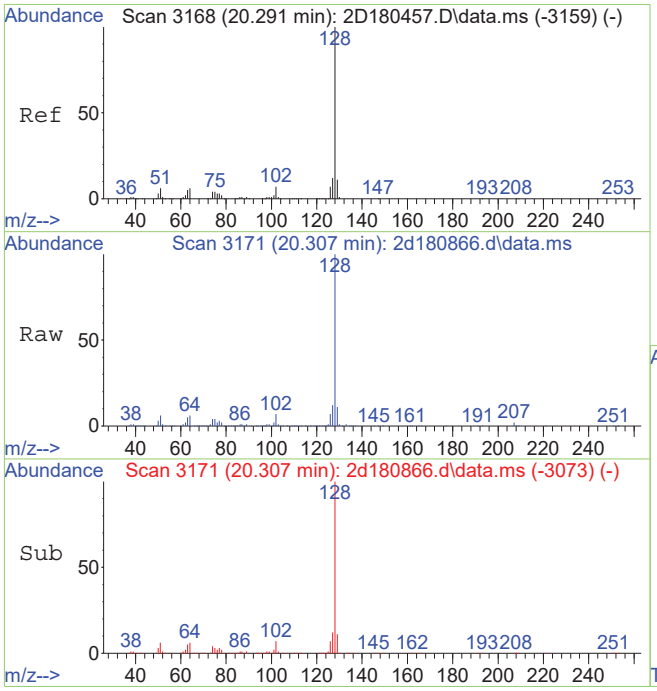


#109
1,2,4-trimethylbenzene
Concen: 90.31 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:105 Resp: 1872016

Ion	Ratio	Lower	Upper
105	100		
120	47.0	16.7	76.7
77	11.7	0.0	41.8

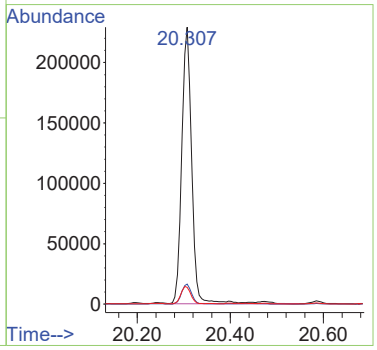




#121
naphthalene
Concen: 19.61 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:128 Resp: 342356

Ion	Ratio	Lower	Upper
128	100		
102	7.2	0.0	37.5
51	6.0	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180822.d
Acq On : 9 Jan 2019 1:13 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 12 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:57 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

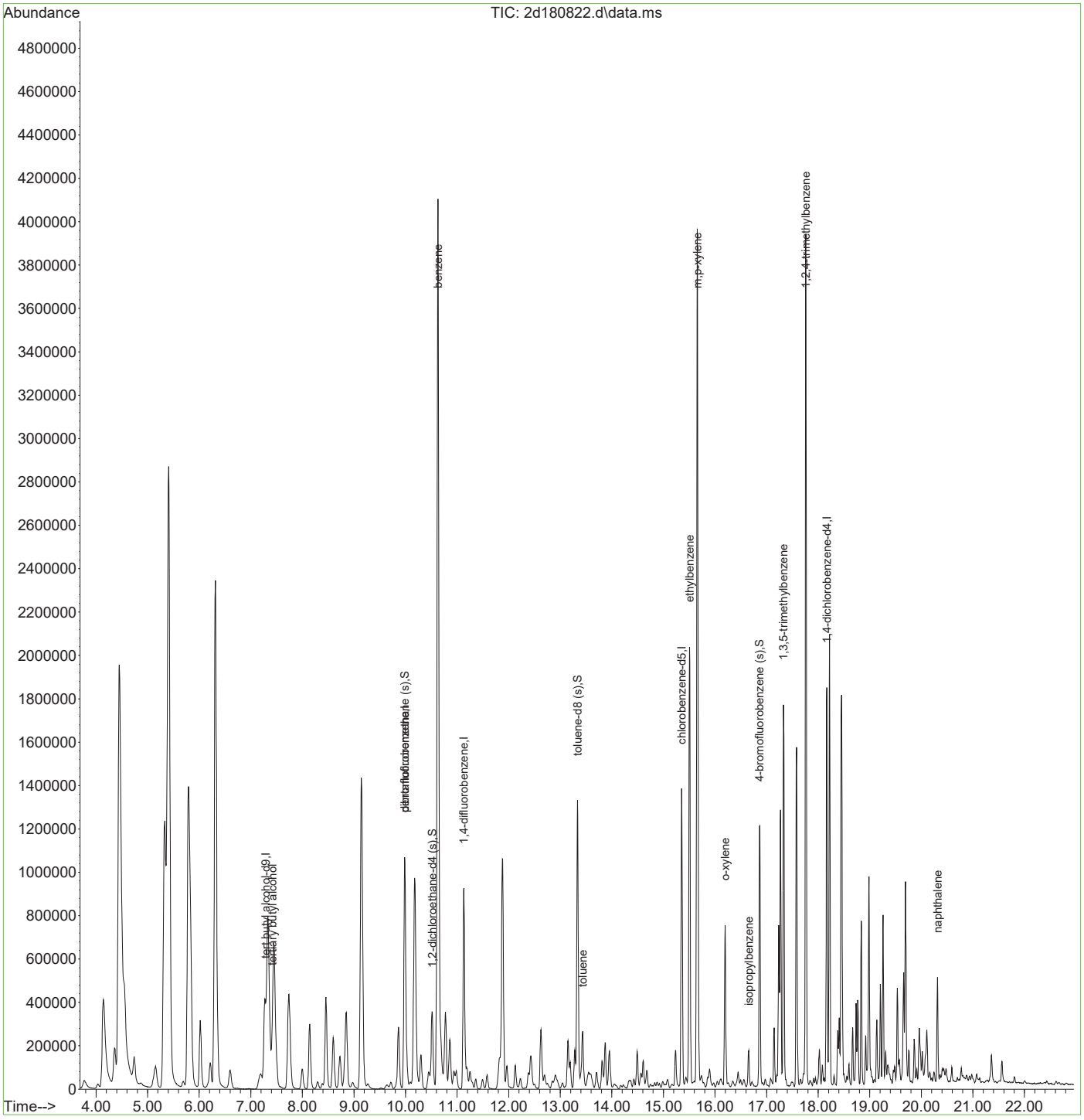
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.289	65	239729	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	660564	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.132	114	876996	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	872712	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.168	152	479062	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.984	113	267833	48.88	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.76%			
53) 1,2-dichloroethane-d4 (s)	10.519	65	271194	50.31	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.62%			
75) toluene-d8 (s)	13.334	98	1019132	48.54	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.08%			
99) 4-bromofluorobenzene (s)	16.863	95	400293	47.13	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.26%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.420	59	7910	17.02	ug/L #	1
54) benzene	10.629	78	4542687	237.95	ug/L	99
76) toluene	13.434	92	120979	9.85	ug/L	96
89) ethylbenzene	15.505	91	1609124	68.72	ug/L	100
90) m,p-xylene	15.657	91	2633669	147.96	ug/L	99
91) o-xylene	16.197	106	225948	25.06	ug/L	99
96) isopropylbenzene	16.653	105	106185	4.53	ug/L	98
107) 1,3,5-trimethylbenzene	17.329	105	957891	47.57	ug/L	99
109) 1,2,4-trimethylbenzene	17.759	105	2095900	102.43	ug/L	100
121) naphthalene	20.312	128	380033	22.05	ug/L	100

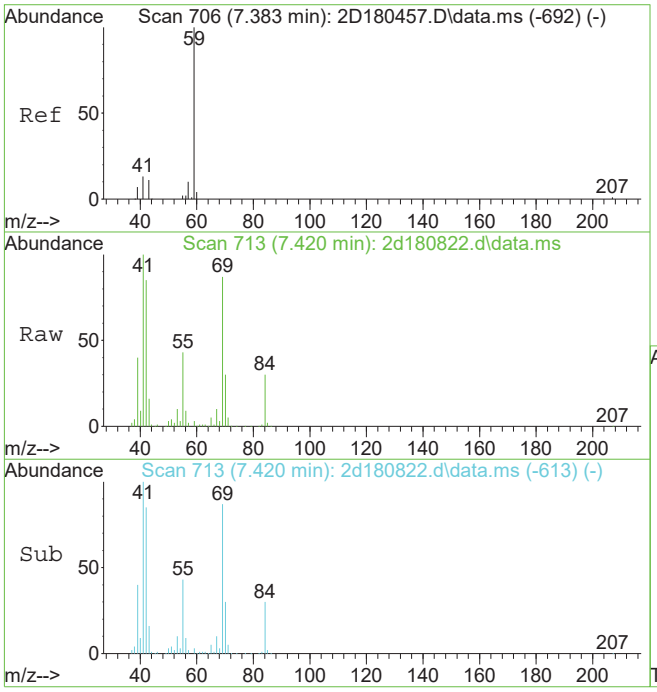
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180822.d
Acq On : 9 Jan 2019 1:13 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 12 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:57 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

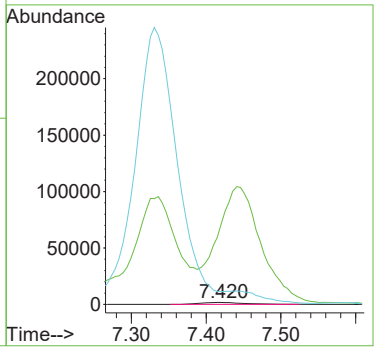


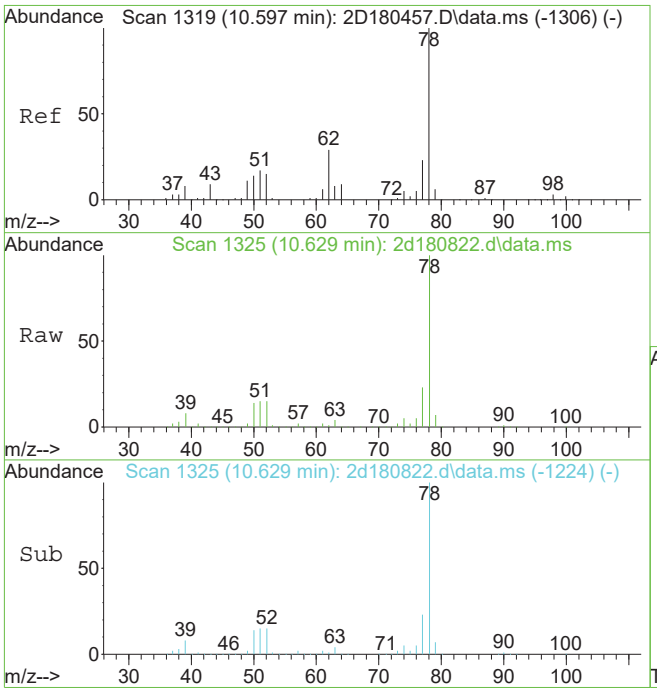


#2
tertiary butyl alcohol
Concen: 17.02 ug/L
RT: 7.420 min Scan# 713
Delta R.T. 0.026 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 59 Resp: 7910

Ion	Ratio	Lower	Upper
59	100		
41	3271.4	0.0	45.0#
43	502.6	0.0	40.6#

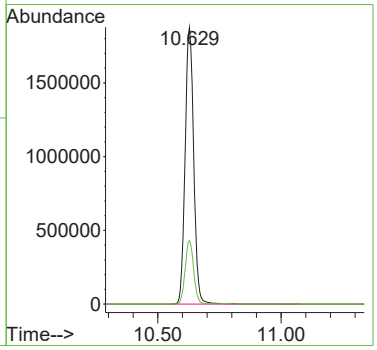


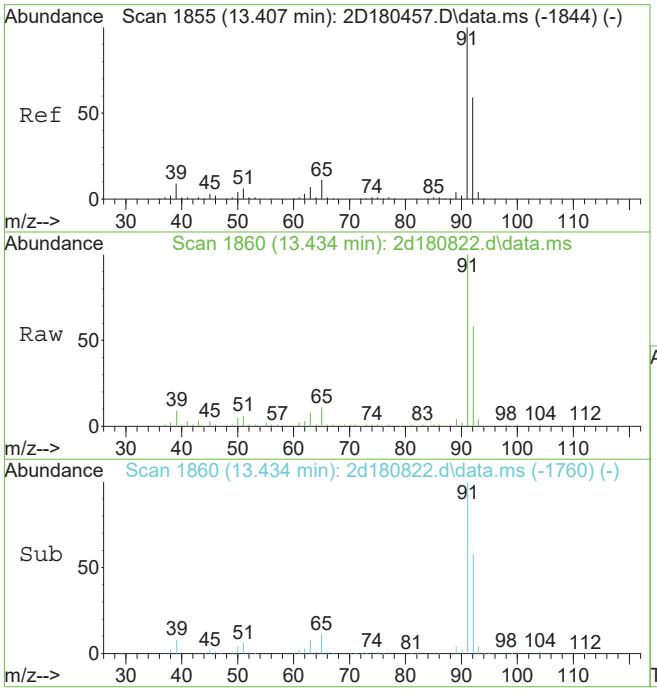


#54
benzene
Concen: 237.95 ug/L
RT: 10.629 min Scan# 1325
Delta R.T. 0.031 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 78 Resp: 4542687

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

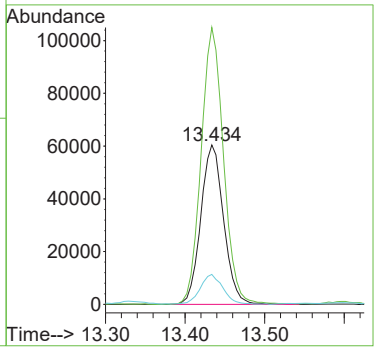


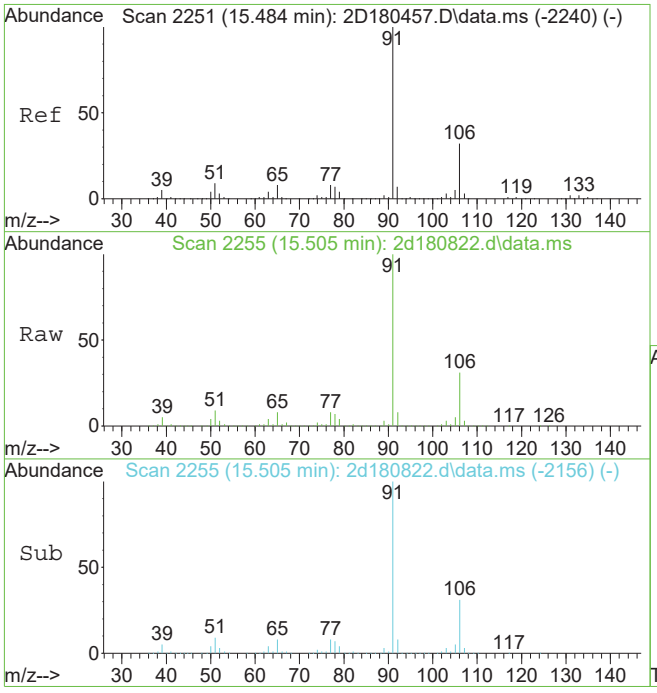


#76
toluene
Concen: 9.85 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 92 Resp: 120979

Ion	Ratio	Lower	Upper
92	100		
91	173.7	148.1	188.1
65	18.7	0.0	38.8

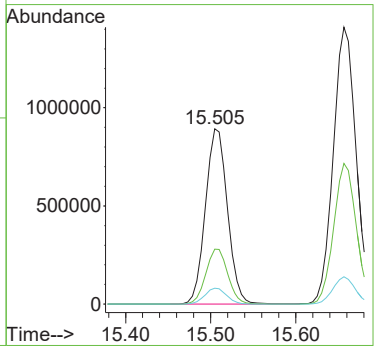


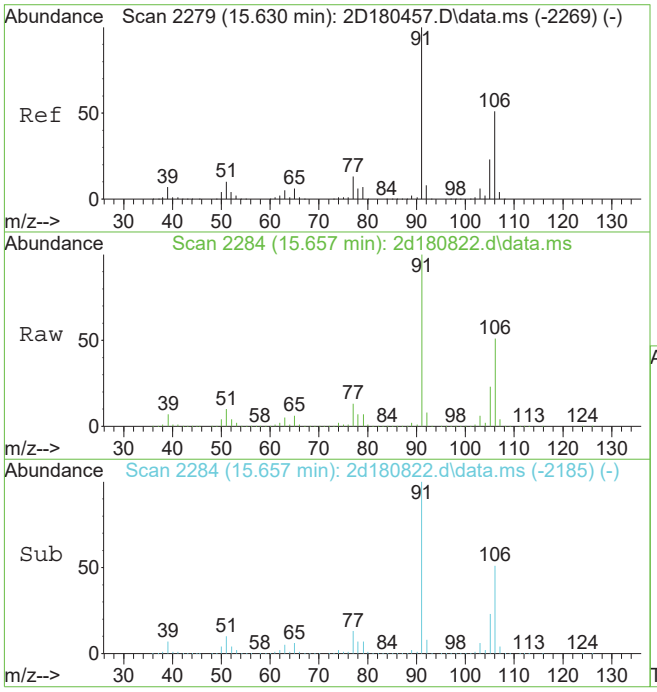


#89
ethylbenzene
Concen: 68.72 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 91 Resp: 1609124

Ion	Ratio	Lower	Upper
91	100		
106	31.4	1.6	61.6
51	9.1	0.0	39.0

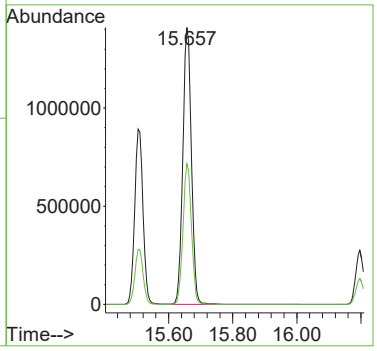


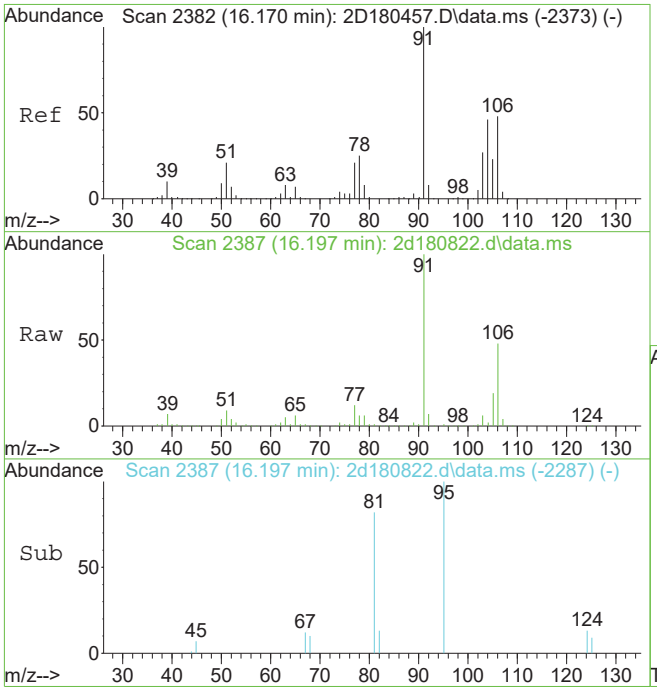


#90
m,p-xylene
Concen: 147.96 ug/L
RT: 15.657 min Scan# 2284
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 91 Resp: 2633669

Ion	Ratio	Lower	Upper
91	100		
106	50.7	21.1	81.1

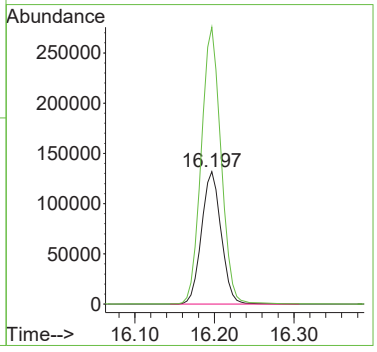


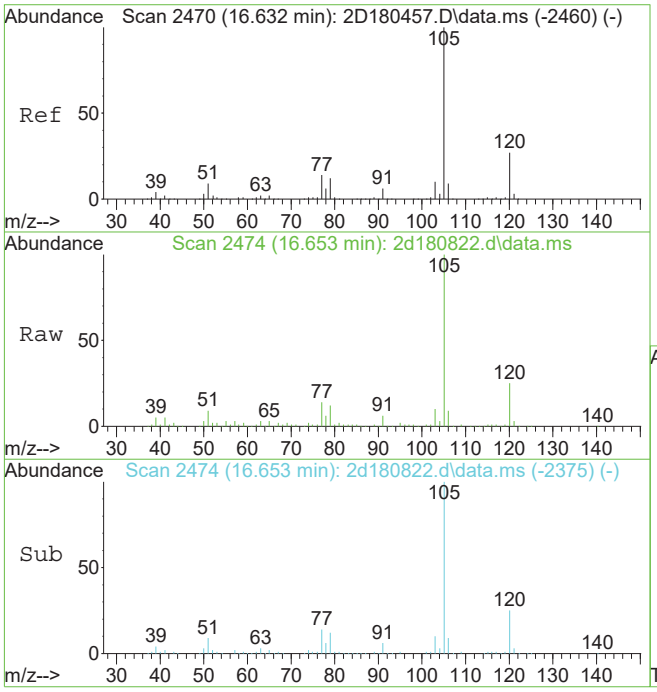


#91
o-xylene
Concen: 25.06 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:106 Resp: 225948

Ion	Ratio	Lower	Upper
106	100		
91	209.0	179.9	239.9

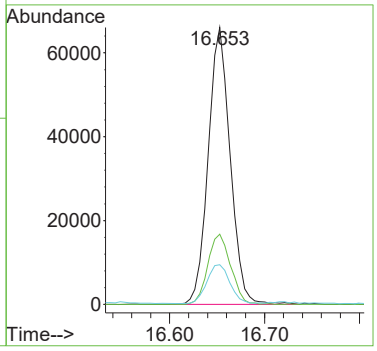


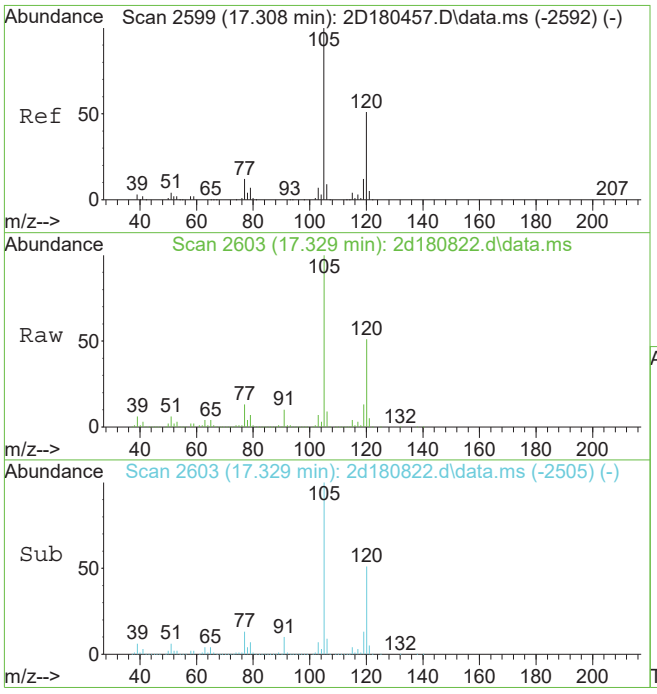


#96
isopropylbenzene
Concen: 4.53 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:105 Resp: 106185

Ion	Ratio	Lower	Upper
105	100		
120	25.3	6.7	46.7
77	14.0	0.0	34.2

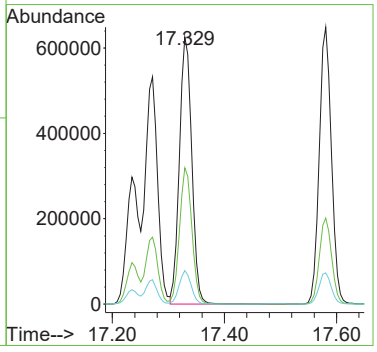


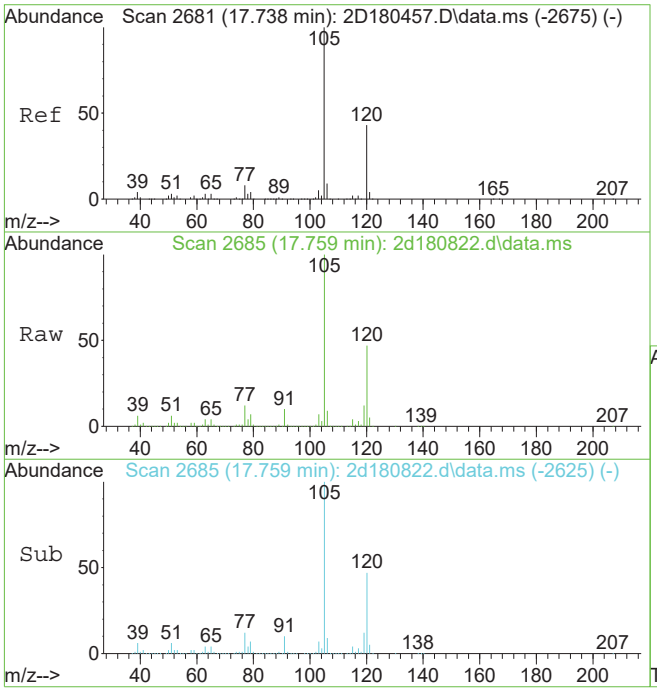


#107
1,3,5-trimethylbenzene
Concen: 47.57 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:105 Resp: 957891

Ion	Ratio	Lower	Upper
105	100		
120	51.0	20.7	80.7
77	12.5	0.0	42.0

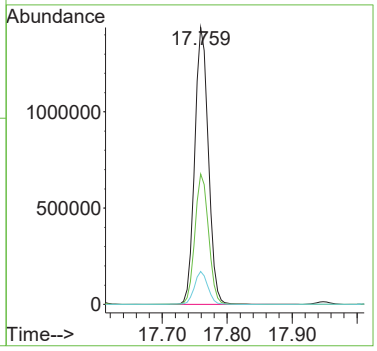


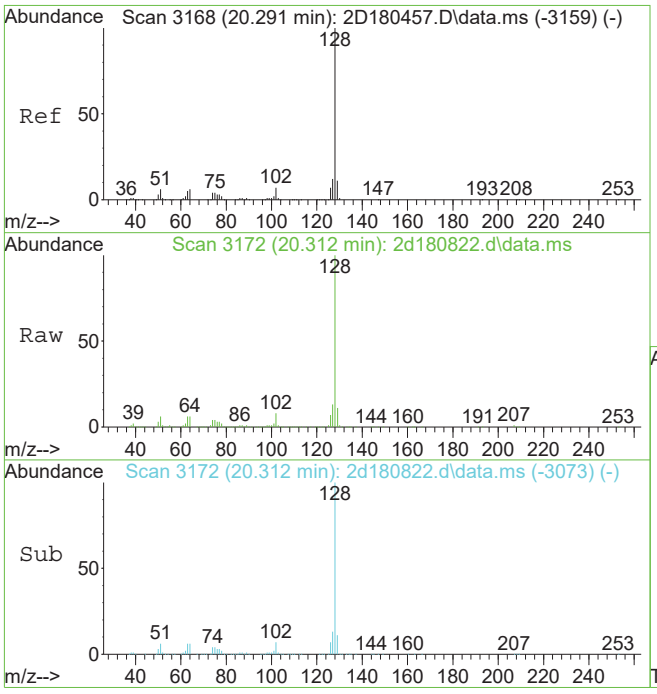


#109
1,2,4-trimethylbenzene
Concen: 102.43 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:105 Resp: 2095900

Ion	Ratio	Lower	Upper
105	100		
120	47.0	16.7	76.7
77	11.9	0.0	41.8

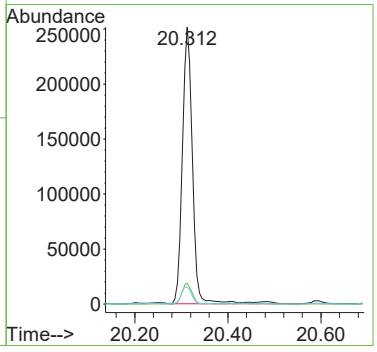




#121
naphthalene
Concen: 22.05 ug/L
RT: 20.312 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:128 Resp: 380033

Ion	Ratio	Lower	Upper
128	100		
102	7.5	0.0	37.5
51	6.2	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180870.d
Acq On : 10 Jan 2019 2:18 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 14 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:18 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

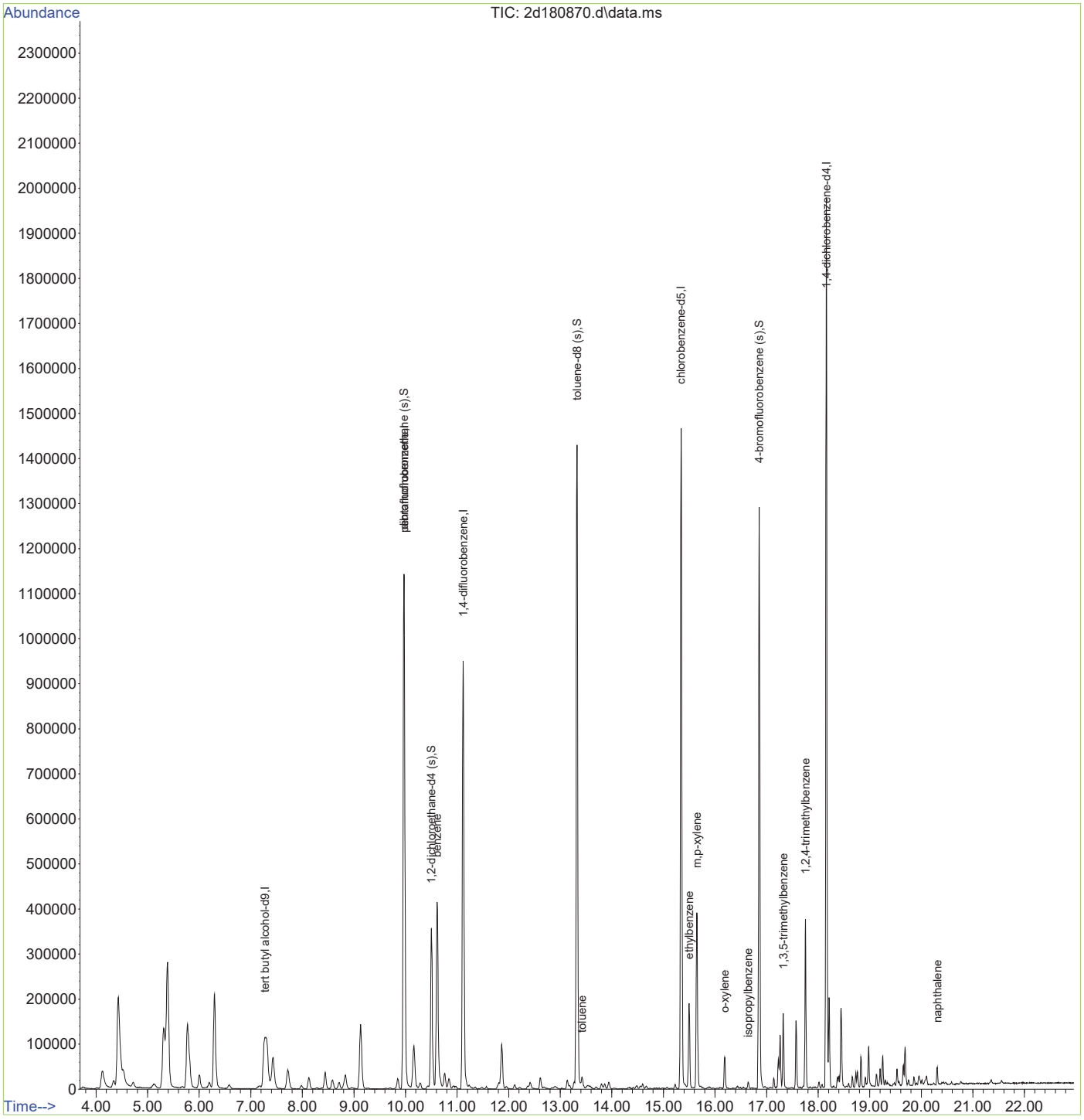
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	210801	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	729249	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	987254	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	958320	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	519057	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	297188	49.13	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.26%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	300122	49.46	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 98.92%			
75) toluene-d8 (s)	13.323	98	1125331	48.81	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.62%			
99) 4-bromofluorobenzene (s)	16.857	95	435773	47.36	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.72%			
Target Compounds						Qvalue
54) benzene	10.613	78	456473	21.24	ug/L	99
76) toluene	13.423	92	11746	0.87	ug/L	94
89) ethylbenzene	15.499	91	153133	5.96	ug/L	98
90) m,p-xylene	15.646	91	267056	13.66	ug/L	98
91) o-xylene	16.186	106	21569	2.18	ug/L	95
96) isopropylbenzene	16.642	105	9773	0.38	ug/L	96
107) 1,3,5-trimethylbenzene	17.324	105	93503	4.29	ug/L	98
109) 1,2,4-trimethylbenzene	17.754	105	201834	9.10	ug/L	99
121) naphthalene	20.307	128	30477	1.63	ug/L	98

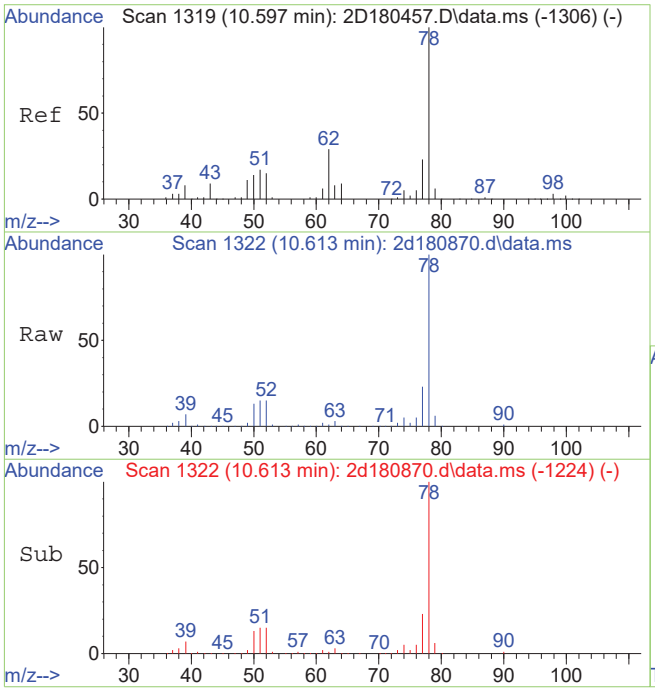
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180870.d
Acq On : 10 Jan 2019 2:18 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 14 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:18 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

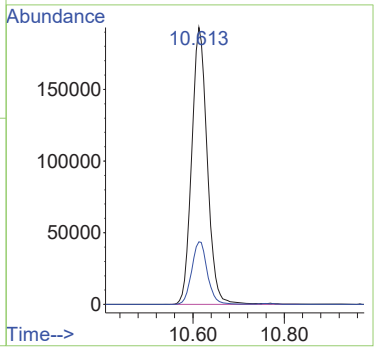


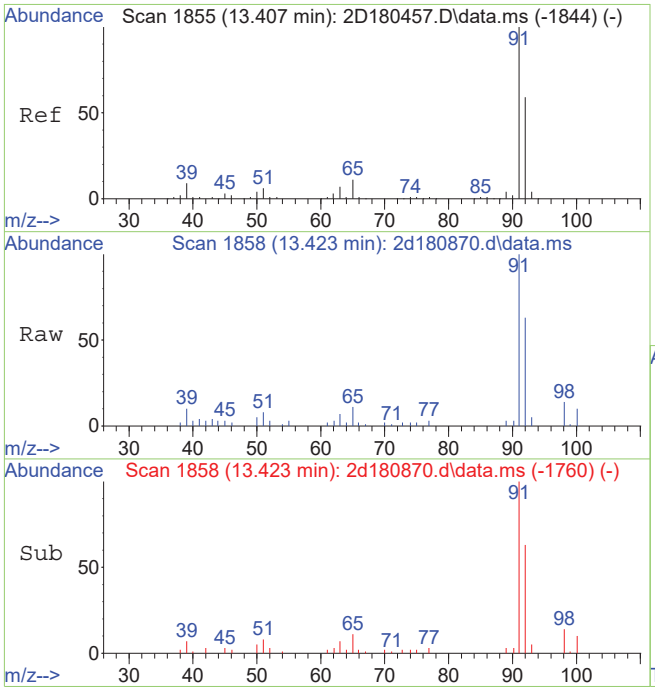


#54
benzene
Concen: 21.24 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 78 Resp: 456473

Ion	Ratio	Lower	Upper
78	100		
77	22.6	0.0	53.2

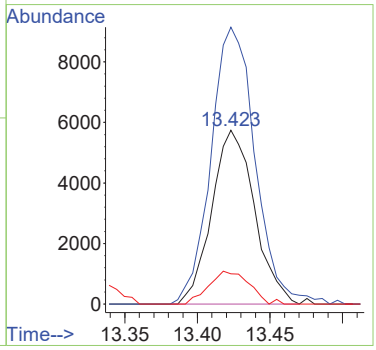


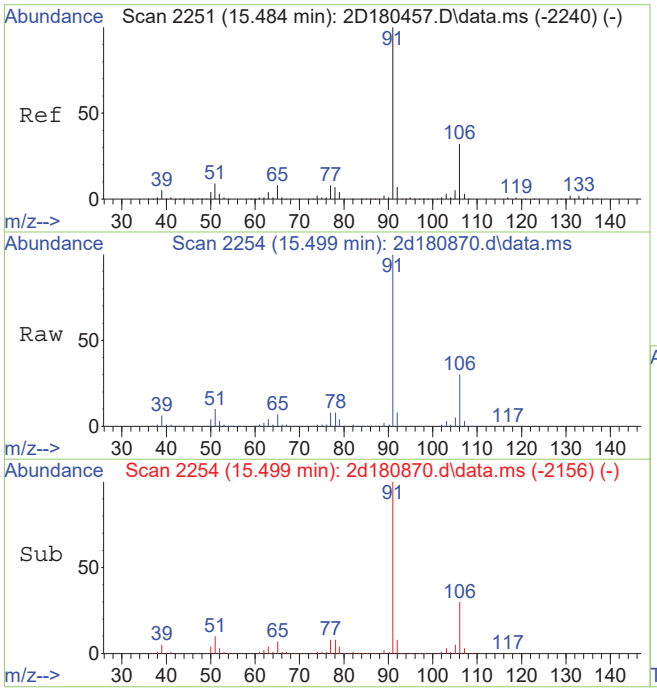


#76
toluene
Concen: 0.87 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 92 Resp: 11746

Ion	Ratio	Lower	Upper
92	100		
91	159.4	148.1	188.1
65	17.4	0.0	38.8

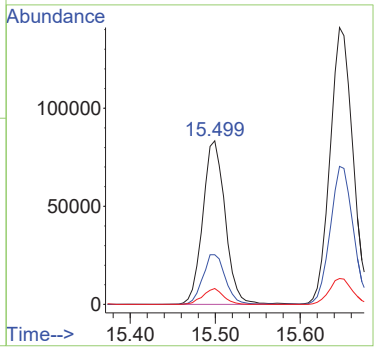


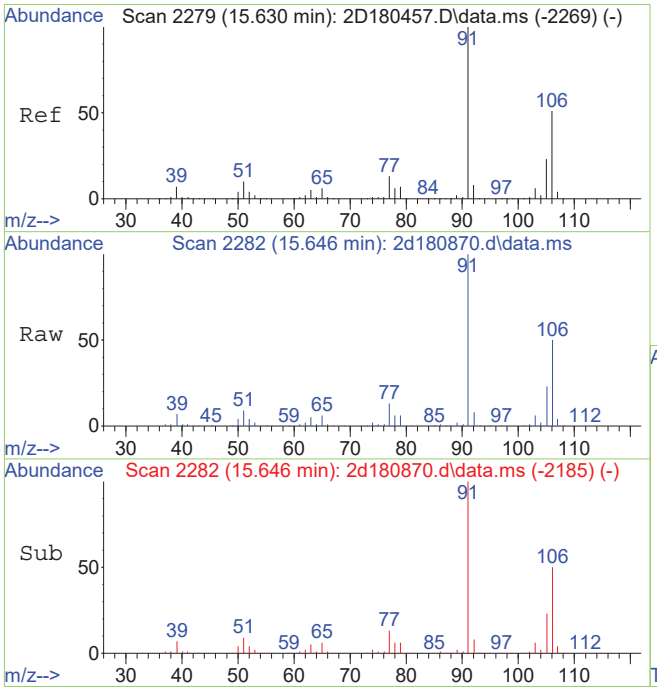


#89
ethylbenzene
Concen: 5.96 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 91 Resp: 153133

Ion	Ratio	Lower	Upper
91	100		
106	30.4	1.6	61.6
51	9.7	0.0	39.0

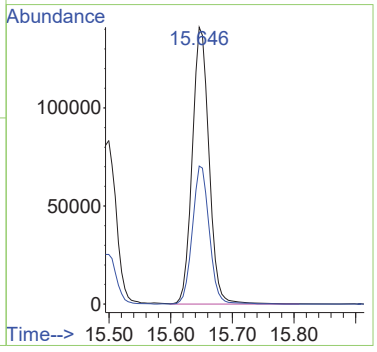


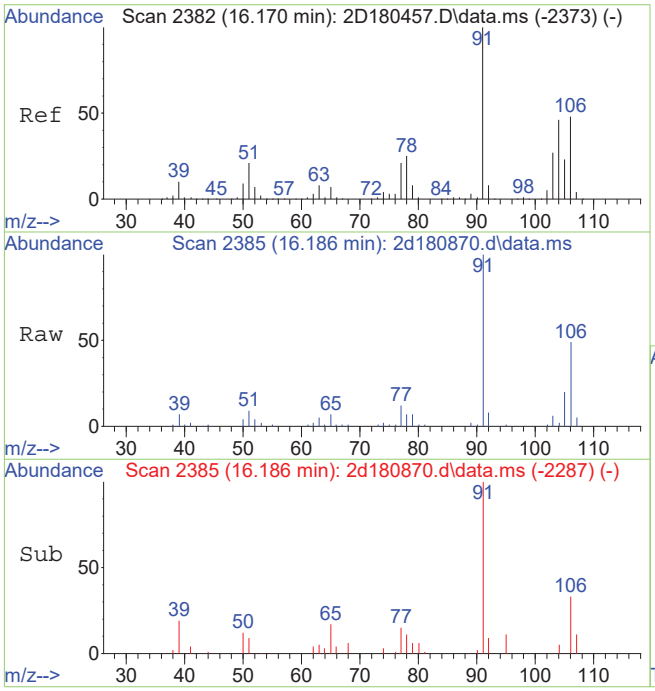


#90
m,p-xylene
Concen: 13.66 ug/L
RT: 15.646 min Scan# 2282
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 91 Resp: 267056

Ion	Ratio	Lower	Upper
91	100		
106	49.8	21.1	81.1

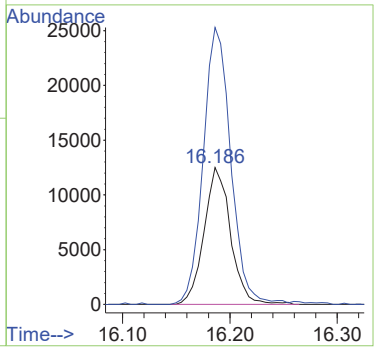


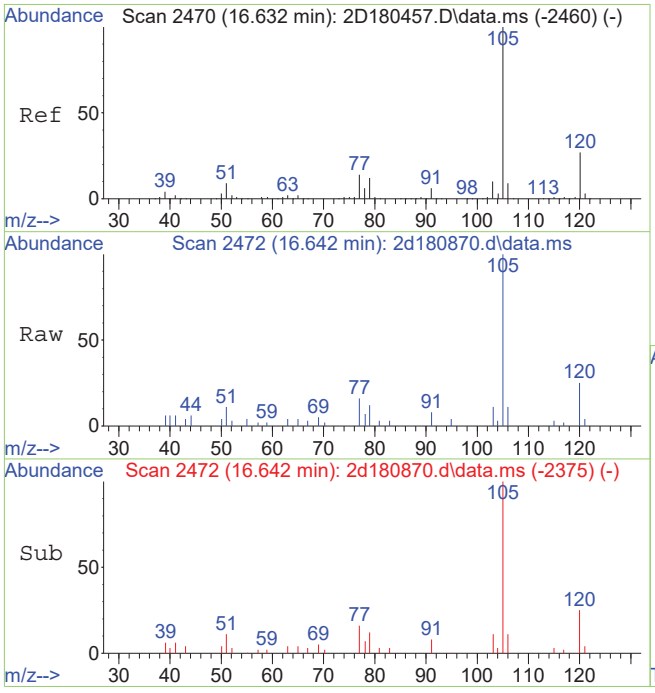


#91
o-xylene
Concen: 2.18 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:106 Resp: 21569

Ion	Ratio	Lower	Upper
106	100		
91	202.5	179.9	239.9

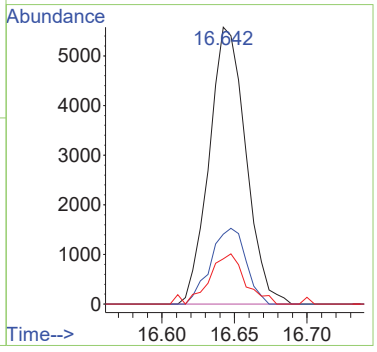


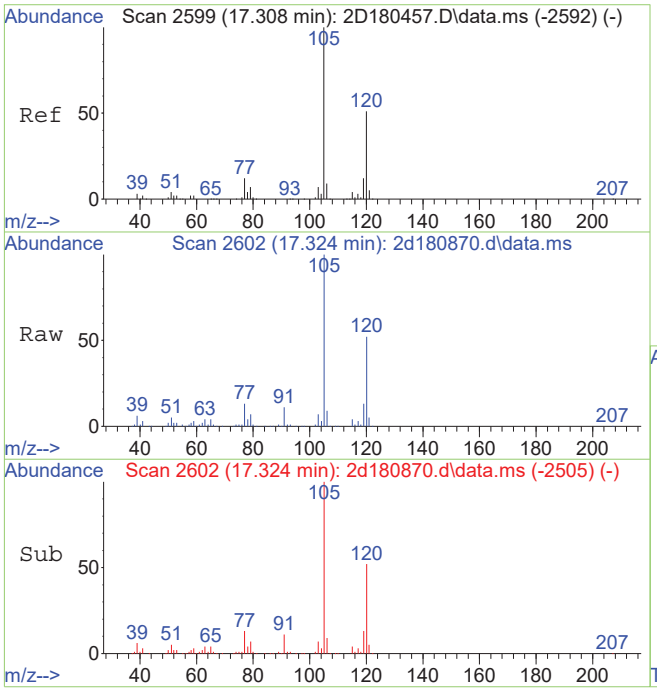


#96
isopropylbenzene
Concen: 0.38 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:105 Resp: 9773

Ion	Ratio	Lower	Upper
105	100		
120	25.2	6.7	46.7
77	16.3	0.0	34.2

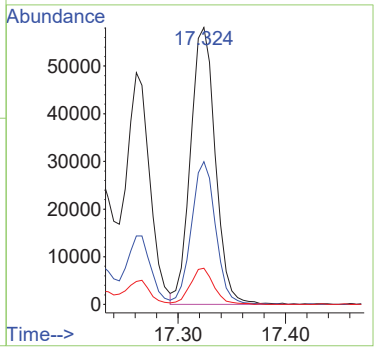


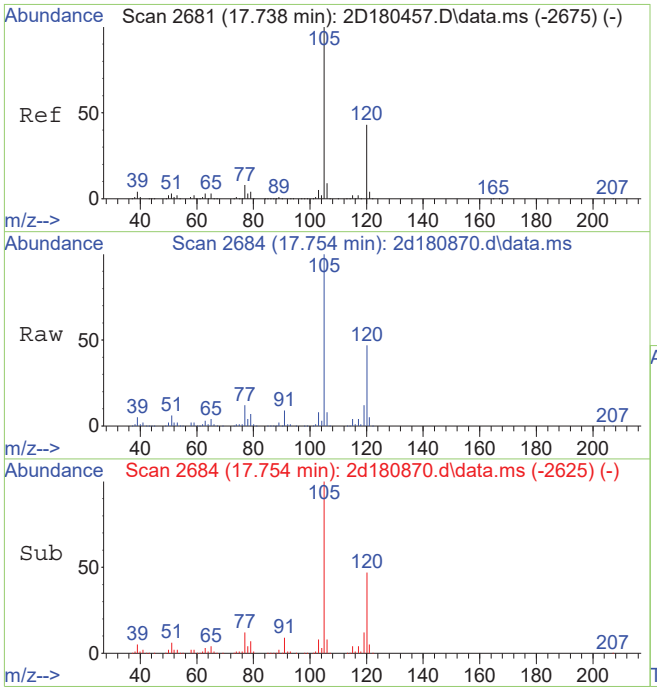


#107
1,3,5-trimethylbenzene
Concen: 4.29 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:105 Resp: 93503

Ion	Ratio	Lower	Upper
105	100		
120	51.6	20.7	80.7
77	13.1	0.0	42.0

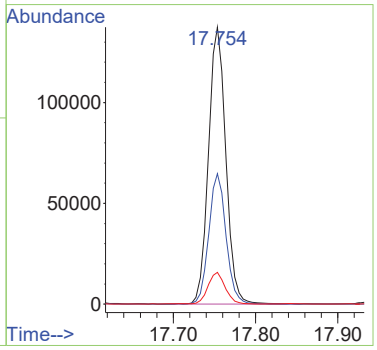


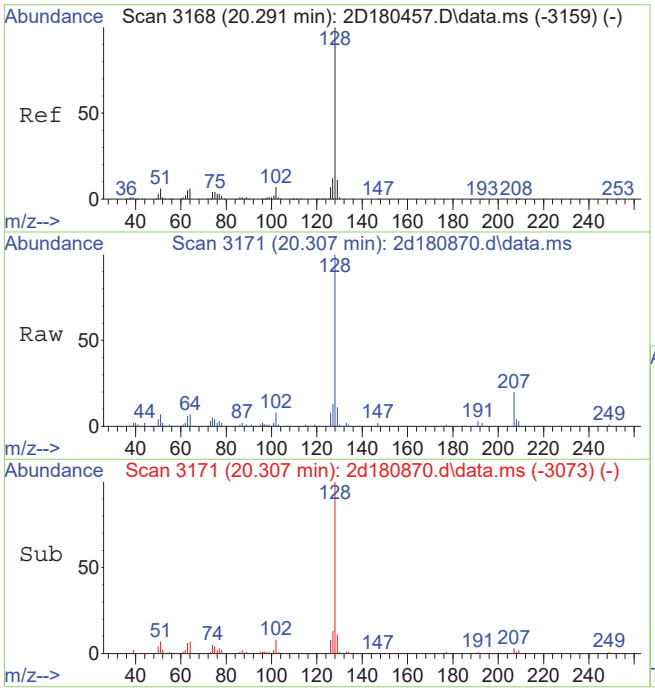


#109
1,2,4-trimethylbenzene
Concen: 9.10 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:105 Resp: 201834

Ion	Ratio	Lower	Upper
105	100		
120	47.0	16.7	76.7
77	11.4	0.0	41.8

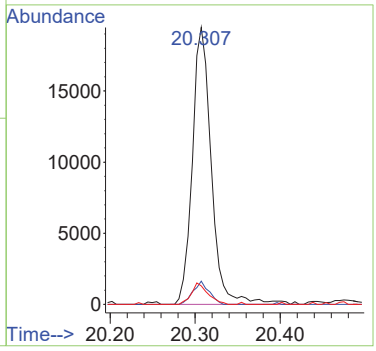




#121
naphthalene
Concen: 1.63 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:128 Resp: 30477

Ion	Ratio	Lower	Upper
128	100		
102	8.4	0.0	37.5
51	6.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180830.d
Acq On : 9 Jan 2019 5:10 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,10
ALS Vial : 20 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:39:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

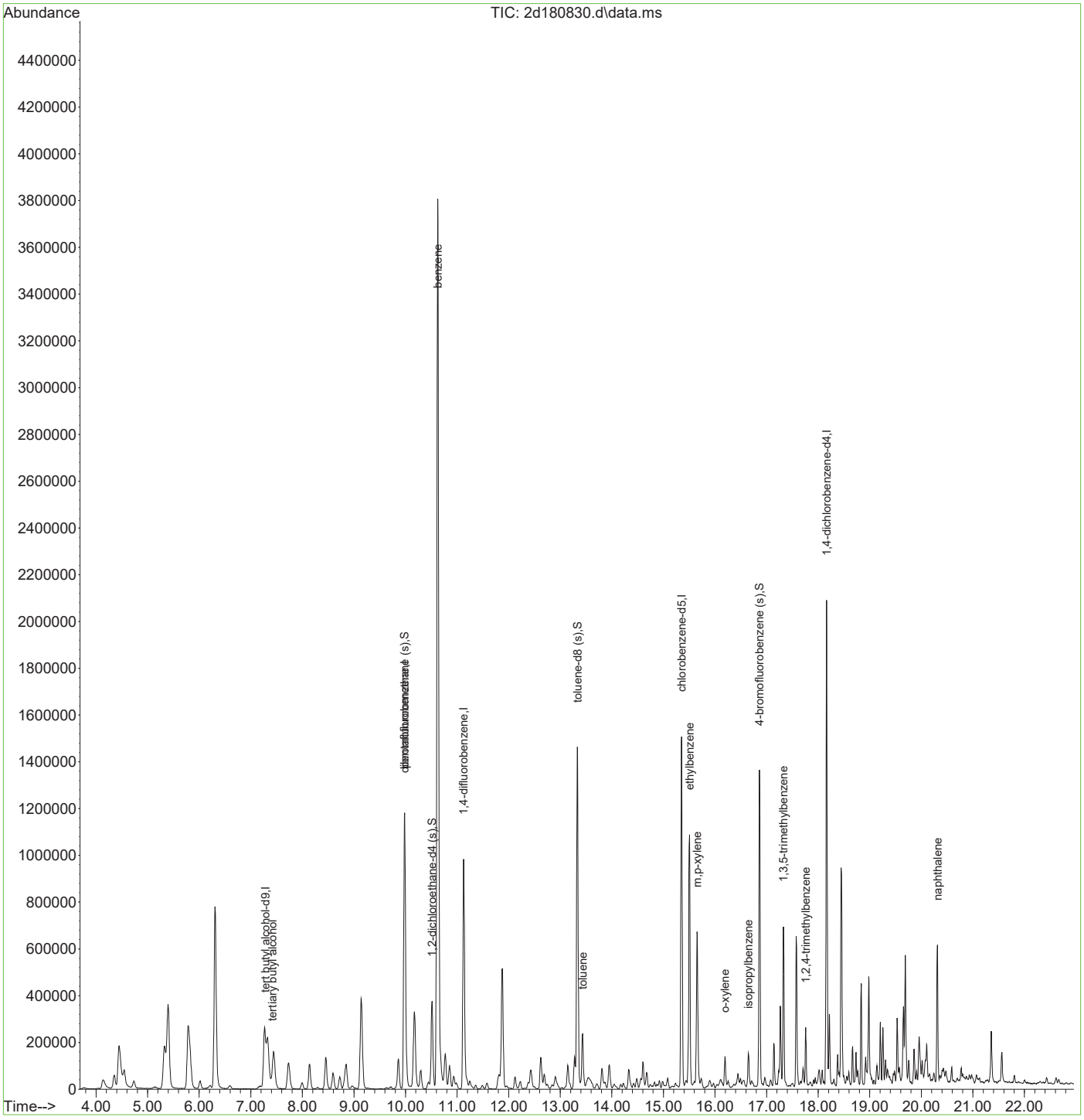
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.284	65	248493	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	764978	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	1011593	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	973972	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	540758	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	304082	47.92	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.84%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	309899	49.84	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 99.68%			
75) toluene-d8 (s)	13.334	98	1166205	49.77	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.54%			
99) 4-bromofluorobenzene (s)	16.863	95	449983	46.94	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.88%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.420	59	5979	12.41	ug/L	# 1
54) benzene	10.623	78	4489025	203.86	ug/L	99
76) toluene	13.434	92	110626	8.07	ug/L	99
89) ethylbenzene	15.505	91	855254	32.73	ug/L	99
90) m,p-xylene	15.651	91	447172	22.51	ug/L	99
91) o-xylene	16.191	106	37933	3.77	ug/L	93
96) isopropylbenzene	16.648	105	87250	3.34	ug/L	96
107) 1,3,5-trimethylbenzene	17.329	105	371901	16.36	ug/L	100
109) 1,2,4-trimethylbenzene	17.759	105	130584	5.65	ug/L	99
121) naphthalene	20.313	128	471865	24.25	ug/L	100

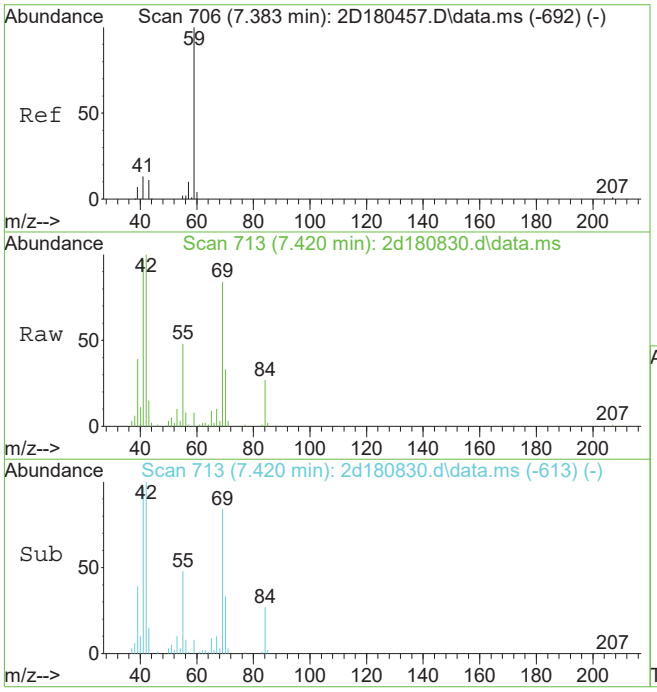
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180830.d
Acq On : 9 Jan 2019 5:10 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,10
ALS Vial : 20 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:39:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

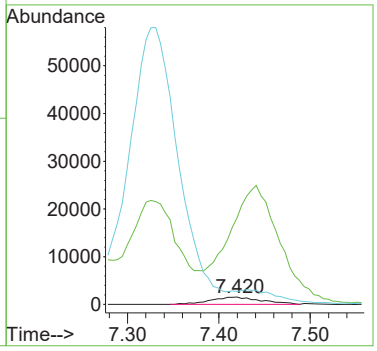


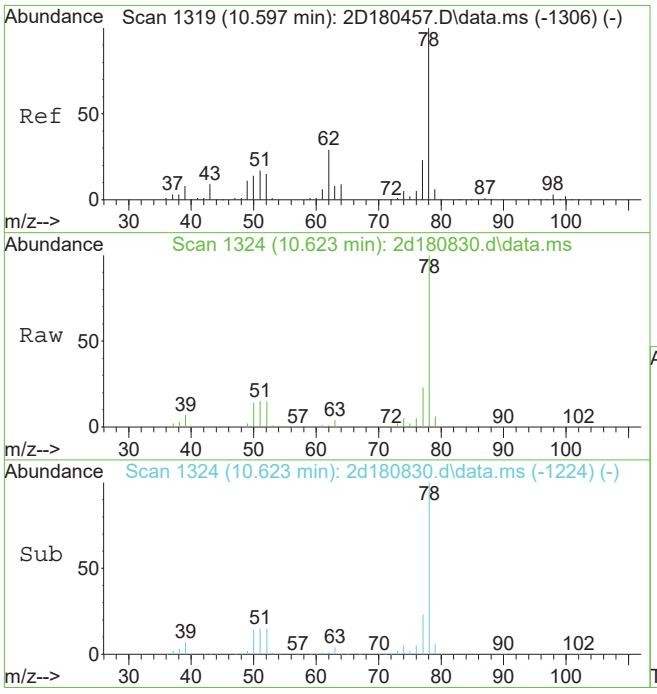


#2
tertiary butyl alcohol
Concen: 12.41 ug/L
RT: 7.420 min Scan# 713
Delta R.T. 0.026 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 59 Resp: 5979

Ion	Ratio	Lower	Upper
59	100		
41	861.1	0.0	45.0#
43	131.3	0.0	40.6#

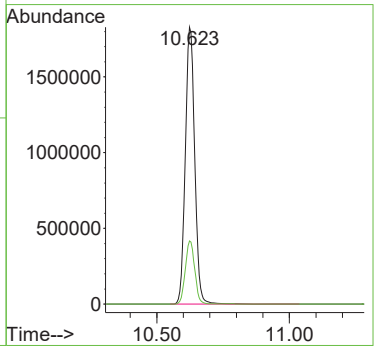


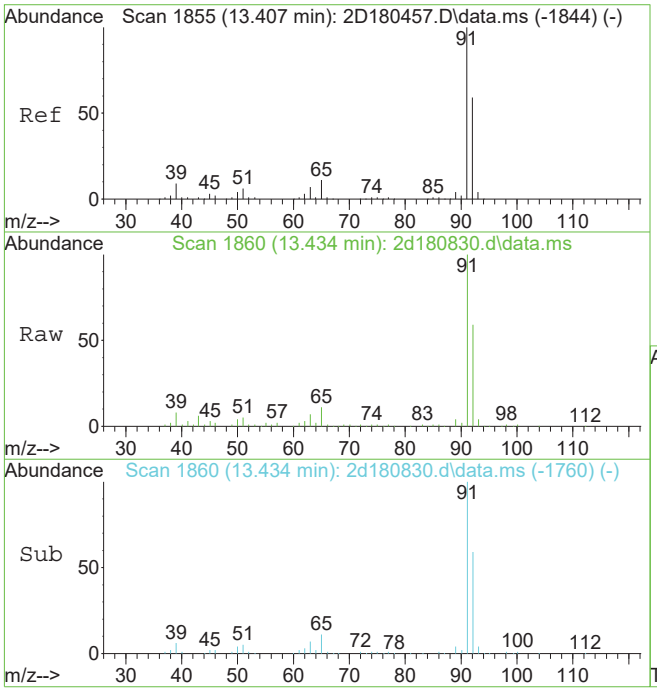


#54
benzene
Concen: 203.86 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 78 Resp: 4489025

Ion	Ratio	Lower	Upper
78	100		
77	22.8	0.0	53.2

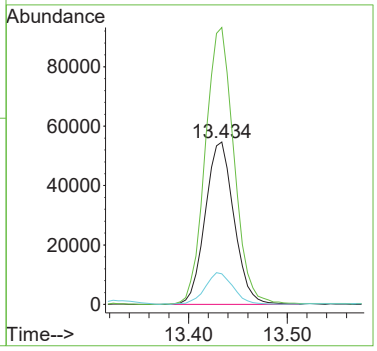


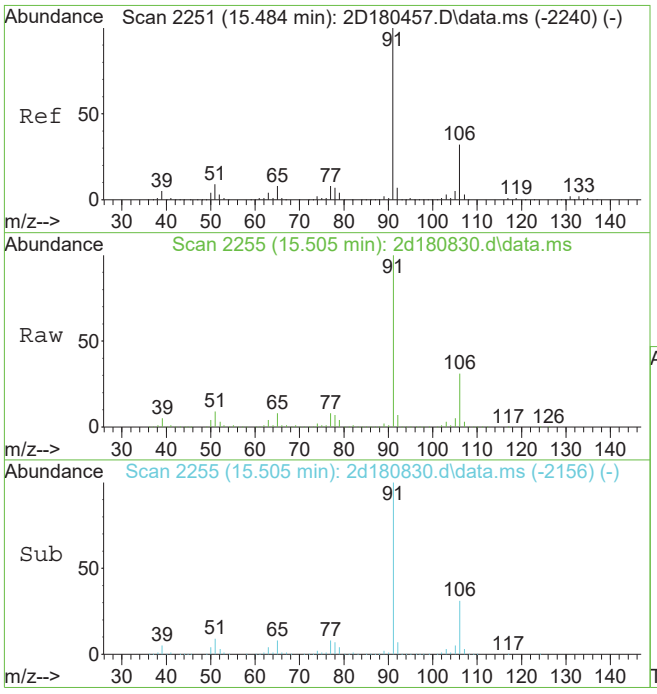


#76
toluene
Concen: 8.07 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 92 Resp: 110626

Ion	Ratio	Lower	Upper
92	100		
91	170.2	148.1	188.1
65	18.8	0.0	38.8

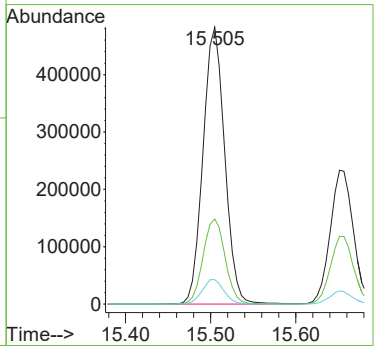


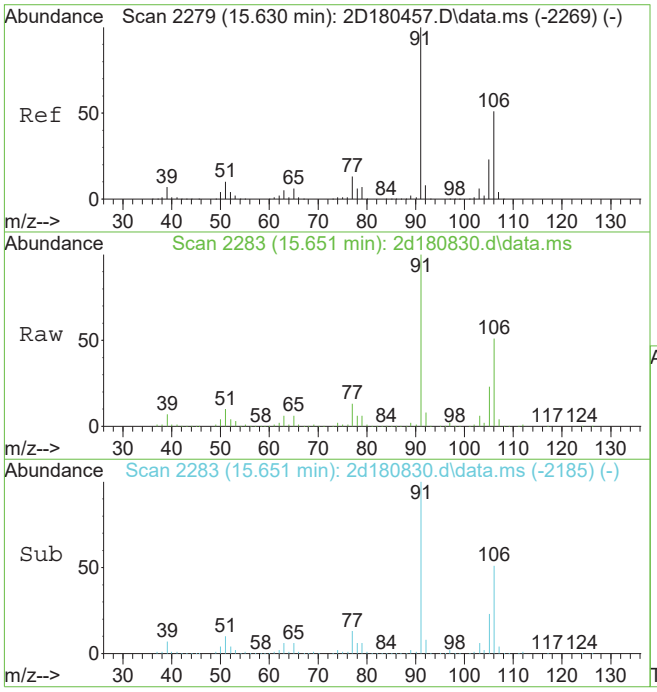


#89
ethylbenzene
Concen: 32.73 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 91 Resp: 855254

Ion	Ratio	Lower	Upper
91	100		
106	30.8	1.6	61.6
51	8.8	0.0	39.0

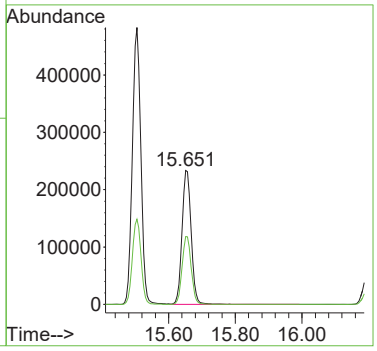


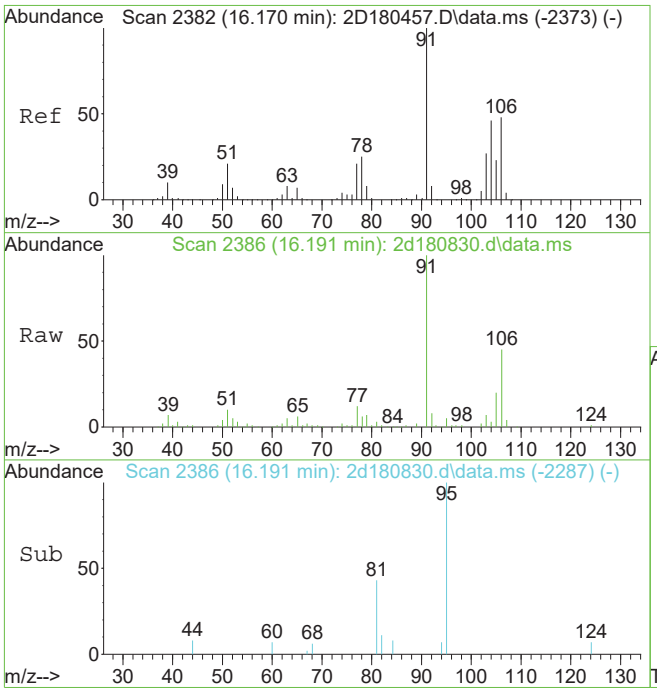


#90
m,p-xylene
Concen: 22.51 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 91 Resp: 447172

Ion	Ratio	Lower	Upper
91	100		
106	50.5	21.1	81.1

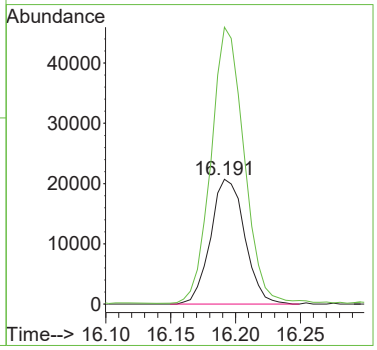


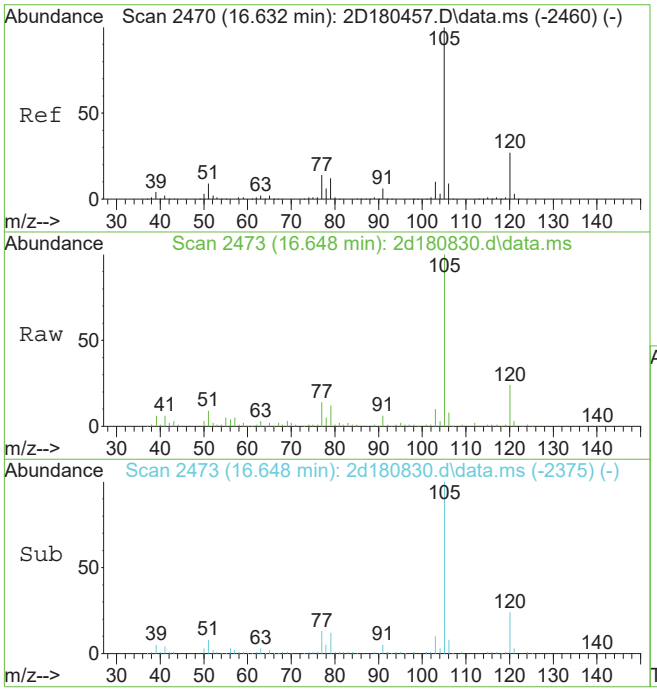


#91
o-xylene
Concen: 3.77 ug/L
RT: 16.191 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:106 Resp: 37933

Ion	Ratio	Lower	Upper
106	100		
91	221.0	179.9	239.9

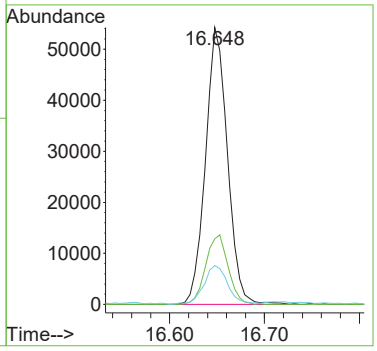


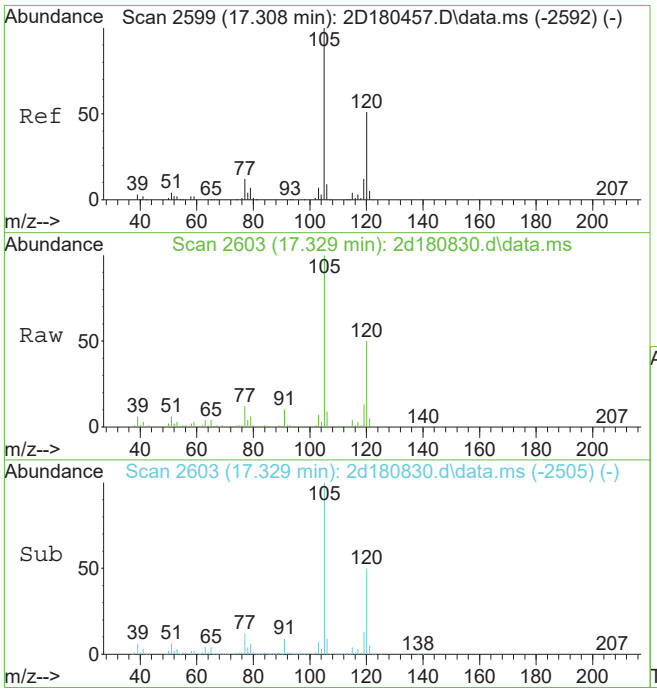


#96
isopropylbenzene
Concen: 3.34 ug/L
RT: 16.648 min Scan# 2473
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:105 Resp: 87250

Ion	Ratio	Lower	Upper
105	100		
120	23.7	6.7	46.7
77	14.1	0.0	34.2

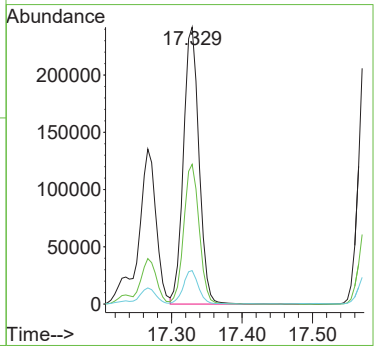


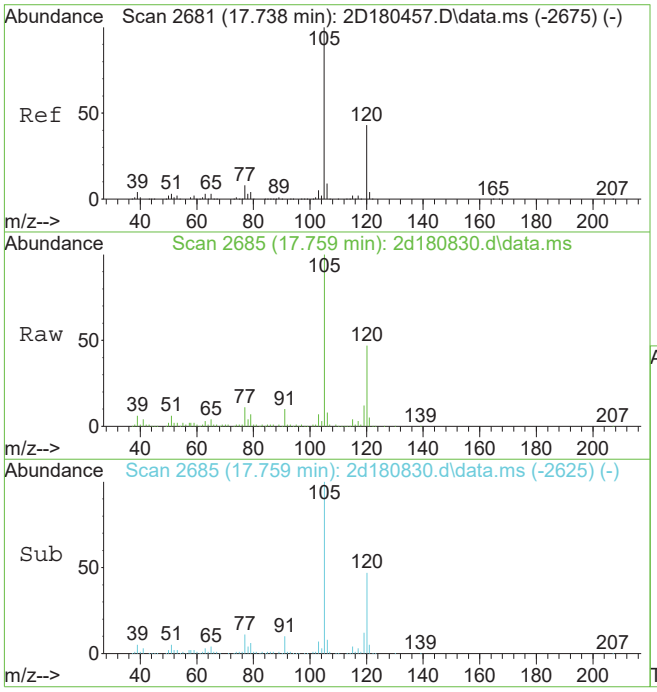


#107
1,3,5-trimethylbenzene
Concen: 16.36 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:105 Resp: 371901

Ion	Ratio	Lower	Upper
105	100		
120	50.4	20.7	80.7
77	11.9	0.0	42.0

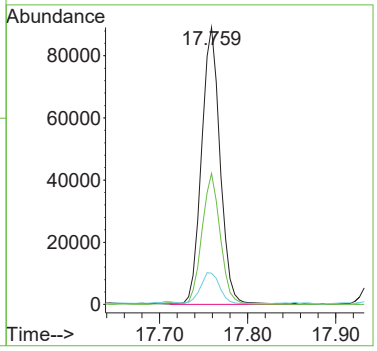


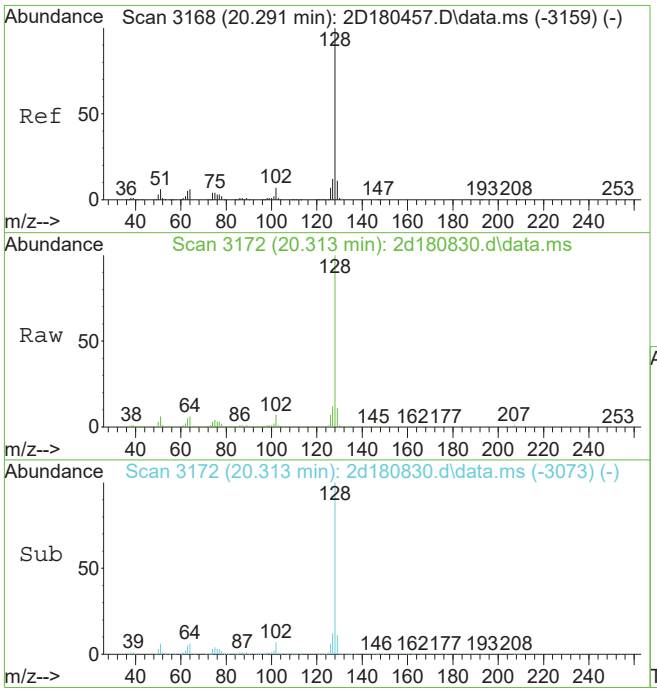


#109
1,2,4-trimethylbenzene
Concen: 5.65 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:105 Resp: 130584

Ion	Ratio	Lower	Upper
105	100		
120	47.2	16.7	76.7
77	10.8	0.0	41.8

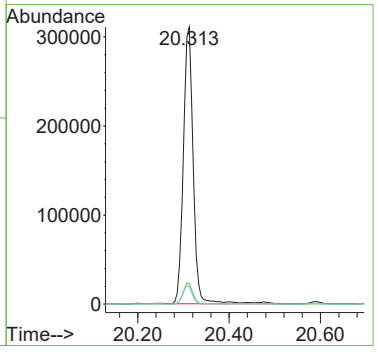




#121
naphthalene
Concen: 24.25 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:128 Resp: 471865

Ion	Ratio	Lower	Upper
128	100		
102	7.4	0.0	37.5
51	6.2	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180869.d
Acq On : 10 Jan 2019 1:48 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,50
ALS Vial : 13 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:00 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

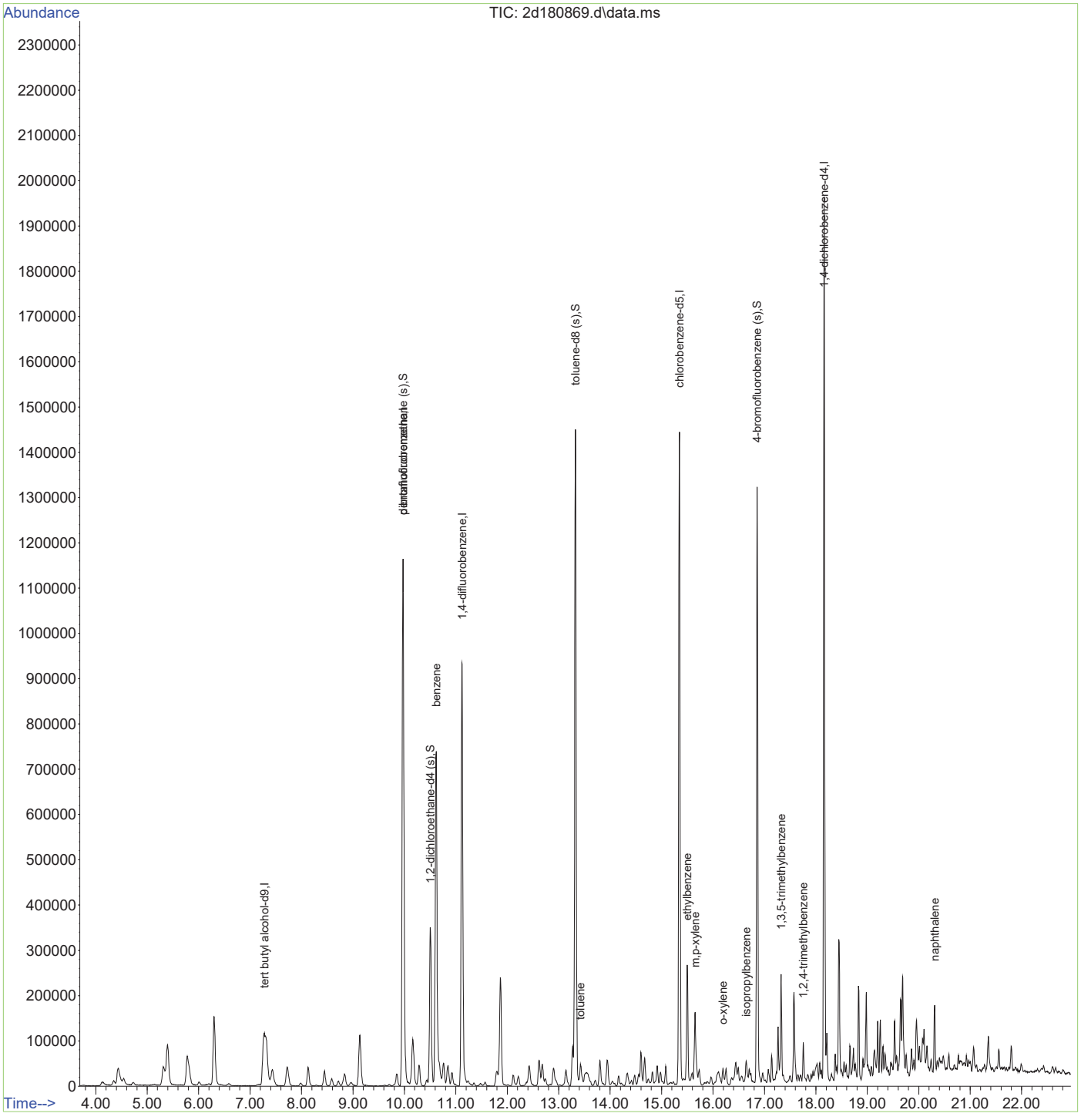
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	208496	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	730156	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.122	114	978618	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	945999	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	519645	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	298880	49.35	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.70%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	302592	50.30	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.60%			
75) toluene-d8 (s)	13.324	98	1116444	49.06	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.12%			
99) 4-bromofluorobenzene (s)	16.857	95	429982	46.67	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.34%			
Target Compounds						Qvalue
54) benzene	10.618	78	841567	39.51	ug/L	100
76) toluene	13.423	92	20965	1.57	ug/L	89
89) ethylbenzene	15.499	91	192564	7.59	ug/L	98
90) m,p-xylene	15.652	91	102652	5.32	ug/L	98
91) o-xylene	16.192	106	8866	0.91	ug/L	91
96) isopropylbenzene	16.648	105	25443	1.00	ug/L	96
107) 1,3,5-trimethylbenzene	17.324	105	122806	5.62	ug/L	100
109) 1,2,4-trimethylbenzene	17.754	105	40784	1.84	ug/L	98
121) naphthalene	20.307	128	117498	6.28	ug/L	100

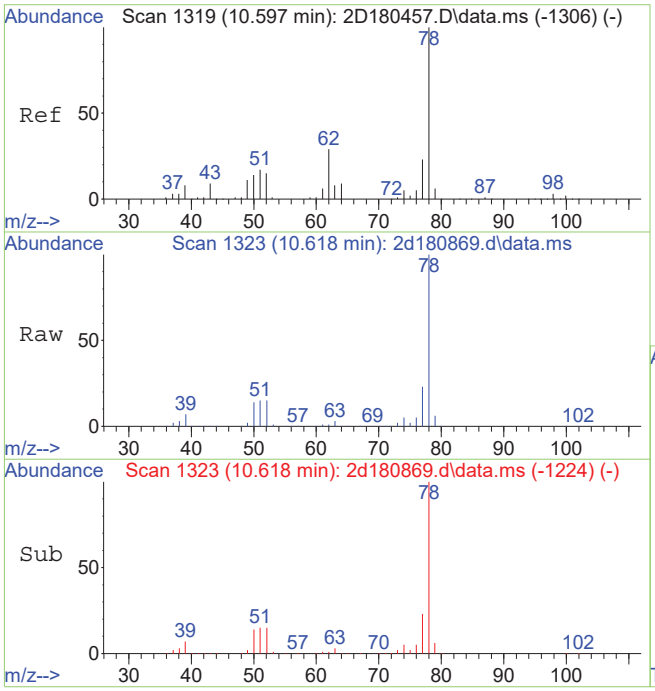
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180869.d
Acq On : 10 Jan 2019 1:48 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,50
ALS Vial : 13 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:00 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

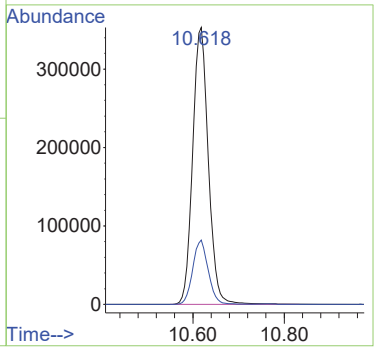


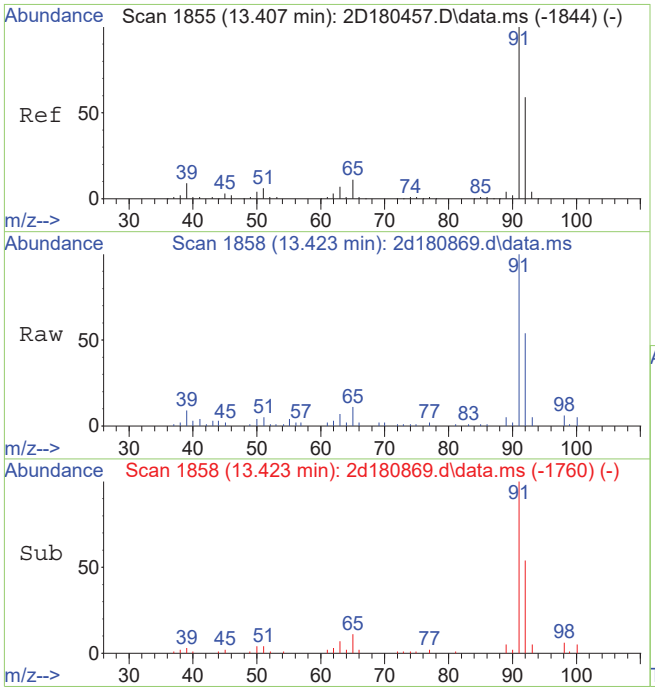


#54
benzene
Concen: 39.51 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 78 Resp: 841567

Ion	Ratio	Lower	Upper
78	100		
77	23.2	0.0	53.2

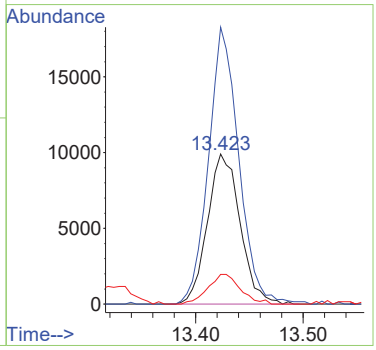


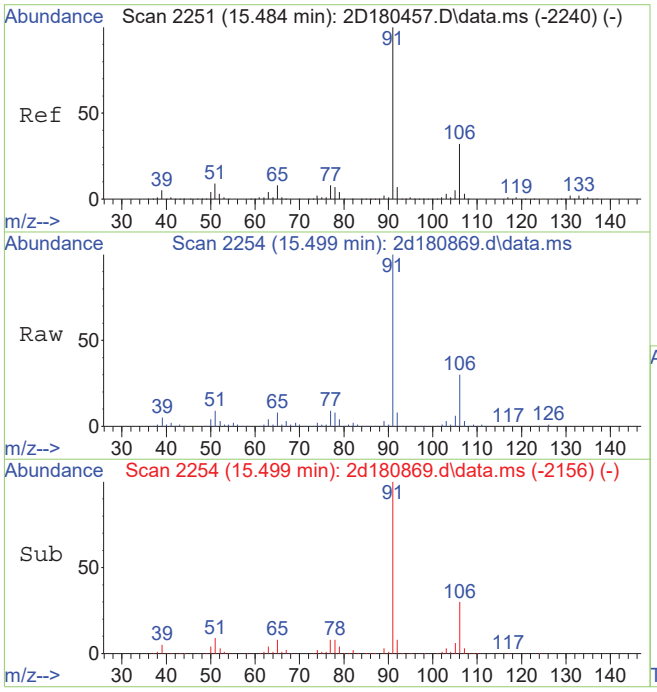


#76
toluene
Concen: 1.57 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 92 Resp: 20965

Ion	Ratio	Lower	Upper
92	100		
91	184.6	148.1	188.1
65	19.9	0.0	38.8

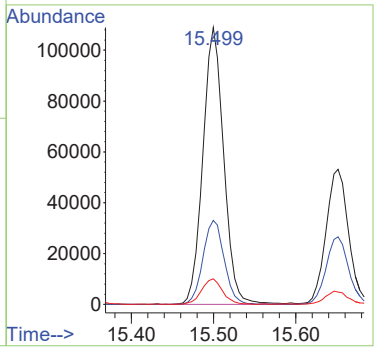


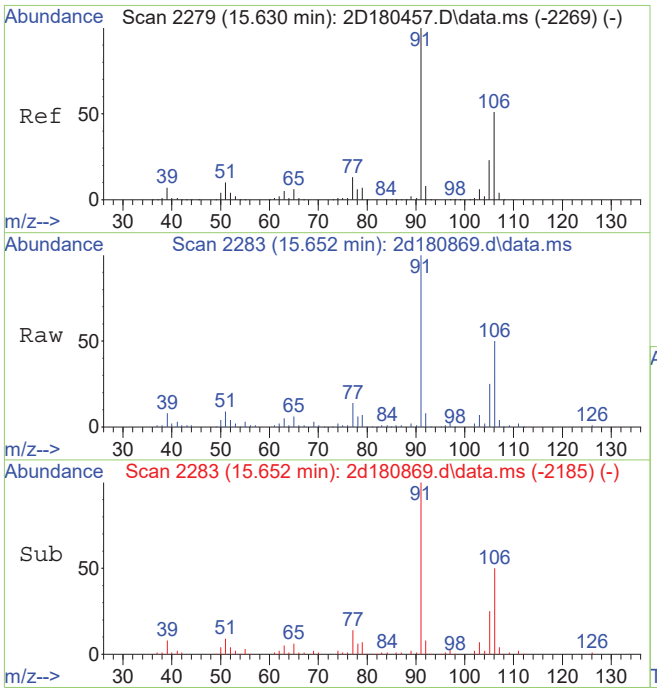


#89
ethylbenzene
Concen: 7.59 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 91 Resp: 192564

Ion	Ratio	Lower	Upper
91	100		
106	30.3	1.6	61.6
51	9.2	0.0	39.0

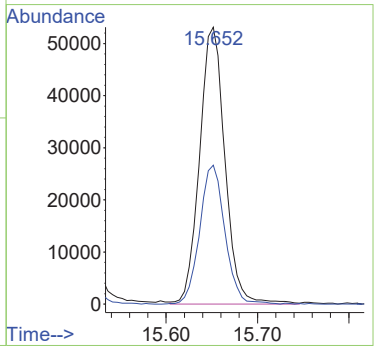


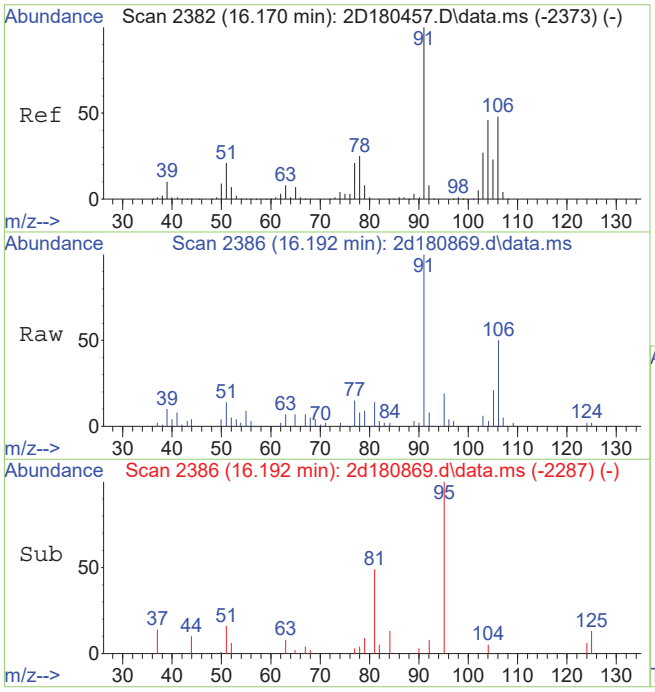


#90
m,p-xylene
Concen: 5.32 ug/L
RT: 15.652 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 91 Resp: 102652

Ion	Ratio	Lower	Upper
91	100		
106	50.0	21.1	81.1

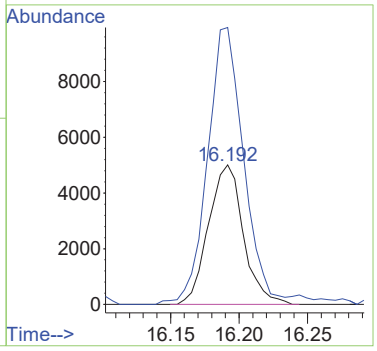


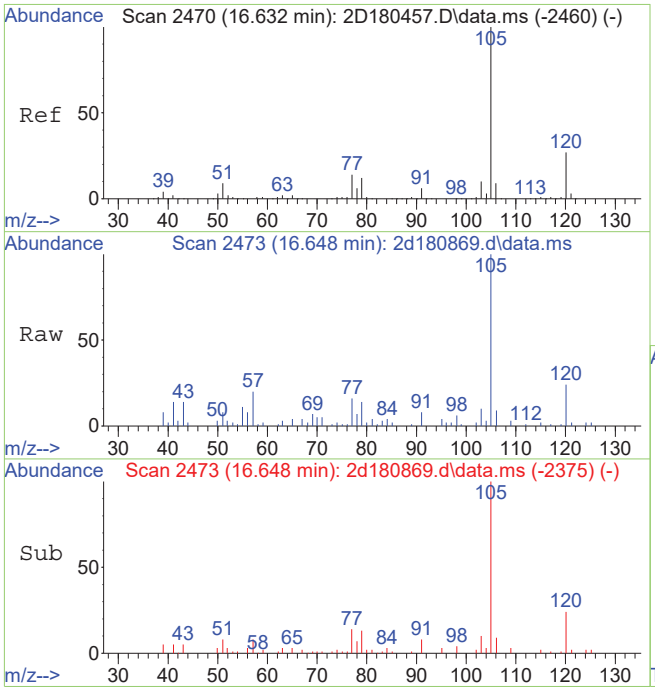


#91
o-xylene
Concen: 0.91 ug/L
RT: 16.192 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:106 Resp: 8866

Ion	Ratio	Lower	Upper
106	100		
91	195.5	179.9	239.9

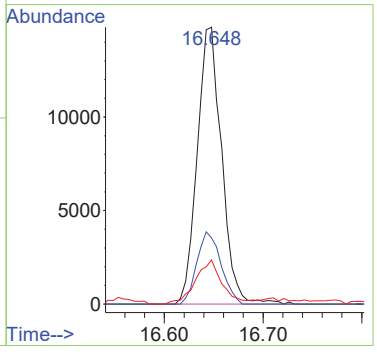


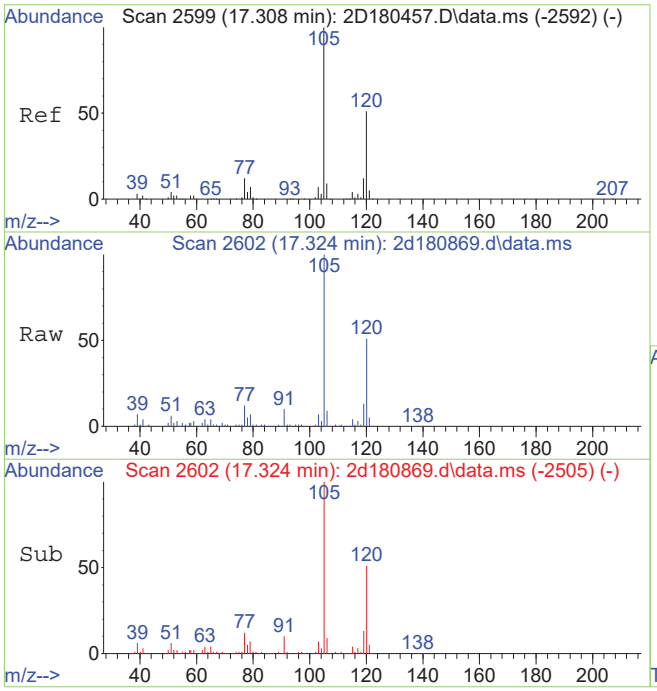


#96
isopropylbenzene
Concen: 1.00 ug/L
RT: 16.648 min Scan# 2473
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:105 Resp: 25443

Ion	Ratio	Lower	Upper
105	100		
120	23.9	6.7	46.7
77	15.1	0.0	34.2

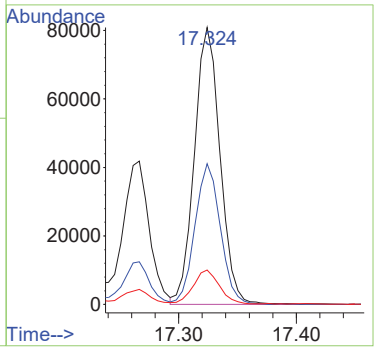


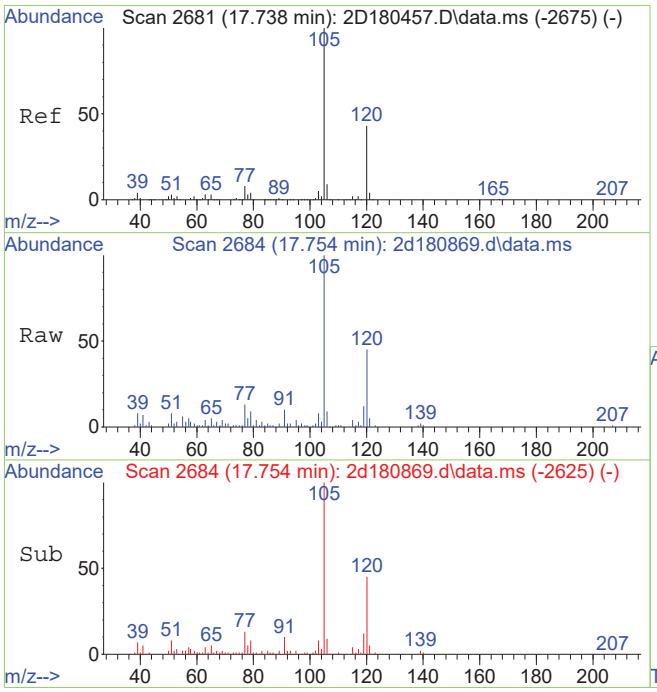


#107
1,3,5-trimethylbenzene
Concen: 5.62 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.011 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:105 Resp: 122806

Ion	Ratio	Lower	Upper
105	100		
120	50.8	20.7	80.7
77	12.2	0.0	42.0

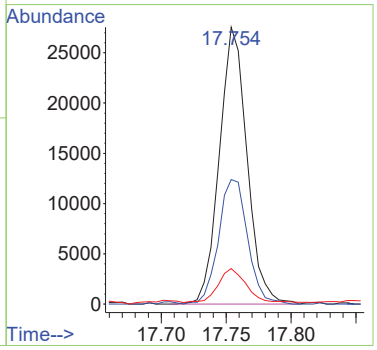


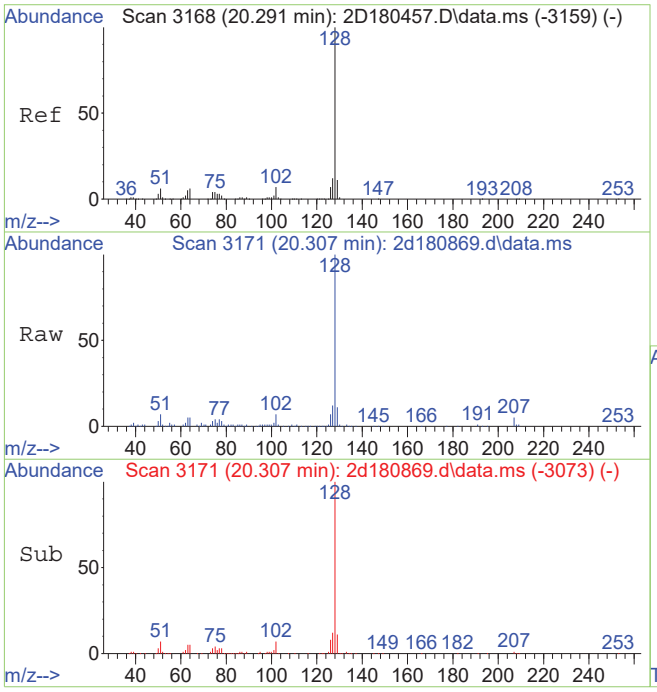


#109
1,2,4-trimethylbenzene
Concen: 1.84 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.011 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:105 Resp: 40784

Ion	Ratio	Lower	Upper
105	100		
120	45.0	16.7	76.7
77	12.1	0.0	41.8

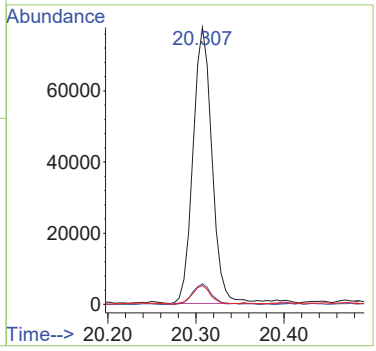




#121
naphthalene
Concen: 6.28 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:128 Resp: 117498

Ion	Ratio	Lower	Upper
128	100		
102	7.5	0.0	37.5
51	6.5	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180828.d
Acq On : 9 Jan 2019 4:11 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 18 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:05:03 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

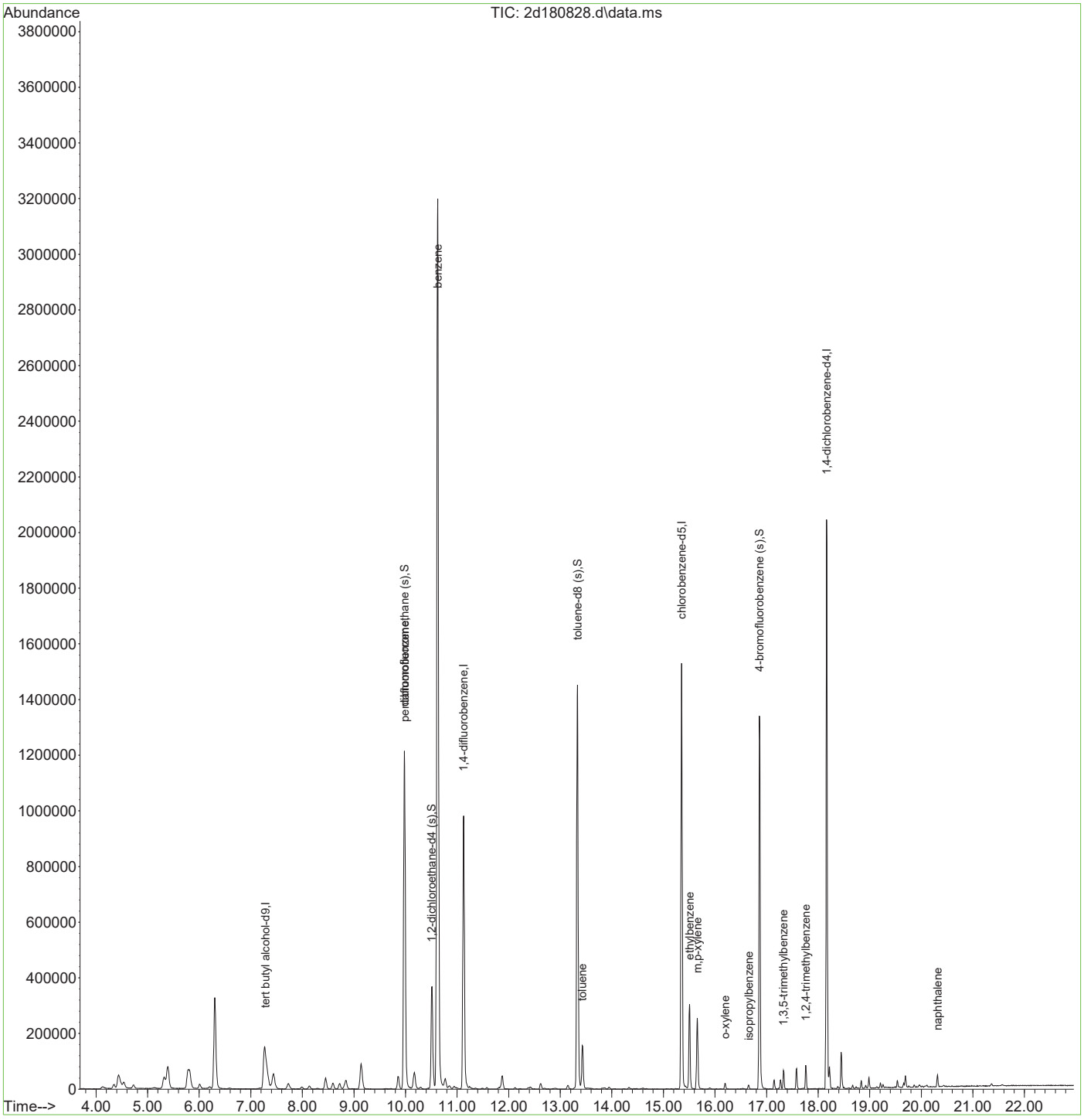
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.284	65	228589	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	772630	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	1015550	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	986611	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	533990	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	311037	48.53	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.06%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	313440	50.21	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.42%			
75) toluene-d8 (s)	13.334	98	1167270	49.18	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.36%			
99) 4-bromofluorobenzene (s)	16.863	95	450147	47.55	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.10%			
Target Compounds						Qvalue
54) benzene	10.623	78	3652442	165.22	ug/L	100
76) toluene	13.428	92	78532	5.65	ug/L	98
89) ethylbenzene	15.505	91	247520	9.35	ug/L	97
90) m,p-xylene	15.657	91	170145	8.46	ug/L	99
91) o-xylene	16.197	106	6748	0.66	ug/L	86
96) isopropylbenzene	16.653	105	9446	0.36	ug/L	96
107) 1,3,5-trimethylbenzene	17.329	105	37688	1.68	ug/L	94
109) 1,2,4-trimethylbenzene	17.759	105	46858	2.05	ug/L	97
121) naphthalene	20.313	128	35018	1.82	ug/L	99

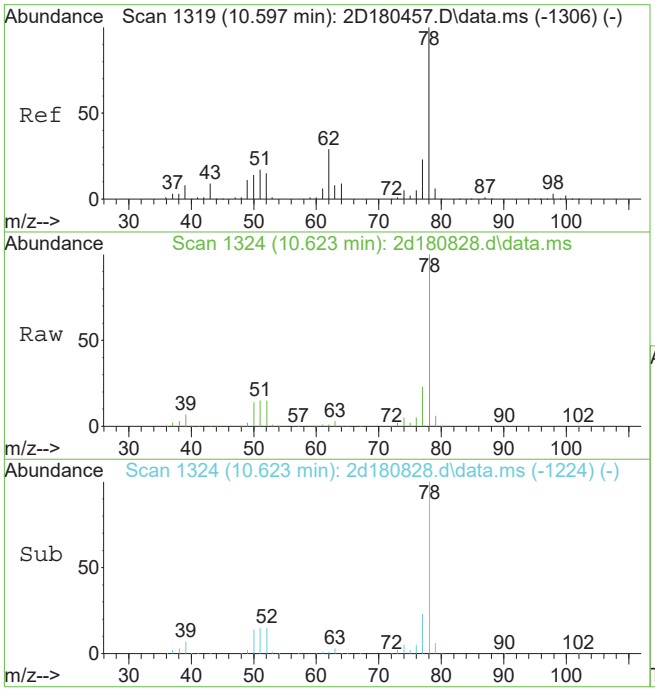
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180828.d
Acq On : 9 Jan 2019 4:11 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 18 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:05:03 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

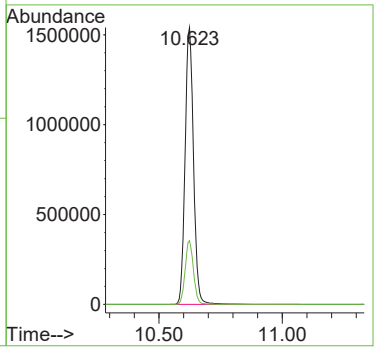


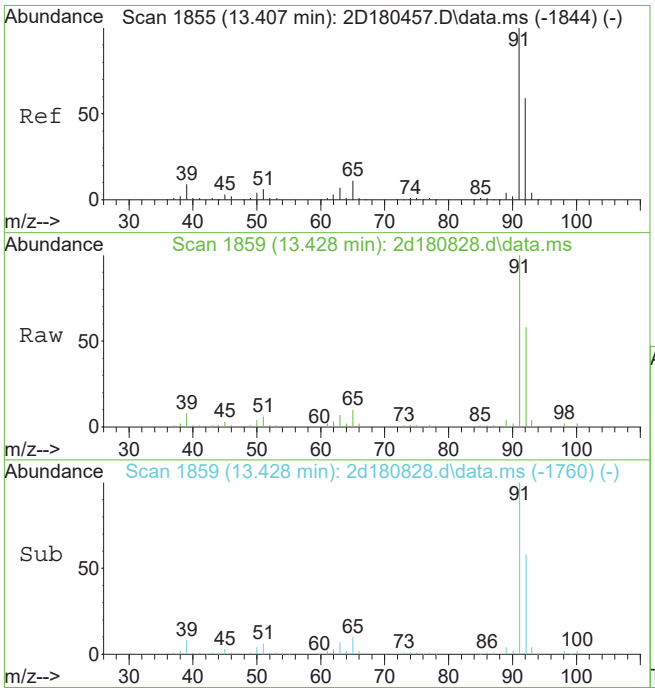


#54
benzene
Concen: 165.22 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 78 Resp: 3652442

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

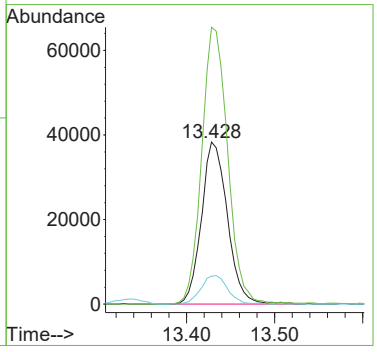


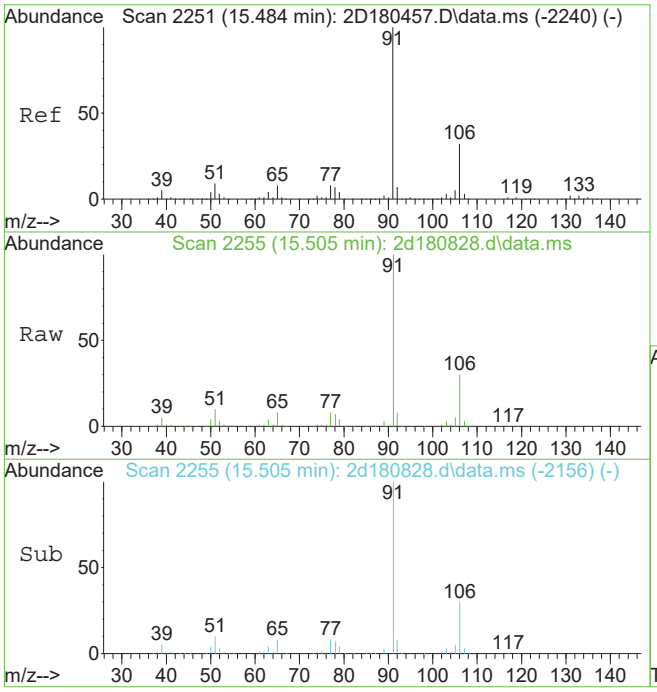


#76
toluene
Concen: 5.65 ug/L
RT: 13.428 min Scan# 1859
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 92 Resp: 78532

Ion	Ratio	Lower	Upper
92	100		
91	171.0	148.1	188.1
65	17.3	0.0	38.8

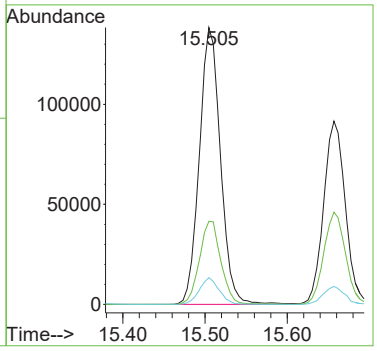


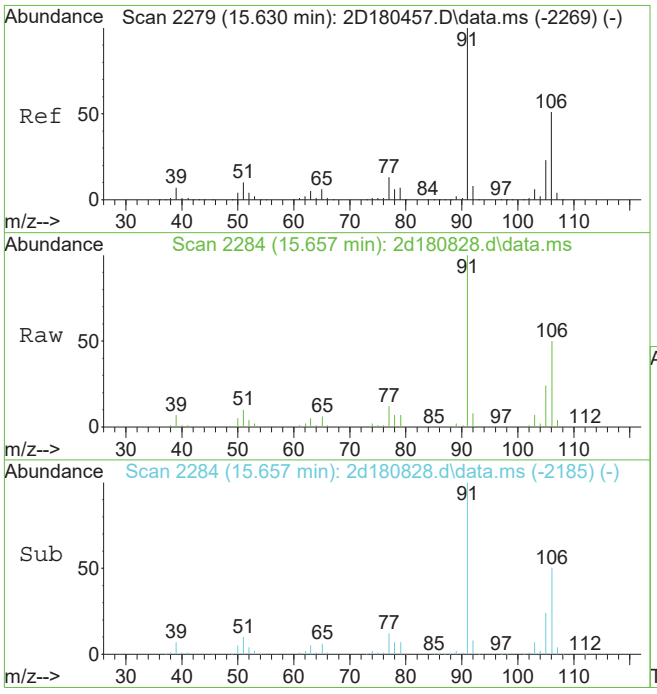


#89
ethylbenzene
Concen: 9.35 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 91 Resp: 247520

Ion	Ratio	Lower	Upper
91	100		
106	30.0	1.6	61.6
51	9.7	0.0	39.0

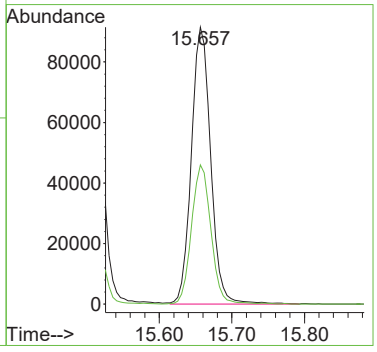


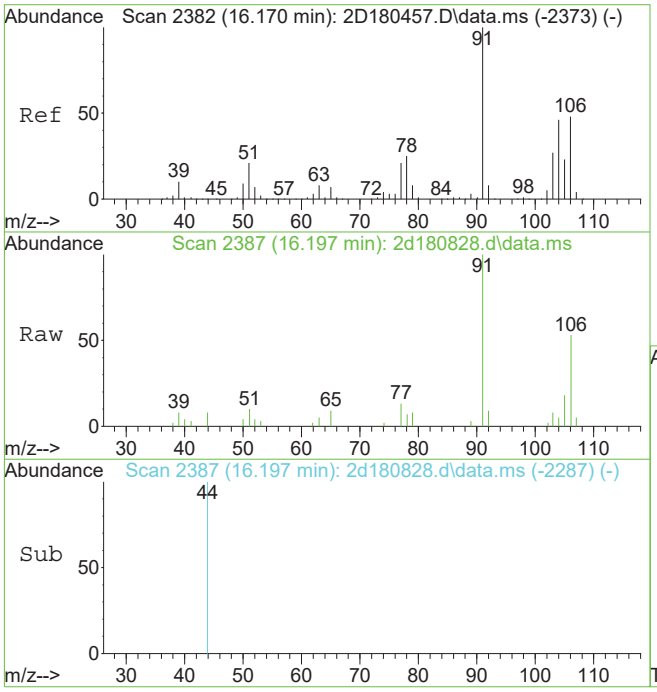


#90
m,p-xylene
Concen: 8.46 ug/L
RT: 15.657 min Scan# 2284
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 91 Resp: 170145

Ion	Ratio	Lower	Upper
91	100		
106	50.3	21.1	81.1

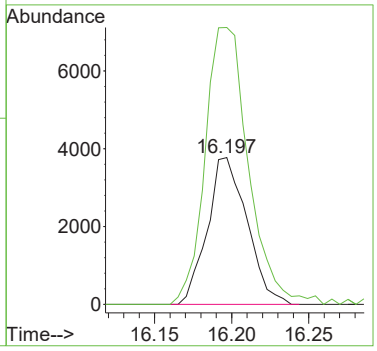


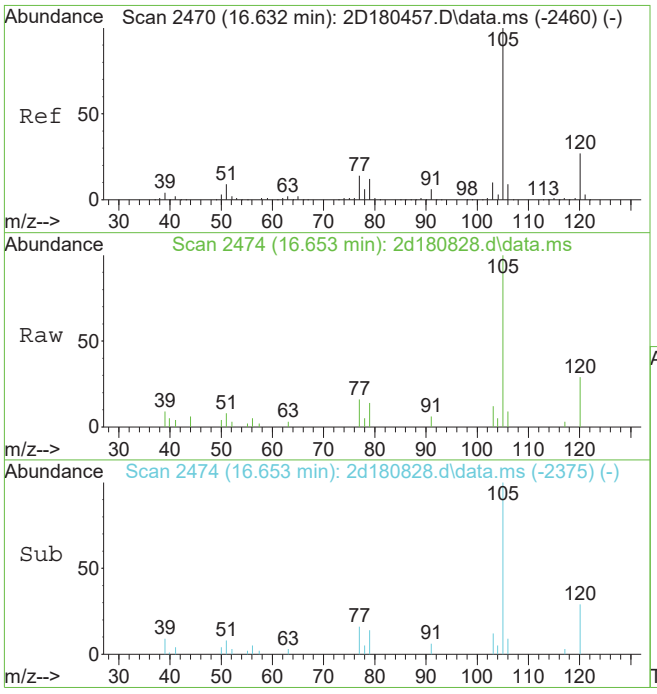


#91
o-xylene
Concen: 0.66 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:106 Resp: 6748

Ion	Ratio	Lower	Upper
106	100		
91	188.6	179.9	239.9

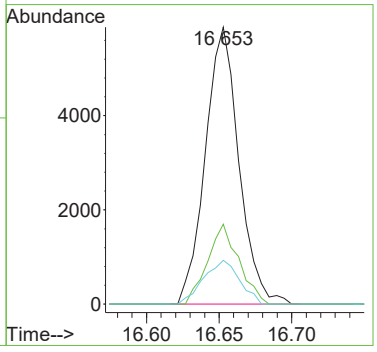


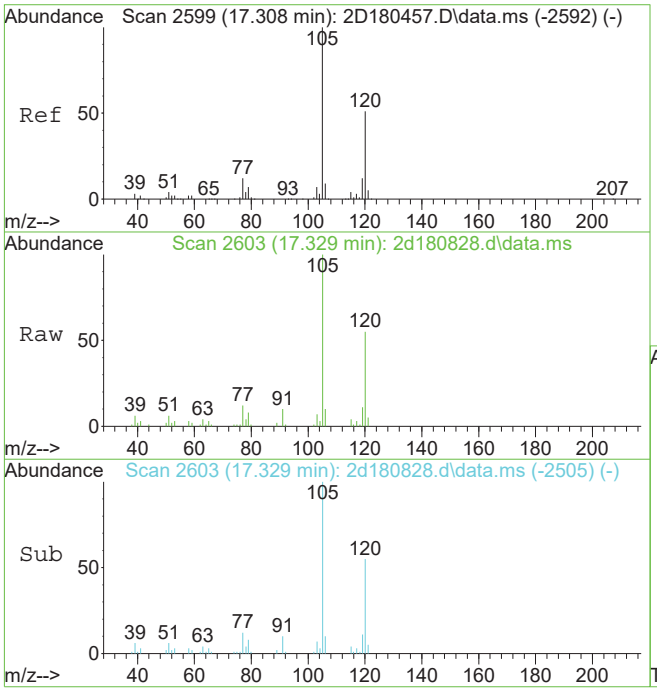


#96
isopropylbenzene
Concen: 0.36 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:105 Resp: 9446

Ion	Ratio	Lower	Upper
105	100		
120	28.8	6.7	46.7
77	15.8	0.0	34.2

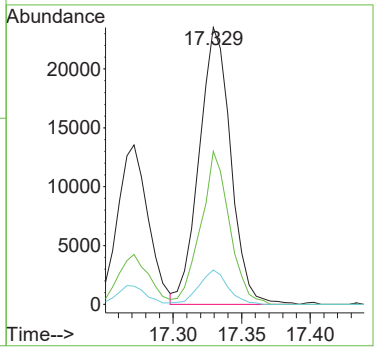


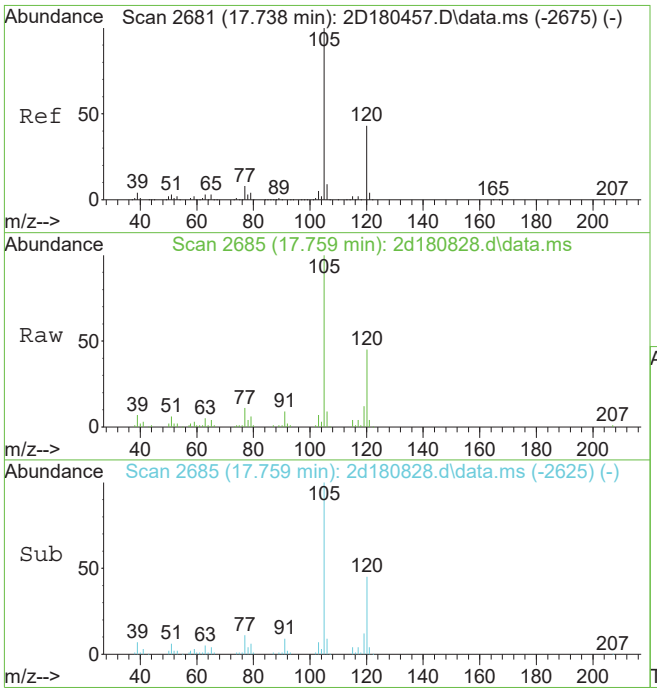


#107
1,3,5-trimethylbenzene
Concen: 1.68 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:105 Resp: 37688

Ion	Ratio	Lower	Upper
105	100		
120	55.2	20.7	80.7
77	12.5	0.0	42.0

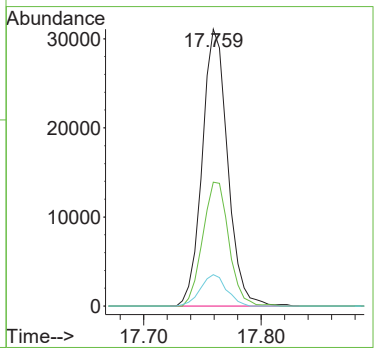


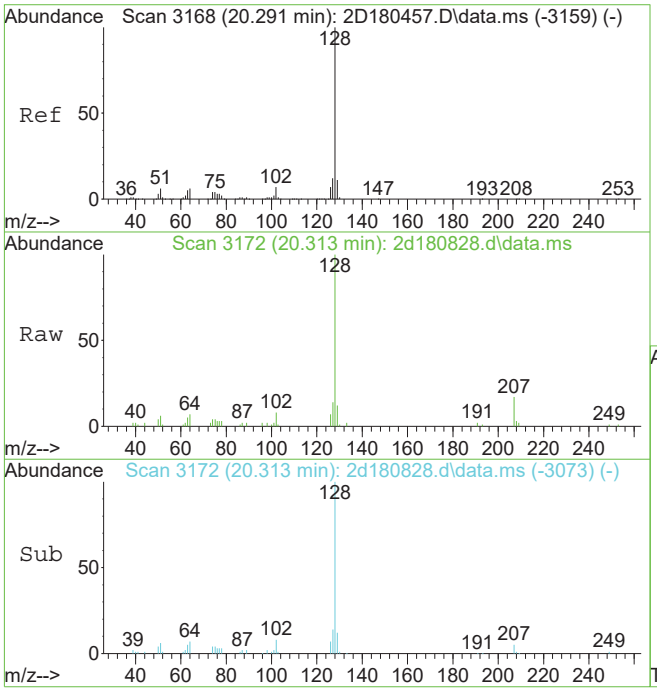


#109
1,2,4-trimethylbenzene
Concen: 2.05 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:105 Resp: 46858

Ion	Ratio	Lower	Upper
105	100		
120	44.7	16.7	76.7
77	11.4	0.0	41.8

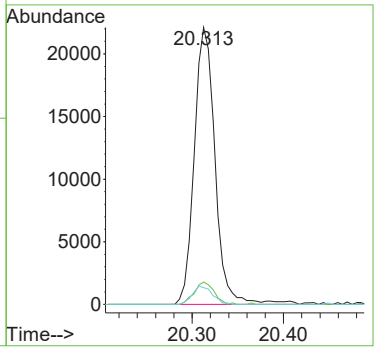




#121
naphthalene
Concen: 1.82 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:128 Resp: 35018

Ion	Ratio	Lower	Upper
128	100		
102	8.0	0.0	37.5
51	6.0	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180871.d
Acq On : 10 Jan 2019 2:48 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 15 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:02 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

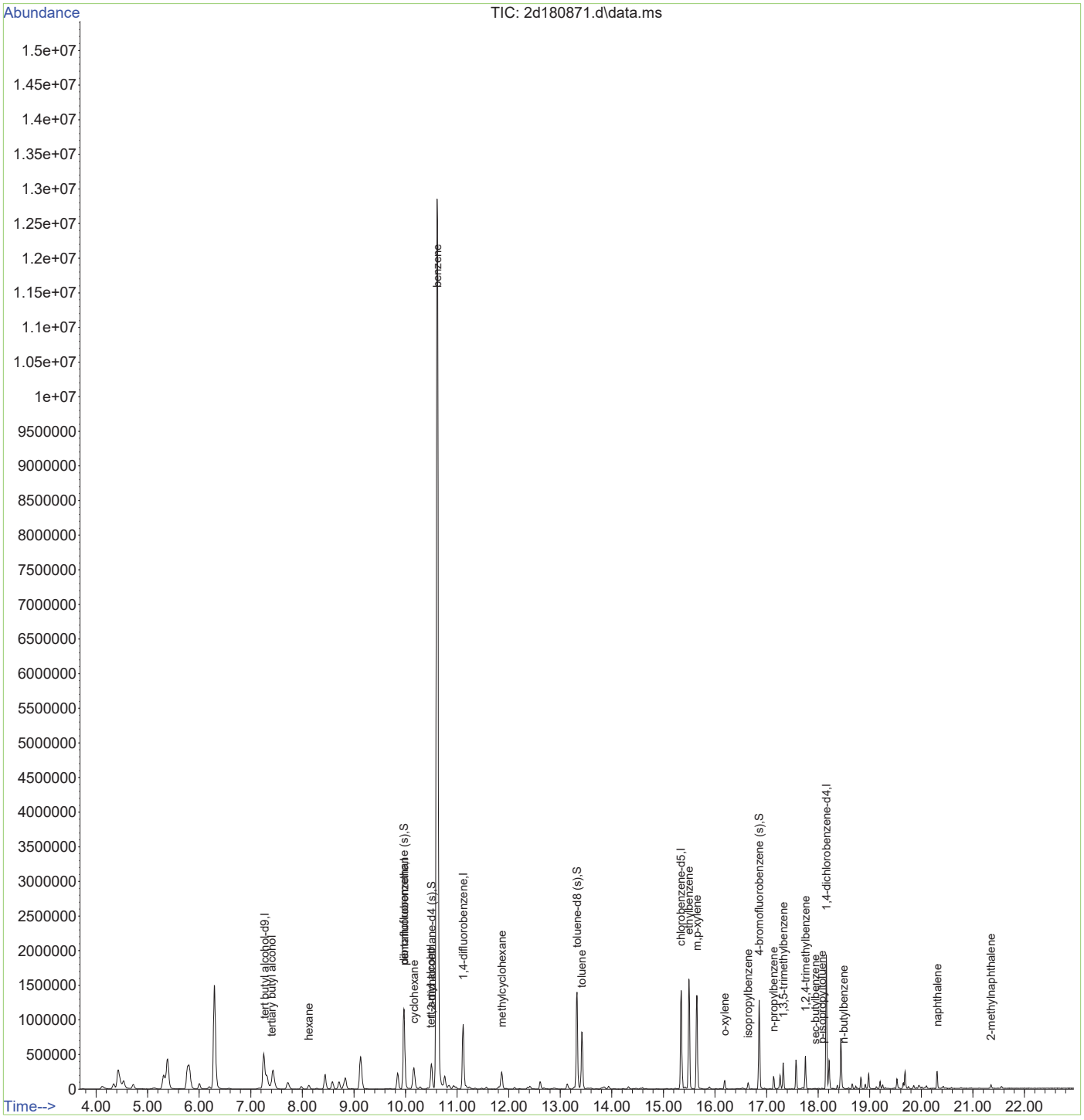
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.268	65	246230	500.00	ug/L	0.01
5) pentafluorobenzene	9.973	168	732659	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	946716	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	938628	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	511895	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	297270	48.92	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.84%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	301546	51.82	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 103.64%			
75) toluene-d8 (s)	13.323	98	1103640	48.88	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.76%			
99) 4-bromofluorobenzene (s)	16.857	95	426088	46.95	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.90%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.399	59	8420	17.63	ug/L #	1
28) hexane	8.122	57	38963	4.63	ug/L	97
47) cyclohexane	10.162	84	174297	22.97	ug/L #	54
51) tert-amyl alcohol	10.487	73	19190	84.85	ug/L	94
54) benzene	10.613	78	15788047	766.10	ug/L	100
68) methylcyclohexane	11.866	83	132820	14.69	ug/L	96
76) toluene	13.418	92	415702	31.46	ug/L	99
89) ethylbenzene	15.494	91	1301743	51.69	ug/L	99
90) m,p-xylene	15.646	91	884138	46.18	ug/L	99
91) o-xylene	16.186	106	36644	3.78	ug/L	99
96) isopropylbenzene	16.642	105	54211	2.15	ug/L	99
104) n-propylbenzene	17.135	91	147146	4.86	ug/L	96
107) 1,3,5-trimethylbenzene	17.324	105	210520	9.78	ug/L	100
109) 1,2,4-trimethylbenzene	17.754	105	258177	11.81	ug/L	97
110) sec-butylbenzene	17.943	105	6709	0.24	ug/L	93
112) p-isopropyltoluene	18.074	119	6094	0.26	ug/L	98
116) n-butylbenzene	18.493	92	4797	0.42	ug/L	92
121) naphthalene	20.307	128	194988	10.59	ug/L	99
126) 2-methylnaphthalene	21.351	142	25808	4.71	ug/L	95

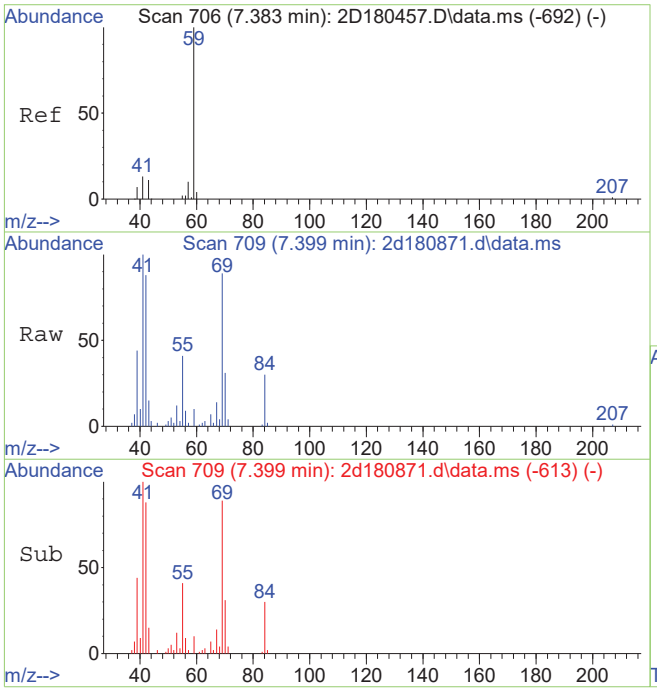
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180871.d
Acq On : 10 Jan 2019 2:48 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 15 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:02 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

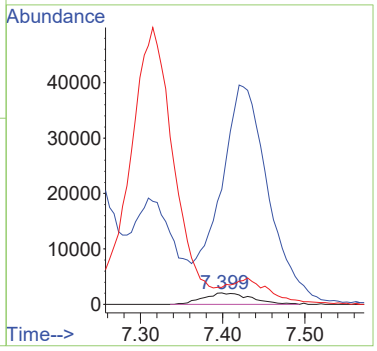


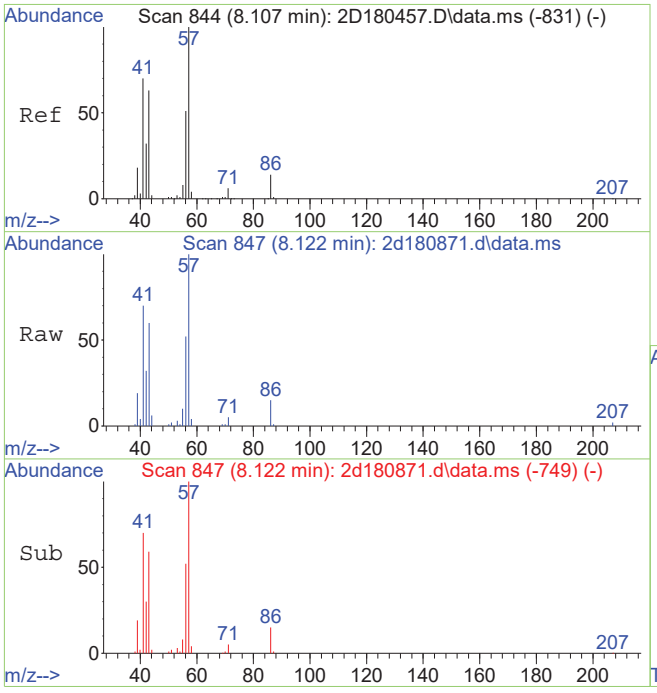


#2
tertiary butyl alcohol
Concen: 17.63 ug/L
RT: 7.399 min Scan# 709
Delta R.T. 0.005 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 59 Resp: 8420

Ion	Ratio	Lower	Upper
59	100		
41	803.5	0.0	45.0#
43	114.2	0.0	40.6#

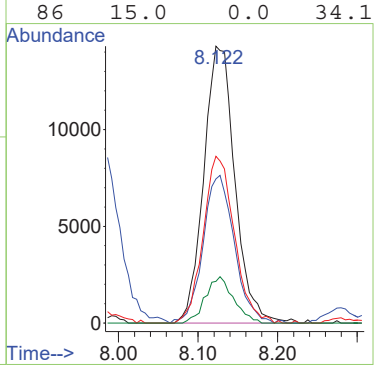


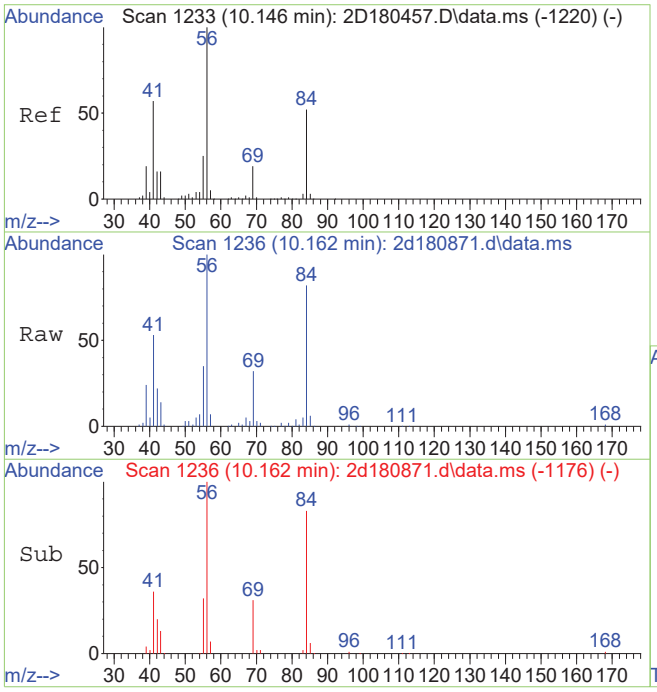


#28
hexane
Concen: 4.63 ug/L
RT: 8.122 min Scan# 847
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 57 Resp: 38963

Ion	Ratio	Lower	Upper
57	100		
56	52.1	30.6	70.6
43	60.2	43.2	83.2
86	15.0	0.0	34.1

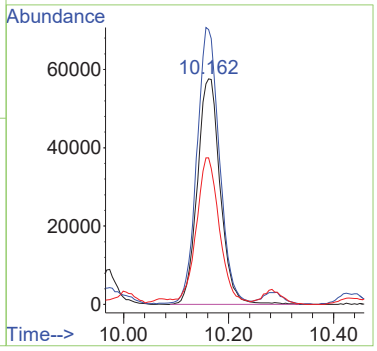


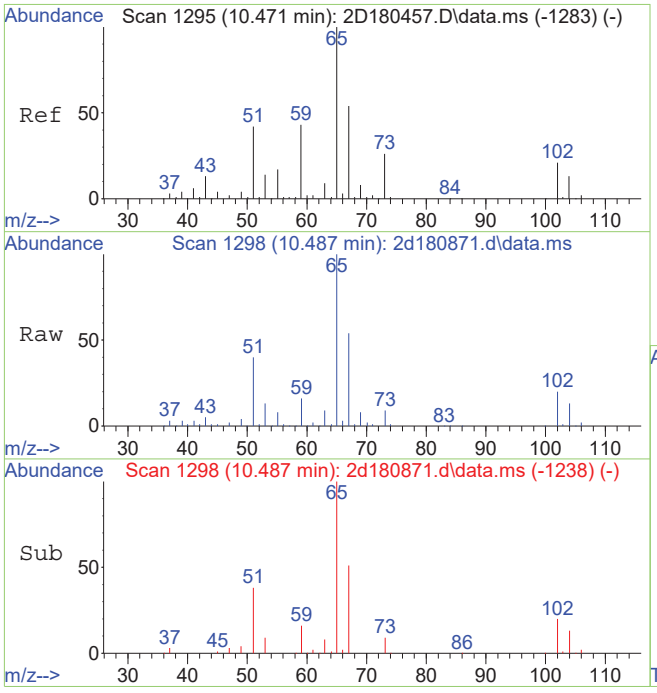


#47
cyclohexane
Concen: 22.97 ug/L
RT: 10.162 min Scan# 1236
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 84 Resp: 174297

Ion	Ratio	Lower	Upper
84	100		
56	121.6	163.0	223.0#
41	64.6	79.6	139.6#

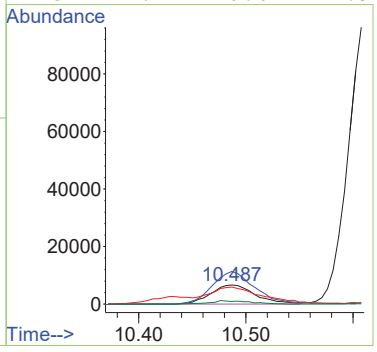


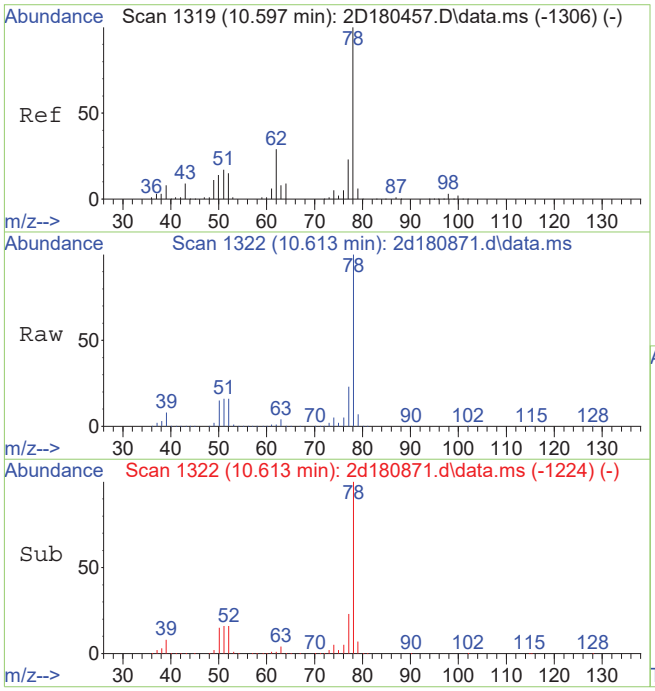


#51
tert-amyl alcohol
Concen: 84.85 ug/L
RT: 10.487 min Scan# 1298
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 73 Resp: 19190

Ion	Ratio	Lower	Upper
73	100		
59	169.8	145.1	185.1
55	76.5	46.9	86.9
45	14.1	0.0	44.9

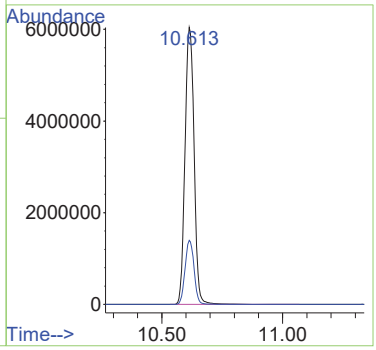


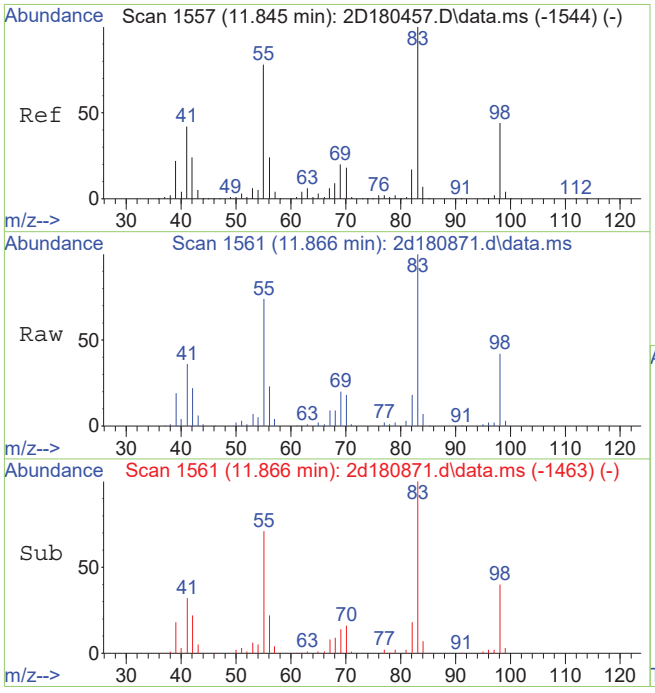


#54
benzene
Concen: 766.10 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 78 Resp:15788047

Ion	Ratio	Lower	Upper
78	100		
77	23.1	0.0	53.2

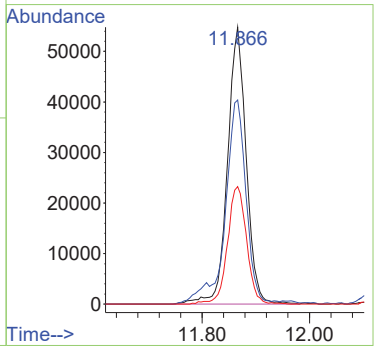


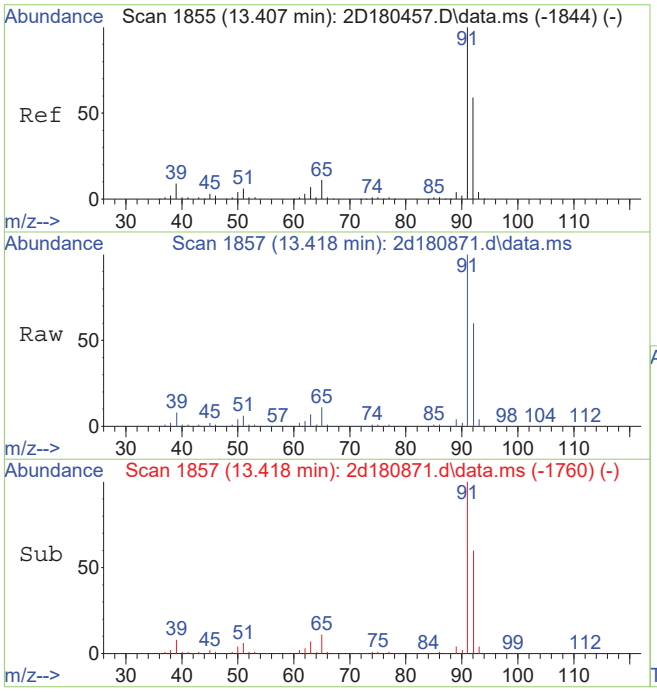


#68
methylcyclohexane
Concen: 14.69 ug/L
RT: 11.866 min Scan# 1561
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 83 Resp: 132820

Ion	Ratio	Lower	Upper
83	100		
55	73.7	47.8	107.8
98	42.4	13.7	73.7

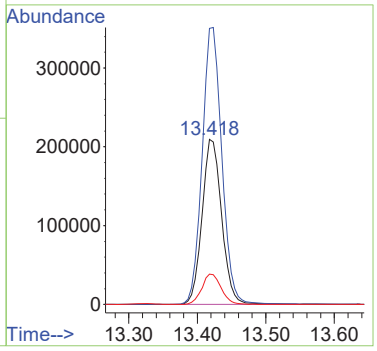


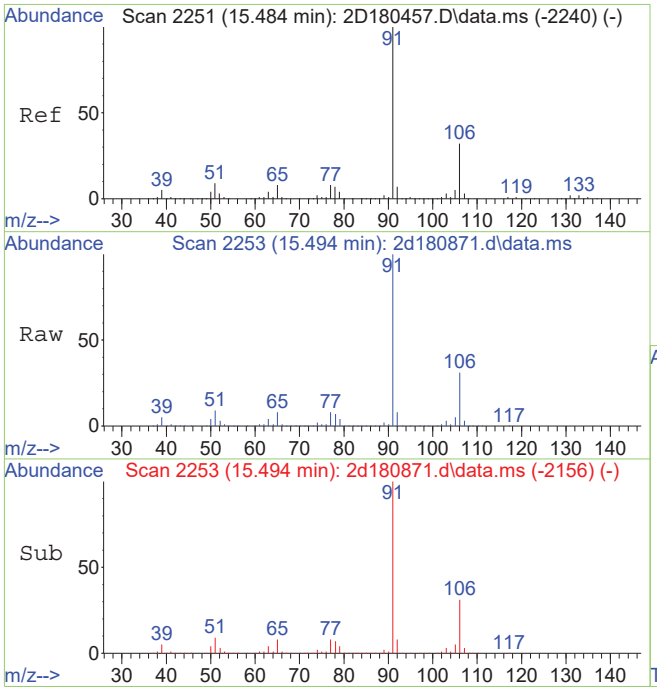


#76
toluene
Concen: 31.46 ug/L
RT: 13.418 min Scan# 1857
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 92 Resp: 415702

Ion	Ratio	Lower	Upper
92	100		
91	167.2	148.1	188.1
65	18.4	0.0	38.8

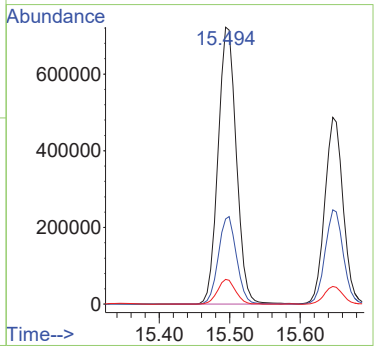


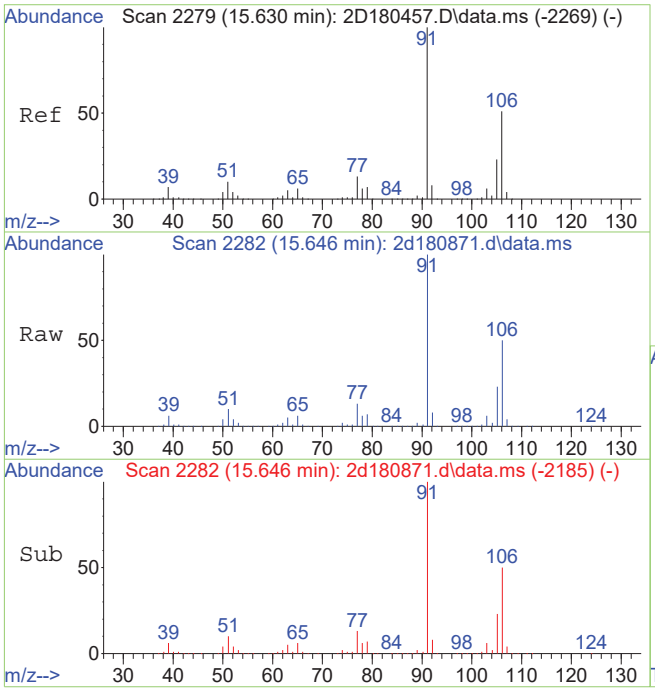


#89
ethylbenzene
Concen: 51.69 ug/L
RT: 15.494 min Scan# 2253
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 91 Resp: 1301743

Ion	Ratio	Lower	Upper
91	100		
106	30.7	1.6	61.6
51	9.0	0.0	39.0

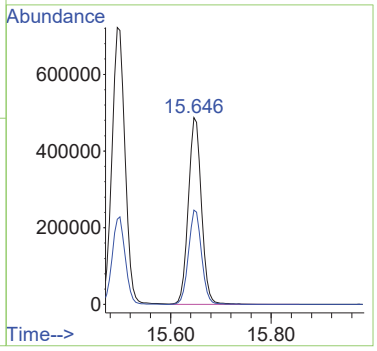


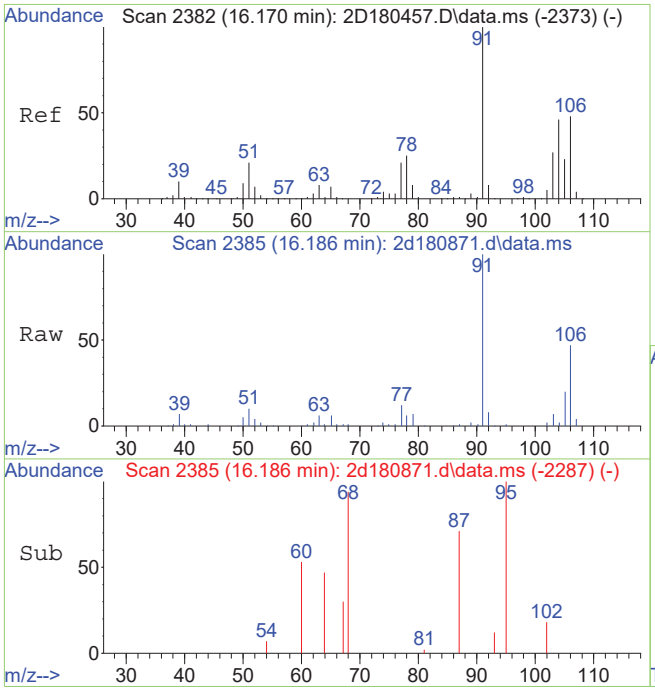


#90
m,p-xylene
Concen: 46.18 ug/L
RT: 15.646 min Scan# 2282
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 91 Resp: 884138

Ion	Ratio	Lower	Upper
91	100		
106	50.5	21.1	81.1

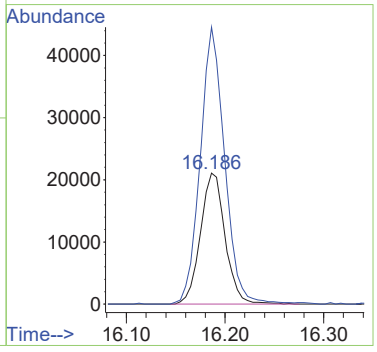


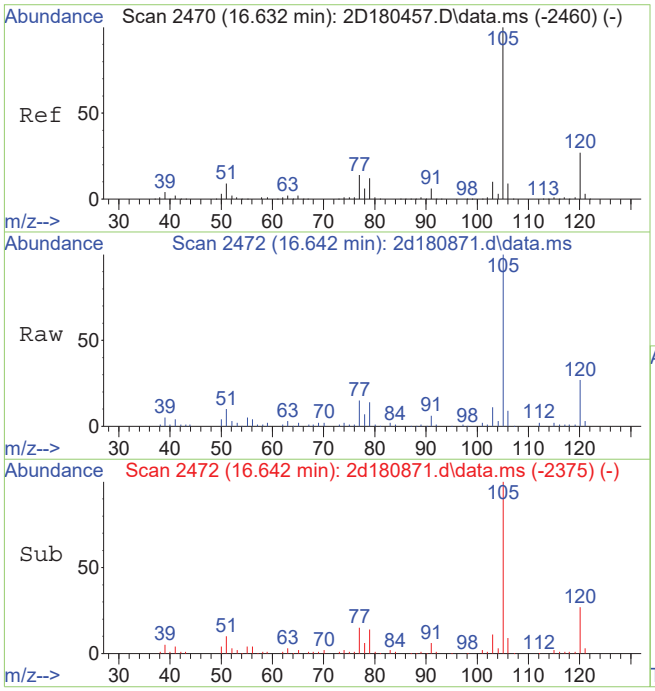


#91
o-xylene
Concen: 3.78 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:106 Resp: 36644

Ion	Ratio	Lower	Upper
106	100		
91	211.3	179.9	239.9

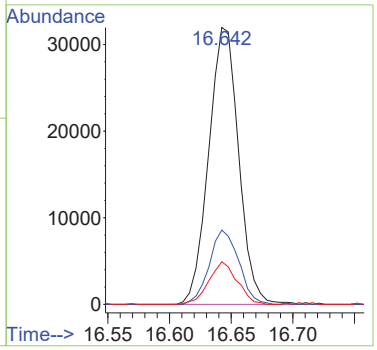


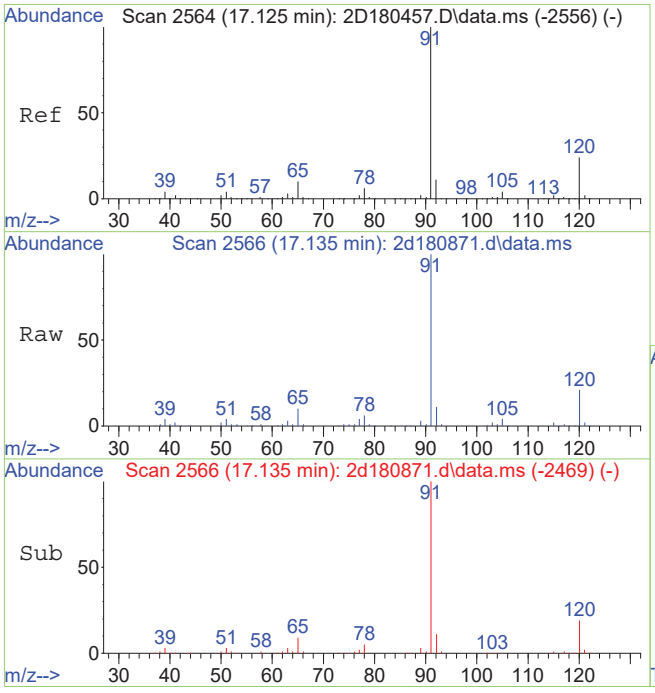


#96
isopropylbenzene
Concen: 2.15 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 54211

Ion	Ratio	Lower	Upper
105	100		
120	26.8	6.7	46.7
77	15.4	0.0	34.2

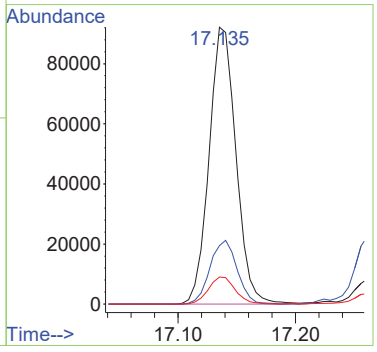


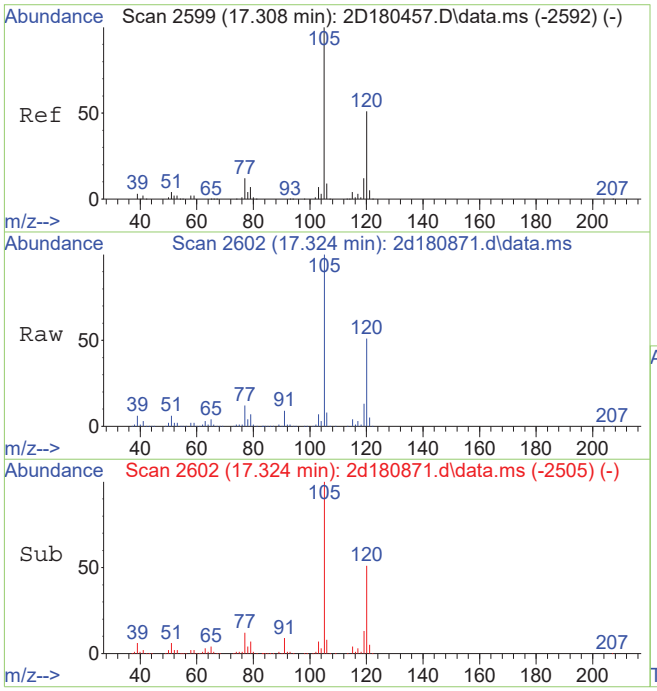


#104
n-propylbenzene
Concen: 4.86 ug/L
RT: 17.135 min Scan# 2566
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 91 Resp: 147146

Ion	Ratio	Lower	Upper
91	100		
120	21.1	0.0	53.6
65	9.8	0.0	39.5

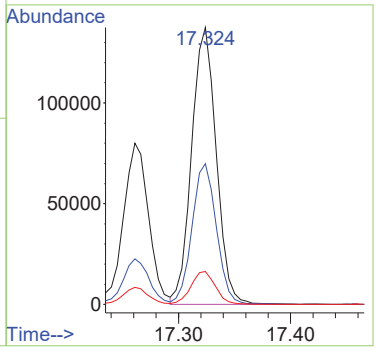


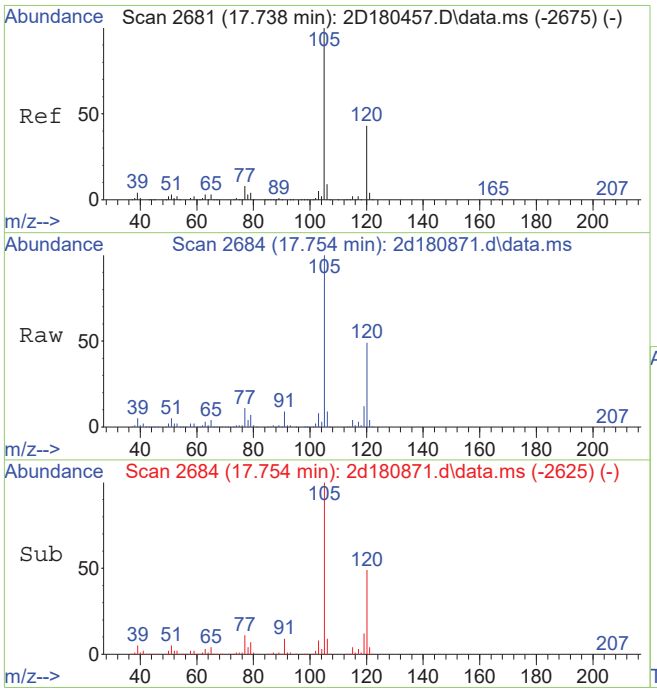


#107
1,3,5-trimethylbenzene
Concen: 9.78 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 210520

Ion	Ratio	Lower	Upper
105	100		
120	50.8	20.7	80.7
77	11.9	0.0	42.0

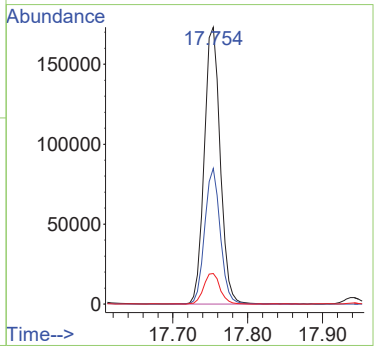


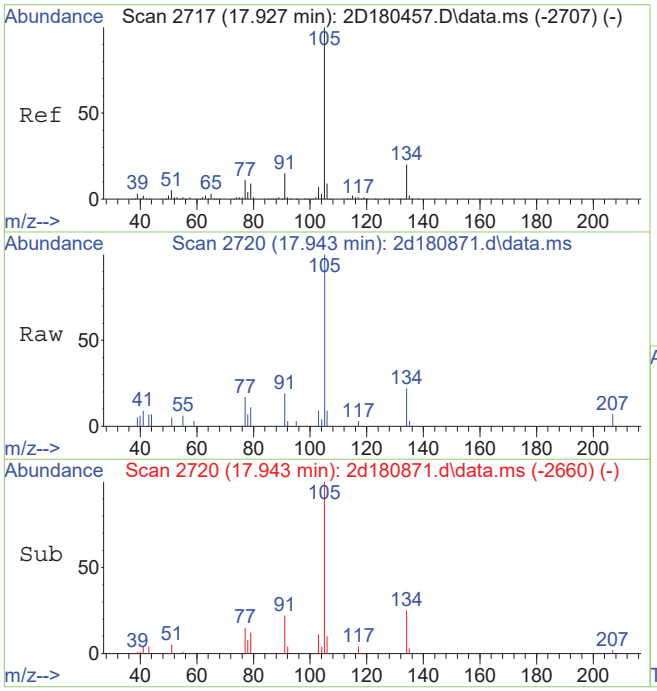


#109
1,2,4-trimethylbenzene
Concen: 11.81 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 258177

Ion	Ratio	Lower	Upper
105	100		
120	49.0	16.7	76.7
77	11.0	0.0	41.8

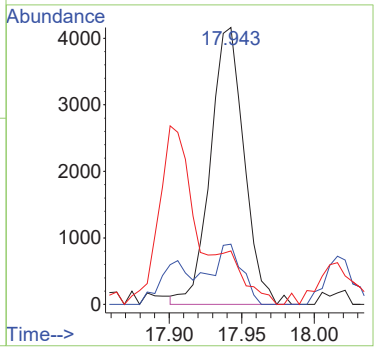


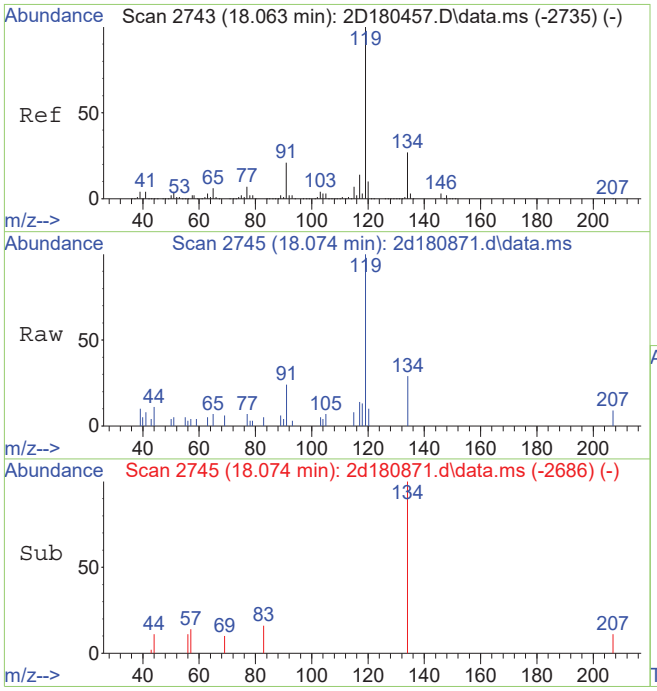


#110
sec-butylbenzene
Concen: 0.24 ug/L
RT: 17.943 min Scan# 2720
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 6709

Ion	Ratio	Lower	Upper
105	100		
134	21.7	0.0	49.8
91	19.4	0.0	44.9

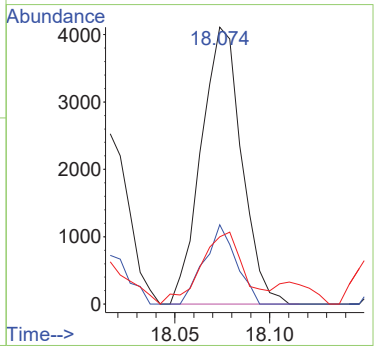


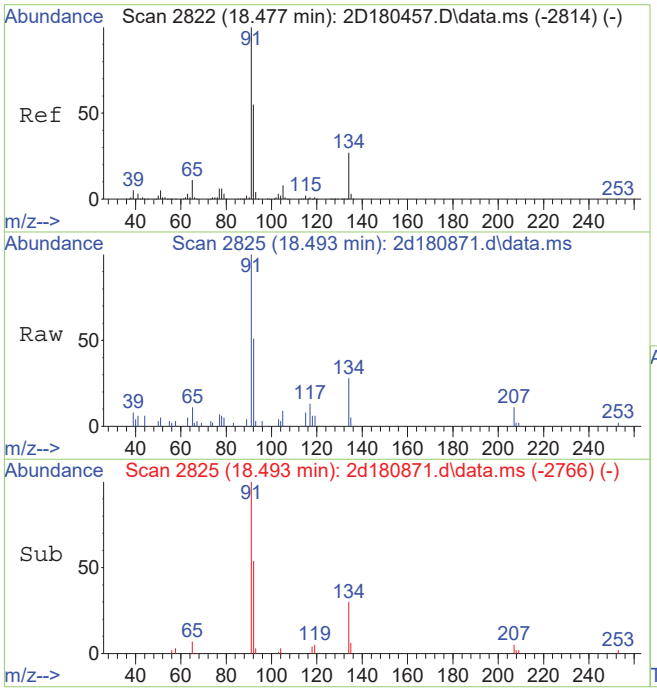


#112
p-isopropyltoluene
Concen: 0.26 ug/L
RT: 18.074 min Scan# 2745
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:119 Resp: 6094

Ion	Ratio	Lower	Upper
119	100		
134	28.6	0.0	57.4
91	20.6	0.0	51.5

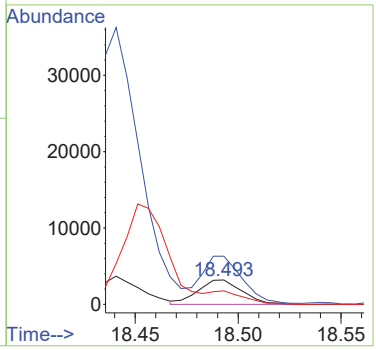


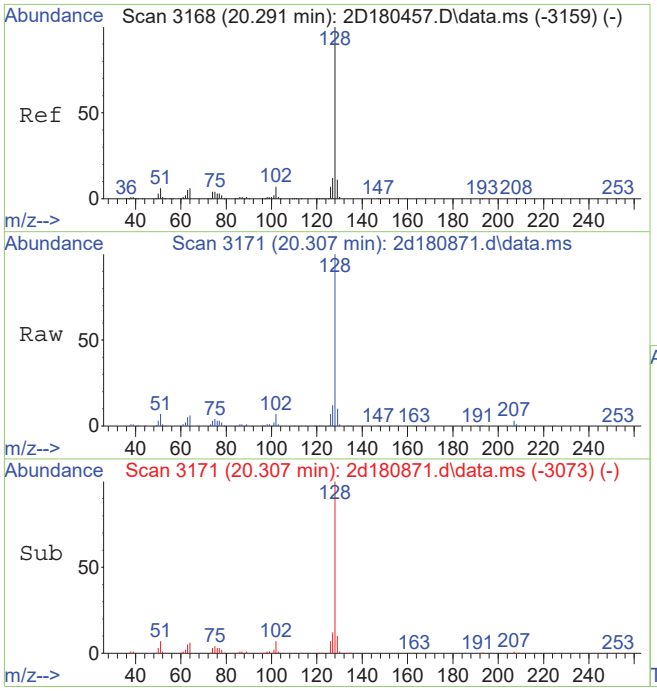


#116
n-butylbenzene
Concen: 0.42 ug/L
RT: 18.493 min Scan# 2825
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 92 Resp: 4797

Ion	Ratio	Lower	Upper
92	100		
91	192.0	151.0	211.0
134	54.9	18.3	78.3

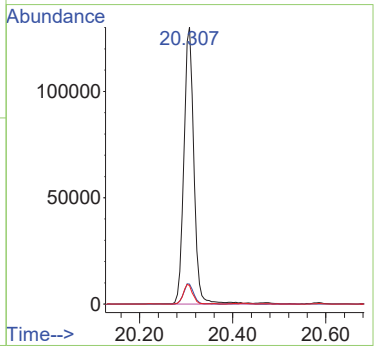


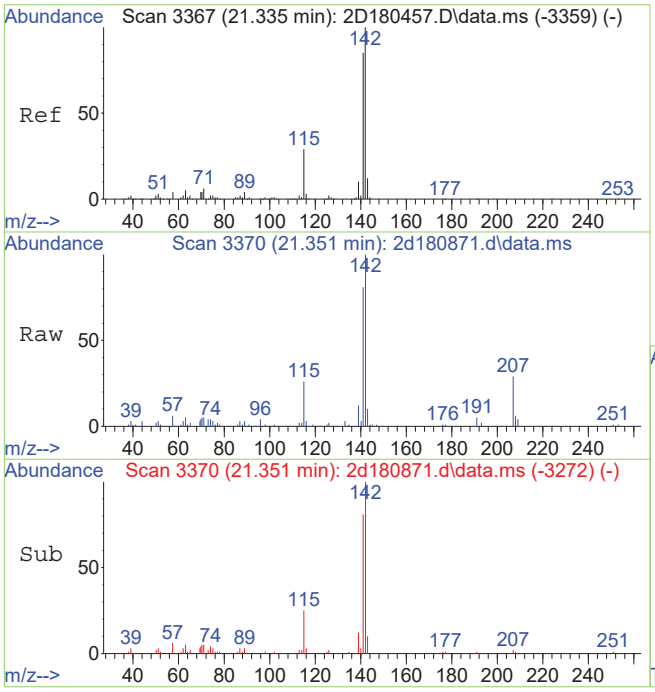


#121
naphthalene
Concen: 10.59 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:128 Resp: 194988

Ion	Ratio	Lower	Upper
128	100		
102	7.3	0.0	37.5
51	6.7	0.0	36.4

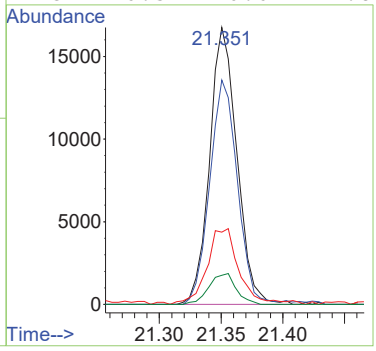




#126
2-methylnaphthalene
Concen: 4.71 ug/L
RT: 21.351 min Scan# 3370
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:142 Resp: 25808

Ion	Ratio	Lower	Upper
142	100		
141	81.0	65.4	105.4
115	26.1	0.0	58.6
143	10.5	0.0	41.8



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180821.d
Acq On : 9 Jan 2019 12:44 pm
Operator : EddieH
Sample : JC80990-7 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 11 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:35:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

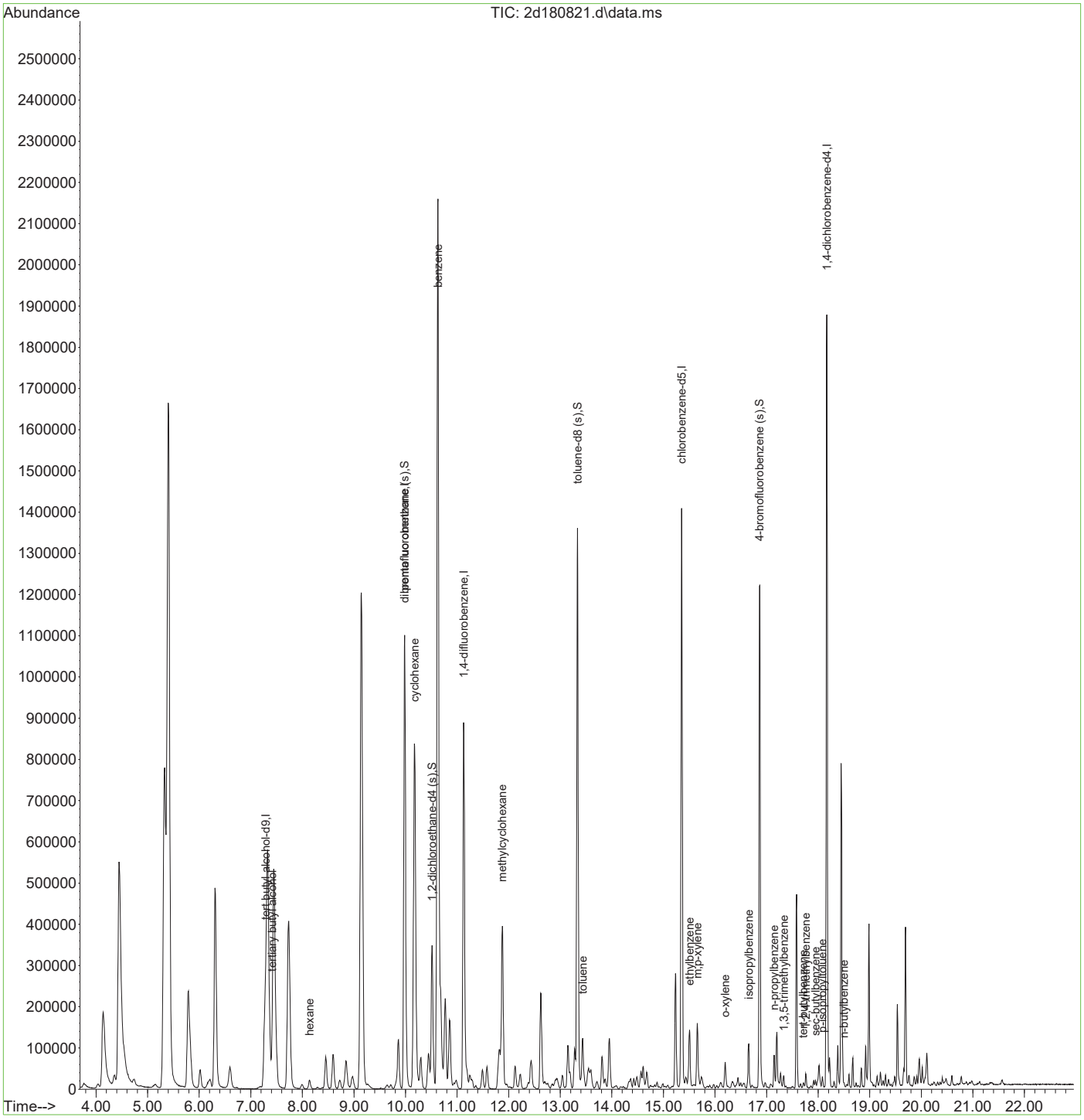
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.289	65	231471	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	685778	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	918048	50.00	ug/L	0.03
74) chlorobenzene-d5	15.352	117	905254	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.168	152	496790	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	283960	49.92	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.84%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	285336	50.56	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 101.12%			
75) toluene-d8 (s)	13.334	98	1057061	48.54	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.08%			
99) 4-bromofluorobenzene (s)	16.863	95	414359	47.05	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.10%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.415	59	2946	6.56	ug/L #	1
28) hexane	8.138	57	14663	1.86	ug/L	96
47) cyclohexane	10.178	84	477638	67.25	ug/L #	55
54) benzene	10.629	78	2423401	121.27	ug/L	100
68) methylcyclohexane	11.876	83	210365	24.00	ug/L	96
76) toluene	13.434	92	56543	4.44	ug/L	99
89) ethylbenzene	15.505	91	93833	3.86	ug/L	99
90) m,p-xylene	15.657	91	103955	5.63	ug/L	95
91) o-xylene	16.197	106	17125	1.83	ug/L	97
96) isopropylbenzene	16.653	105	70913	2.92	ug/L	99
104) n-propylbenzene	17.146	91	64087	2.18	ug/L	97
107) 1,3,5-trimethylbenzene	17.334	105	14391	0.69	ug/L	92
108) tert-butylbenzene	17.712	119	4636	0.25	ug/L	98
109) 1,2,4-trimethylbenzene	17.759	105	17095	0.81	ug/L	100
110) sec-butylbenzene	17.948	105	11507	0.42	ug/L	97
112) p-isopropyltoluene	18.079	119	13650	0.59	ug/L	95
116) n-butylbenzene	18.498	92	2766	0.25	ug/L	88

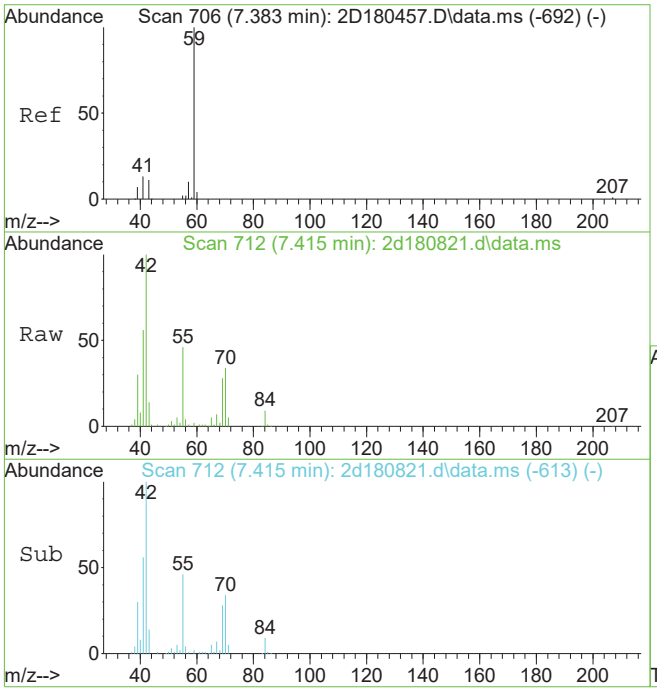
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180821.d
Acq On : 9 Jan 2019 12:44 pm
Operator : EddieH
Sample : JC80990-7 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 11 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:35:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

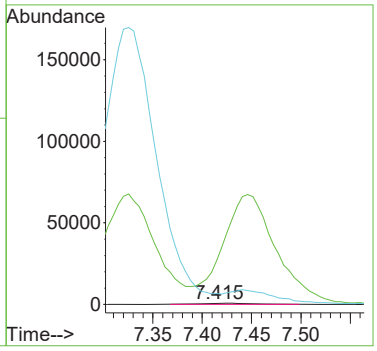


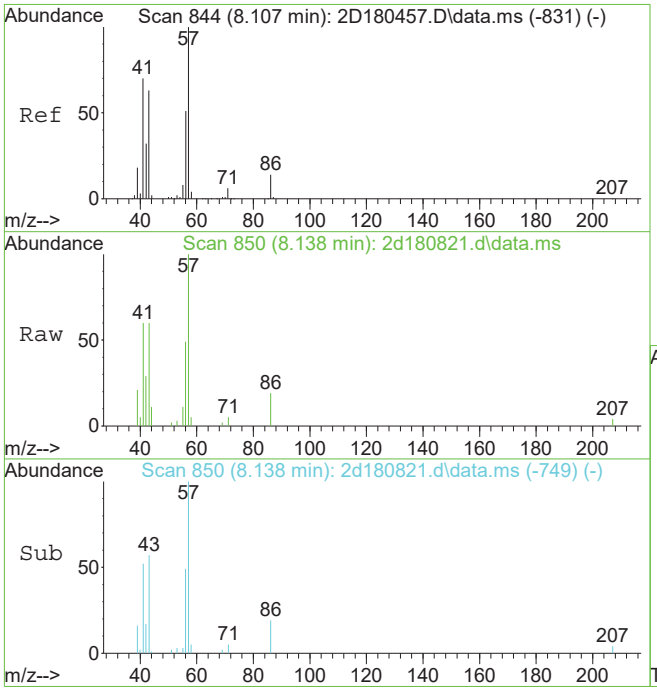


#2
tertiary butyl alcohol
Concen: 6.56 ug/L
RT: 7.415 min Scan# 712
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 59 Resp: 2946

Ion	Ratio	Lower	Upper
59	100		
41	1517.0	0.0	45.0#
43	546.3	0.0	40.6#

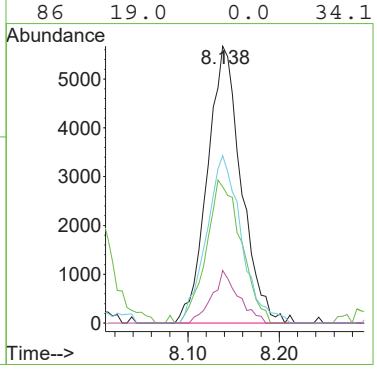


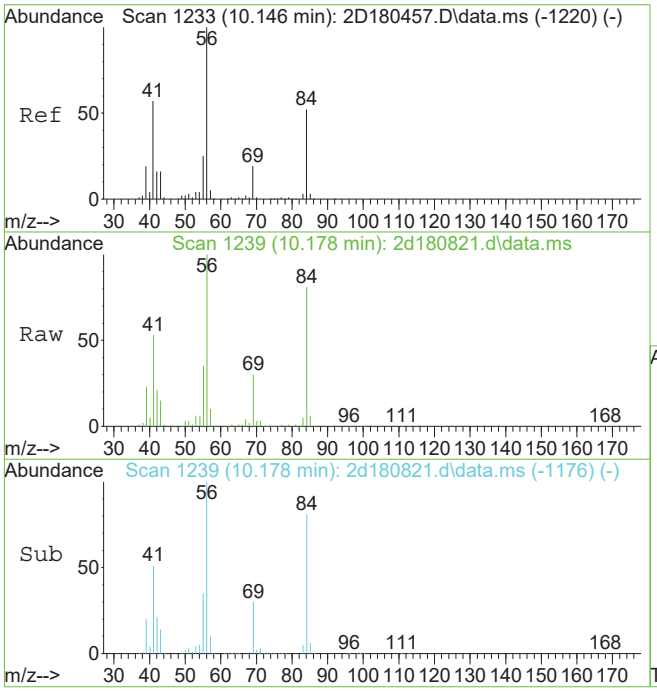


#28
hexane
Concen: 1.86 ug/L
RT: 8.138 min Scan# 850
Delta R.T. 0.031 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 57 Resp: 14663

Ion	Ratio	Lower	Upper
57	100		
56	49.2	30.6	70.6
43	60.4	43.2	83.2
86	19.0	0.0	34.1

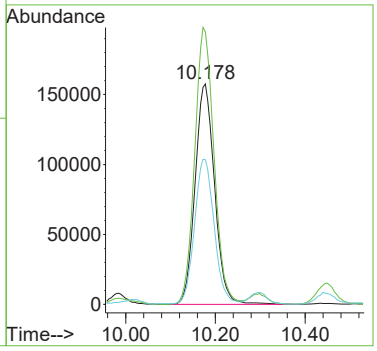


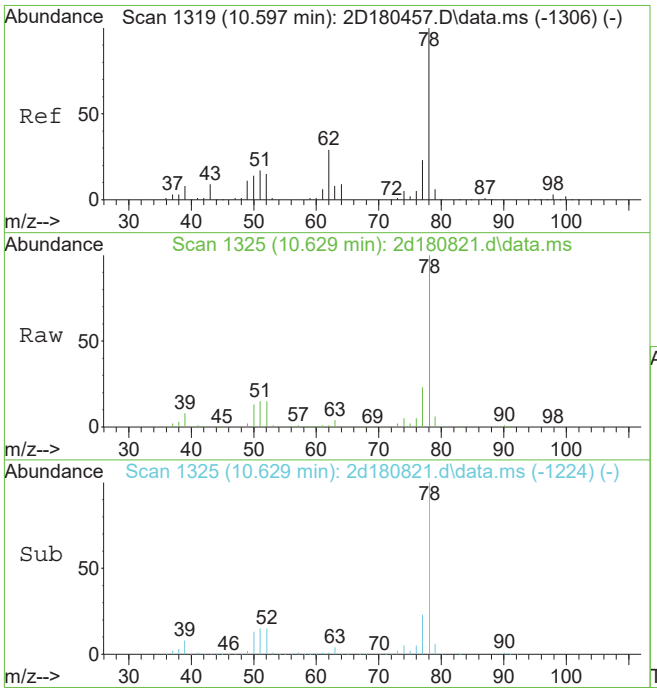


#47
cyclohexane
Concen: 67.25 ug/L
RT: 10.178 min Scan# 1239
Delta R.T. 0.031 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 84 Resp: 477638

Ion	Ratio	Lower	Upper
84	100		
56	123.4	163.0	223.0#
41	65.5	79.6	139.6#

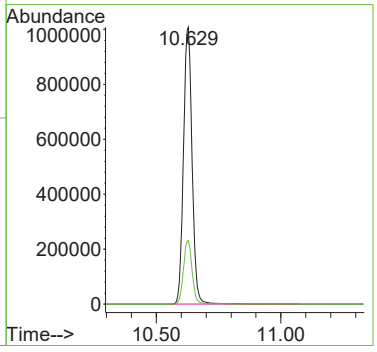


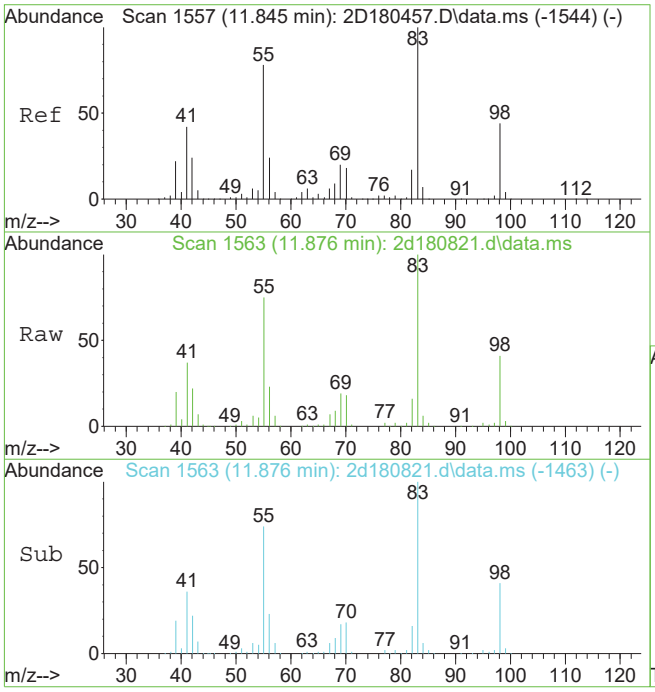


#54
benzene
Concen: 121.27 ug/L
RT: 10.629 min Scan# 1325
Delta R.T. 0.031 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 78 Resp: 2423401

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

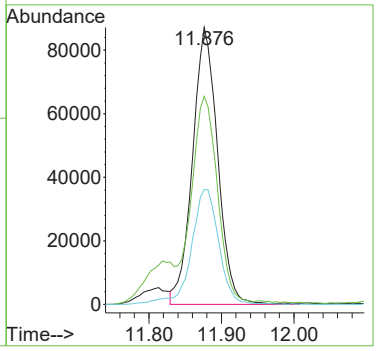


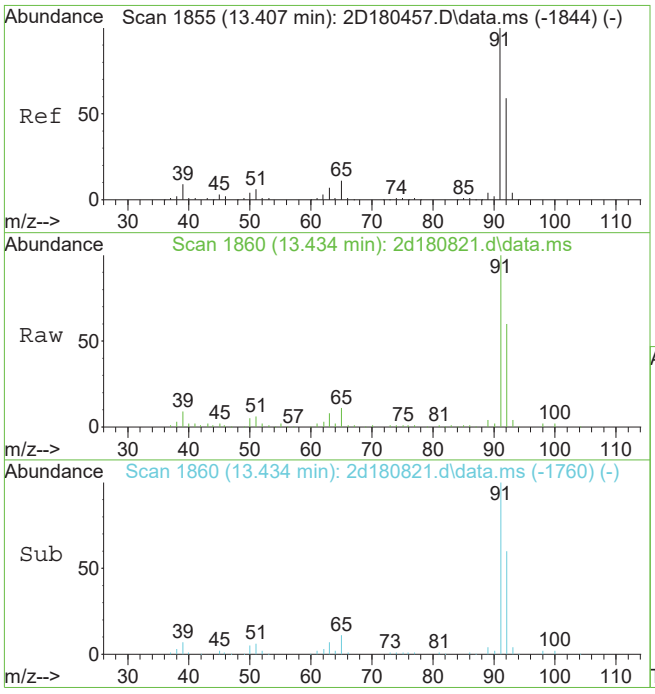


#68
methylcyclohexane
Concen: 24.00 ug/L
RT: 11.876 min Scan# 1563
Delta R.T. 0.026 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 83 Resp: 210365

Ion	Ratio	Lower	Upper
83	100		
55	74.5	47.8	107.8
98	41.4	13.7	73.7

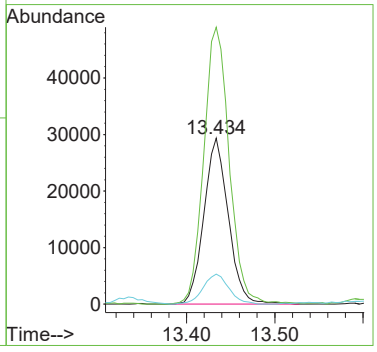


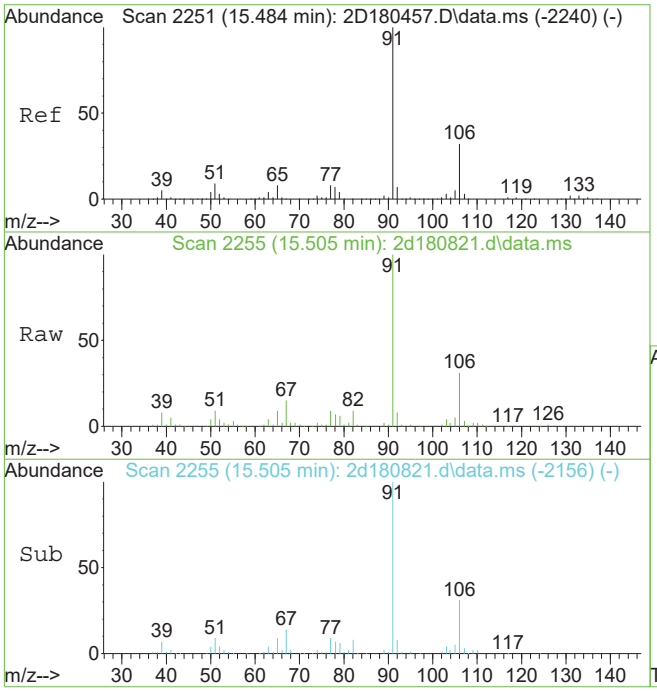


#76
toluene
Concen: 4.44 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 92 Resp: 56543

Ion	Ratio	Lower	Upper
92	100		
91	167.1	148.1	188.1
65	18.1	0.0	38.8

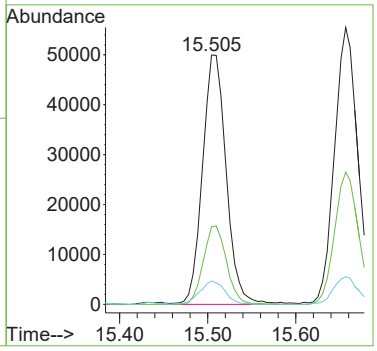


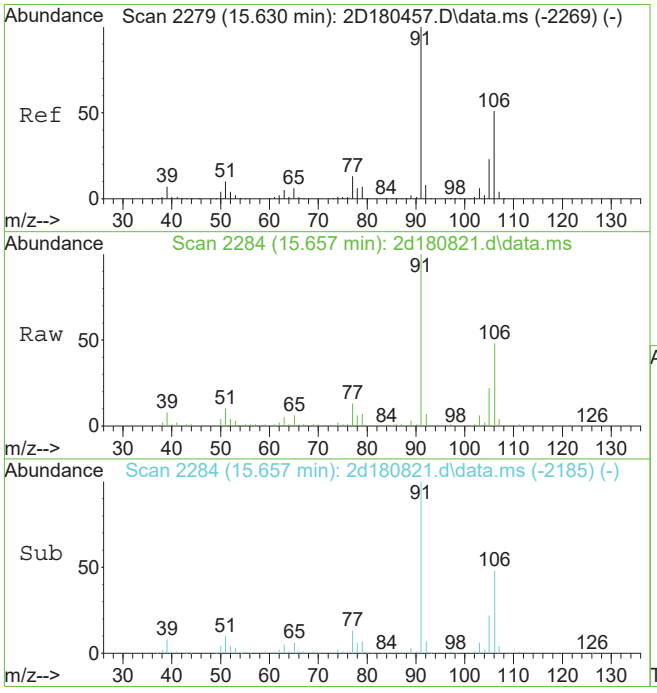


#89
ethylbenzene
Concen: 3.86 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 91 Resp: 93833

Ion	Ratio	Lower	Upper
91	100		
106	31.2	1.6	61.6
51	9.5	0.0	39.0

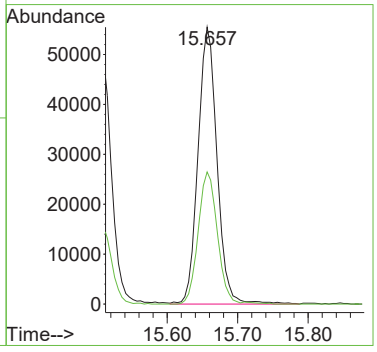


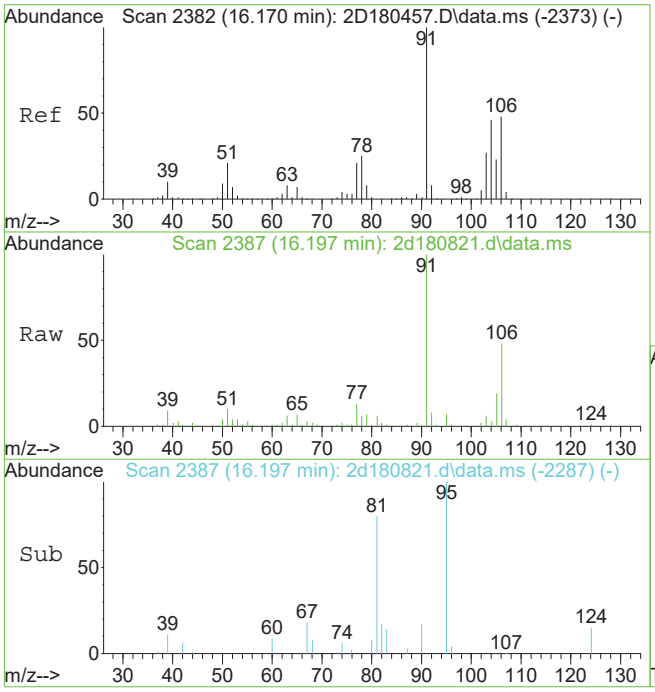


#90
m,p-xylene
Concen: 5.63 ug/L
RT: 15.657 min Scan# 2284
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 91 Resp: 103955

Ion	Ratio	Lower	Upper
91	100		
106	47.7	21.1	81.1

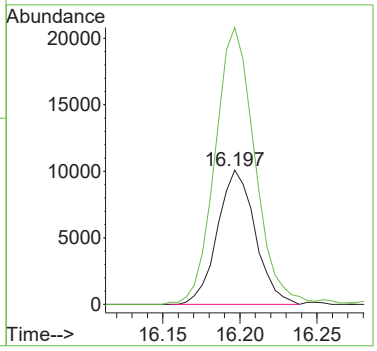


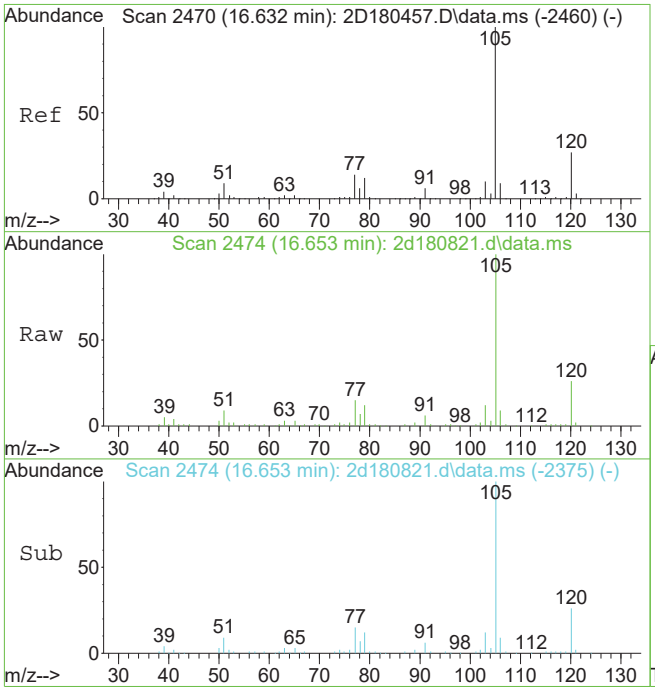


#91
o-xylene
Concen: 1.83 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:106 Resp: 17125

Ion	Ratio	Lower	Upper
106	100		
91	205.1	179.9	239.9

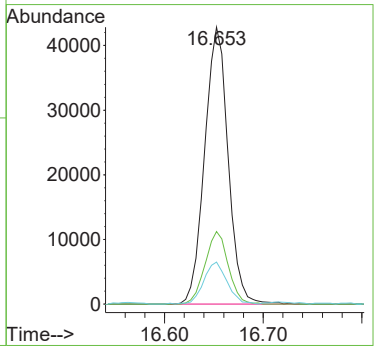


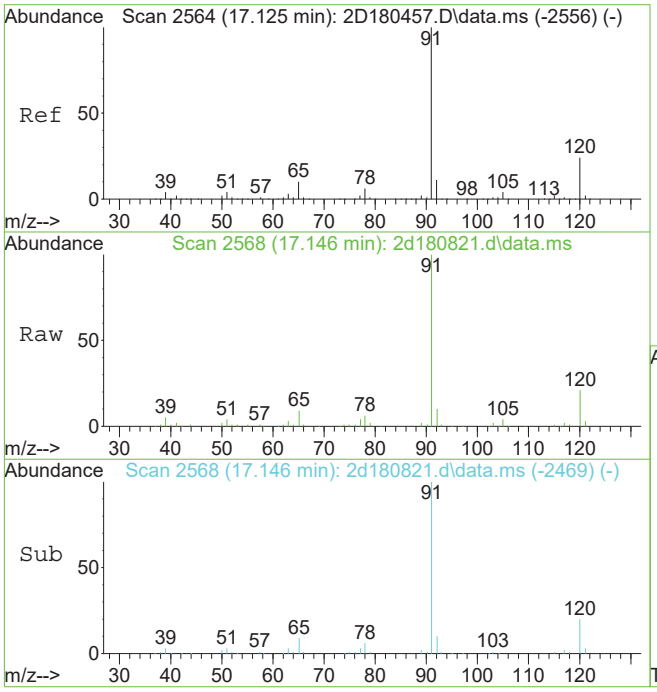


#96
isopropylbenzene
Concen: 2.92 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 70913

Ion	Ratio	Lower	Upper
105	100		
120	26.2	6.7	46.7
77	14.8	0.0	34.2

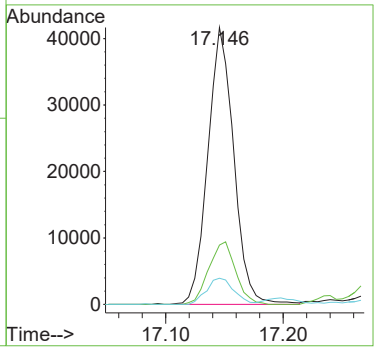


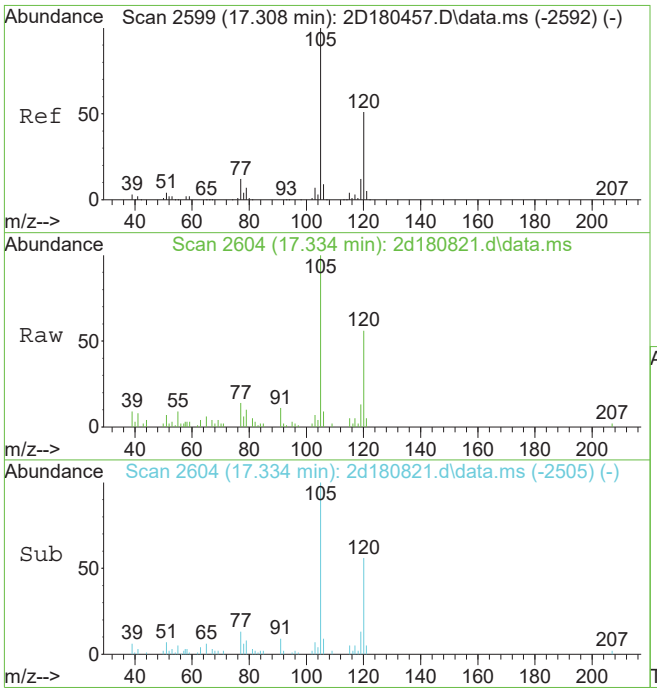


#104
n-propylbenzene
Concen: 2.18 ug/L
RT: 17.146 min Scan# 2568
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 91 Resp: 64087

Ion	Ratio	Lower	Upper
91	100		
120	21.4	0.0	53.6
65	9.5	0.0	39.5

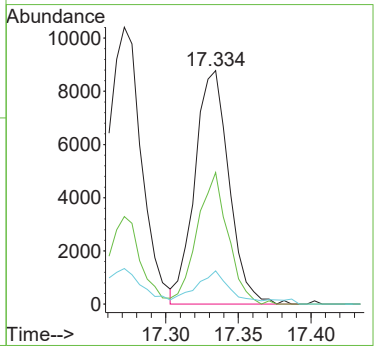


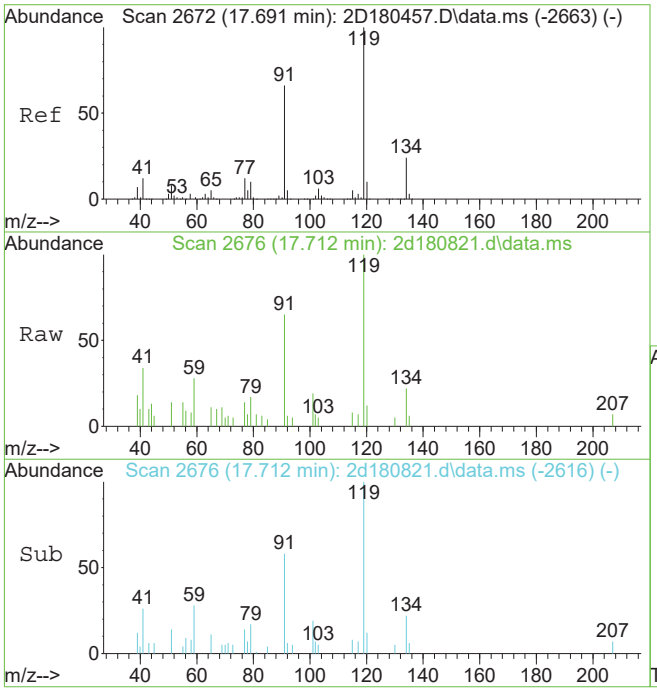


#107
1,3,5-trimethylbenzene
Concen: 0.69 ug/L
RT: 17.334 min Scan# 2604
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 14391

Ion	Ratio	Lower	Upper
105	100		
120	56.4	20.7	80.7
77	14.3	0.0	42.0

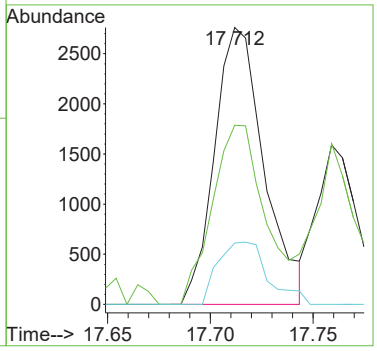


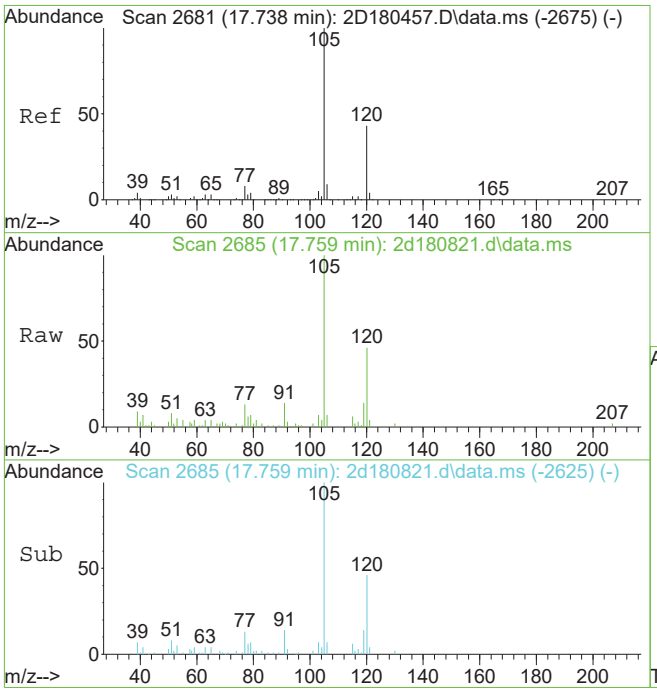


#108
tert-butylbenzene
Concen: 0.25 ug/L
RT: 17.712 min Scan# 2676
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:119 Resp: 4636

Ion	Ratio	Lower	Upper
119	100		
91	64.7	35.6	95.6
134	22.2	0.0	54.0

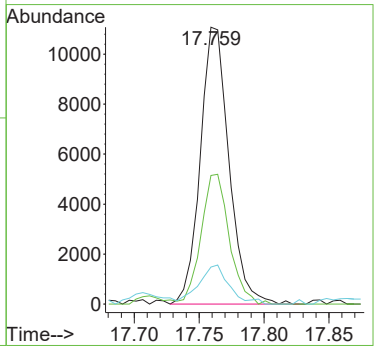


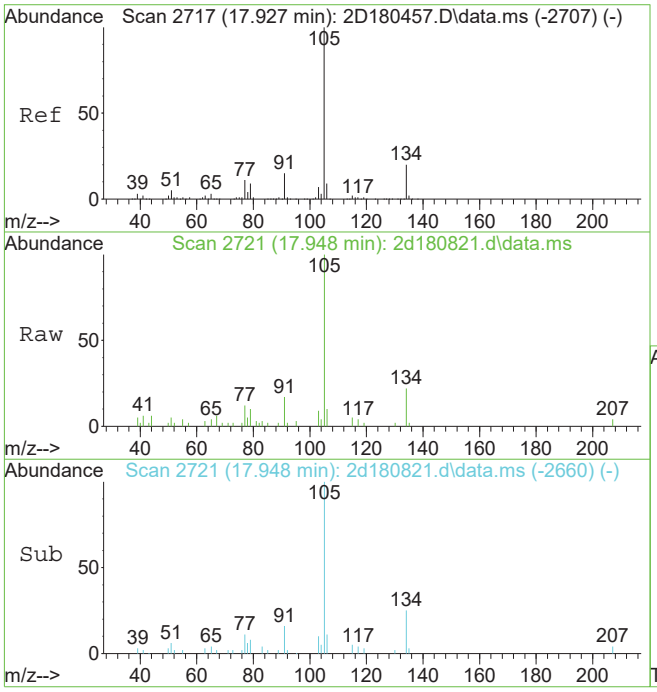


#109
1,2,4-trimethylbenzene
Concen: 0.81 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 17095

Ion	Ratio	Lower	Upper
105	100		
120	46.4	16.7	76.7
77	11.8	0.0	41.8

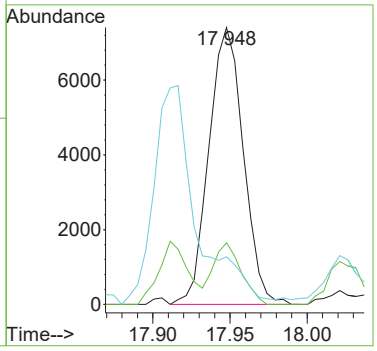


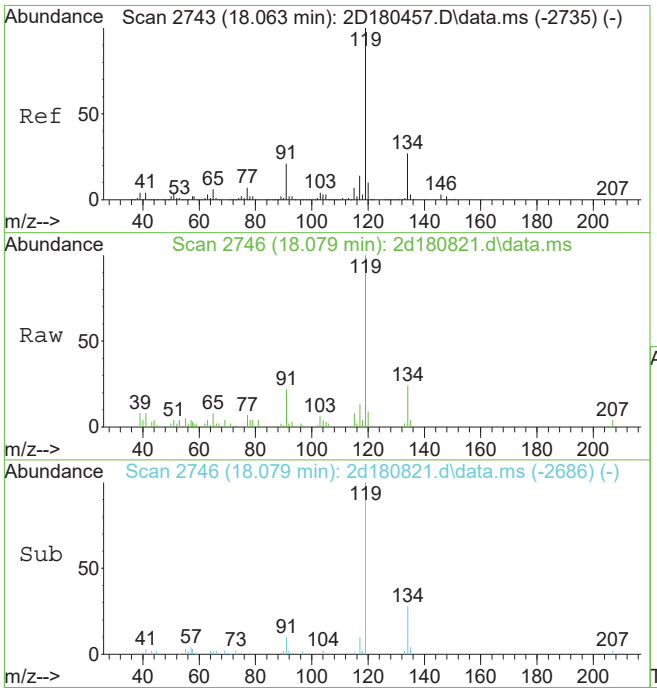


#110
sec-butylbenzene
Concen: 0.42 ug/L
RT: 17.948 min Scan# 2721
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 11507

Ion	Ratio	Lower	Upper
105	100		
134	22.3	0.0	49.8
91	15.1	0.0	44.9

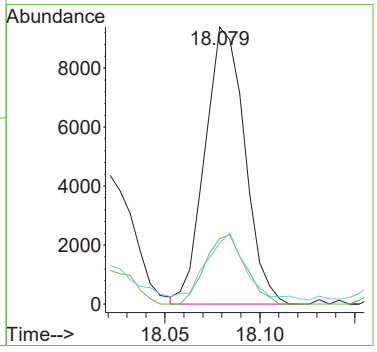


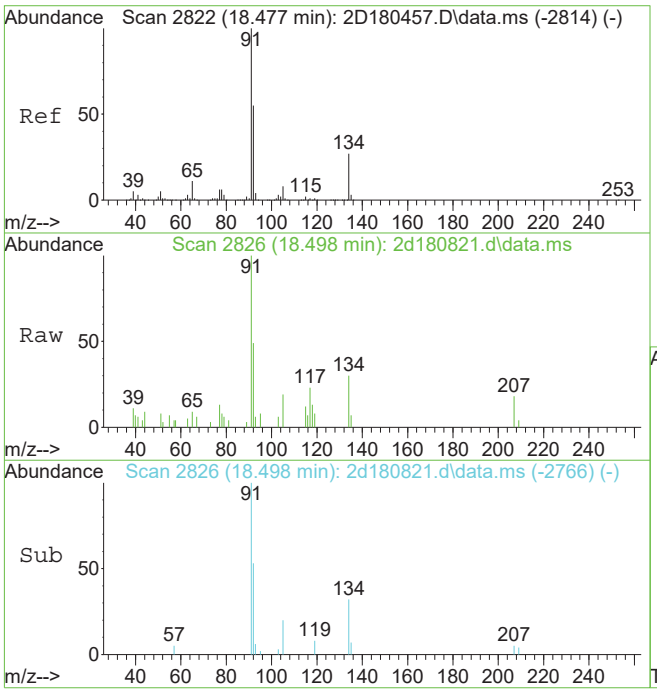


#112
p-isopropyltoluene
Concen: 0.59 ug/L
RT: 18.079 min Scan# 2746
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:119 Resp: 13650

Ion	Ratio	Lower	Upper
119	100		
134	23.6	0.0	57.4
91	20.1	0.0	51.5

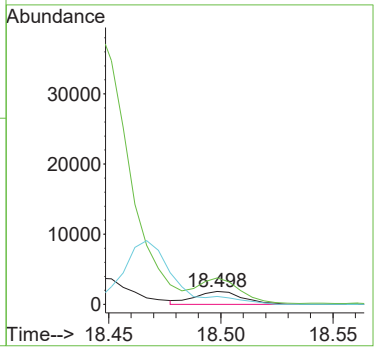




#116
n-butylbenzene
Concen: 0.25 ug/L
RT: 18.498 min Scan# 2826
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 92 Resp: 2766

Ion	Ratio	Lower	Upper
92	100		
91	195.2	151.0	211.0
134	61.3	18.3	78.3



7.1.11

7

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-10-19\janellec\v2d7692\
Data File : 2d180829.d
Acq On : 9 Jan 2019 4:40 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 19 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 19:36:15 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

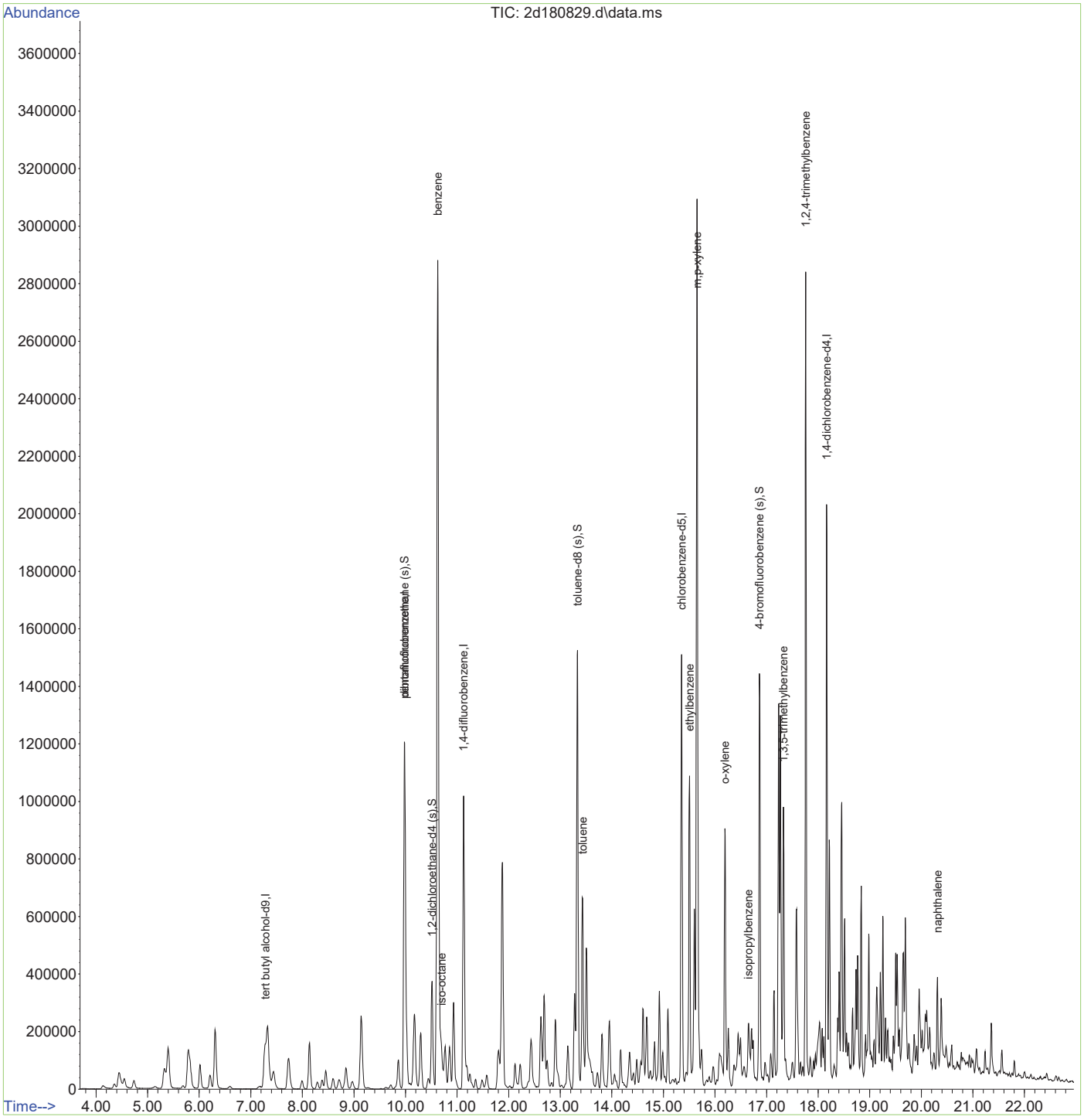
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.283	65	231911	500.00	ug/L	0.03
5) pentafluorobenzene	9.983	168	759840	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.126	114	998712	50.00	ug/L	0.03
74) chlorobenzene-d5	15.352	117	950313	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	526239	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	308484	48.94	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.88%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	311925	50.81	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 101.62%			
75) toluene-d8 (s)	13.334	98	1145345	50.10	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.20%			
99) 4-bromofluorobenzene (s)	16.862	95	442053	47.38	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.76%			
Target Compounds						Qvalue
54) benzene	10.623	78	3319053	152.67	ug/L	99
55) iso-octane	10.702	57	117257	5.79	ug/L	87
76) toluene	13.433	92	332450	24.85	ug/L	100
89) ethylbenzene	15.504	91	788976	30.94	ug/L	99
90) m,p-xylene	15.651	91	2034220	104.95	ug/L	98
91) o-xylene	16.191	106	275610	28.07	ug/L	97
96) isopropylbenzene	16.647	105	92844	3.64	ug/L	97
107) 1,3,5-trimethylbenzene	17.329	105	502235	22.71	ug/L	99
109) 1,2,4-trimethylbenzene	17.759	105	1467392	65.29	ug/L	100
121) naphthalene	20.312	128	259549	13.71	ug/L	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

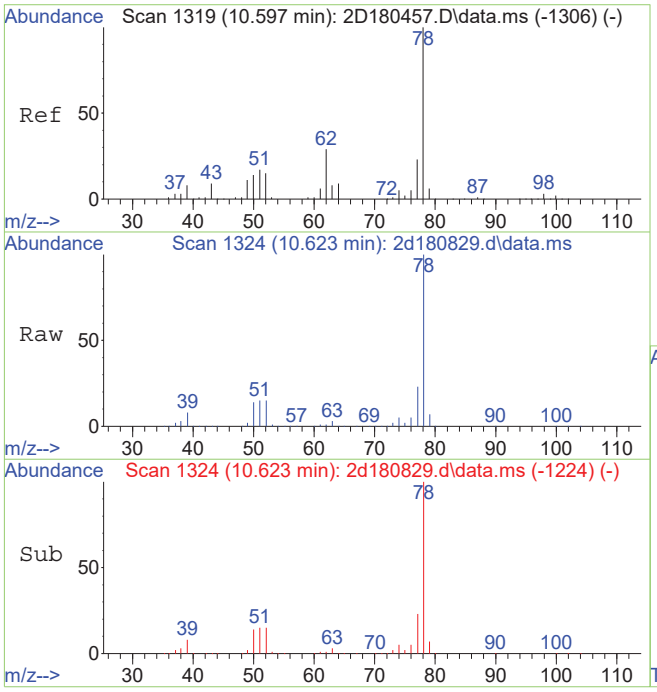
Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-10-19\janellec\v2d7692\
Data File : 2d180829.d
Acq On : 9 Jan 2019 4:40 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 19 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 19:36:15 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



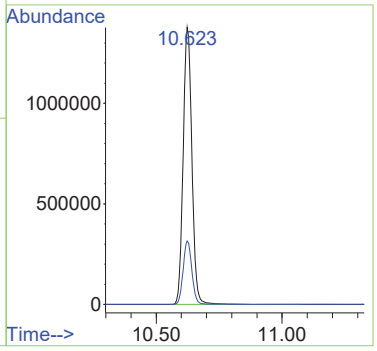
M2D7670.M Mon Jan 21 19:36:37 2019 Page: 2

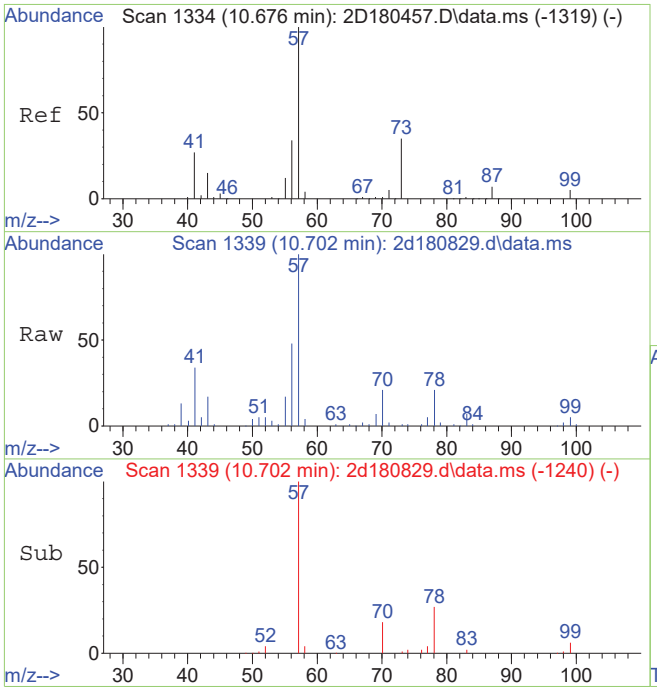


#54
benzene
Concen: 152.67 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 78 Resp: 3319053

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

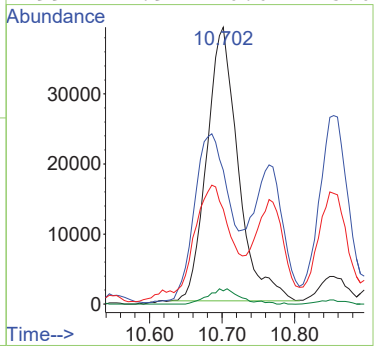


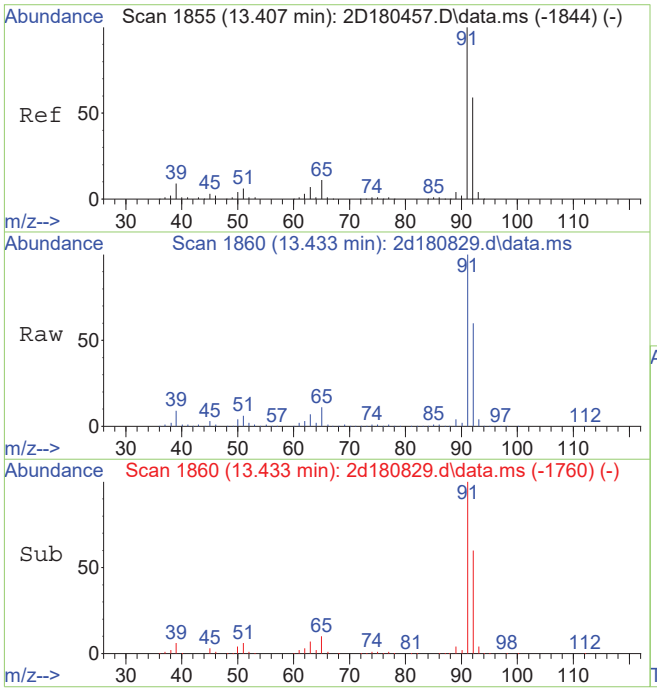


#55
iso-octane
Concen: 5.79 ug/L
RT: 10.702 min Scan# 1339
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 57 Resp: 117257

Ion	Ratio	Lower	Upper
57	100		
56	47.4	13.7	53.7
41	29.8	8.4	48.4
99	4.9	0.0	25.0

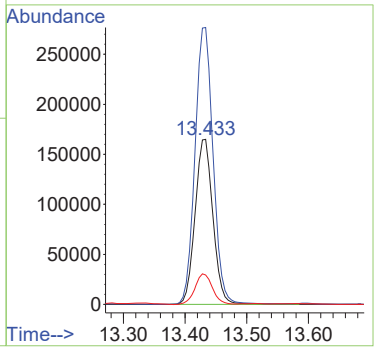


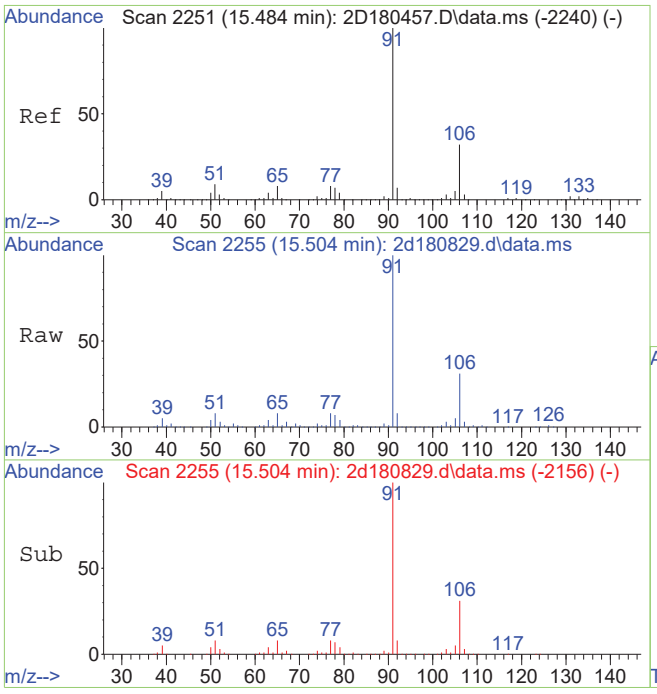


#76
toluene
Concen: 24.85 ug/L
RT: 13.433 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 92 Resp: 332450

Ion	Ratio	Lower	Upper
92	100		
91	167.8	148.1	188.1
65	17.7	0.0	38.8

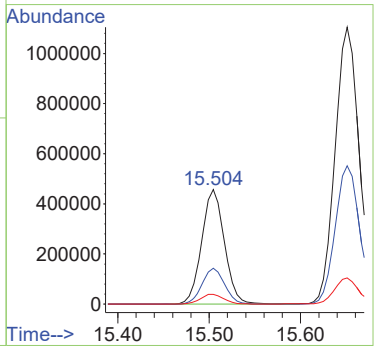


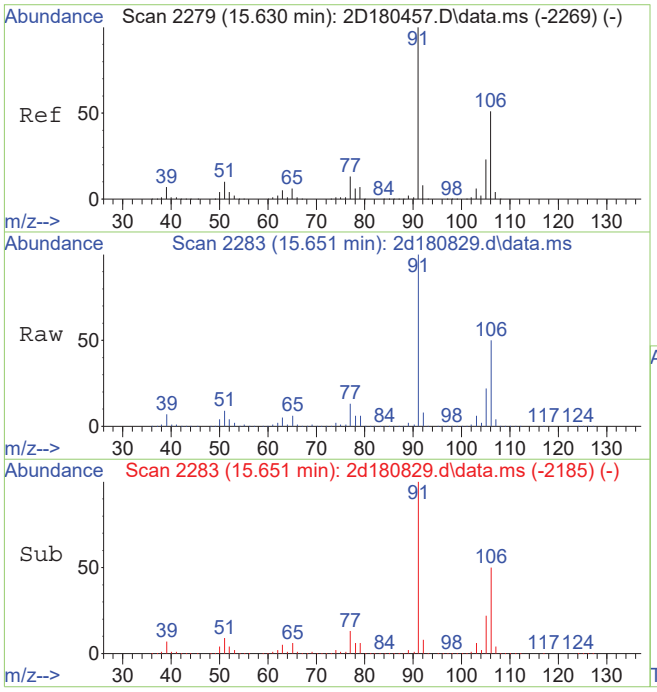


#89
ethylbenzene
Concen: 30.94 ug/L
RT: 15.504 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 91 Resp: 788976

Ion	Ratio	Lower	Upper
91	100		
106	31.4	1.6	61.6
51	8.3	0.0	39.0

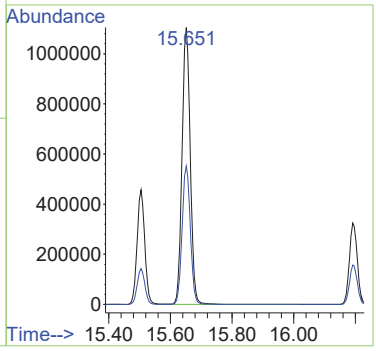


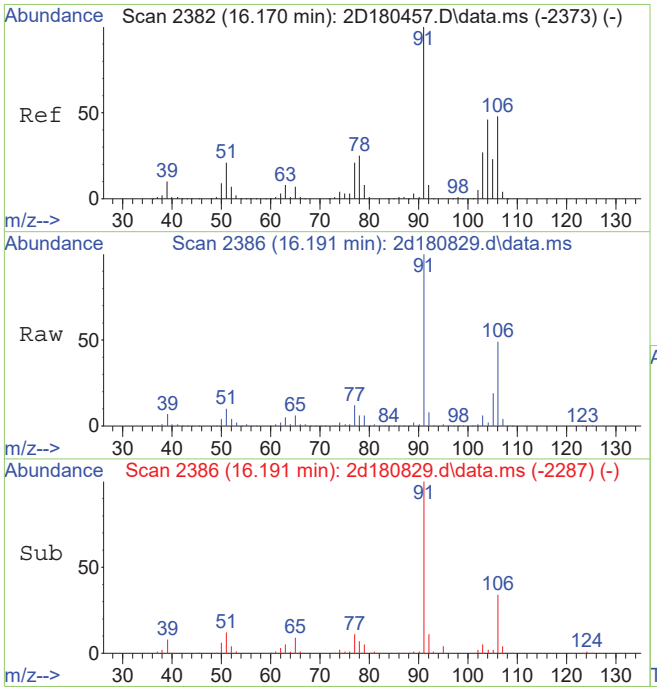


#90
m,p-xylene
Concen: 104.95 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 91 Resp: 2034220

Ion	Ratio	Lower	Upper
91	100		
106	49.9	21.1	81.1

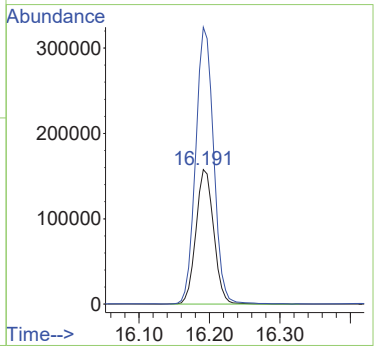


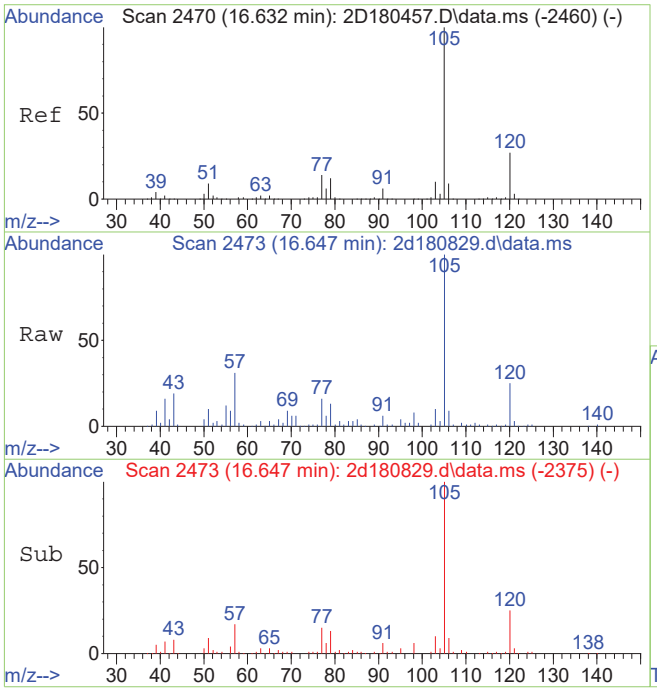


#91
o-xylene
Concen: 28.07 ug/L
RT: 16.191 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:106 Resp: 275610

Ion	Ratio	Lower	Upper
106	100		
91	206.0	179.9	239.9

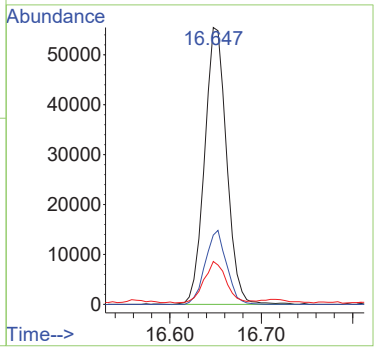


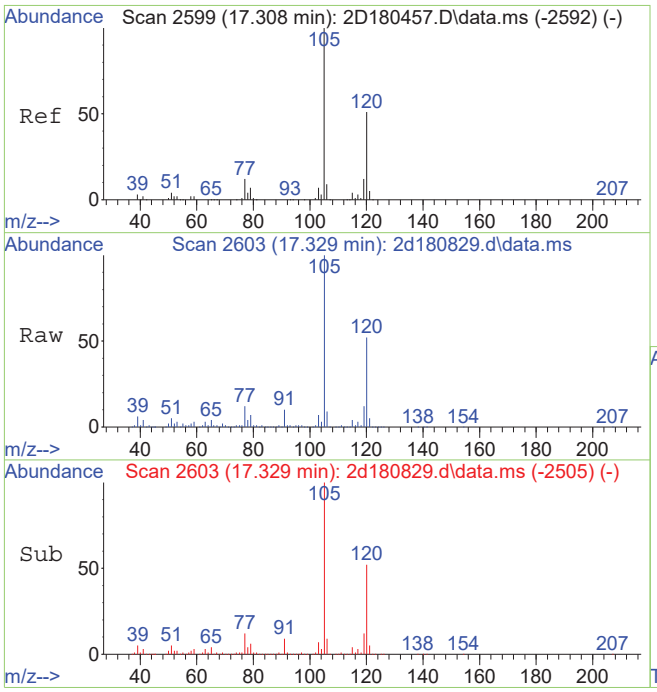


#96
isopropylbenzene
Concen: 3.64 ug/L
RT: 16.647 min Scan# 2473
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:105 Resp: 92844

Ion	Ratio	Lower	Upper
105	100		
120	25.0	6.7	46.7
77	14.6	0.0	34.2

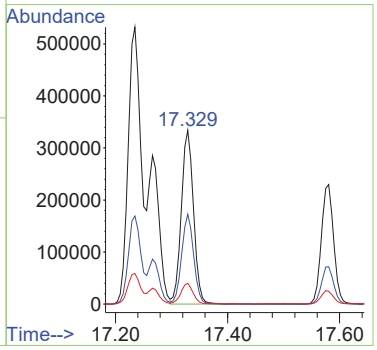


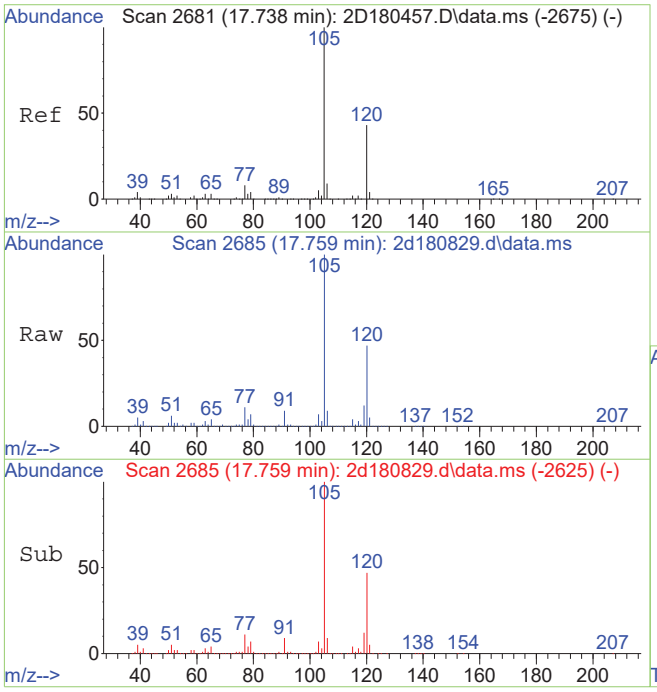


#107
1,3,5-trimethylbenzene
Concen: 22.71 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:105 Resp: 502235

Ion	Ratio	Lower	Upper
105	100		
120	51.6	20.7	80.7
77	11.8	0.0	42.0

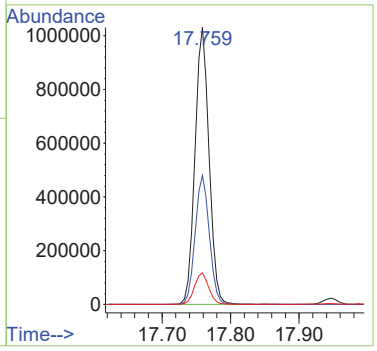


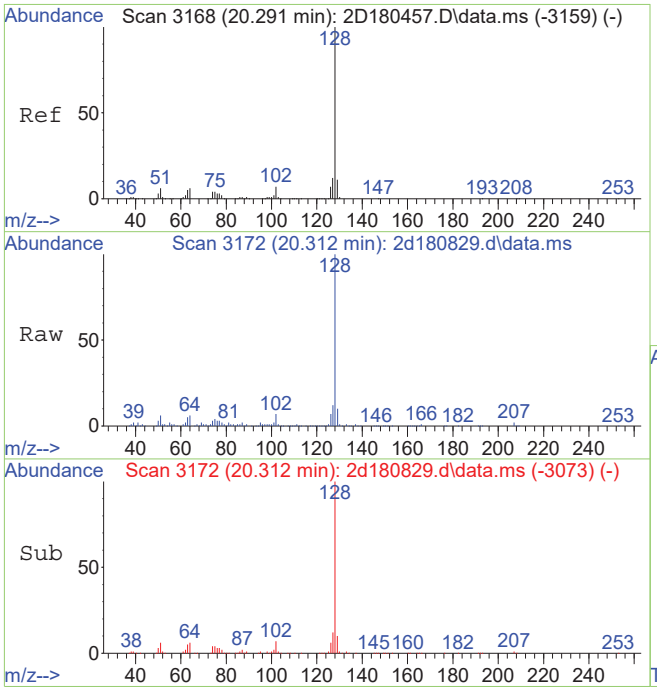


#109
1,2,4-trimethylbenzene
Concen: 65.29 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:105 Resp: 1467392

Ion	Ratio	Lower	Upper
105	100		
120	46.5	16.7	76.7
77	11.3	0.0	41.8

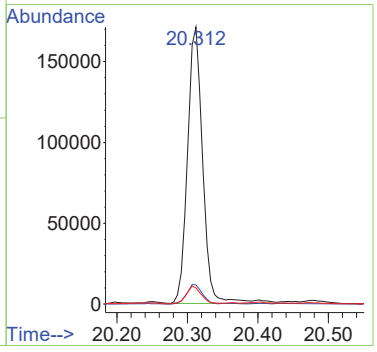




#121
naphthalene
Concen: 13.71 ug/L
RT: 20.312 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:128 Resp: 259549

Ion	Ratio	Lower	Upper
128	100		
102	6.9	0.0	37.5
51	5.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\v2d7694\
Data File : 2d180873.d
Acq On : 10 Jan 2019 3:47 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 05:07:25 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

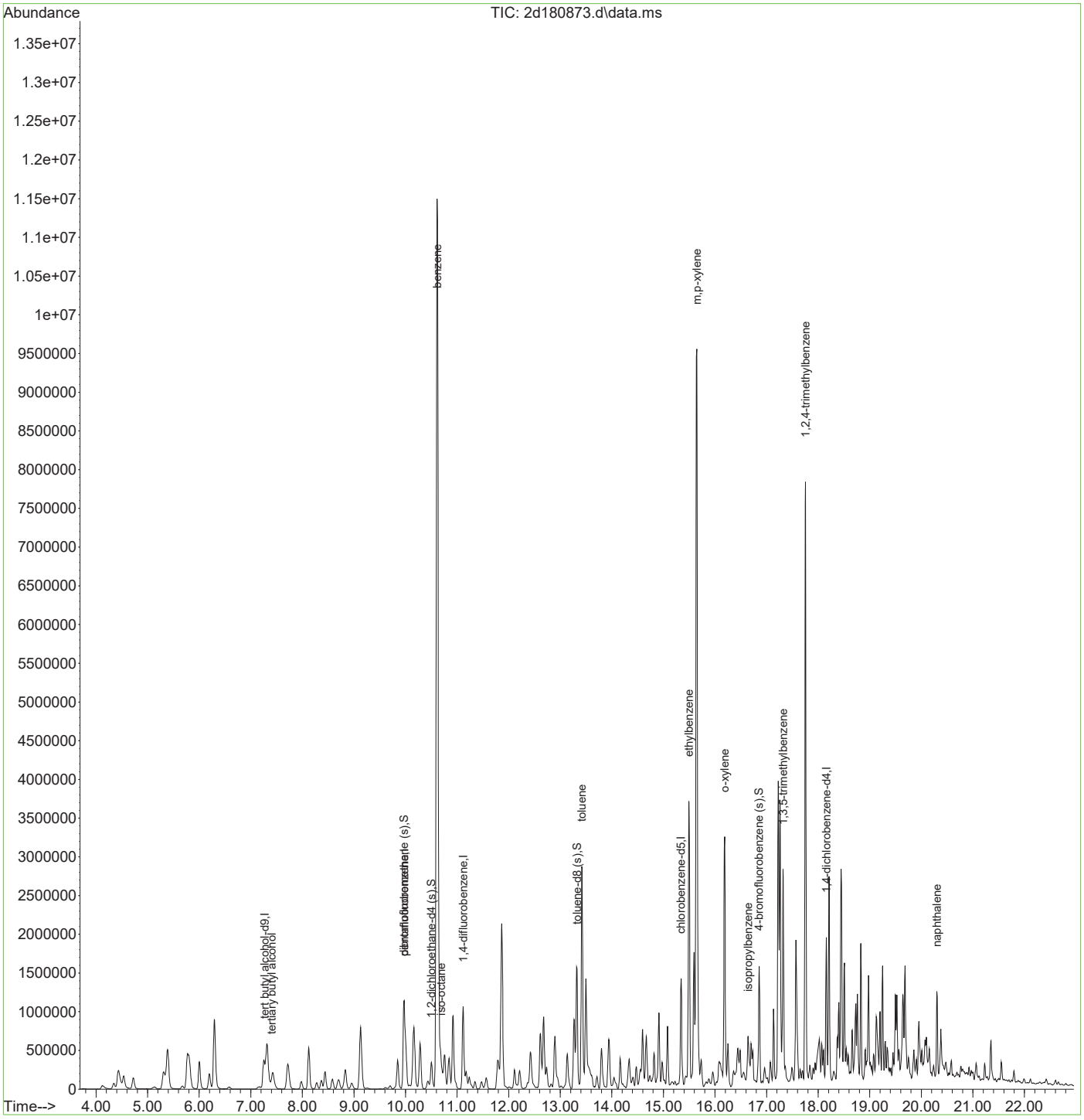
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.268	65	231177	500.00	ug/L	0.01
5) pentafluorobenzene	9.973	168	694886	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	897940	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	851120	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.157	152	466242	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	284366	49.34	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.68%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	283191	51.31	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 102.62%			
75) toluene-d8 (s)	13.323	98	1016159	49.63	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.26%			
99) 4-bromofluorobenzene (s)	16.852	95	399324	48.31	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.62%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.399	59	11704	26.11	ug/L	# 1
54) benzene	10.613	78	13992288	715.85	ug/L	100
55) iso-octane	10.691	57	336268	18.46	ug/L	84
76) toluene	13.418	92	1445049	120.61	ug/L	100
89) ethylbenzene	15.494	91	2834798	124.14	ug/L	100
90) m,p-xylene	15.646	91	6759351	389.38	ug/L	98
91) o-xylene	16.186	106	1000709	113.82	ug/L	99
96) isopropylbenzene	16.642	105	291975	12.78	ug/L	99
107) 1,3,5-trimethylbenzene	17.319	105	1473328	75.18	ug/L	99
109) 1,2,4-trimethylbenzene	17.754	105	4216046	211.72	ug/L	100
121) naphthalene	20.302	128	888668	52.98	ug/L	99

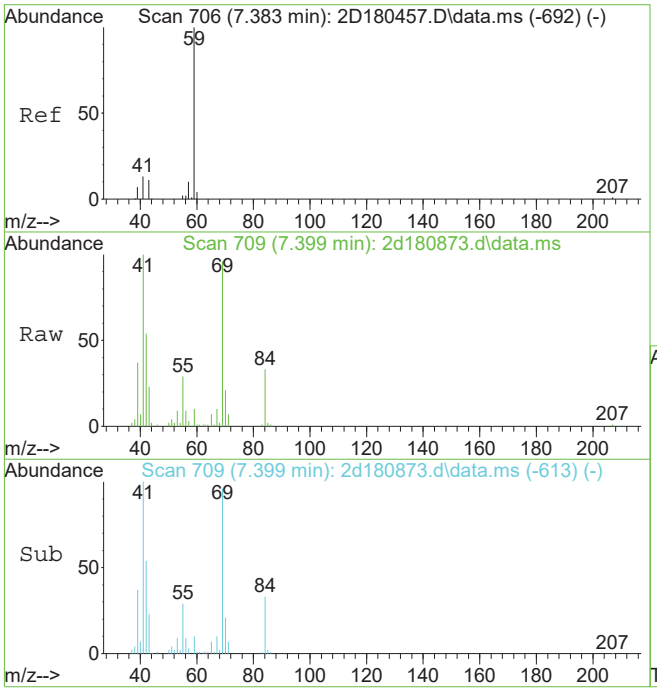
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\v2d7694\
Data File : 2d180873.d
Acq On : 10 Jan 2019 3:47 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 05:07:25 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

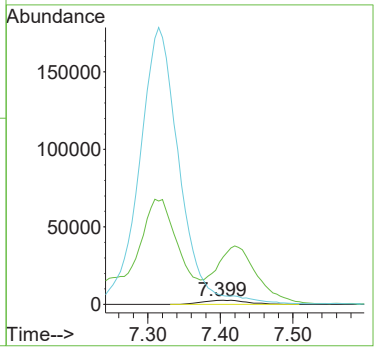


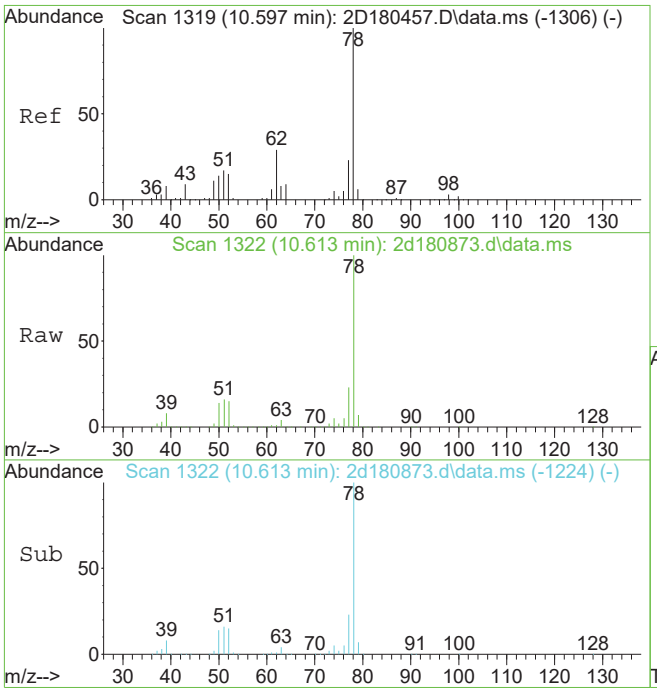


#2
tertiary butyl alcohol
Concen: 26.11 ug/L
RT: 7.399 min Scan# 709
Delta R.T. 0.005 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 59 Resp: 11704

Ion	Ratio	Lower	Upper
59	100		
41	918.6	0.0	45.0#
43	211.2	0.0	40.6#

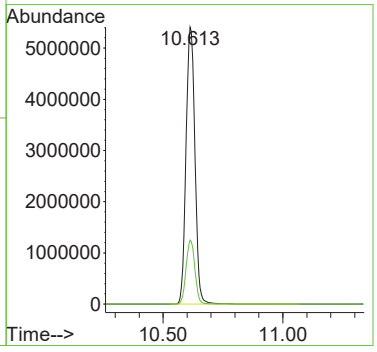


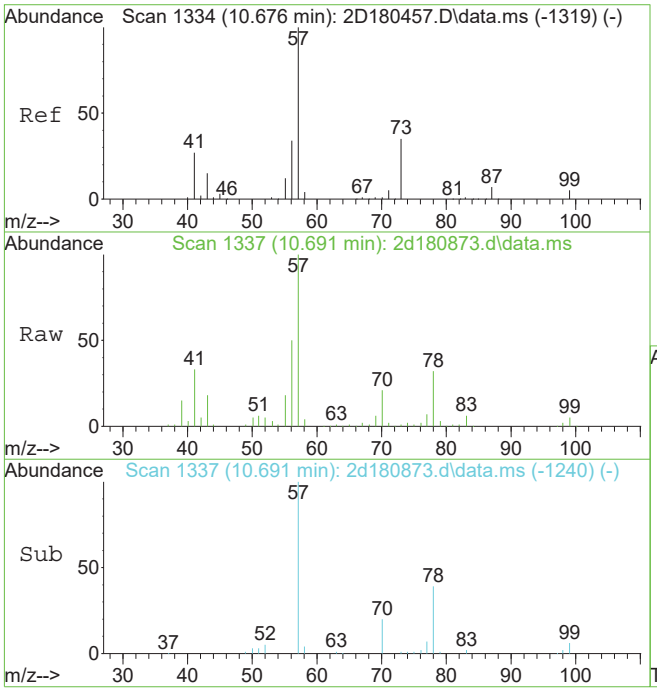


#54
benzene
Concen: 715.85 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 78 Resp:13992288

Ion	Ratio	Lower	Upper
78	100		
77	23.1	0.0	53.2

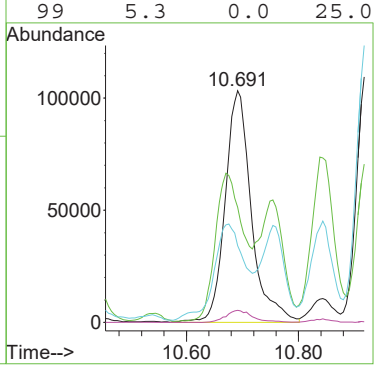


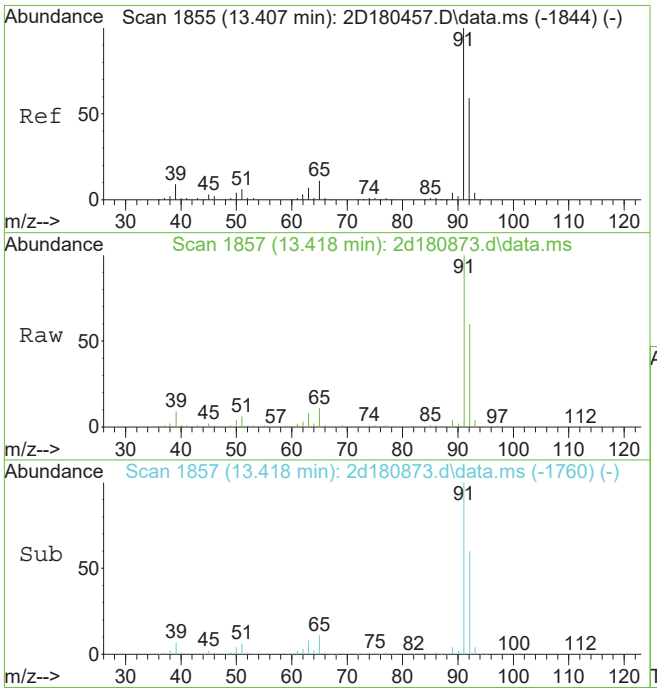


#55
iso-octane
Concen: 18.46 ug/L
RT: 10.691 min Scan# 1337
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 57 Resp: 336268

Ion	Ratio	Lower	Upper
57	100		
56	48.8	13.7	53.7
41	32.2	8.4	48.4
99	5.3	0.0	25.0

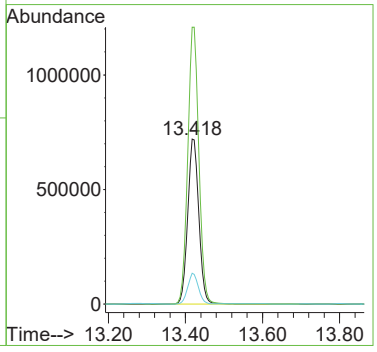


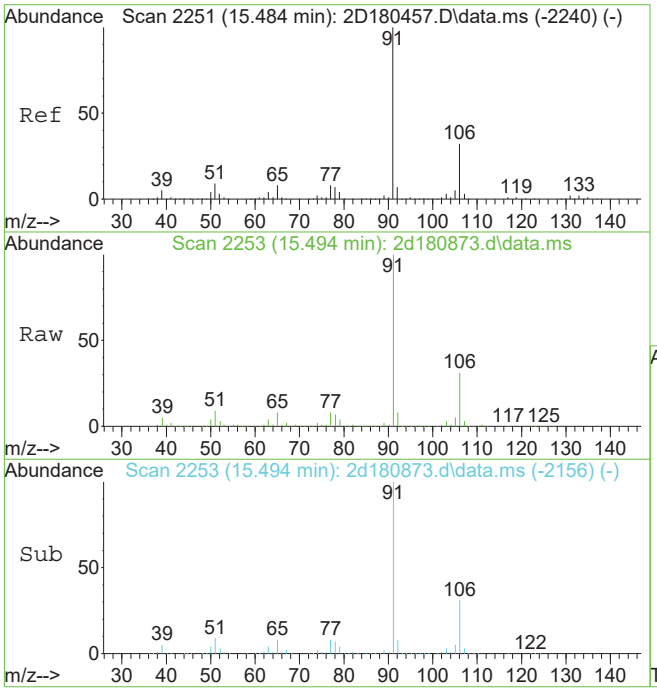


#76
toluene
Concen: 120.61 ug/L
RT: 13.418 min Scan# 1857
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 92 Resp: 1445049

Ion	Ratio	Lower	Upper
92	100		
91	167.6	148.1	188.1
65	18.6	0.0	38.8

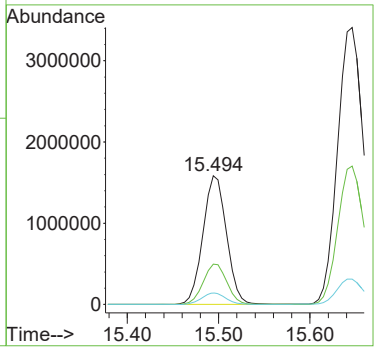


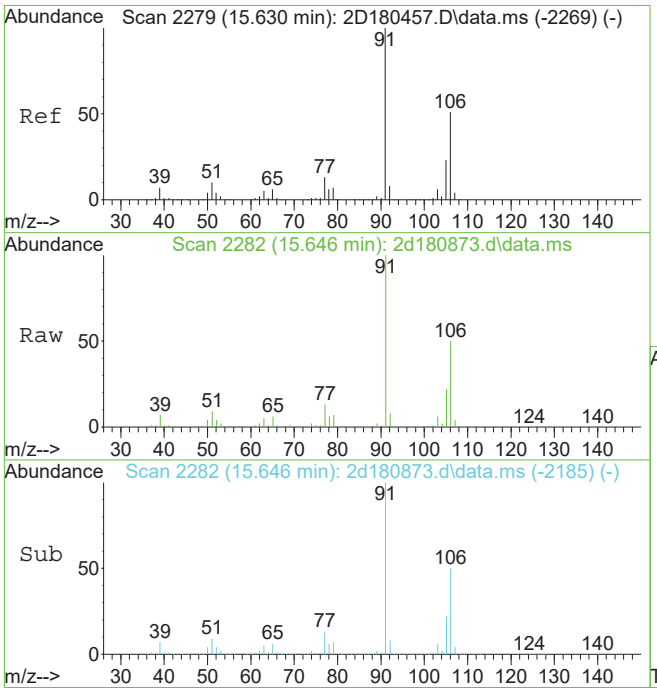


#89
ethylbenzene
Concen: 124.14 ug/L
RT: 15.494 min Scan# 2253
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 91 Resp: 2834798

Ion	Ratio	Lower	Upper
91	100		
106	31.4	1.6	61.6
51	8.8	0.0	39.0

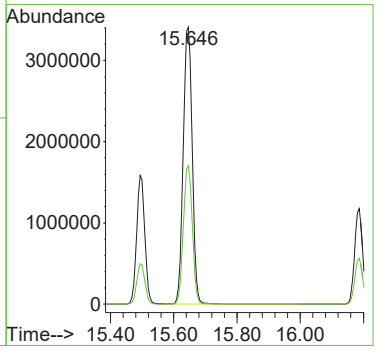


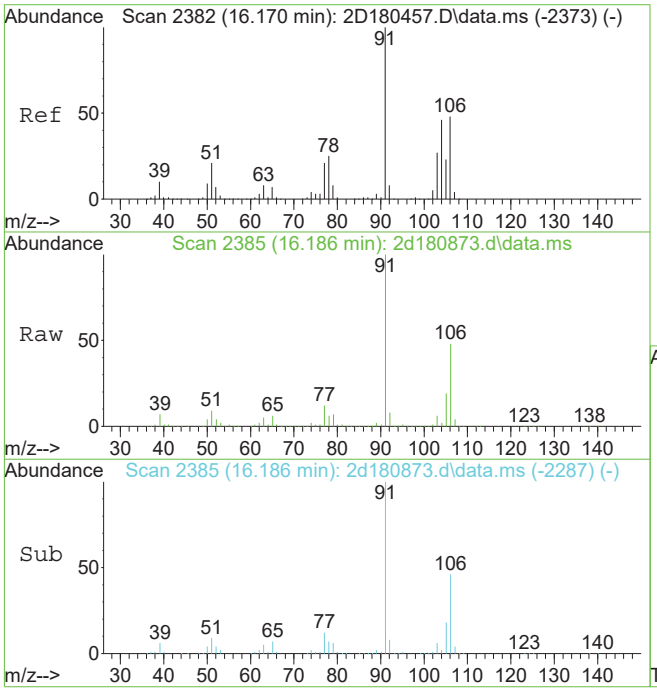


#90
m,p-xylene
Concen: 389.38 ug/L
RT: 15.646 min Scan# 2282
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 91 Resp: 6759351

Ion	Ratio	Lower	Upper
91	100		
106	49.9	21.1	81.1

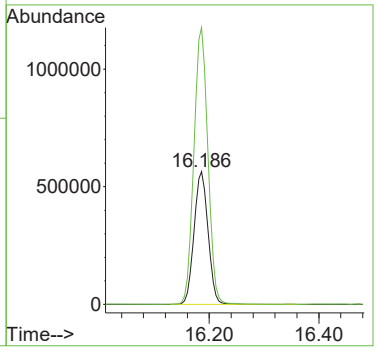


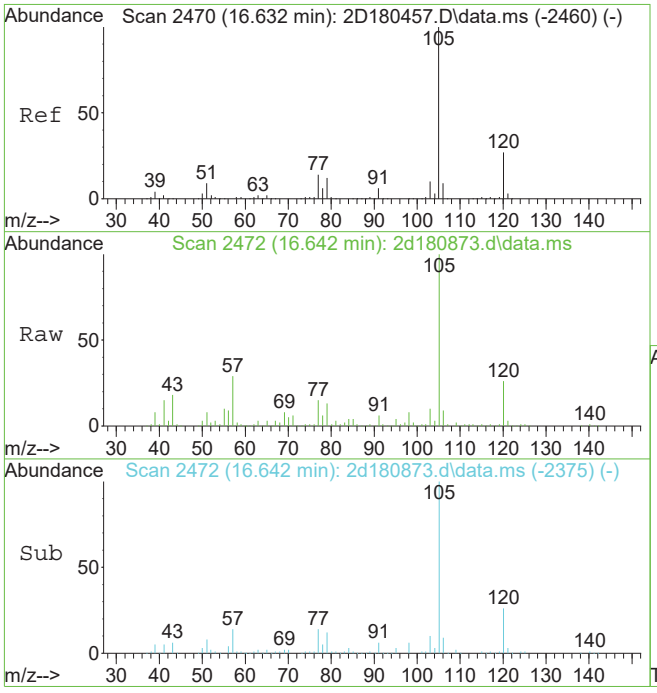


#91
o-xylene
Concen: 113.82 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:106 Resp: 1000709

Ion	Ratio	Lower	Upper
106	100		
91	208.4	179.9	239.9

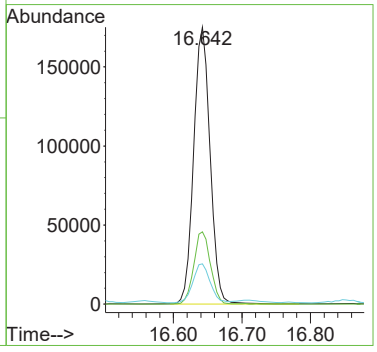


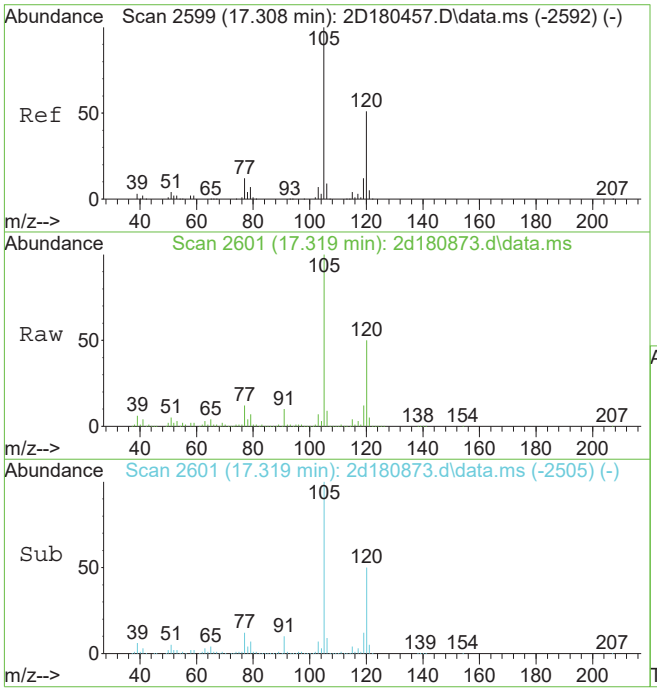


#96
isopropylbenzene
Concen: 12.78 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:105 Resp: 291975

Ion	Ratio	Lower	Upper
105	100		
120	26.1	6.7	46.7
77	14.1	0.0	34.2

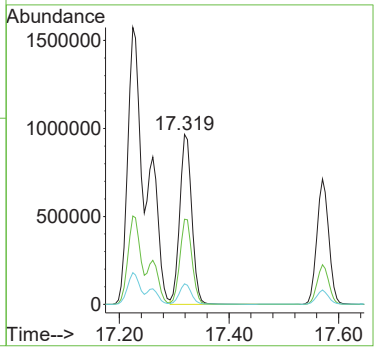


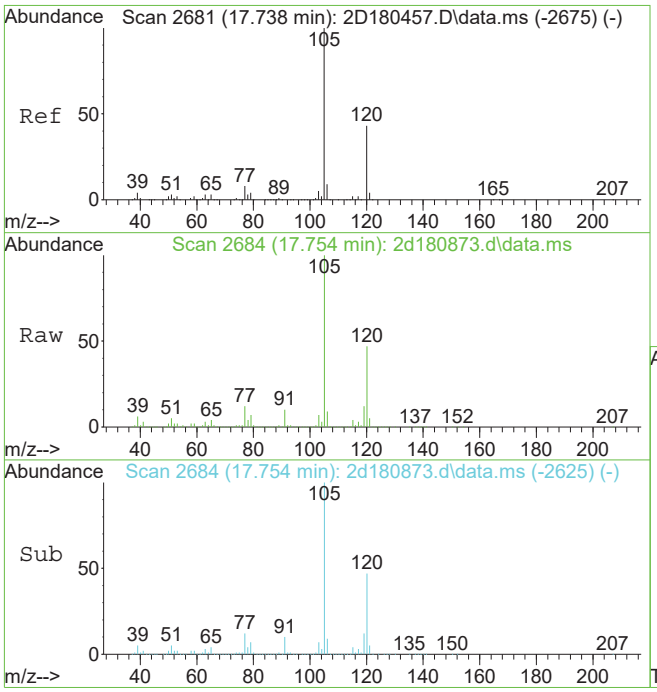


#107
1,3,5-trimethylbenzene
Concen: 75.18 ug/L
RT: 17.319 min Scan# 2601
Delta R.T. 0.005 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:105 Resp: 1473328

Ion	Ratio	Lower	Upper
105	100		
120	50.1	20.7	80.7
77	12.1	0.0	42.0

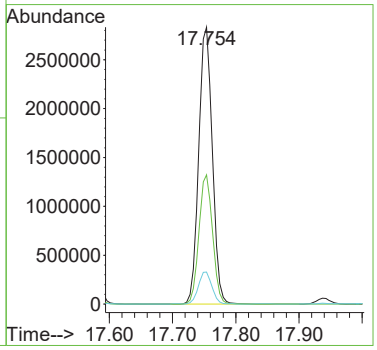


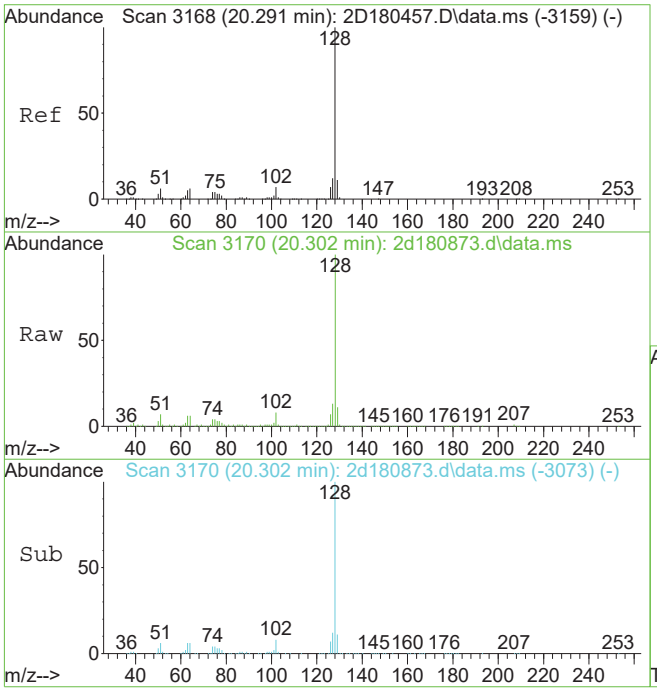


#109
1,2,4-trimethylbenzene
Concen: 211.72 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:105 Resp: 4216046

Ion	Ratio	Lower	Upper
105	100		
120	46.6	16.7	76.7
77	11.5	0.0	41.8

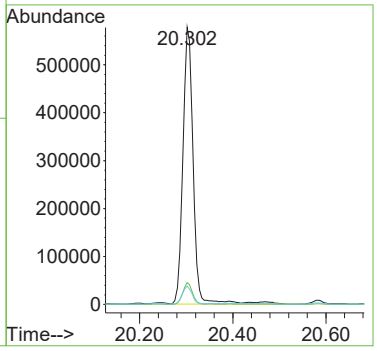




#121
naphthalene
Concen: 52.98 ug/L
RT: 20.302 min Scan# 3170
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:128 Resp: 888668

Ion	Ratio	Lower	Upper
128	100		
102	7.8	0.0	37.5
51	6.5	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180827.d
Acq On : 9 Jan 2019 3:41 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:23 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

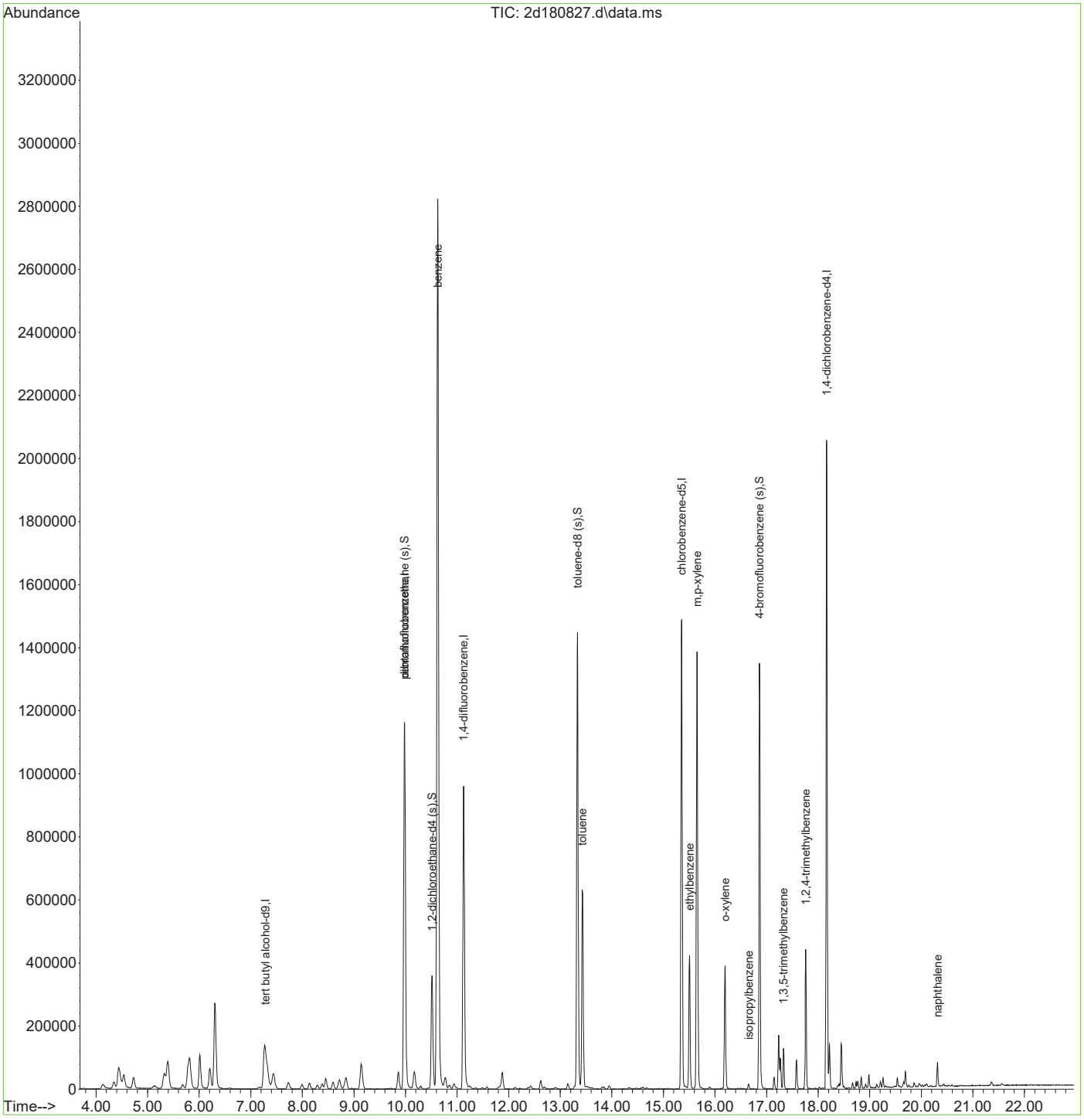
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.284	65	224498	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	757781	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	1007416	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	975320	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	540008	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.979	113	305293	48.57	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.14%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	308782	49.86	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 99.72%			
75) toluene-d8 (s)	13.334	98	1150095	49.02	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.04%			
99) 4-bromofluorobenzene (s)	16.863	95	445505	46.53	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.06%			
Target Compounds						Qvalue
54) benzene	10.623	78	3300803	150.52	ug/L	100
76) toluene	13.428	92	322087	23.46	ug/L	100
89) ethylbenzene	15.505	91	337241	12.89	ug/L	99
90) m,p-xylene	15.652	91	940686	47.29	ug/L	98
91) o-xylene	16.197	106	121997	12.11	ug/L	100
96) isopropylbenzene	16.653	105	11318	0.43	ug/L	94
107) 1,3,5-trimethylbenzene	17.329	105	70978	3.13	ug/L	98
109) 1,2,4-trimethylbenzene	17.759	105	238072	10.32	ug/L	100
121) naphthalene	20.313	128	60385	3.11	ug/L	98

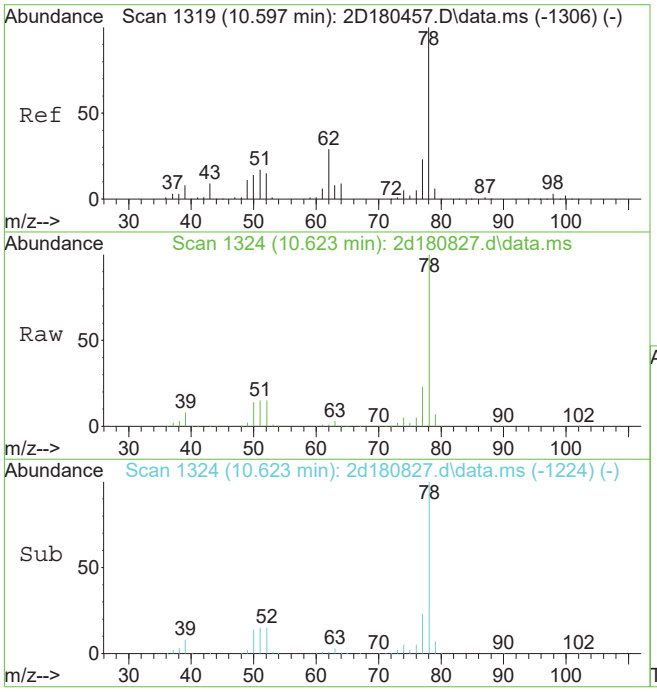
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180827.d
Acq On : 9 Jan 2019 3:41 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:23 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

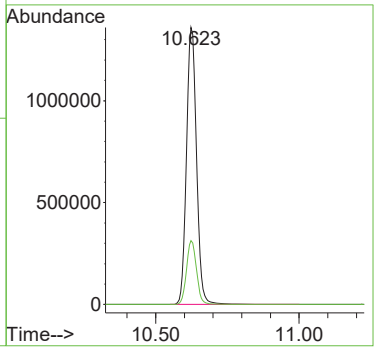


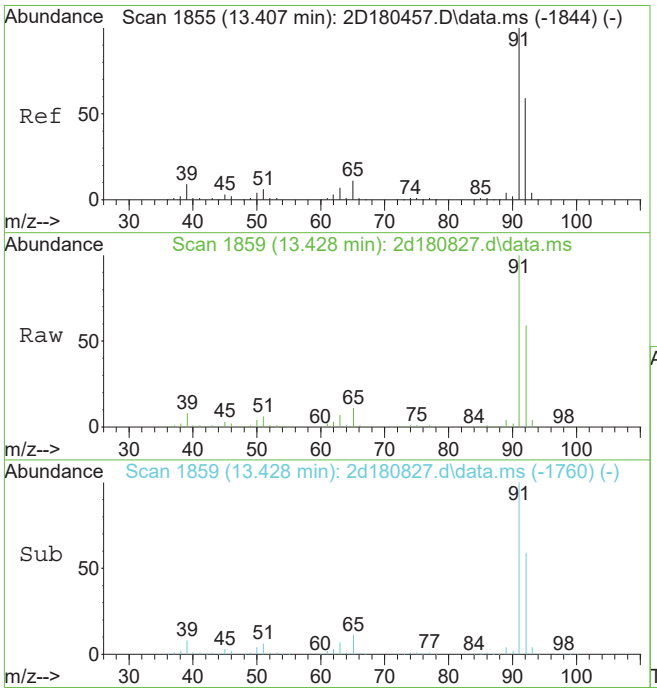


#54
benzene
Concen: 150.52 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 78 Resp: 3300803

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

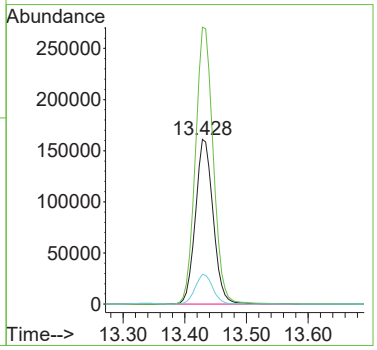


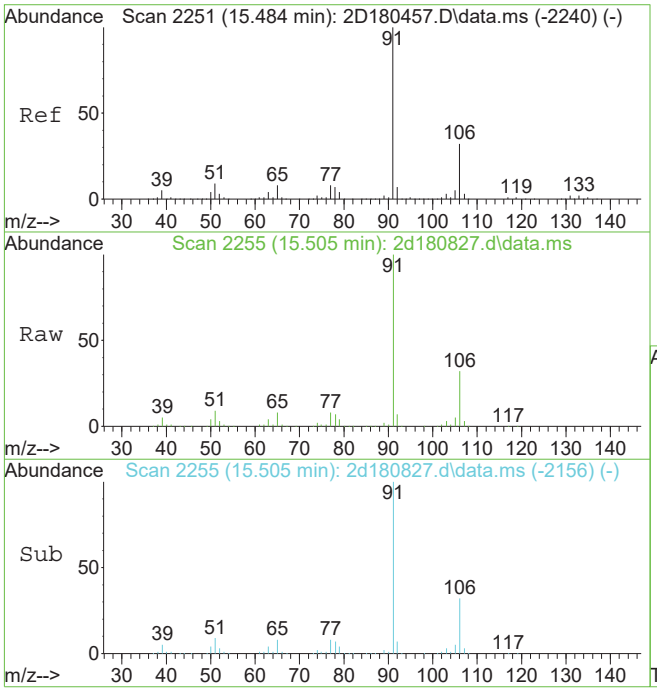


#76
toluene
Concen: 23.46 ug/L
RT: 13.428 min Scan# 1859
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 92 Resp: 322087

Ion	Ratio	Lower	Upper
92	100		
91	168.2	148.1	188.1
65	18.1	0.0	38.8

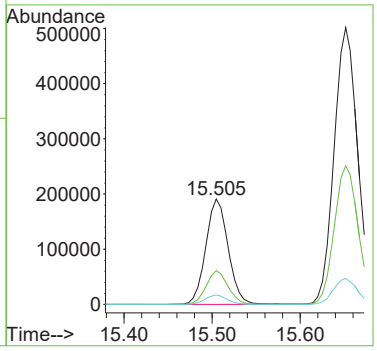


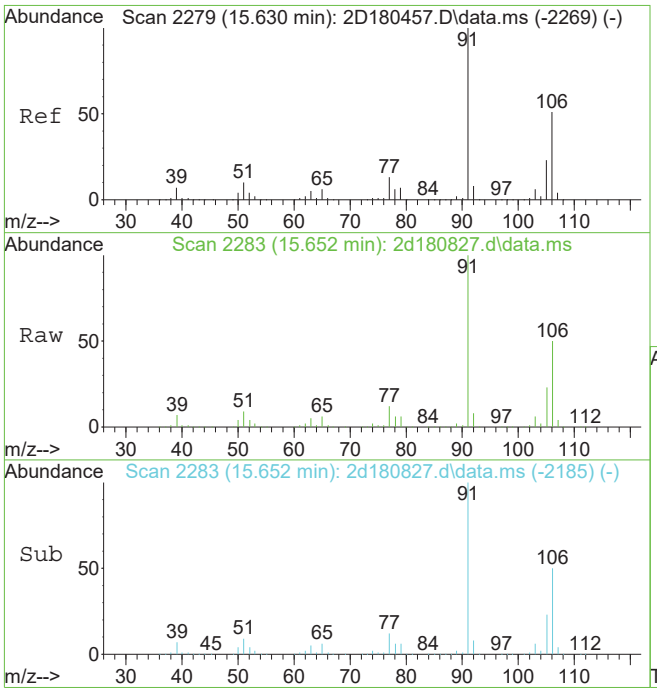


#89
ethylbenzene
Concen: 12.89 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 91 Resp: 337241

Ion	Ratio	Lower	Upper
91	100		
106	32.0	1.6	61.6
51	9.0	0.0	39.0

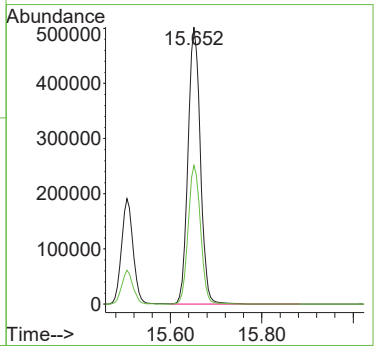


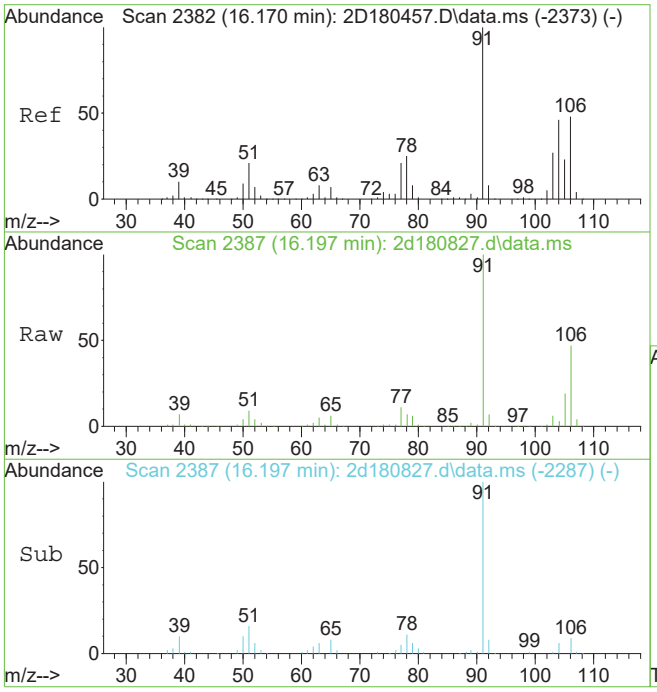


#90
m,p-xylene
Concen: 47.29 ug/L
RT: 15.652 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 91 Resp: 940686

Ion	Ratio	Lower	Upper
91	100		
106	50.0	21.1	81.1

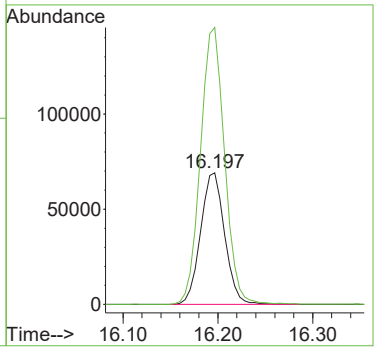


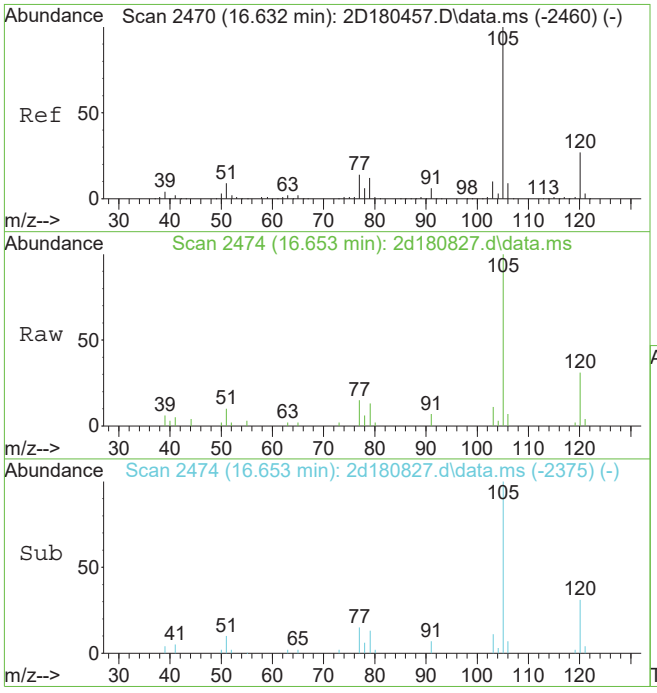


#91
o-xylene
Concen: 12.11 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:106 Resp: 121997

Ion	Ratio	Lower	Upper
106	100		
91	210.5	179.9	239.9

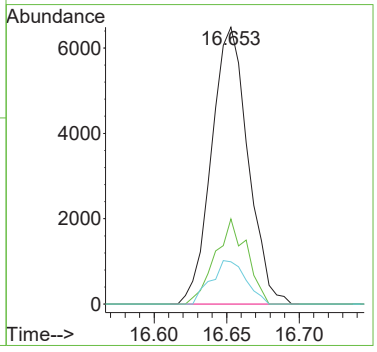


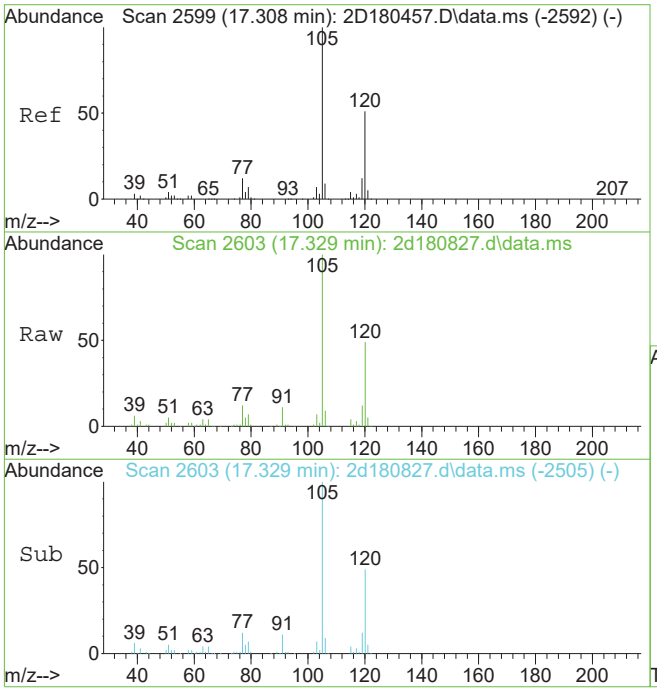


#96
isopropylbenzene
Concen: 0.43 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:105 Resp: 11318

Ion	Ratio	Lower	Upper
105	100		
120	30.7	6.7	46.7
77	15.3	0.0	34.2

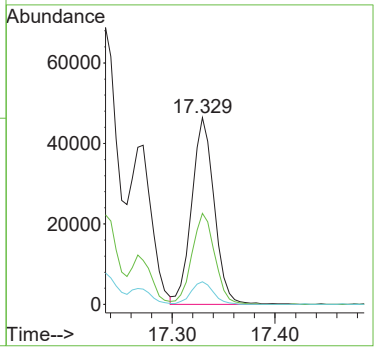


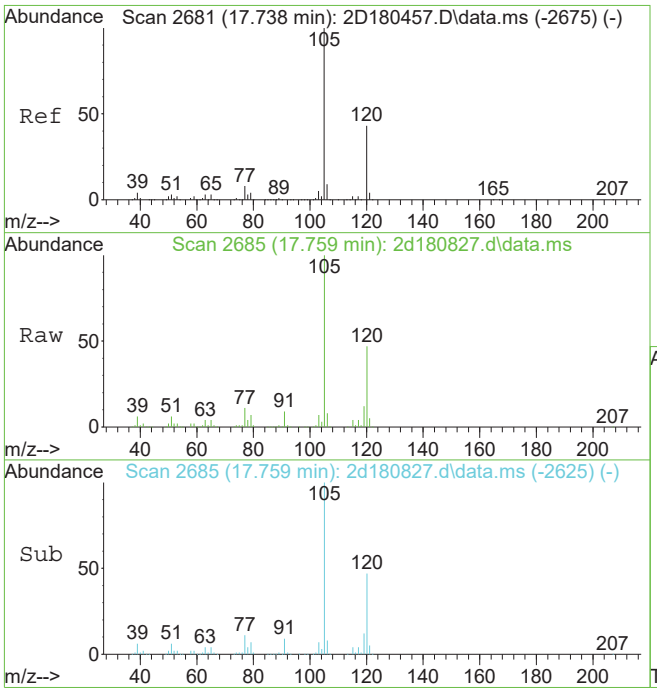


#107
1,3,5-trimethylbenzene
Concen: 3.13 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:105 Resp: 70978

Ion	Ratio	Lower	Upper
105	100		
120	48.7	20.7	80.7
77	12.1	0.0	42.0

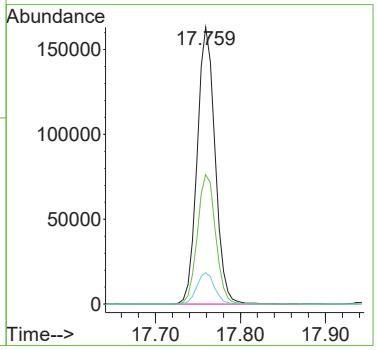


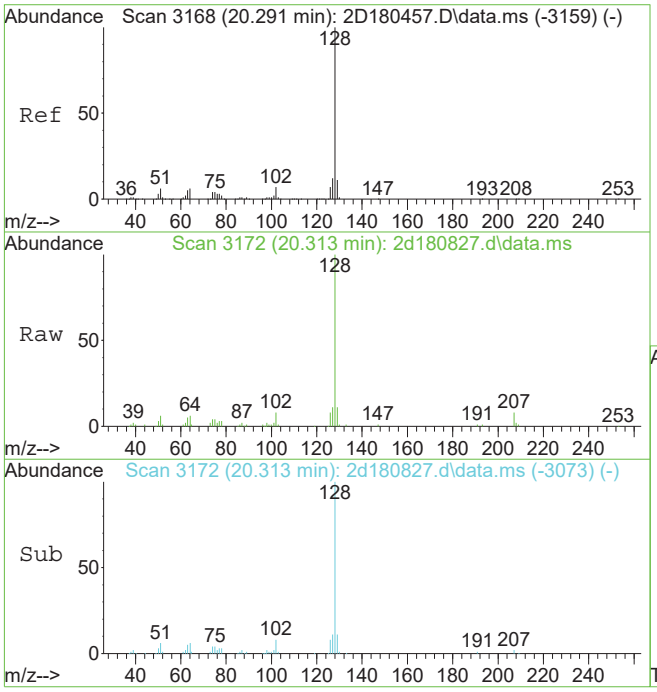


#109
1,2,4-trimethylbenzene
Concen: 10.32 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:105 Resp: 238072

Ion	Ratio	Lower	Upper
105	100		
120	46.8	16.7	76.7
77	11.3	0.0	41.8

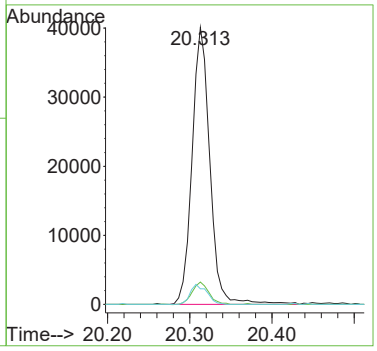




#121
naphthalene
Concen: 3.11 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:128 Resp: 60385

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.5
51	5.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180872.d
Acq On : 10 Jan 2019 3:18 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 16 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:28 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

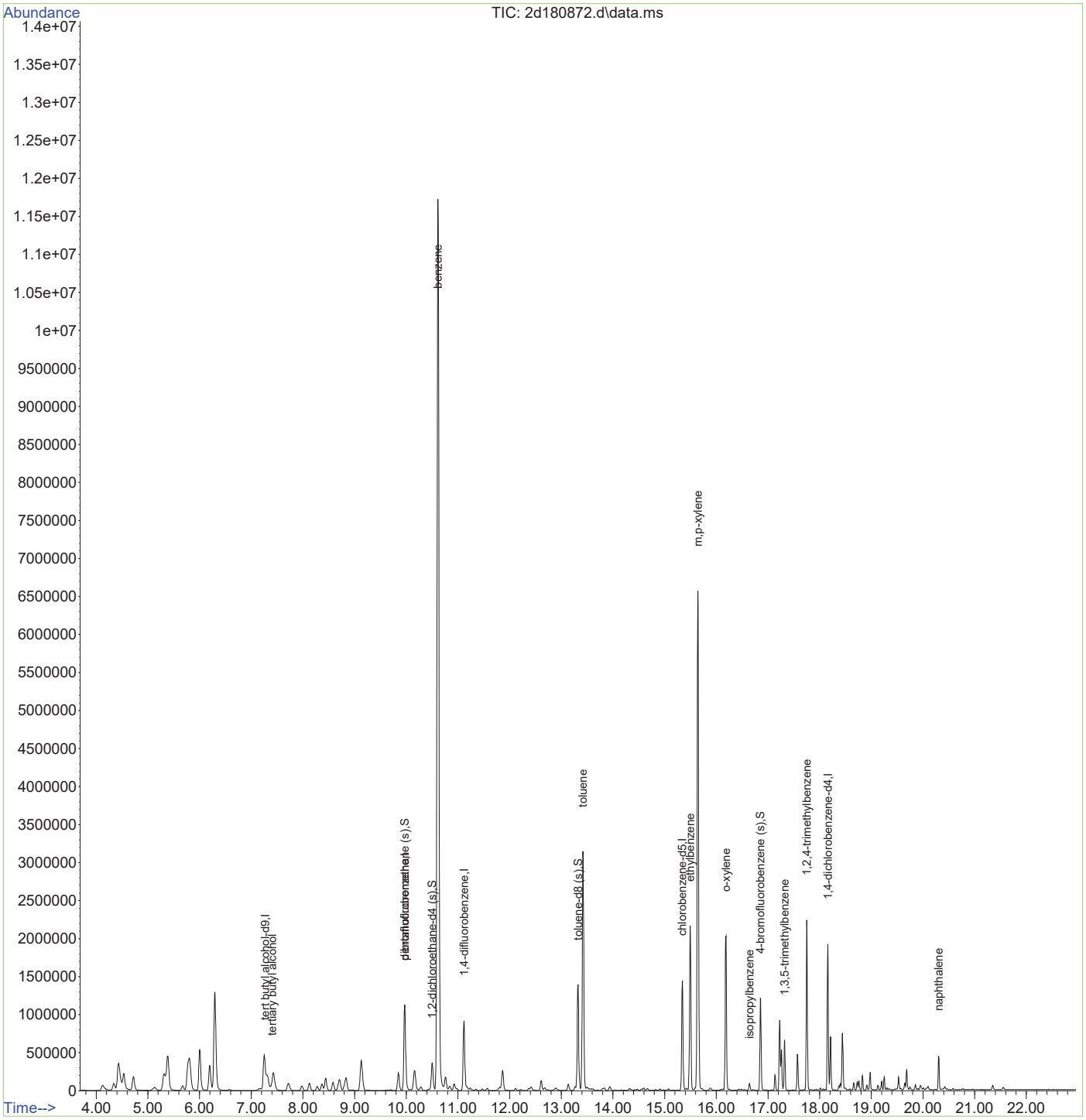
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.268	65	250364	500.00	ug/L	0.01
5) pentafluorobenzene	9.968	168	717665	50.00	ug/L	0.01
52) 1,4-difluorobenzene	11.116	114	924533	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	919236	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	503114	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	290299	48.77	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.54%			
53) 1,2-dichloroethane-d4 (s)	10.498	65	295217	51.95	ug/L	0.01
Spiked Amount 50.000	Range 81 - 124		Recovery = 103.90%			
75) toluene-d8 (s)	13.324	98	1081619	48.91	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.82%			
99) 4-bromofluorobenzene (s)	16.852	95	413249	46.33	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 92.66%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.404	59	4660	9.60	ug/L	# 1
54) benzene	10.613	78	14427527	716.88	ug/L	100
76) toluene	13.418	92	1612864	124.64	ug/L	99
89) ethylbenzene	15.494	91	1731763	70.22	ug/L	100
90) m,p-xylene	15.641	91	4531304	241.69	ug/L	98
91) o-xylene	16.186	106	628857	66.22	ug/L	99
96) isopropylbenzene	16.642	105	57678	2.34	ug/L	100
107) 1,3,5-trimethylbenzene	17.319	105	367619	17.38	ug/L	100
109) 1,2,4-trimethylbenzene	17.749	105	1223214	56.92	ug/L	100
121) naphthalene	20.302	128	346747	19.16	ug/L	100

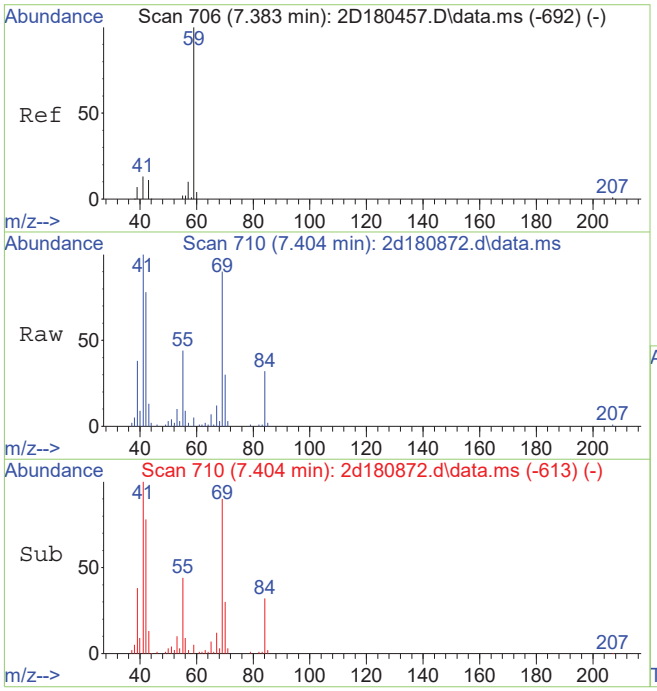
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180872.d
Acq On : 10 Jan 2019 3:18 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 16 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:28 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

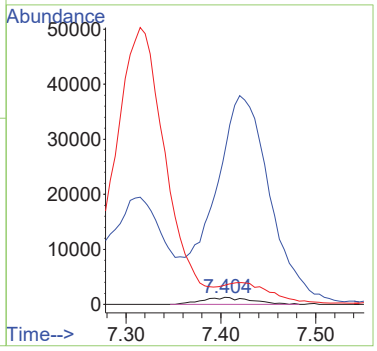


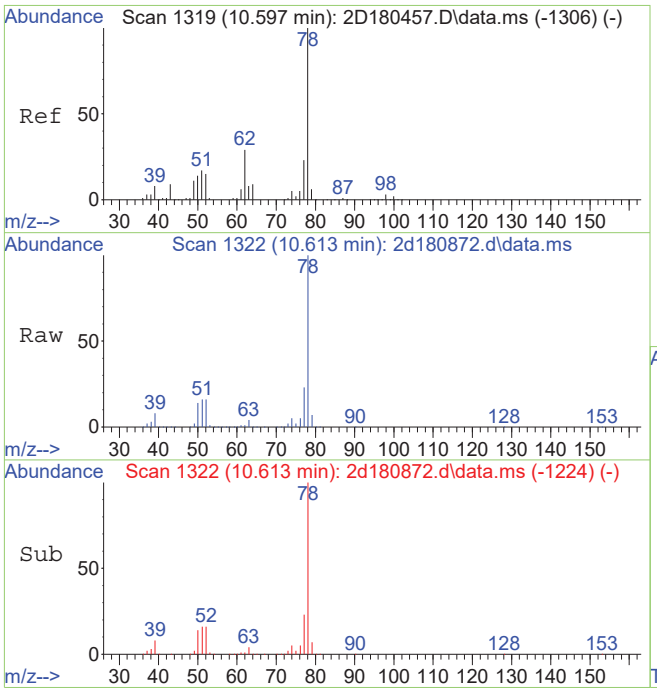


#2
tertiary butyl alcohol
Concen: 9.60 ug/L
RT: 7.404 min Scan# 710
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 59 Resp: 4660

Ion	Ratio	Lower	Upper
59	100		
41	1777.7	0.0	45.0#
43	228.4	0.0	40.6#

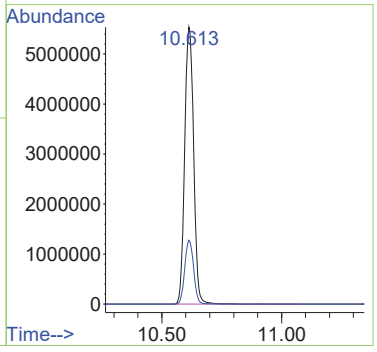


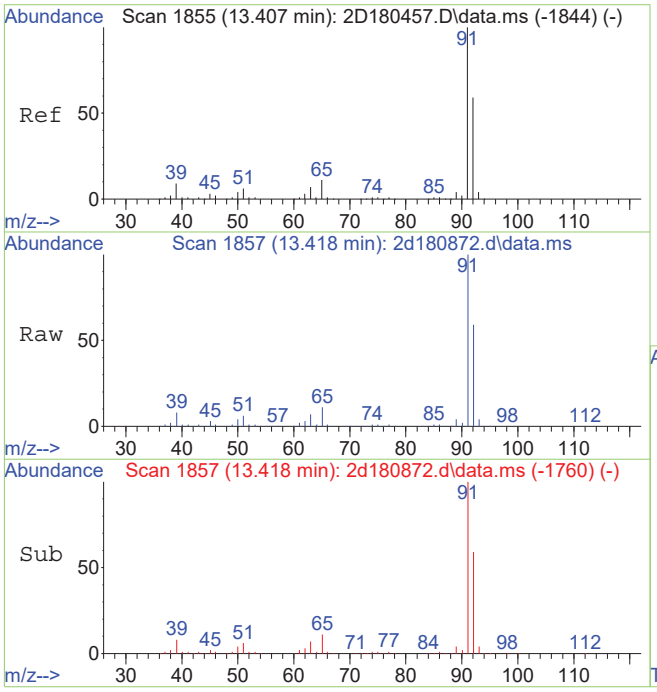


#54
benzene
Concen: 716.88 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 78 Resp:14427527

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

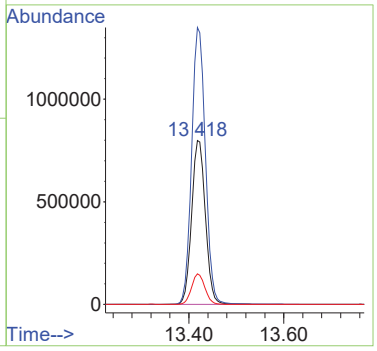


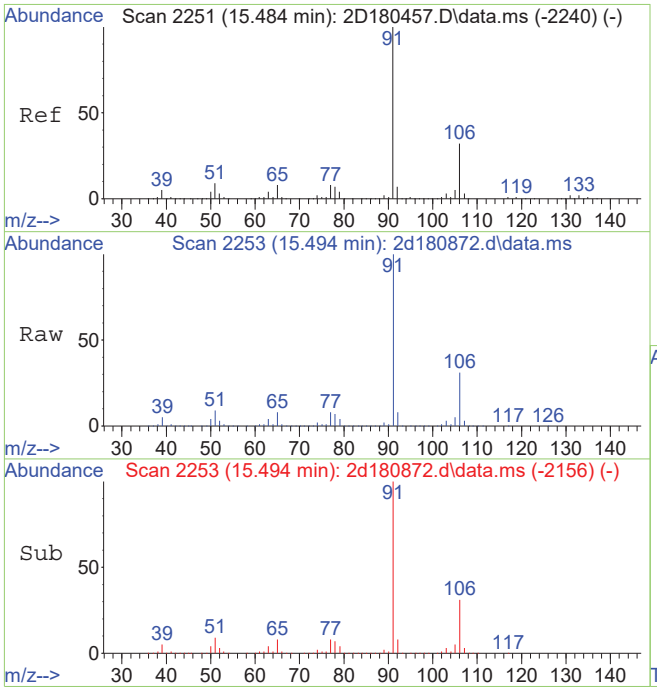


#76
toluene
Concen: 124.64 ug/L
RT: 13.418 min Scan# 1857
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 92 Resp: 1612864

Ion	Ratio	Lower	Upper
92	100		
91	169.0	148.1	188.1
65	18.7	0.0	38.8

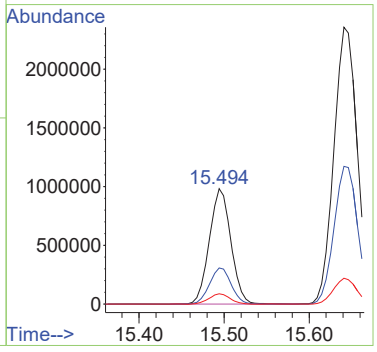


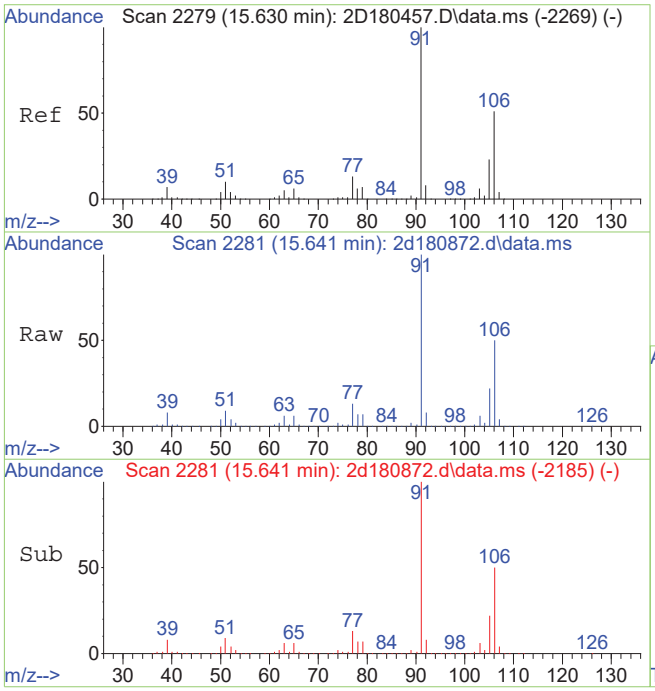


#89
ethylbenzene
Concen: 70.22 ug/L
RT: 15.494 min Scan# 2253
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 91 Resp: 1731763

Ion	Ratio	Lower	Upper
91	100		
106	31.3	1.6	61.6
51	9.0	0.0	39.0

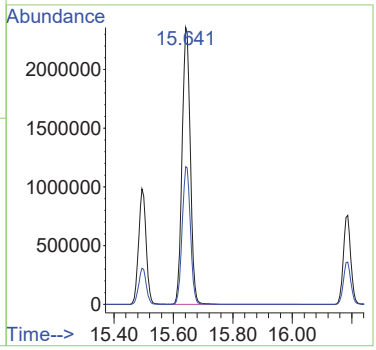


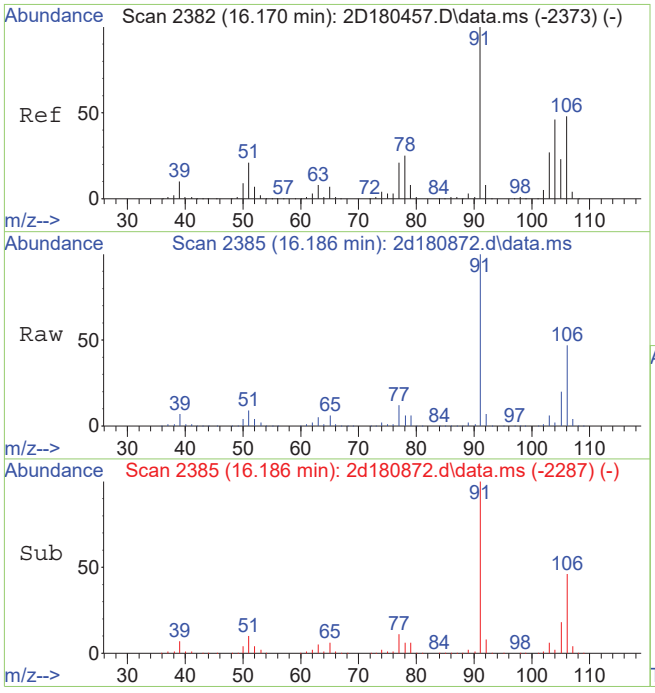


#90
m,p-xylene
Concen: 241.69 ug/L
RT: 15.641 min Scan# 2281
Delta R.T. 0.005 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 91 Resp: 4531304

Ion	Ratio	Lower	Upper
91	100		
106	49.7	21.1	81.1

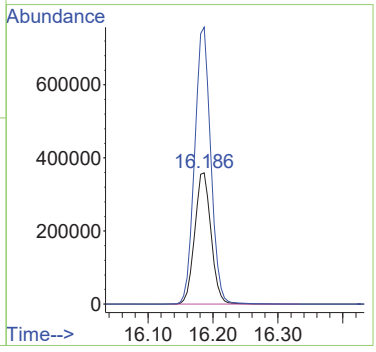


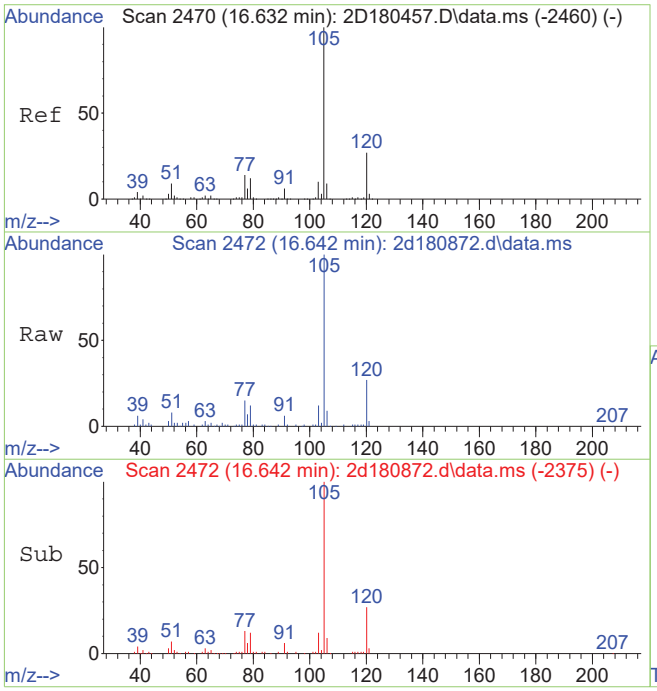


#91
o-xylene
Concen: 66.22 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:106 Resp: 628857

Ion	Ratio	Lower	Upper
106	100		
91	210.8	179.9	239.9

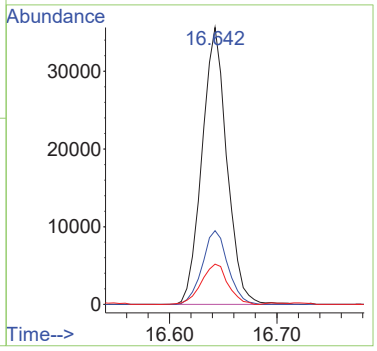


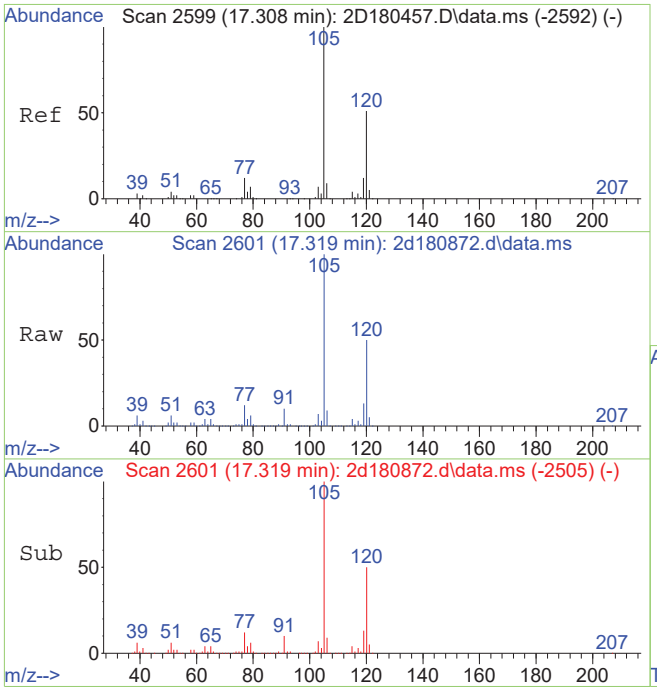


#96
isopropylbenzene
Concen: 2.34 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:105 Resp: 57678

Ion	Ratio	Lower	Upper
105	100		
120	26.6	6.7	46.7
77	14.6	0.0	34.2

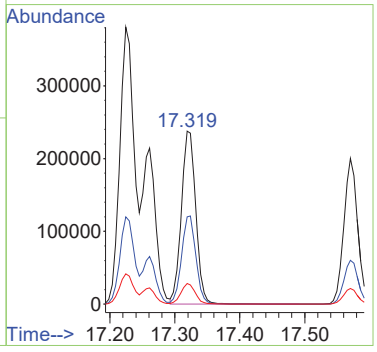


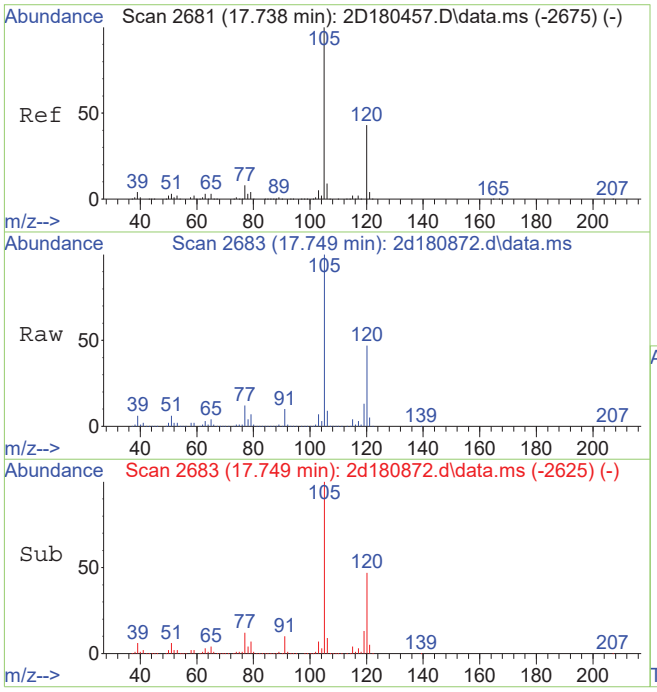


#107
1,3,5-trimethylbenzene
Concen: 17.38 ug/L
RT: 17.319 min Scan# 2601
Delta R.T. 0.005 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:105 Resp: 367619

Ion	Ratio	Lower	Upper
105	100		
120	50.3	20.7	80.7
77	11.9	0.0	42.0

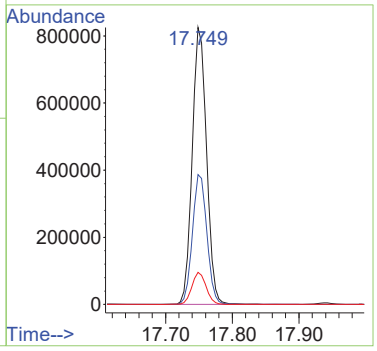


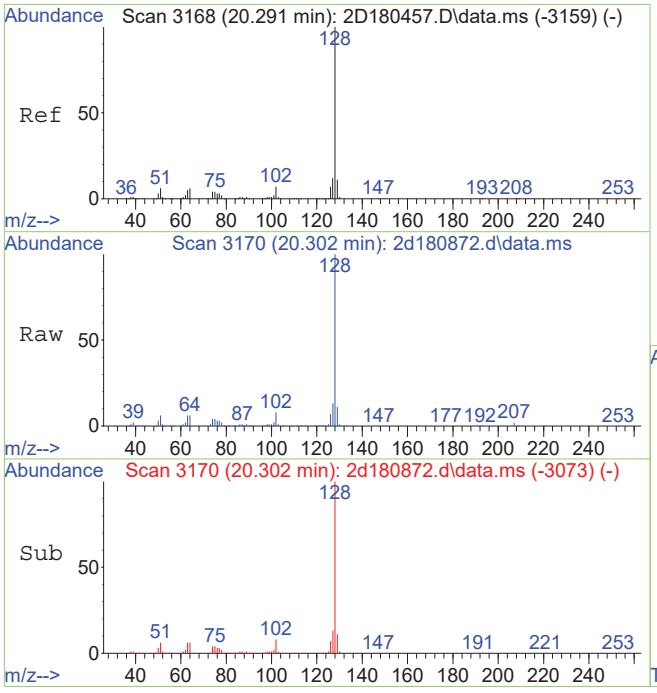


#109
1,2,4-trimethylbenzene
Concen: 56.92 ug/L
RT: 17.749 min Scan# 2683
Delta R.T. 0.005 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:105 Resp: 1223214

Ion	Ratio	Lower	Upper
105	100		
120	46.8	16.7	76.7
77	11.6	0.0	41.8

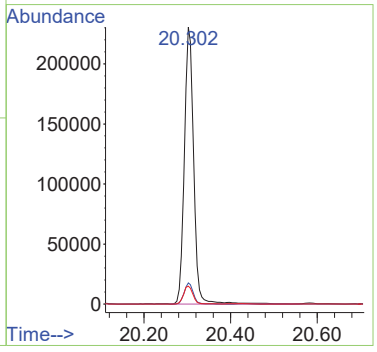




#121
naphthalene
Concen: 19.16 ug/L
RT: 20.302 min Scan# 3170
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:128 Resp: 346747

Ion	Ratio	Lower	Upper
128	100		
102	7.7	0.0	37.5
51	6.5	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180864.d
Acq On : 10 Jan 2019 11:20 am
Operator : EddieH
Sample : JC80990-10 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 8 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:04 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

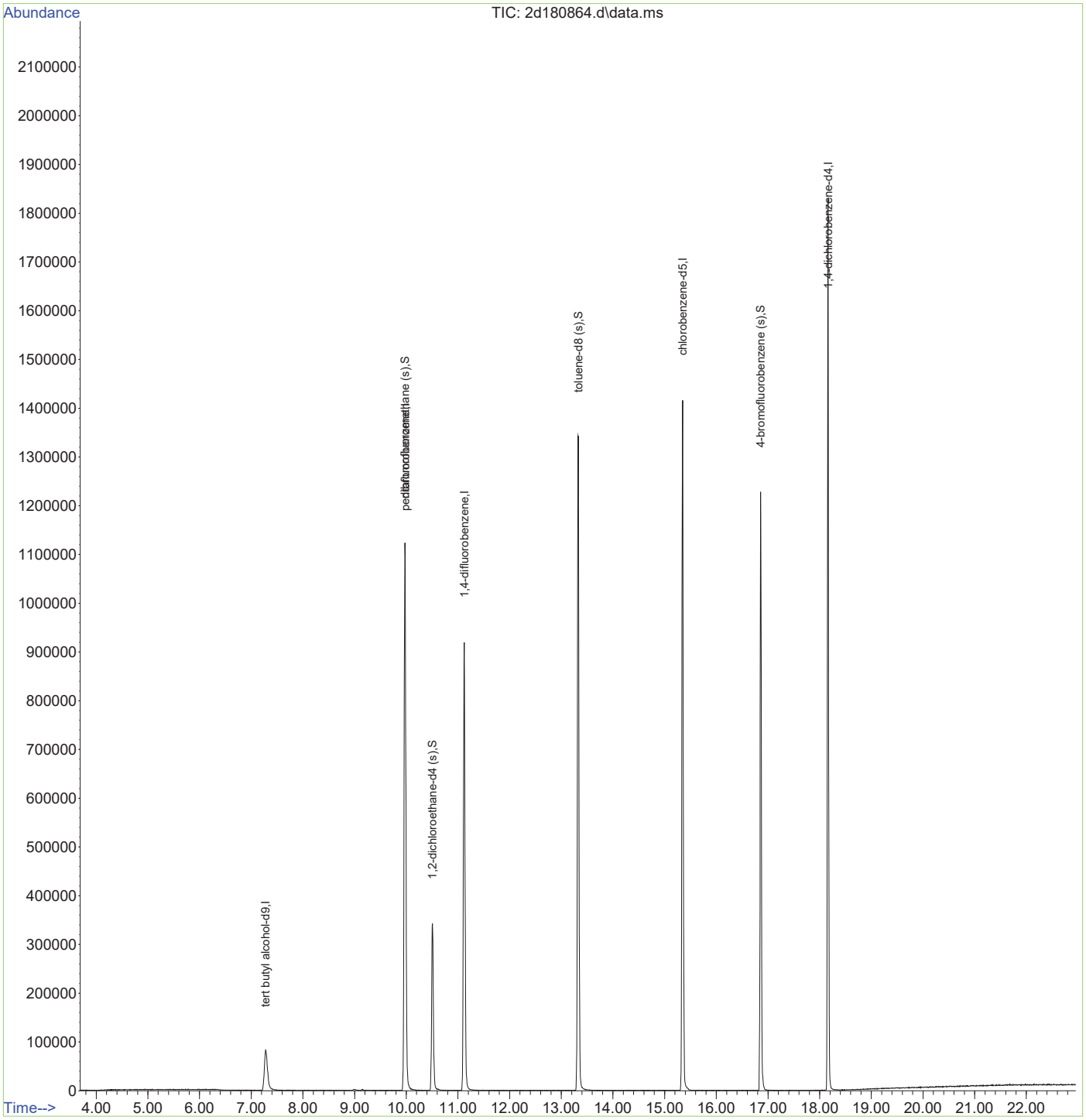
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	198203	500.00	ug/L	0.02
5) pentafluorobenzene	9.978	168	706736	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	961290	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	914377	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	484844	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	292061	49.82	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.64%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	296122	50.11	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.22%			
75) toluene-d8 (s)	13.329	98	1080888	49.14	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.28%			
99) 4-bromofluorobenzene (s)	16.857	95	411658	47.89	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.78%			
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180864.d
Acq On : 10 Jan 2019 11:20 am
Operator : EddieH
Sample : JC80990-10 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 8 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:04 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180863.d
Acq On : 10 Jan 2019 10:51 am
Operator : EddieH
Sample : JC80990-11 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 7 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:28:33 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	198132	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	702511	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	961271	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	912114	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	485471	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	289966	49.76	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.52%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	296365	50.16	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.32%			
75) toluene-d8 (s)	13.329	98	1078674	49.16	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.32%			
99) 4-bromofluorobenzene (s)	16.857	95	408117	47.42	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.84%			
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration (+) = signals summed

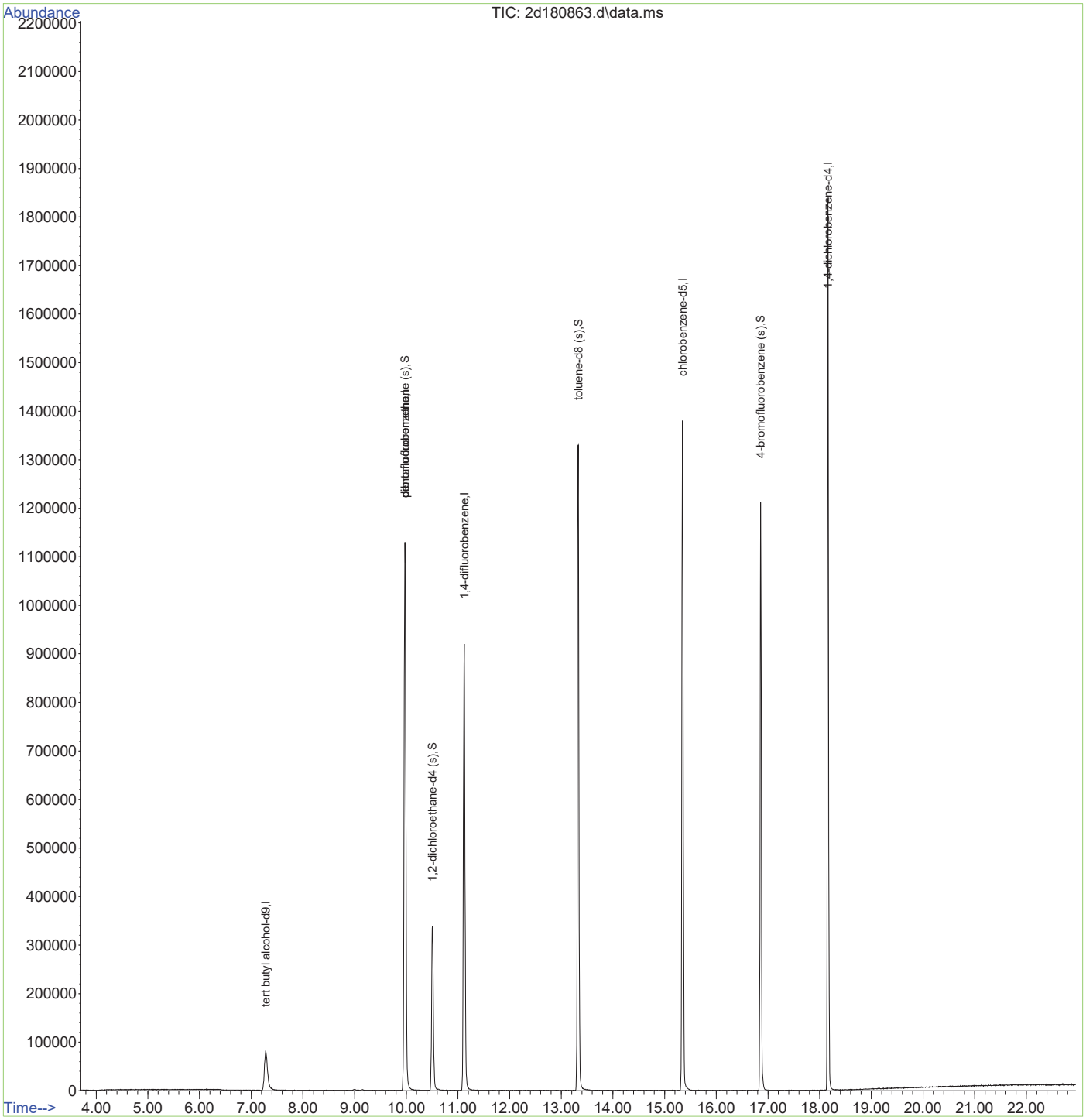
7.1.17

7

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180863.d
Acq On : 10 Jan 2019 10:51 am
Operator : EddieH
Sample : JC80990-11 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 7 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:28:33 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\v2d7694\
Data File : 2d180862.d
Acq On : 10 Jan 2019 10:21 am
Operator : EddieH
Sample : JC80990-12 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 6 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 04:47:19 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	199055	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	718034	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	971540	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	925119	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	490006	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	297329	49.92	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.84%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	300849	50.38	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.76%			
75) toluene-d8 (s)	13.323	98	1088241	48.90	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.80%			
99) 4-bromofluorobenzene (s)	16.857	95	413702	47.62	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.24%			
Target Compounds						Qvalue

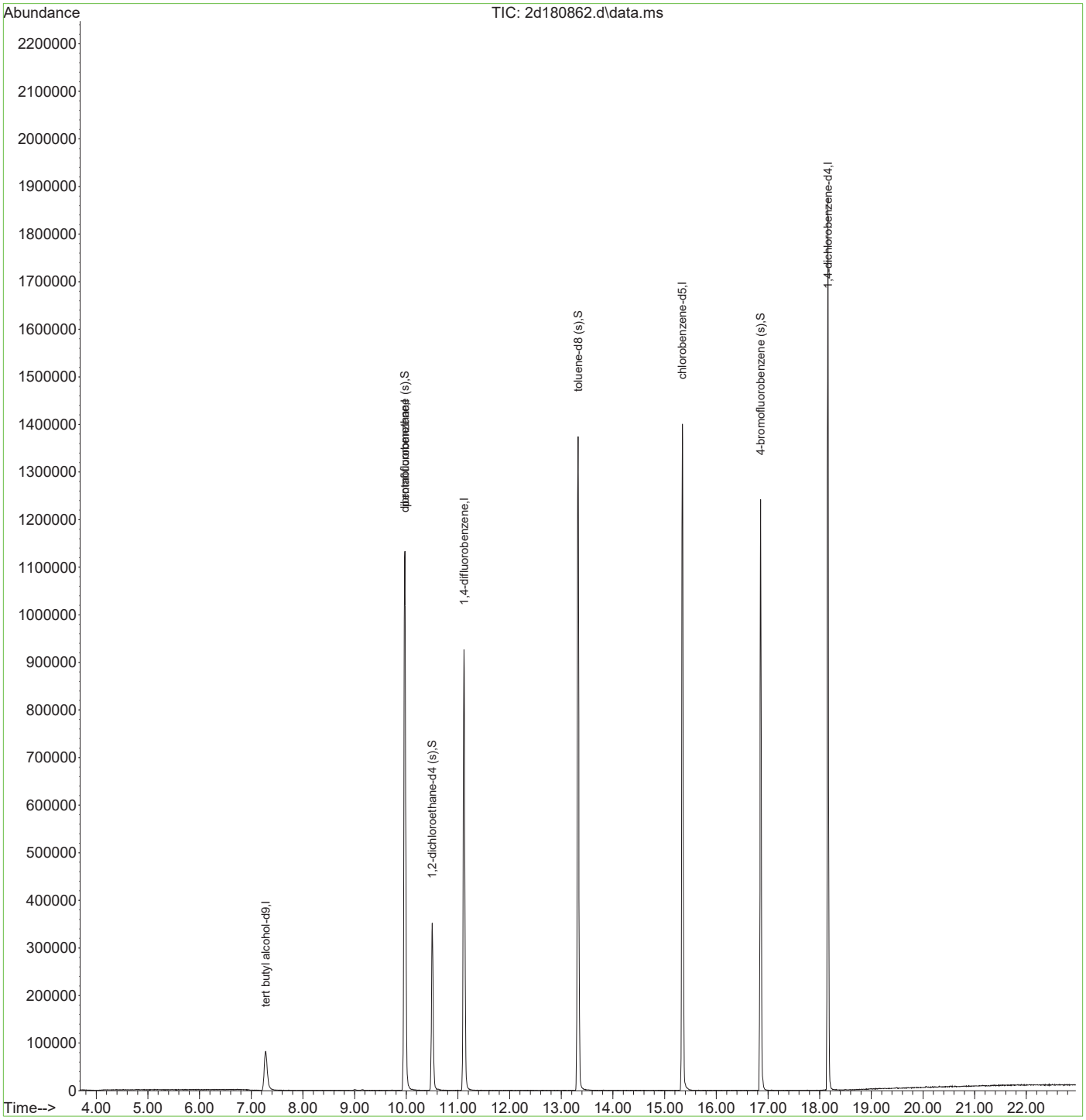
(#) = qualifier out of range (m) = manual integration (+) = signals summed

7.1.18
7

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\v2d7694\
Data File : 2d180862.d
Acq On : 10 Jan 2019 10:21 am
Operator : EddieH
Sample : JC80990-12 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 6 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 04:47:19 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



M2D7670.M Fri Jan 11 05:17:25 2019 Page: 2

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180815.d
Acq On : 9 Jan 2019 8:52 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS31817,V2D7692,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:15:46 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

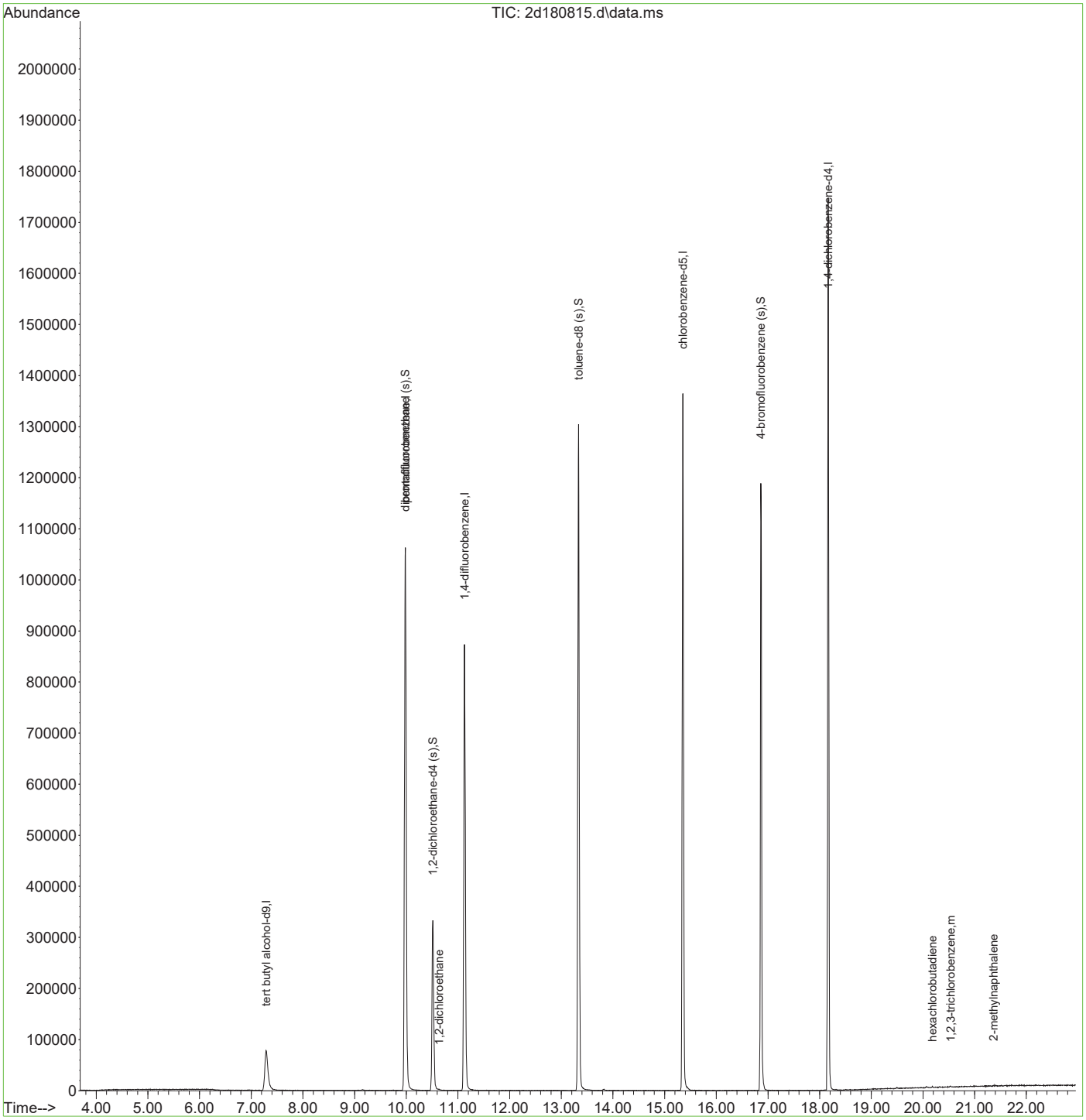
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.289	65	191374	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	668765	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	909192	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	876449	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	464601	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.979	113	279277	50.35	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.70%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	286365	51.24	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 102.48%			
75) toluene-d8 (s)	13.334	98	1026060	48.66	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.32%			
99) 4-bromofluorobenzene (s)	16.863	95	395994	48.08	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.16%			
Target Compounds						Qvalue
59) 1,2-dichloroethane	10.634	62	1098	0.18	ug/L	89
120) hexachlorobutadiene	20.181	225	644	0.13	ug/L	94
124) 1,2,3-trichlorobenzene	20.533	180	786	0.10	ug/L	86
126) 2-methylnaphthalene	21.366	142	275	2.42	ug/L #	64

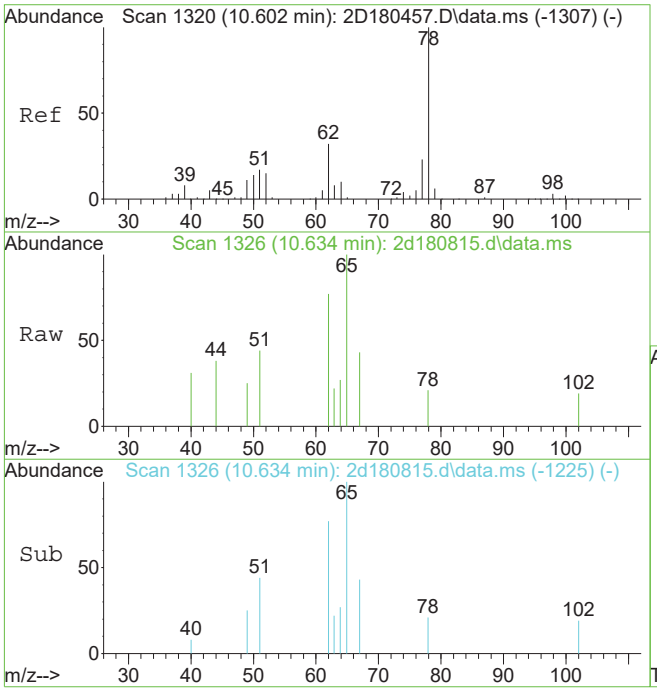
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\01-10-19\v2d7692\
Data File : 2d180815.d
Acq On : 9 Jan 2019 8:52 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS31817,V2D7692,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:15:46 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

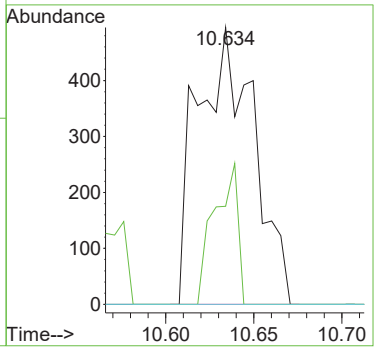


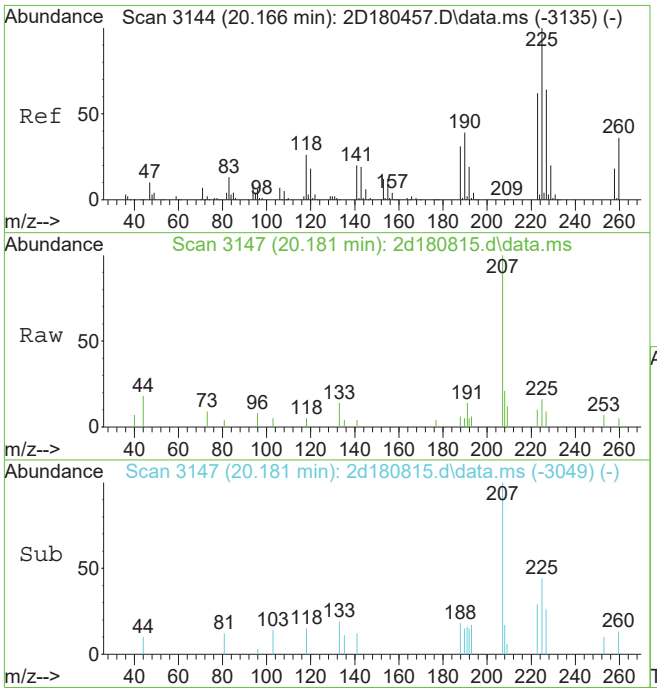


#59
1,2-dichloroethane
Concen: 0.18 ug/L
RT: 10.634 min Scan# 1326
Delta R.T. 0.032 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion: 62 Resp: 1098

Ion	Ratio	Lower	Upper
62	100		
64	35.4	1.9	61.9
98	0.0	0.0	39.6

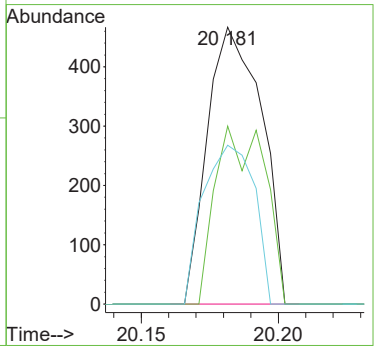


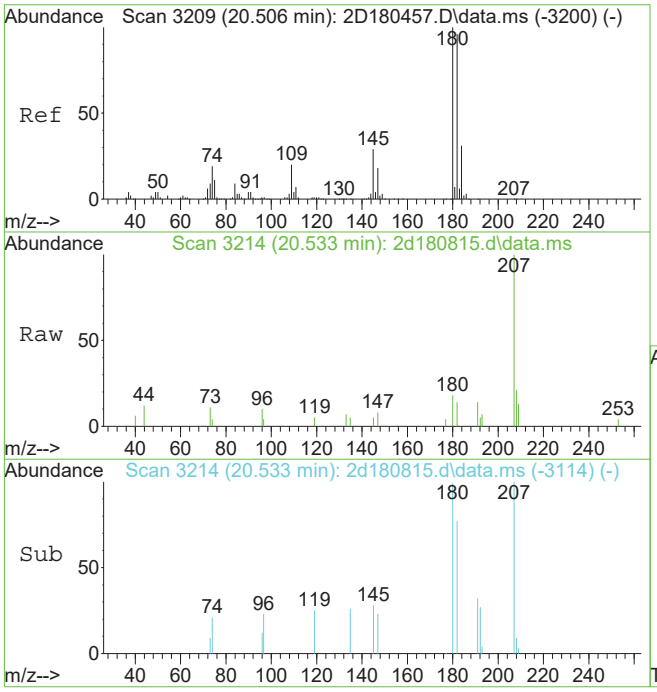


#120
hexachlorobutadiene
Concen: 0.13 ug/L
RT: 20.181 min Scan# 3147
Delta R.T. 0.016 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion:225 Resp: 644

Ion	Ratio	Lower	Upper
225	100		
223	64.2	31.8	91.8
227	57.4	33.7	93.7

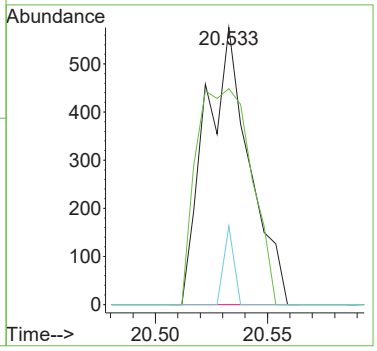


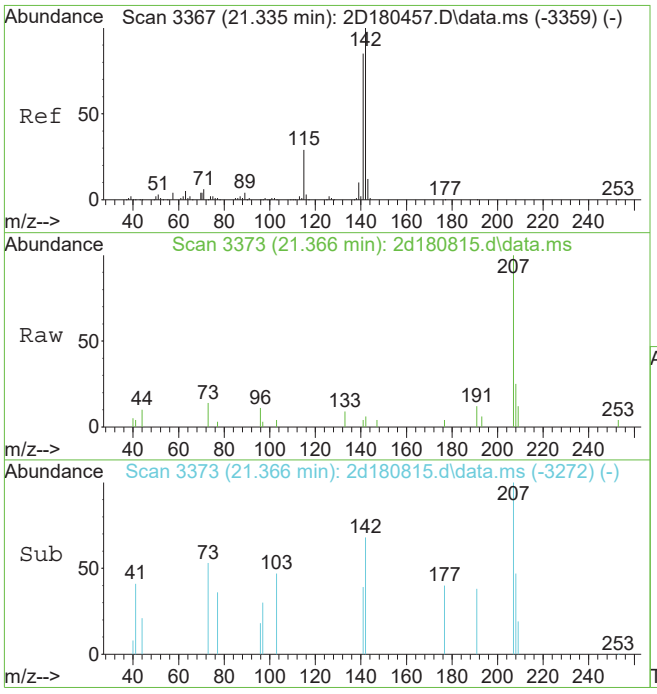


#124
1,2,3-trichlorobenzene
Concen: 0.10 ug/L
RT: 20.533 min Scan# 3214
Delta R.T. 0.026 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion:180 Resp: 786

Ion	Ratio	Lower	Upper
180	100		
182	78.0	65.6	125.6
145	28.3	0.0	58.8

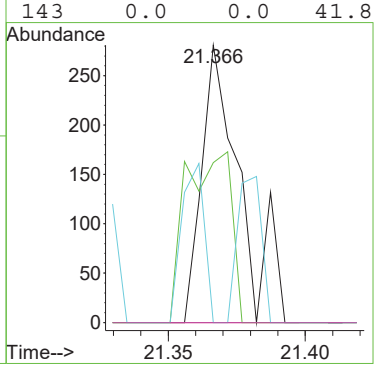




#126
2-methylnaphthalene
Concen: 2.42 ug/L
RT: 21.366 min Scan# 3373
Delta R.T. 0.032 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion:142 Resp: 275

Ion	Ratio	Lower	Upper
142	100		
141	57.7	65.4	105.4#
115	0.0	0.0	58.6
143	0.0	0.0	41.8



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180861.d
Acq On : 10 Jan 2019 9:40 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS30376,V2D7694,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:27:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

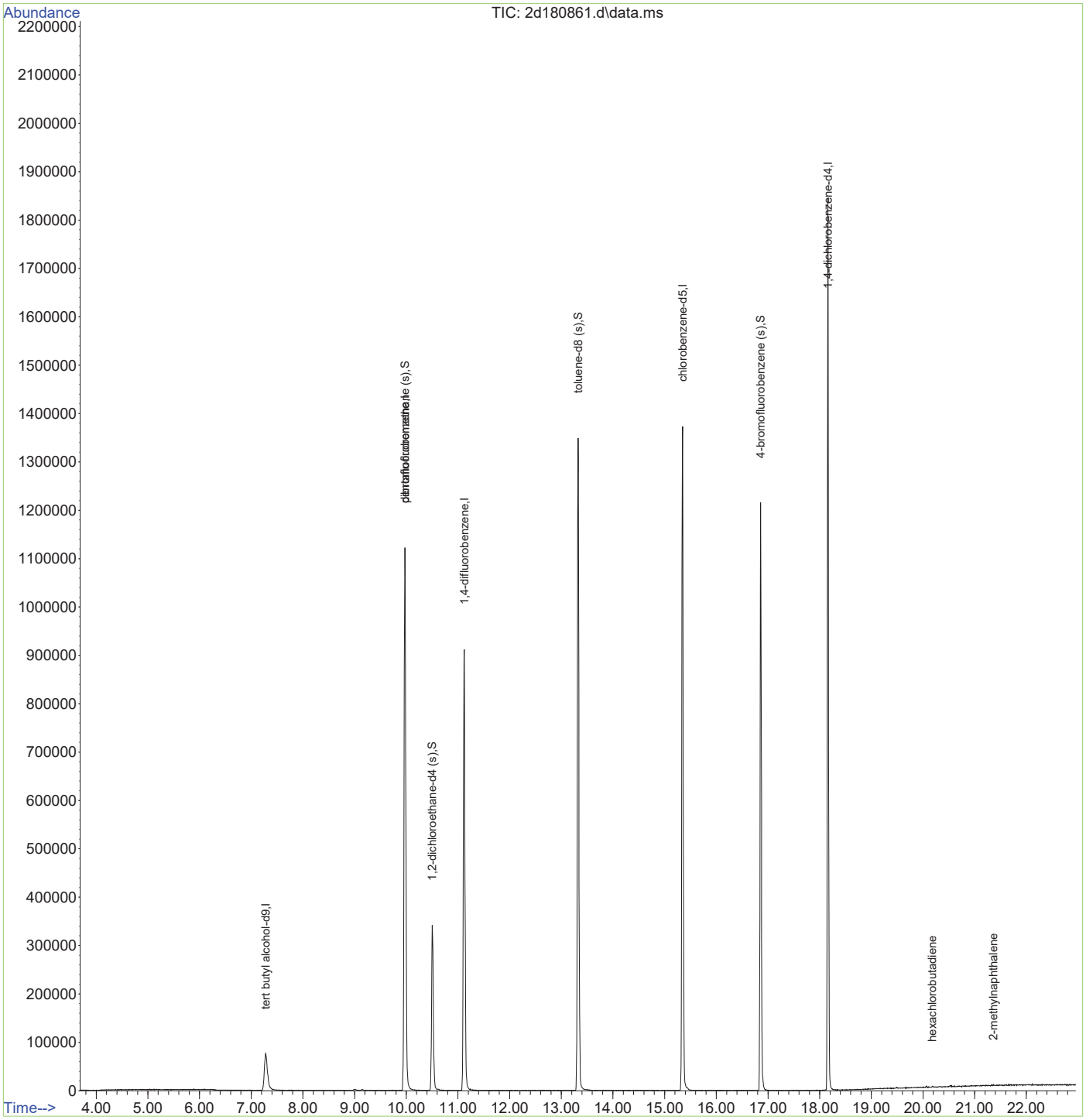
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	188785	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	707549	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	956305	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	915285	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	487870	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	289116	49.26	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.52%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	296612	50.46	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.92%			
75) toluene-d8 (s)	13.323	98	1076753	48.90	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.80%			
99) 4-bromofluorobenzene (s)	16.857	95	409716	47.37	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.74%			
Target Compounds						Qvalue
120) hexachlorobutadiene	20.176	225	667	0.12	ug/L	82
126) 2-methylnaphthalene	21.361	142	293	2.42	ug/L #	62

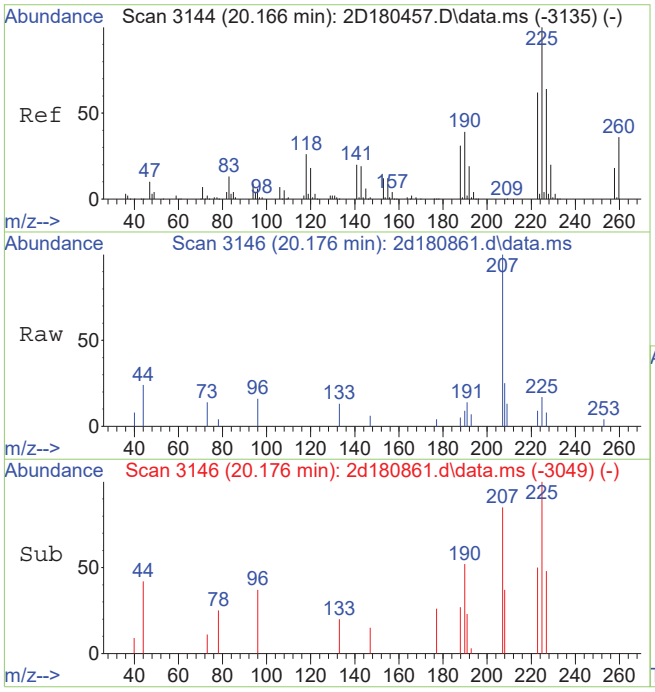
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180861.d
Acq On : 10 Jan 2019 9:40 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS30376,V2D7694,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : C:\msdchem\1\METHODS\M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:27:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

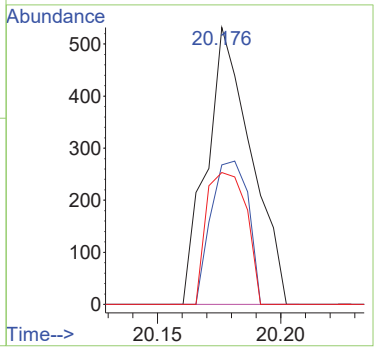


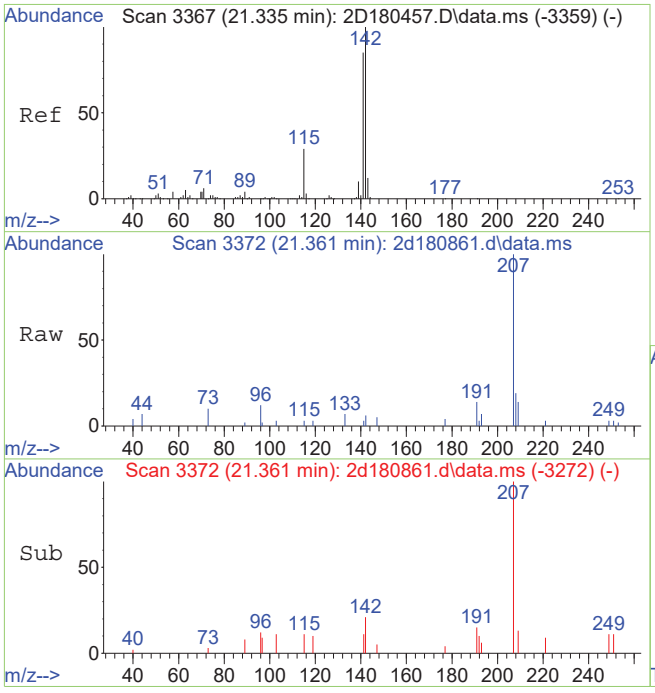


#120
hexachlorobutadiene
Concen: 0.12 ug/L
RT: 20.176 min Scan# 3146
Delta R.T. 0.010 min
Lab File: 2d180861.d
Acq: 10 Jan 2019 9:40 am

Tgt Ion:225 Resp: 667

Ion	Ratio	Lower	Upper
225	100		
223	50.4	31.8	91.8
227	47.6	33.7	93.7

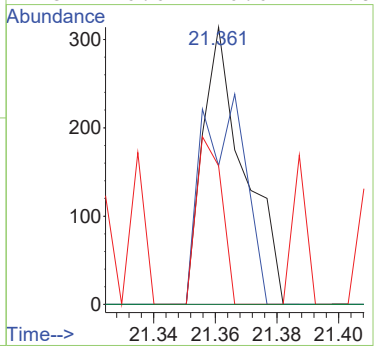




#126
2-methylnaphthalene
Concen: 2.42 ug/L
RT: 21.361 min Scan# 3372
Delta R.T. 0.026 min
Lab File: 2d180861.d
Acq: 10 Jan 2019 9:40 am

Tgt Ion:142 Resp: 293

Ion	Ratio	Lower	Upper
142	100		
141	50.0	65.4	105.4#
115	50.0	0.0	58.6
143	0.0	0.0	41.8



GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- GC Identification Summaries (Hits)
- Surrogate Recovery Summaries
- GC Surrogate Retention Time Summaries
- Initial and Continuing Calibration Summaries

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6218-MB2	GH116731.D	1	01/09/19	XPL	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	34	ug/l	

CAS No.	Surrogate Recoveries		Limits
111-27-3	Hexanol	80%	56-145%
111-27-3	Hexanol	88%	56-145%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6219-MB1	GH116743.D	1	01/11/19	XPL	n/a	n/a	GGH6219

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	34	ug/l	

CAS No.	Surrogate Recoveries		Limits
111-27-3	Hexanol	77%	56-145%
111-27-3	Hexanol	89%	56-145%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6218-MB1	GH116722.D	1	01/09/19	XPL	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

GGH6218-BS, JC80750-1MS, JC80750-1MSD

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	34	ug/l	

CAS No.	Surrogate Recoveries		Limits
111-27-3	Hexanol	77%	56-145%
111-27-3	Hexanol	82%	56-145%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP17739-MB1	7G30930.D	1	01/10/19	VDT	01/10/19	OP17739	G7G1085

The QC reported here applies to the following samples: **Method:** SW846-8011

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	0.0053	ug/l	

CAS No.	Surrogate Recoveries		Limits
3017-95-6	2-Bromo-1-chloropropane	83%	20-144%
3017-95-6	2-Bromo-1-chloropropane	86%	20-144%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1617-MB	AA70305.D	1	01/10/19	PC	n/a	n/a	GAA1617

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.11	0.060	ug/l	
74-84-0	Ethane	ND	0.23	0.099	ug/l	
74-85-1	Ethene	ND	0.31	0.072	ug/l	

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5151-MB	WW134881.D	1	01/10/19	PC	n/a	n/a	GWW5151

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
124-38-9	Carbon Dioxide	ND	50	4.4	ug/l	

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5152-MB	WW134901.D	1	01/11/19	PC	n/a	n/a	GWW5152

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
124-38-9	Carbon Dioxide	ND	50	4.4	ug/l	

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1618-MB	AA70332.D	1	01/11/19	PC	n/a	n/a	GAA1618

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.11	0.060	ug/l	
74-84-0	Ethane	ND	0.23	0.099	ug/l	
74-85-1	Ethene	ND	0.31	0.072	ug/l	

Blank Spike Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6218-BS	GH116723.D	1	01/09/19	XPL	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
64-17-5	Ethanol	5000	5290	106	74-123

CAS No.	Surrogate Recoveries	BSP	Limits
111-27-3	Hexanol	103%	56-145%
111-27-3	Hexanol	125%	56-145%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6219-BS	GH116744.D	1	01/11/19	XPL	n/a	n/a	GGH6219

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
64-17-5	Ethanol	5000	6030	121	74-123

CAS No.	Surrogate Recoveries	BSP	Limits
111-27-3	Hexanol	91%	56-145%
111-27-3	Hexanol	104%	56-145%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP17739-BS1	7G30931.D	1	01/10/19	VDT	01/10/19	OP17739	G7G1085
OP17739-BSD	7G30932.D	1	01/10/19	VDT	01/10/19	OP17739	G7G1085

The QC reported here applies to the following samples: **Method:** SW846-8011

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
106-93-4	1,2-Dibromoethane	0.5	0.52	104	0.52	104	0	60-140/32

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
3017-95-6	2-Bromo-1-chloropropane	84%	90%	20-144%
3017-95-6	2-Bromo-1-chloropropane	85%	92%	20-144%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1617-LCS	AA70303.D	1	01/10/19	PC	n/a	n/a	GAA1617

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
74-82-8	Methane	11	11.6	105	59-134
74-84-0	Ethane	23	22.9	100	63-135
74-85-1	Ethene	31	28.1	91	62-133

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5151-LCS	WW134879.D	1	01/10/19	PC	n/a	n/a	GWW5151

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
124-38-9	Carbon Dioxide	164	158	96	66-114

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5152-LCS	WW134899.D	1	01/11/19	PC	n/a	n/a	GWW5152

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
124-38-9	Carbon Dioxide	164	160	98	66-114

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1618-LCS	AA70329.D	1	01/11/19	PC	n/a	n/a	GAA1618

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
74-82-8	Methane	11	13.1	119	59-134
74-84-0	Ethane	23	28.0	122	63-135
74-85-1	Ethene	31	37.3	120	62-133

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80750-1MS	GH116726.D	1	01/09/19	XPL	n/a	n/a	GGH6218
JC80750-1MSD	GH116727.D	1	01/09/19	XPL	n/a	n/a	GGH6218
JC80750-1	GH116725.D	1	01/09/19	XPL	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-10, JC80990-11

CAS No.	Compound	JC80750-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
64-17-5	Ethanol	100		5000	4440	87	5000	5000	98	12	58-145/27

CAS No.	Surrogate Recoveries	MS	MSD	JC80750-1	Limits
111-27-3	Hexanol	109%	132%	145%	56-145%
111-27-3	Hexanol	100%	89%	105%	56-145%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7MS	GH116746.D	1	01/11/19	XPL	n/a	n/a	GGH6219
JC80990-7MSD	GH116747.D	1	01/11/19	XPL	n/a	n/a	GGH6219
JC80990-7	GH116745.D	1	01/11/19	XPL	n/a	n/a	GGH6219

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
64-17-5	Ethanol	100	U	5000	4510	90	5000	5180	104	14	58-145/27

CAS No.	Surrogate Recoveries	MS	MSD	JC80990-7	Limits
111-27-3	Hexanol	96%	98%	90%	56-145%
111-27-3	Hexanol	79%	84%	80%	56-145%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP17739-MS	7G30946.D	1	01/10/19	VDT	01/10/19	OP17739	G7G1085
OP17739-MSD	7G30947.D	1	01/10/19	VDT	01/10/19	OP17739	G7G1085
JC80990-7	7G30941.D	1	01/10/19	VDT	01/10/19	OP17739	G7G1085

The QC reported here applies to the following samples: **Method:** SW846-8011

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11

CAS No.	Compound	JC80990-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
106-93-4	1,2-Dibromoethane	0.020	U	0.5	0.35	70	0.499	0.49	98	33	60-140/43

CAS No.	Surrogate Recoveries	MS	MSD	JC80990-7	Limits
3017-95-6	2-Bromo-1-chloropropane	85%	87%	93%	20-144%
3017-95-6	2-Bromo-1-chloropropane	77%	87%	90%	20-144%

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7DUP [a]	WW134892.D	1	01/10/19	PC	n/a	n/a	GWW5151
JC80990-7 [b]	WW134891.D	1	01/10/19	PC	n/a	n/a	GWW5151

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	DUP ug/l	Q	RPD	Limits
124-38-9	Carbon Dioxide	7160		7250		1	20

(a) (pH = 7(Sample is not acid preserved. Sample analyzed within 7 days
(b) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7DUP	AA70321.D	1	01/10/19	PC	n/a	n/a	GAA1617
JC80990-7	AA70320.D	1	01/10/19	PC	n/a	n/a	GAA1617
JC80990-7	AA70322.D	100	01/10/19	PC	n/a	n/a	GAA1617

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	5130 [a]		3630	E	1	20
74-84-0	Ethane	0.23 U		ND		nc	20
74-85-1	Ethene	0.31 U		ND		nc	20

(a) Result is from Run #2.

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC81068-1DUP [a]	WW134906.D	20	01/11/19	PC	n/a	n/a	GWW5152
JC81068-1 [a]	WW134905.D	20	01/11/19	PC	n/a	n/a	GWW5152

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	JC81068-1 ug/l	Q	DUP ug/l	Q	RPD	Limits
124-38-9	Carbon Dioxide	157000		150000		5	20

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

8.6.3

8

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC81071-2DUP	AA70338.D	1	01/11/19	PC	n/a	n/a	GAA1618
JC81071-2	AA70337.D	1	01/11/19	PC	n/a	n/a	GAA1618

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	JC81071-2 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	4.8		4.6		4	20
74-84-0	Ethane	ND		ND		nc	20
74-85-1	Ethene	ND		ND		nc	20

8.6.4

8

* = Outside of Control Limits.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	GGH6218-BS	**Injection Date:**	01/09/19
Lab File ID:	GH116723.D	**Injection Time:**	08:36
Client ID:	Blank Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.64	0.64	7020		ug/l	28.1
Ethanol	2 [a]	1.56	1.56	5290		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	GGH6219-BS	**Injection Date:**	01/11/19
Lab File ID:	GH116744.D	**Injection Time:**	06:54
Client ID:	Blank Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.66	0.65	8090		ug/l	29.2
Ethanol	2 [a]	1.59	1.59	6030		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80750-1MS	**Injection Date:**	01/09/19
Lab File ID:	GH116726.D	**Injection Time:**	09:32
Client ID:	Matrix Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.64	0.64	6830		ug/l	42.4
Ethanol	2 [a]	1.56	1.56	4440		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80990-7MS	**Injection Date:**	01/11/19
Lab File ID:	GH116746.D	**Injection Time:**	07:31
Client ID:	Matrix Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.65	0.65	6460		ug/l	35.6
Ethanol	2 [a]	1.59	1.59	4510		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80750-1MSD	**Injection Date:**	01/09/19
Lab File ID:	GH116727.D	**Injection Time:**	09:50
Client ID:	Matrix Spike Duplicate		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.64	0.64	6140		ug/l	20.5
Ethanol	2 [a]	1.56	1.56	5000		ug/l	

(a) QC results reported from this column.

8.7.5

8

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80990-7MSD	**Injection Date:**	01/11/19
Lab File ID:	GH116747.D	**Injection Time:**	07:50
Client ID:	Matrix Spike Duplicate		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.65	0.65	6520		ug/l	22.9
Ethanol	2 [a]	1.59	1.59	5180		ug/l	

(a) QC results reported from this column.

Surrogate Recovery Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846-8015D (DAI) **Matrix:** AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 [a]	S1 [b]
JC80990-1	GH116732.D	105	73
JC80990-2	GH116733.D	111	80
JC80990-3	GH116734.D	120	85
JC80990-4	GH116735.D	110	86
JC80990-5	GH116736.D	108	92
JC80990-6	GH116737.D	97	102
JC80990-7	GH116745.D	90	80
JC80990-8	GH116748.D	109	121
JC80990-9	GH116749.D	98	85
JC80990-10	GH116739.D	113	85
JC80990-11	GH116738.D	107	81
GGH6218-BS	GH116723.D	103	125
GGH6218-MB2	GH116731.D	80	88
GGH6219-BS	GH116744.D	91	104
GGH6219-MB1	GH116743.D	77	89
JC80750-1MS	GH116726.D	109	100
JC80750-1MSD	GH116727.D	132	89
JC80990-7MS	GH116746.D	96	79
JC80990-7MSD	GH116747.D	98	84
GGH6218-MB1	GH116722.D	77	82

Surrogate Compounds	Recovery Limits
S1 = Hexanol	56-145%

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

Surrogate Recovery Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846-8011 **Matrix:** AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 [a]	S1 [b]
JC80990-1	7G30933.D	77	81
JC80990-2	7G30934.D	79	86
JC80990-3	7G30935.D	77	81
JC80990-4	7G30936.D	78	82
JC80990-5	7G30937.D	68	73
JC80990-6	7G30940.D	75	72
JC80990-7	7G30941.D	93	90
JC80990-8	7G30942.D	68	90
JC80990-9	7G30943.D	66	72
JC80990-10	7G30944.D	89	88
JC80990-11	7G30945.D	86	84
OP17739-BS1	7G30931.D	84	85
OP17739-BSD	7G30932.D	90	92
OP17739-MB1	7G30930.D	83	86
OP17739-MS	7G30946.D	85	77
OP17739-MSD	7G30947.D	87	87

Surrogate Compounds	Recovery Limits
S1 = 2-Bromo-1-chloropropane	20-144%

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

	S1 [a] RT	S1 [b] RT
Check Std	6.14	5.02

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
GGH6218-MB1	GH116722.D	01/09/19	08:18	6.14	5.02
GGH6218-BS	GH116723.D	01/09/19	08:36	6.14	5.01
ZZZZZZ	GH116724.D	01/09/19	08:55	6.14	5.01
JC80750-1	GH116725.D	01/09/19	09:13	6.14	5.01
JC80750-1MS	GH116726.D	01/09/19	09:32	6.14	5.01
JC80750-1MSD	GH116727.D	01/09/19	09:50	6.14	5.01
ZZZZZZ	GH116728.D	01/09/19	10:09	6.15	5.01
ZZZZZZ	GH116729.D	01/09/19	10:27	6.14	5.02

Surrogate Compounds

S1 = Hexanol

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116730.D	**Injection Time:**	10:46
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

	S1 [a] RT	S1 [b] RT
Check Std	6.14	5.01

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
GGH6218-MB2	GH116731.D	01/09/19	11:04	6.14	5.01
JC80990-1	GH116732.D	01/09/19	11:23	6.14	5.02
JC80990-2	GH116733.D	01/09/19	11:41	6.14	5.01
JC80990-3	GH116734.D	01/09/19	12:00	6.14	5.01
JC80990-4	GH116735.D	01/09/19	12:18	6.14	5.01
JC80990-5	GH116736.D	01/09/19	12:37	6.14	5.01
JC80990-6	GH116737.D	01/09/19	12:55	6.14	5.01
JC80990-11	GH116738.D	01/09/19	13:13	6.14	5.01
JC80990-10	GH116739.D	01/09/19	13:32	6.15	5.01

Surrogate Compounds

S1 = Hexanol

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

	S1 [a] RT	S1 [b] RT
Check Std	6.17	5.03

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
GGH6219-MB1	GH116743.D	01/11/19	06:35	6.17	5.03
GGH6219-BS	GH116744.D	01/11/19	06:54	6.16	5.03
JC80990-7	GH116745.D	01/11/19	07:13	6.16	5.04
JC80990-7MS	GH116746.D	01/11/19	07:31	6.17	5.03
JC80990-7MSD	GH116747.D	01/11/19	07:50	6.17	5.03
JC80990-8	GH116748.D	01/11/19	08:08	6.17	5.03
JC80990-9	GH116749.D	01/11/19	08:27	6.17	5.03
ZZZZZZ	GH116750.D	01/11/19	08:45	6.17	5.03
ZZZZZZ	GH116751.D	01/11/19	09:04	6.17	5.03

Surrogate Compounds

S1 = Hexanol

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	G7G1085-CC999	**Injection Date:**	01/10/19
Lab File ID:	7G30928.D	**Injection Time:**	16:54
Instrument ID:	GC7G	**Method:**	SW846-8011

	S1 [a] RT	S1 [b] RT
Check Std	2.93	2.51

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
OP17739-MB1	7G30930.D	01/10/19	17:32	2.92	2.51
OP17739-BS1	7G30931.D	01/10/19	17:51	2.93	2.51
OP17739-BSD	7G30932.D	01/10/19	18:09	2.93	2.51
JC80990-1	7G30933.D	01/10/19	18:28	2.92	2.51
JC80990-2	7G30934.D	01/10/19	18:47	2.93	2.52
JC80990-3	7G30935.D	01/10/19	19:06	2.93	2.51
JC80990-4	7G30936.D	01/10/19	19:24	2.93	2.51
JC80990-5	7G30937.D	01/10/19	19:43	2.92	2.51

Surrogate Compounds

S1 = 2-Bromo-1-chloropropane

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	G7G1085-CC999	**Injection Date:**	01/10/19
Lab File ID:	7G30938.D	**Injection Time:**	20:02
Instrument ID:	GC7G	**Method:**	SW846-8011

	S1 [a] RT	S1 [b] RT
Check Std	2.93	2.51

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
JC80990-6	7G30940.D	01/10/19	20:39	2.92	2.51
JC80990-7	7G30941.D	01/10/19	20:58	2.93	2.51
JC80990-8	7G30942.D	01/10/19	21:17	2.92	2.51
JC80990-9	7G30943.D	01/10/19	21:36	2.92	2.51
JC80990-10	7G30944.D	01/10/19	21:54	2.93	2.51
JC80990-11	7G30945.D	01/10/19	22:13	2.93	2.51
OP17739-MS	7G30946.D	01/10/19	22:32	2.93	2.51
OP17739-MSD	7G30947.D	01/10/19	22:51	2.93	2.51

Surrogate Compounds

S1 = 2-Bromo-1-chloropropane

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

Initial Calibration Summary

Job Number: JC80990 **Sample:** G7G999-ICC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G29210.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report HP G1530A

Method : C:\MSDCHEM\1\METHODS\7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Wed Aug 08 12:07:45 2018
Response via : Initial Calibration

Calibration Files
2 =7g29209.D 1 =7g29210.D 0.5 =7g29211.D 0.2 =7g29212.D
0.1 =7g29213.D 0.02 =7g29214.D

	Compound	2	1	0.5	0.2	0.1	0.02	Avg		%RSD
1) S	2-Bromo-1-Chloropro	1.255	1.306	1.355	1.454	1.444		1.363	E6	6.33
2)	1,2-Dibromoethane	7.227	7.499	7.436	7.386	6.188	6.729	7.077	E6	7.31
3)	1,2,3-Trichloroprop	8.559	8.958	8.911	8.812	8.182	9.793	8.869	E5	6.04
4)	1,2-Dibromo-3-Chlor	1.639	1.636	1.625	1.631	1.526	1.540	1.599	E7	3.24

Signal #2

1) S	2-Bromo-1-Chloropro	1.539	1.645	1.729	1.895	1.860		1.734	E6	8.54
2)	1,2-Dibromoethane	0.855	0.908	0.947	1.022	1.028	0.917	0.946	E7	7.18
3)	1,2,3-Trichloroprop	0.998	1.035	1.058	1.134	1.048	1.114	1.064	E6	4.77
4)	1,2-Dibromo-3-Chlor	1.762	1.755	1.734	1.786	1.658	1.966	1.777	E7	5.77

(#) = Out of Range

7G504M999.M Wed Aug 08 12:13:07 2018

8.10.1

8

Initial Calibration Verification

Job Number: JC80990 **Sample:** G7G999-ICV999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G29215.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\7g999\7g29215.D\ECD1A.CH Vial: 8
Signal #2 : C:\msdchem\1\DATA\7g999\7g29215.D\ECD2B.CH
Acq On : 08 Aug 2018 10:57 am Operator: vinced
Sample : icv999-0.5 Inst : HP G1530A
Misc : op13958,g7g999,34.2,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : C:\MSDCHEM\1\METHODS\7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Wed Aug 08 12:07:45 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	2.767 E6	-1.5	106	0.00	2.44- 2.50
2	1,2-Dibromoethane	7.077	7.946 E6	-12.3	107	0.00	2.61- 2.67
3	1,2,3-Trichloropropane	886.925	968.637 E3	-9.2	109	0.00	4.05- 4.11
4	1,2-Dibromo-3-Chloropr	15.994	16.759 E6	-4.8	103	0.00	5.69- 5.75

***** Signal #2 *****

1 S	2-Bromo-1-Chloropropan	1.734	3.429 E6	1.1	104	0.00	2.85- 2.91
2	1,2-Dibromoethane	9.464	10.379 E6	-9.7	110	0.00	3.28- 3.34
3	1,2,3-Trichloropropane	1064.368	1147.036 E3	-7.8	108	0.00	4.79- 4.85
4	1,2-Dibromo-3-Chloropr	17.770	18.647 E6	-4.9	108	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29211.D 7G504M999.M Wed Aug 08 12:13:28 2018

Continuing Calibration Summary

Job Number: JC80990 **Sample:** G7G1085-CC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G30928.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\7g1085\7g30928.D\ECD1A.CH Vial: 3
Signal #2 : C:\msdchem\1\DATA\7g1085\7g30928.D\ECD2B.CH
Acq On : 10 Jan 2019 4:54 pm Operator: vinced
Sample : cc999-1.0 Inst : HP G1530A
Misc : op17739,g7g1085,35.0,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : C:\MSDCHEM\1\METHODS\7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Tue Dec 11 11:14:35 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	1.283 E6	5.9	98	0.00	2.48- 2.54
2	1,2-Dibromoethane	7.077	7.386 E6	-4.4	98	0.00	2.65- 2.71
3	1,2,3-Trichloropropane	886.925	875.199 E3	1.3	98	0.00	4.07- 4.13
4	1,2-Dibromo-3-Chloropr	15.994	15.745 E6	1.6	96	0.00	5.69- 5.75

***** Signal #2 *****

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.734	1.619 E6	6.6	98	0.00	2.90- 2.96
2	1,2-Dibromoethane	9.464	9.223 E6	2.5	102	0.00	3.32- 3.38
3	1,2,3-Trichloropropane	1064.368	1211.879 E3	-13.9	117	0.00	4.81- 4.87
4	1,2-Dibromo-3-Chloropr	17.770	17.879 E6	-0.6	102	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29210.D 7G504M999.M Fri Jan 11 11:44:44 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** G7G1085-CC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G30938.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\7g1085\7g30938.D\ECD1A.CH Vial: 2
Signal #2 : C:\msdchem\1\DATA\7g1085\7g30938.D\ECD2B.CH
Acq On : 10 Jan 2019 8:02 pm Operator: vinced
Sample : cc999-0.5 Inst : HP G1530A
Misc : op17739,g7g1085,35.3,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : C:\MSDCHEM\1\METHODS\7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Tue Dec 11 11:14:35 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	1.282 E6	5.9	95	0.00	2.48- 2.54
2	1,2-Dibromoethane	7.077	7.066 E6	0.2	95	0.00	2.65- 2.71
3	1,2,3-Trichloropropane	886.925	873.381 E3	1.5	98	0.00	4.07- 4.13
4	1,2-Dibromo-3-Chloropr	15.994	14.704 E6	8.1	90	0.00	5.69- 5.75

***** Signal #2 *****

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.734	1.646 E6	5.1	95	0.00	2.90- 2.96
2	1,2-Dibromoethane	9.464	9.529 E6	-0.7	101	0.00	3.32- 3.38
3	1,2,3-Trichloropropane	1064.368	1271.006 E3	-19.4	120	0.00	4.81- 4.87
4	1,2-Dibromo-3-Chloropr	17.770	17.106 E6	3.7	99	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29211.D 7G504M999.M Fri Jan 11 11:44:58 2019

8.10.4
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** G7G1085-CC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G30948.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : C:\msdchem\1\DATA\7g1085\7g30948.D\ECD1A.CH Vial: 3
Signal #2 : C:\msdchem\1\DATA\7g1085\7g30948.D\ECD2B.CH
Acq On : 10 Jan 2019 11:10 pm Operator: vinced
Sample : cc999-1.0 Inst : HP G1530A
Misc : op17739,g7g1085,35.1,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : C:\MSDCHEM\1\METHODS\7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Tue Dec 11 11:14:35 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	1.245 E6	8.7	95	0.00	2.48- 2.54
2	1,2-Dibromoethane	7.077	7.039 E6	0.5	94	0.00	2.65- 2.71
3	1,2,3-Trichloropropane	886.925	874.899 E3	1.4	98	0.00	4.07- 4.13
4	1,2-Dibromo-3-Chloropr	15.994	15.598 E6	2.5	95	0.00	5.69- 5.75

***** Signal #2 *****

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.734	1.546 E6	10.8	94	0.00	2.89- 2.95
2	1,2-Dibromoethane	9.464	8.726 E6	7.8	96	0.00	3.32- 3.38
3	1,2,3-Trichloropropane	1064.368	1154.714 E3	-8.5	112	0.00	4.81- 4.87
4	1,2-Dibromo-3-Chloropr	17.770	17.640 E6	0.7	101	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29210.D 7G504M999.M Fri Jan 11 11:44:46 2019

Initial Calibration Summary

Job Number: JC80990 **Sample:** GAA611-ICC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA44604.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report GCAA

Method : C:\MSDCHEM\1\METHODS\MAA611.M (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Feb 04 12:42:31 2015
Response via : Initial Calibration

Calibration Files
200 =AA44605.D 100 =AA44604.D 20 =AA44603.D 10 =AA44602.D
2 =AA44601.D 1 =AA44608.D 500 =AA44606.D 1000=AA44607.D
2000=AA38039.D = = =

Compound	200	100	20	10	2	1	500	1000	2000	Avg	%RSD
1) Methane	3.495	2.972	2.227	3.034	2.500	1.220	2.833	2.689		2.621 E4	25.95
2) Ethane	6.678	5.691	4.213	4.974	4.212	2.201	5.484	5.197		4.831 E4	27.56
3) Ethene	6.666	5.675	4.188	4.964	4.177	2.494	5.473	5.191		4.853 E4	25.76
4) Propane	9.771	8.352	6.261	7.405	6.062	2.808	8.032	7.596		7.036 E4	29.46
5) Propylene										0.000	-1.00
6) Isobutane										0.000	-1.00
7) n-Butane	1.333	1.138	0.891	1.078	0.825	0.361	1.098	1.037		0.970 E5	29.93
8) Acetylene										0.000	-1.00
9) n-Pentane	1.628	1.355	1.158	1.454	1.011	0.481	1.331	1.258		1.210 E5	28.73
10) Hexane	1.898	1.462	1.503	1.959	1.335	0.900	1.542	1.454		1.506 E5	21.88

(#) = Out of Range ### Number of calibration levels exceeded format ###

MAA611.M Wed Feb 04 14:15:12 2015 S

8.10.6 8

Initial Calibration Verification

Job Number: JC80990 **Sample:** GAA611-ICV611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA44609.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\msdchem\1\DATA\
Data File : AA44609.D
Signal(s) : FID1A.ch
Acq On : 4 Feb 2015 12:59 pm
Operator : THOMASH
Sample : ICV611-100
Misc : GC45339,GAA611,,,,,1
ALS Vial : 12 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Feb 04 14:15:20 2015
Quant Method : C:\MSDCHEM\1\METHODS\MAA611.M
Quant Title : METHOD V8015 DG by GC-FID
QLast Update : Wed Feb 04 12:42:31 2015
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 0.5 ml
Signal Phase : Rt-Alumina BOND/Na2SO4
Signal Info : 50m x 0.53 mm ID x 10um df

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
1	Methane	26.211	28.583 E3	-9.0	96	0.00
2	Ethane	48.315	54.762 E3	-13.3	96	0.00
3	Ethene	48.534	54.783 E3	-12.9	97	0.00
4	Propane	70.357	80.260 E3	-14.1	96	0.00
7	n-Butane	97.009	107.063 E3	-10.4	94	0.00
9	n-Pentane	120.954	120.719 E3	0.2	89	-0.02
10	Hexane	150.637	131.911 E3	12.4	90	-0.03

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MAA611.M Wed Feb 04 14:16:18 2015 S

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1617-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70302.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\AA70302.d Vial: 1
Acq On : 10 Jan 2019 8:15 am Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53780,GAA1617,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : C:\msdchem\1\methods\maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	27.568 E3	-5.2	93	0.01	0.84- 1.84
2	Ethane	48.315	53.176 E3	-10.1	93	0.00	1.26- 2.26
3	Ethene	48.534	53.010 E3	-9.2	93	-0.02	1.96- 2.96
4	Propane	70.357	80.102 E3	-13.9	96	-0.03	2.41- 3.41
5	n-Butane	97.009	104.718 E3	-7.9	92	-0.04	3.64- 4.64
6	n-Pentane	120.954	116.543 E3	3.6	86	-0.03	4.70- 5.70
7	Hexane	150.637	128.556 E3	14.7	88	-0.06	5.91- 6.91

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Fri Jan 11 16:48:03 2019 GCAA

8.10.8

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1617-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70318.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\AA70318.d Vial: 17
Acq On : 10 Jan 2019 1:43 pm Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53789,GAA1617,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : C:\msdchem\1\methods\maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	25.711 E3	1.9	87	0.00	0.84- 1.84
2	Ethane	48.315	50.262 E3	-4.0	88	0.00	1.26- 2.26
3	Ethene	48.534	50.012 E3	-3.0	88	-0.02	1.96- 2.96
4	Propane	70.357	76.885 E3	-9.3	92	-0.03	2.41- 3.41
5	n-Butane	97.009	103.613 E3	-6.8	91	-0.04	3.64- 4.64
6	n-Pentane	120.954	121.540 E3	-0.5	90	-0.06	4.68- 5.68
7	Hexane	150.637	137.833 E3	8.5	94	-0.09	5.87- 6.87

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Fri Jan 11 16:32:13 2019 GCAA

8.10.9

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1617-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70327.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\AA70327.d Vial: 26
Acq On : 10 Jan 2019 4:18 pm Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53789,GAA1617,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : C:\msdchem\1\methods\maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	28.162 E3	-7.4	95	0.01	0.84- 1.84
2	Ethane	48.315	54.502 E3	-12.8	96	0.00	1.26- 2.26
3	Ethene	48.534	54.339 E3	-12.0	96	-0.02	1.97- 2.97
4	Propane	70.357	82.499 E3	-17.3#	99	-0.03	2.41- 3.41
5	n-Butane	97.009	109.847 E3	-13.2	97	-0.04	3.64- 4.64
6	n-Pentane	120.954	129.365 E3	-7.0	95	-0.05	4.69- 5.69
7	Hexane	150.637	153.705 E3	-2.0	105	-0.09	5.88- 6.88

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Fri Jan 11 16:32:15 2019 GCAA

8.10.10

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1618-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70328.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\AA70328.d Vial: 1
Acq On : 11 Jan 2019 8:19 am Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53789,GAA1618,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : C:\msdchem\1\methods\maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	28.625 E3	-9.2	96	0.02	0.84- 1.84
2	Ethane	48.315	55.041 E3	-13.9	97	0.00	1.27- 2.27
3	Ethene	48.534	54.943 E3	-13.2	97	-0.02	1.97- 2.97
4	Propane	70.357	83.181 E3	-18.2#	100	-0.03	2.41- 3.41
5	n-Butane	97.009	109.073 E3	-12.4	96	-0.04	3.64- 4.64
6	n-Pentane	120.954	121.518 E3	-0.5	90	-0.03	4.70- 5.70
7	Hexane	150.637	139.848 E3	7.2	96	-0.06	5.91- 6.91

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Wed Jan 16 09:52:32 2019 GCAA

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1618-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70343.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\AA70343.d Vial: 16
Acq On : 11 Jan 2019 1:30 pm Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53792,GAA1618,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : C:\msdchem\1\methods\maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	26.537 E3	-1.2	89	0.01	0.84- 1.84
2	Ethane	48.315	50.810 E3	-5.2	89	0.00	1.27- 2.27
3	Ethene	48.534	50.775 E3	-4.6	89	-0.02	1.97- 2.97
4	Propane	70.357	76.983 E3	-9.4	92	-0.03	2.41- 3.41
5	n-Butane	97.009	103.642 E3	-6.8	91	-0.04	3.64- 4.64
6	n-Pentane	120.954	124.373 E3	-2.8	92	-0.05	4.68- 5.68
7	Hexane	150.637	154.523 E3	-2.6	106	-0.09	5.87- 6.87

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Wed Jan 16 09:52:34 2019 GCAA

Initial Calibration Summary

Job Number: JC80990 **Sample:** GGH5519-ICC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH106910.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report GCGH

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Tue Oct 11 07:59:30 2016
Response via : Initial Calibration

Calibration Files
0.5 =GH106908.D 1 =GH106909.D 5 =GH106910.D 10 =GH106911.D
50 =GH106912.D 100 =GH106913.D 0.2 =GH106907.D 0.1 =GH106906.D

Compound	0.5	1	5	10	50	100	0.2	0.1	Avg		%RSD
1) Methanol	1.006	1.360	1.085	1.028	0.838	0.897	1.076	1.224	1.064	E1	15.79
2) Ethanol	1.428	1.868	1.575	1.643	1.264	1.240	1.406	1.621	1.505	E1	14.06
3) Tert-Butyl A	2.283	3.019	2.529	2.595	2.099	2.385	2.511	2.811	2.529	E1	11.49
4) 1-Propanol	2.011	3.111	2.902	2.930	1.965	2.481	2.170	3.001	2.571	E1	18.38
5) 2-Propanol	1.486	1.914	1.587	1.666	1.263	1.387	1.541	1.885	1.591	E1	14.24
6) Isobutanol	2.597	3.392	3.330	3.751	2.828	3.143	3.080	2.714	3.104	E1	12.41
7) 1-Butanol	2.449	3.433	3.761	3.340	2.789	3.067	2.951	3.468	3.157	E1	13.43
8) 2-Butanol	2.133	2.972	2.860	3.006	2.413	2.665	2.488	2.602	2.642	E1	11.32
9) Hexanol	8.432	7.939	7.720	8.014	8.162	5.562	5.898		7.389	E1	15.68

Signal #2

1) Methanol	1.300	1.262	1.387	1.205	1.312	1.550	1.387	0.867	1.284	E1	15.40
2) Ethanol	1.841	1.987	1.942	2.090	1.771	2.080	1.699	1.337	1.843	E1	13.44
3) Tert-Butyl A	2.556	2.702	3.217	3.180	2.649	3.094	2.839	3.157	2.924	E1	9.16
4) 1-Propanol	2.888	2.679	2.974	2.929	2.417	2.754	2.987	2.617	2.781	E1	7.24
5) 2-Propanol	1.884	2.126	2.463	2.249	1.835	2.184	1.851	1.602	2.024	E1	13.74
6) Isobutanol	3.537	3.280	3.430	3.462	2.731	3.185	3.170	3.736	3.316	E1	9.12
7) 1-Butanol	2.792	3.210	3.276	3.223	2.603	2.946	3.158	2.910	3.015	E1	7.98
8) 2-Butanol	2.140	2.391	2.902	2.981	2.451	2.800	2.176	1.956	2.475	E1	15.45
9) Hexanol	9.625	8.668	8.851	8.768	8.540	5.996	7.999	6.459	8.113	E1	15.43

(#) = Out of Range ### Number of calibration levels exceeded format ###

MGH5519.M Tue Oct 11 08:00:42 2016 GCGH

Initial Calibration Verification

Job Number: JC80990 **Sample:** GGH5519-ICV5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH106914.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH106914.D\FID1A.CH Vial: 10
Acq On : 10 Oct 2016 1:40 pm Operator: XULIU
Sample : ICV5519-5000 Inst : GCGH
Misc : GC49338,GGH5519,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH106914.D\FID2B.CH Vial: 10
Acq On : 10 Oct 2016 1:59 pm Operator: XULIU
Sample : ICV5519-5000 Inst : GCGH
Misc : GC49338,GGH5519,5.0,,,,1 Multiplr: 1.00
IntFile : autoint2.e

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Tue Oct 11 07:59:30 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	10.330	2.9	95	0.00	0.46- 0.52
2	Ethanol	15.055	15.437	-2.5	98	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	25.421	-0.5	101	0.00	0.83- 0.95
4	1-Propanol	25.711	23.160	9.9	80	0.00	1.07- 1.23
5	2-Propanol	15.911	15.757	1.0	99	0.00	0.71- 0.83
6	Isobutanol	31.044	31.539	-1.6	95	0.00	1.81- 1.91
7	1-Butanol	31.573	37.216	-17.9	99	0.00	2.36- 2.48
8	2-Butanol	26.424	25.368	4.0	89	0.00	1.40- 1.54
9 S	Hexanol	73.894	81.187	-9.9	105	0.00	4.98- 5.10

***** Signal #2 *****

1	Methanol	12.838	12.989	-1.2	94	0.00	1.13- 1.19
2	Ethanol	18.434	20.455	-11.0	105	0.00	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	32.770	-12.1	102	0.00	2.13- 2.19
4	1-Propanol	27.806	30.220	-8.7	102	0.00	2.76- 2.83
5	2-Propanol	20.243	22.159	-9.5	90	0.00	1.86- 1.92
6	Isobutanol	33.164	34.774	-4.9	101	0.00	3.72- 3.78
7	1-Butanol	30.147	32.938	-9.3	101	0.00	4.29- 4.35
8	2-Butanol	24.747	30.371	-22.7#	105	0.00	3.21- 3.27
9 S	Hexanol	81.132	86.623	-6.8	98	0.00	6.14- 6.20

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH106910.D MGH5519.M Tue Oct 11 08:05:43 2016 GCGH

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6218-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116721.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116721.D\FID1A.CH Vial: 92
Acq On : 9 Jan 2019 7:59 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53784,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116721.D\FID2B.CH Vial: 92
Acq On : 9 Jan 2019 8:18 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53784,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	9.676	9.1	89	0.00	0.46- 0.52
2	Ethanol	15.055	18.066	-20.0	115	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	49.762	-96.8#	197#	0.00	0.83- 0.95
4	1-Propanol	25.711	35.168	-36.8#	121	0.00	1.07- 1.23
5	2-Propanol	15.911	22.539	-41.7#	142	0.00	0.71- 0.83
6	Isobutanol	31.044	25.779	17.0	77	0.00	1.80- 1.90
7	1-Butanol	31.573	16.414	48.0#	44#	0.00	2.36- 2.49
8	2-Butanol	26.424	31.151	-17.9	109	0.00	1.40- 1.54
9 S	Hexanol	73.894	74.776	-1.2	97	-0.01	4.96- 5.08
*****	Signal #2 *****						
1	Methanol	12.838	15.191	-18.3	109	0.00	1.14- 1.20
2	Ethanol	18.434	20.625	-11.9	106	0.00	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	27.898	4.6	87	-0.02	2.12- 2.18
4	1-Propanol	27.806	30.636	-10.2	103	-0.02	2.75- 2.82
5	2-Propanol	20.243	19.997	1.2	81	-0.01	1.86- 1.92
6	Isobutanol	33.164	36.610	-10.4	107	-0.01	3.66- 3.72
7	1-Butanol	30.147	34.938	-15.9	107	0.00	4.22- 4.28
8	2-Butanol	24.747	29.572	-19.5	102	0.00	3.19- 3.25
9 S	Hexanol	81.132	79.776	1.7	90	-0.01	6.11- 6.17

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH113241.D MGH5519.M Wed Jan 09 09:01:26 2019 GCGH

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6218-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116730.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116730.D\FID1A.CH Vial: 95
Acq On : 9 Jan 2019 10:46 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53774,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116730.D\FID2B.CH Vial: 95
Acq On : 9 Jan 2019 11:04 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53774,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	10.699	-0.5	104	0.00	0.47- 0.53
2	Ethanol	15.055	17.434	-15.8	106	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	44.037	-74.1#	170#	0.00	0.82- 0.95
4	1-Propanol	25.711	28.861	-12.3	99	-0.01	1.07- 1.23
5	2-Propanol	15.911	21.721	-36.5#	130	0.00	0.71- 0.83
6	Isobutanol	31.044	25.886	16.6	69	-0.02	1.79- 1.90
7	1-Butanol	31.573	20.253	35.9#	61	-0.01	2.35- 2.47
8	2-Butanol	26.424	27.023	-2.3	90	0.00	1.39- 1.53
9 S	Hexanol	73.894	68.338	7.5	85	-0.02	4.95- 5.07

***** Signal #2 *****

1	Methanol	12.838	12.740	0.8	106	0.00	1.13- 1.19
2	Ethanol	18.434	16.958	8.0	81	-0.01	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	23.917	18.2	75	-0.02	2.12- 2.18
4	1-Propanol	27.806	23.028	17.2	79	-0.02	2.75- 2.82
5	2-Propanol	20.243	16.630	17.8	74	-0.02	1.85- 1.91
6	Isobutanol	33.164	29.327	11.6	85	-0.01	3.66- 3.72
7	1-Butanol	30.147	27.612	8.4	86	0.00	4.22- 4.28
8	2-Butanol	24.747	25.445	-2.8	85	-0.01	3.19- 3.25
9 S	Hexanol	81.132	70.930	12.6	81	0.00	6.11- 6.17

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH106911.D MGH5519.M Wed Jan 09 12:06:30 2019 GCGH

8.10.16
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6218-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116740.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116740.D\FID1A.CH Vial: 95
Acq On : 9 Jan 2019 1:50 pm Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116740.D\FID2B.CH Vial: 95
Acq On : 9 Jan 2019 2:09 pm Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	10.546	0.9	97	0.00	0.46- 0.52
2	Ethanol	15.055	18.028	-19.7	114	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	43.697	-72.8#	173#	0.00	0.82- 0.95
4	1-Propanol	25.711	24.902	3.1	86	-0.01	1.07- 1.23
5	2-Propanol	15.911	22.110	-39.0#	139	0.00	0.71- 0.83
6	Isobutanol	31.044	25.937	16.5	78	-0.01	1.80- 1.90
7	1-Butanol	31.573	18.022	42.9#	48#	0.00	2.35- 2.48
8	2-Butanol	26.424	24.138	8.7	84	0.00	1.39- 1.53
9 S	Hexanol	73.894	77.537	-4.9	100	-0.02	4.95- 5.08

***** Signal #2 *****

1	Methanol	12.838	13.653	-6.3	98	0.00	1.14- 1.20
2	Ethanol	18.434	21.079	-14.3	109	0.00	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	30.175	-3.2	94	-0.01	2.13- 2.19
4	1-Propanol	27.806	27.874	-0.2	94	-0.01	2.75- 2.82
5	2-Propanol	20.243	21.965	-8.5	89	-0.01	1.86- 1.92
6	Isobutanol	33.164	35.416	-6.8	103	0.00	3.66- 3.72
7	1-Butanol	30.147	32.045	-6.3	98	0.00	4.22- 4.28
8	2-Butanol	24.747	29.375	-18.7	101	0.00	3.19- 3.25
9 S	Hexanol	81.132	90.565	-11.6	102	0.00	6.12- 6.18

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH113241.D MGH5519.M Wed Jan 09 14:23:39 2019 GCGH

8.10.17
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6219-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116742.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116742.D\FID1A.CH Vial: 92
Acq On : 11 Jan 2019 6:17 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116742.D\FID2B.CH Vial: 92
Acq On : 11 Jan 2019 6:35 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	14.811	-39.2#	137	0.02	0.48- 0.54
2	Ethanol	15.055	23.057	-53.2#	146	0.01	0.60- 0.71
3	Tert-Butyl Alcohol	25.288	46.036	-82.0#	182#	0.01	0.84- 0.97
4	1-Propanol	25.711	35.356	-37.5#	122	0.01	1.09- 1.25
5	2-Propanol	15.911	25.529	-60.4#	161#	0.02	0.72- 0.85
6	Isobutanol	31.044	30.781	0.8	92	0.02	1.83- 1.94
7	1-Butanol	31.573	25.832	18.2	69	0.03	2.39- 2.51
8	2-Butanol	26.424	33.536	-26.9#	117	0.02	1.42- 1.56
9 S	Hexanol	73.894	76.012	-2.9	98	0.00	4.97- 5.09

***** Signal #2 *****

1	Methanol	12.838	15.111	-17.7	109	0.02	1.16- 1.22
2	Ethanol	18.434	20.531	-11.4	106	0.02	1.56- 1.62
3	Tert-Butyl Alcohol	29.242	27.281	6.7	85	0.02	2.16- 2.22
4	1-Propanol	27.806	25.819	7.1	87	0.02	2.79- 2.86
5	2-Propanol	20.243	18.821	7.0	76	0.02	1.89- 1.95
6	Isobutanol	33.164	33.568	-1.2	98	0.03	3.70- 3.76
7	1-Butanol	30.147	32.765	-8.7	100	0.03	4.26- 4.32
8	2-Butanol	24.747	29.855	-20.6#	103	0.03	3.23- 3.29
9 S	Hexanol	81.132	74.708	7.9	84	0.02	6.14- 6.20

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH113241.D MGH5519.M Fri Jan 11 10:09:48 2019 GCGH

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6219-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116752.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116752.D\FID1A.CH Vial: 95
Acq On : 11 Jan 2019 9:23 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53796,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116752.D\FID2B.CH Vial: 95
Acq On : 11 Jan 2019 9:42 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53796,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	12.200	-14.6	119	0.02	0.48- 0.54
2	Ethanol	15.055	19.479	-29.4#	119	0.02	0.60- 0.71
3	Tert-Butyl Alcohol	25.288	41.879	-65.6#	161#	0.01	0.84- 0.96
4	1-Propanol	25.711	27.908	-8.5	95	0.01	1.09- 1.25
5	2-Propanol	15.911	23.406	-47.1#	141	0.02	0.72- 0.85
6	Isobutanol	31.044	27.435	11.6	73	0.02	1.83- 1.93
7	1-Butanol	31.573	23.324	26.1#	70	0.03	2.39- 2.51
8	2-Butanol	26.424	27.600	-4.5	92	0.02	1.42- 1.56
9 S	Hexanol	73.894	68.913	6.7	86	0.00	4.97- 5.10
*****	Signal #2 *****						
1	Methanol	12.838	12.228	4.8	101	0.02	1.16- 1.22
2	Ethanol	18.434	17.115	7.2	82	0.02	1.56- 1.62
3	Tert-Butyl Alcohol	29.242	24.012	17.9	76	0.02	2.16- 2.22
4	1-Propanol	27.806	22.309	19.8	76	0.03	2.79- 2.86
5	2-Propanol	20.243	16.302	19.5	72	0.03	1.90- 1.96
6	Isobutanol	33.164	28.785	13.2	83	0.03	3.70- 3.76
7	1-Butanol	30.147	27.623	8.4	86	0.03	4.26- 4.32
8	2-Butanol	24.747	25.349	-2.4	85	0.03	3.23- 3.29
9 S	Hexanol	81.132	68.933	15.0	79	0.02	6.14- 6.20

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH106911.D MGH5519.M Fri Jan 11 10:09:22 2019 GCGH

8.10.19
8

Initial Calibration Summary

Job Number: JC80990 **Sample:** GWW5071-ICC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW133620.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report GCWW

Method : C:\msdchem\1\METHODS\MWW5071.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Fri Jun 22 13:05:24 2018
Response via : Initial Calibration

Calibration Files
20 =ww133619.D 100 =ww133620.D 25^4=ww133624.D 10^4=ww133623.D
1000=ww133622.D 500 =ww133621.D 10 =ww133618.D

Compound	20	100	25^4	10^4	1000	500	10	Avg	%RSD
1) Carbon Monoxide								0.000	-1.00
2) Methane	5.572	4.917	2.495	3.981	4.859	4.044	4.114	4.283 E2	22.90
3) Carbon Dioxide	7.552	7.662	5.185	5.919	6.940	6.449	7.133	6.691 E2	13.45
4) Ethylene	6.955	6.846			6.058	5.269	5.732	6.172 E2	11.71
5) Ethane	7.826	7.511			6.719	5.924	5.618	6.720 E2	14.31

(#) = Out of Range

MWW5071.M Thu Jun 28 12:11:14 2018

8.10.20

8

Initial Calibration Verification

Job Number: JC80990 **Sample:** GWW5071-ICV5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW133627.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\MSDCHEM\1\DATA\
Data File : ww133627.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 22 Jun 2018 2:32 pm
Operator : paulcw
Sample : ICV5071-100
Misc : gc52722,gww5071,,,,,1
ALS Vial : 15 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jun 22 14:41:58 2018
Quant Method : C:\MSDCHEM\1\METHODS\MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Fri Jun 22 13:05:24 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	514.986	-20.2#	105	0.05
3	Carbon Dioxide	669.145	665.4	-1.0	99	0.08
4	Ethylene	617.173	582.160	5.7	85	0.01
5	Ethane	671.960	649.158	3.4	86	0.02

Evaluate Continuing Calibration Report - Not Founds

1	Carbon Monoxide	0.000	0.000	0.0	0#	-3.58#

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Tue Jul 03 13:49:21 2018

8.10.21
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5151-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134878.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\MSDCHEM\1\DATA\
Data File : ww134878.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 10 Jan 2019 8:43 am
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5151,,,,,1
ALS Vial : 2 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 14 16:59:15 2019
Quant Method : C:\MSDCHEM\1\METHODS\MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	400.509	6.5	81	0.00
3	Carbon Dioxide	669.145	666.813	0.3	87	0.02
4	Ethylene	617.173	571.877	7.3	84	0.07
5	Ethane	671.960	677.293	-0.8	90	0.09

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 08:46:37 2019

8.10.22
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5151-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134893.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\MSDCHEM\1\DATA\
Data File : ww134893.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 10 Jan 2019 2:28 pm
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5151,,,,,1
ALS Vial : 17 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 10 14:38:03 2019
Quant Method : C:\MSDCHEM\1\METHODS\MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	529.042	-23.5#	108	0.02
3	Carbon Dioxide	669.145	671.506	-0.4	88	0.04
5	Ethane	671.960	735.799	-9.5	98	0.12

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 08:46:40 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5151-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134897.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\MSDCHEM\1\DATA\
Data File : ww134897.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 10 Jan 2019 4:04 pm
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5151,,,,,1
ALS Vial : 21 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 10 16:14:04 2019
Quant Method : C:\MSDCHEM\1\METHODS\MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	426.906	0.3	87	0.01
3	Carbon Dioxide	669.145	690.012	-3.1	90	0.03
4	Ethylene	617.173	621.913	-0.8	91	0.08
5	Ethane	671.960	696.704	-3.7	93	0.10

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 08:46:42 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5152-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134898.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\MSDCHEM\1\DATA\
Data File : ww134898.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 11 Jan 2019 8:18 am
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5152,,,,,1
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 11 08:28:04 2019
Quant Method : C:\MSDCHEM\1\METHODS\MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	584.128	-36.4#	119	0.02
3	Carbon Dioxide	669.145	725.411	-8.4	95	0.03
4	Ethylene	617.173	656.115	-6.3	96	0.09
5	Ethane	671.960	728.528	-8.4	97	0.11

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 13:29:08 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5152-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134912.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : C:\MSDCHEM\1\DATA\
Data File : ww134912.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 11 Jan 2019 2:12 pm
Operator : paulcw
Sample : CC5071-100
Misc : gc53794,gww5152,,,,,1
ALS Vial : 15 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 11 14:21:29 2019
Quant Method : C:\MSDCHEM\1\METHODS\MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	464.203	-8.4	94	0.02
3	Carbon Dioxide	669.145	721.128	-7.8	94	0.04
5	Ethane	671.960	742.837	-10.5	99	0.11

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 13:29:10 2019

GC Volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID1A.CH Vial: 30
Acq On : 9 Jan 2019 11:23 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID2B.CH Vial: 30
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:12 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

	Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
	System Monitoring Compounds						
9) S	Hexanol	5.02	6.14	271104	424211	3668.798	5228.664 #
Spiked Amount	5000.000			Recovery	=	73.38%	104.57%
	Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116732.D MGH5519.M Wed Jan 09 12:12:29 2019 GCGH

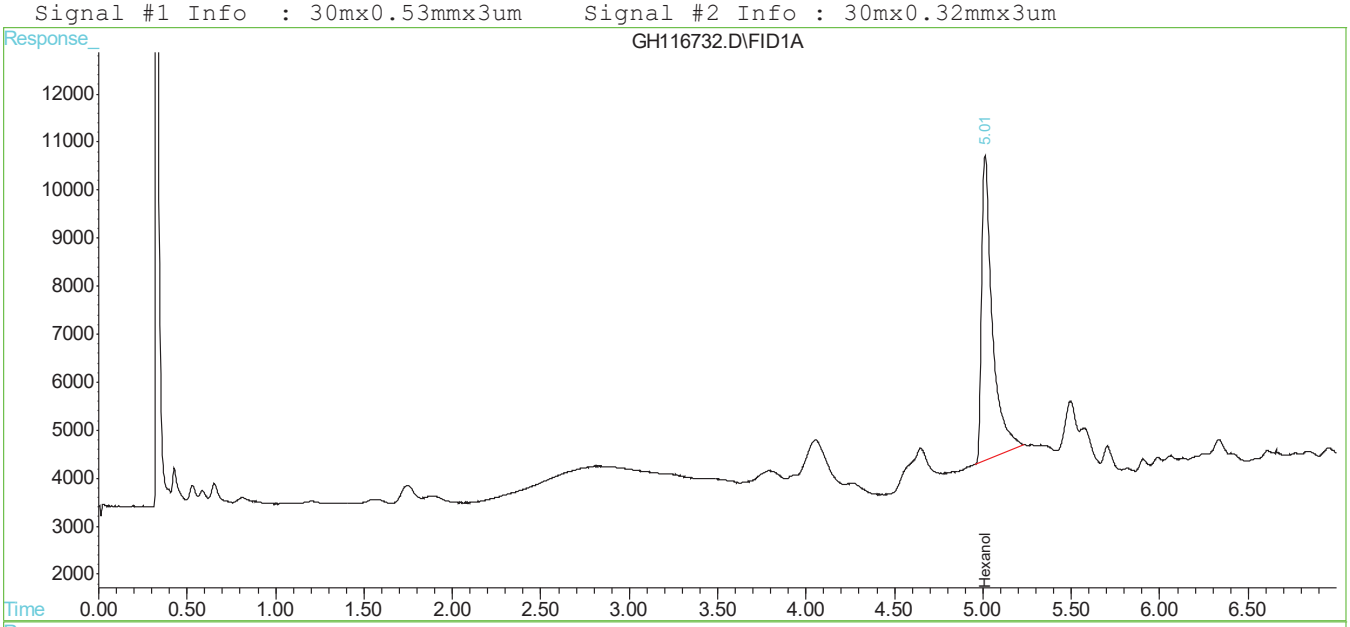
Quantitation Report (QT Reviewed)

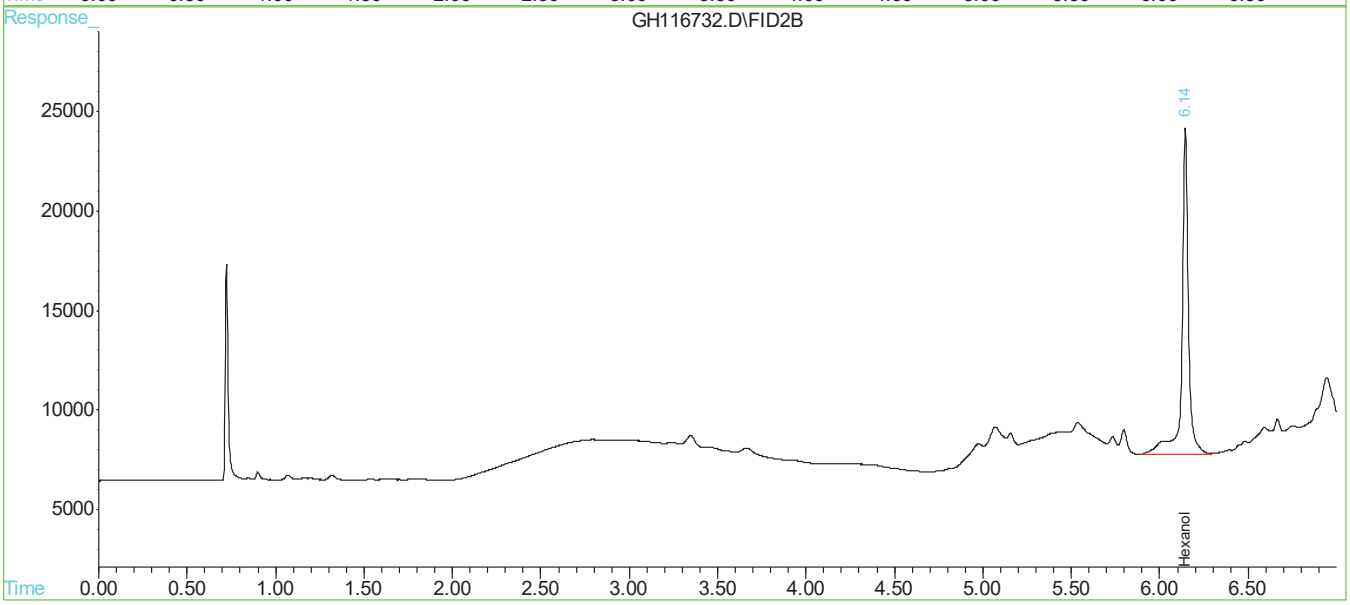
Data File : C:\HPCHEM\1\DATA\GH116732.D\FID1A.CH Vial: 30
Acq On : 9 Jan 2019 11:23 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID2B.CH Vial: 30
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:12 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116733.D\FID1A.CH Vial: 31
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116733.D\FID2B.CH Vial: 31
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:13 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	296999	449565	4019.231	5541.167
Spiked Amount 5000.000			Recovery =		80.38%	110.82%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116733.D MGH5519.M Wed Jan 09 12:13:27 2019 GCGH Page 1

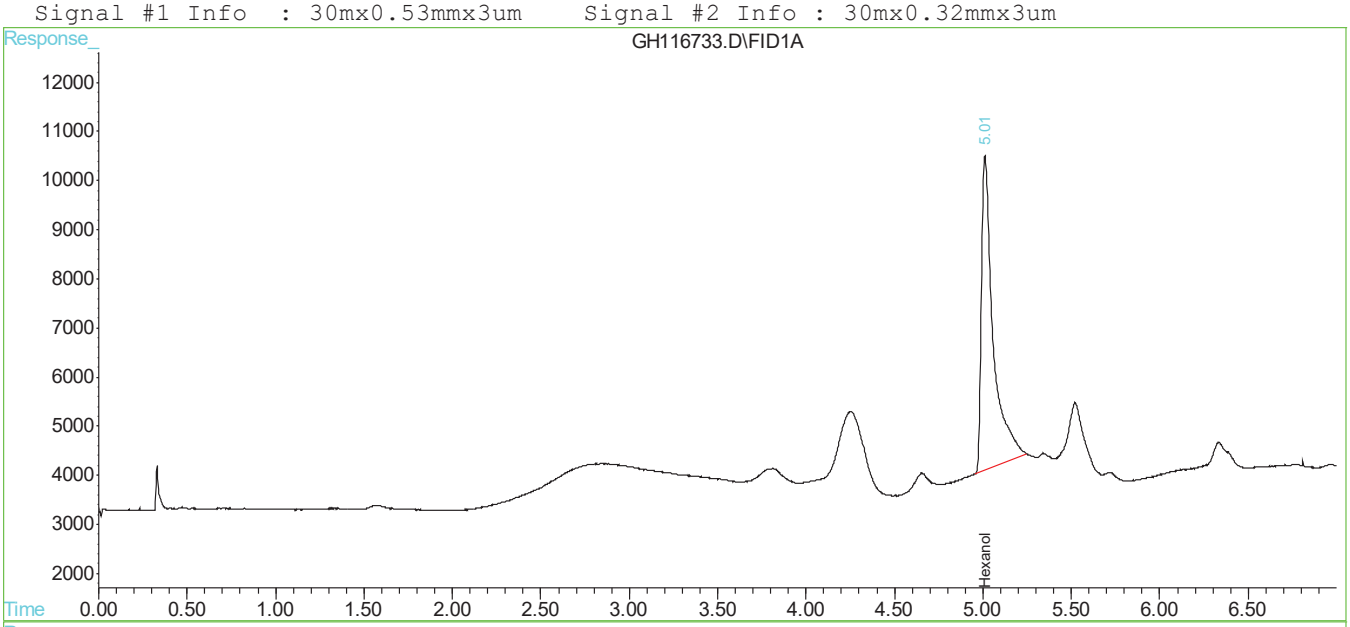
Quantitation Report (QT Reviewed)

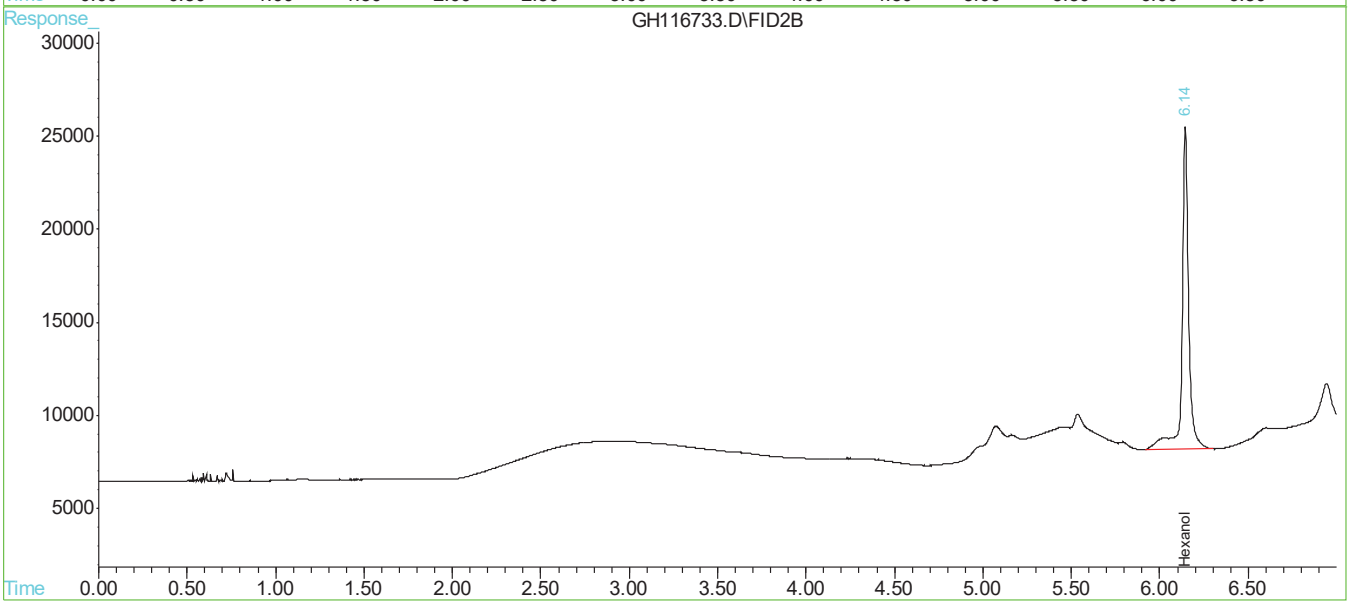
Data File : C:\HPCHEM\1\DATA\GH116733.D\FID1A.CH Vial: 31
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116733.D\FID2B.CH Vial: 31
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:13 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116734.D\FID1A.CH Vial: 32
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116734.D\FID2B.CH Vial: 32
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	312616	486724	4230.584	5999.177 #
Spiked Amount 5000.000			Recovery =		84.61%	119.98%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116734.D MGH5519.M Wed Jan 09 14:06:19 2019 GCGH Page 1

Quantitation Report (QT Reviewed)

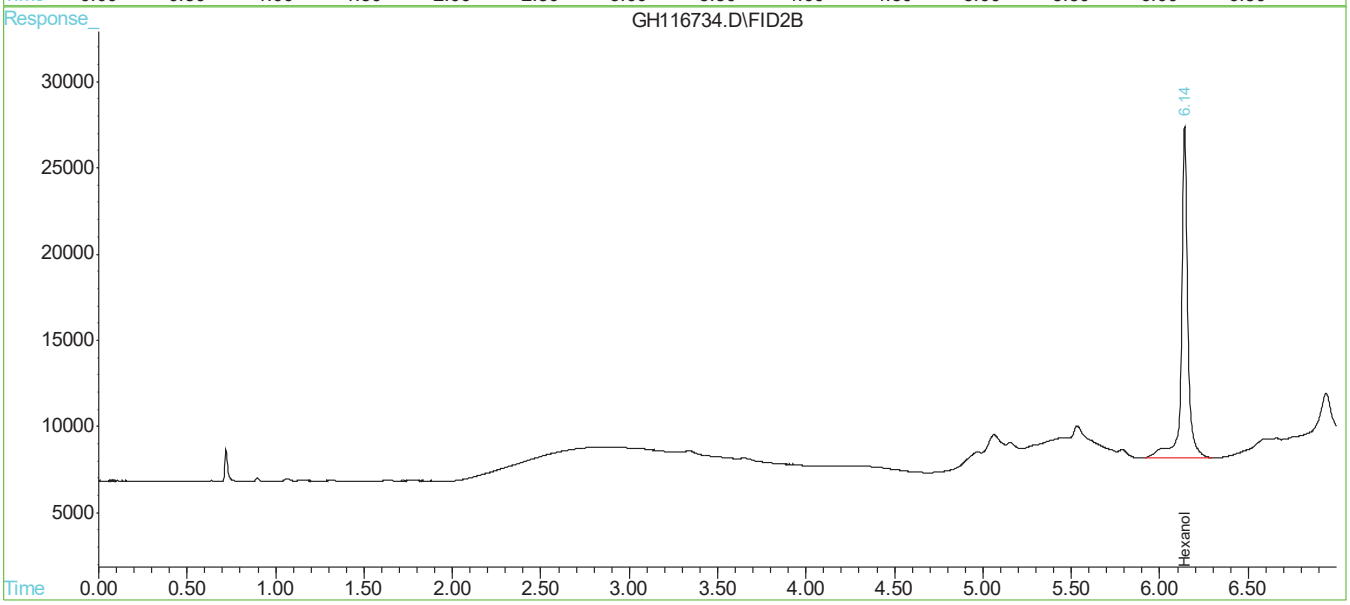
Data File : C:\HPCHEM\1\DATA\GH116734.D\FID1A.CH Vial: 32
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116734.D\FID2B.CH Vial: 32
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116735.D\FID1A.CH Vial: 33
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116735.D\FID2B.CH Vial: 33
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	318143	445964	4305.379	5496.789
Spiked Amount 5000.000			Recovery =		86.11%	109.94%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116735.D MGH5519.M Wed Jan 09 14:06:41 2019 GCGH Page 1

Quantitation Report (QT Reviewed)

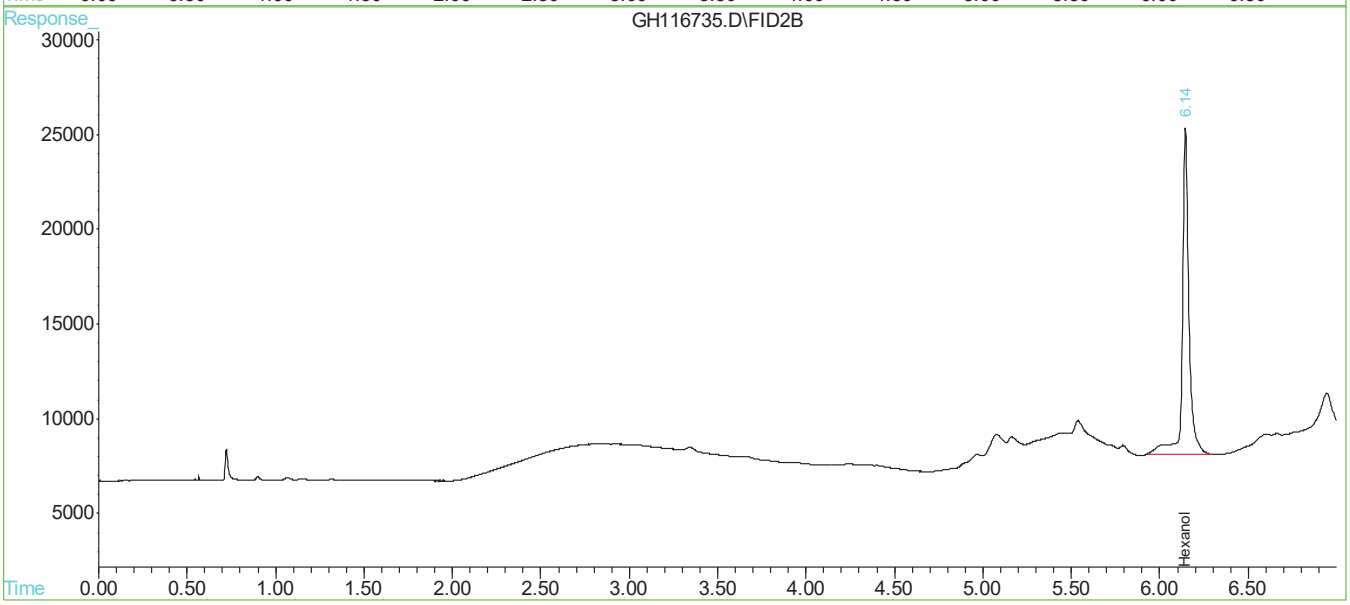
Data File : C:\HPCHEM\1\DATA\GH116735.D\FID1A.CH Vial: 33
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116735.D\FID2B.CH Vial: 33
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116736.D\FID1A.CH Vial: 34
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116736.D\FID2B.CH Vial: 34
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	338236	437316	4577.294	5390.189
Spiked Amount 5000.000			Recovery =		91.55%	107.80%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116736.D MGH5519.M Wed Jan 09 14:07:04 2019 GCGH Page 1

Quantitation Report (QT Reviewed)

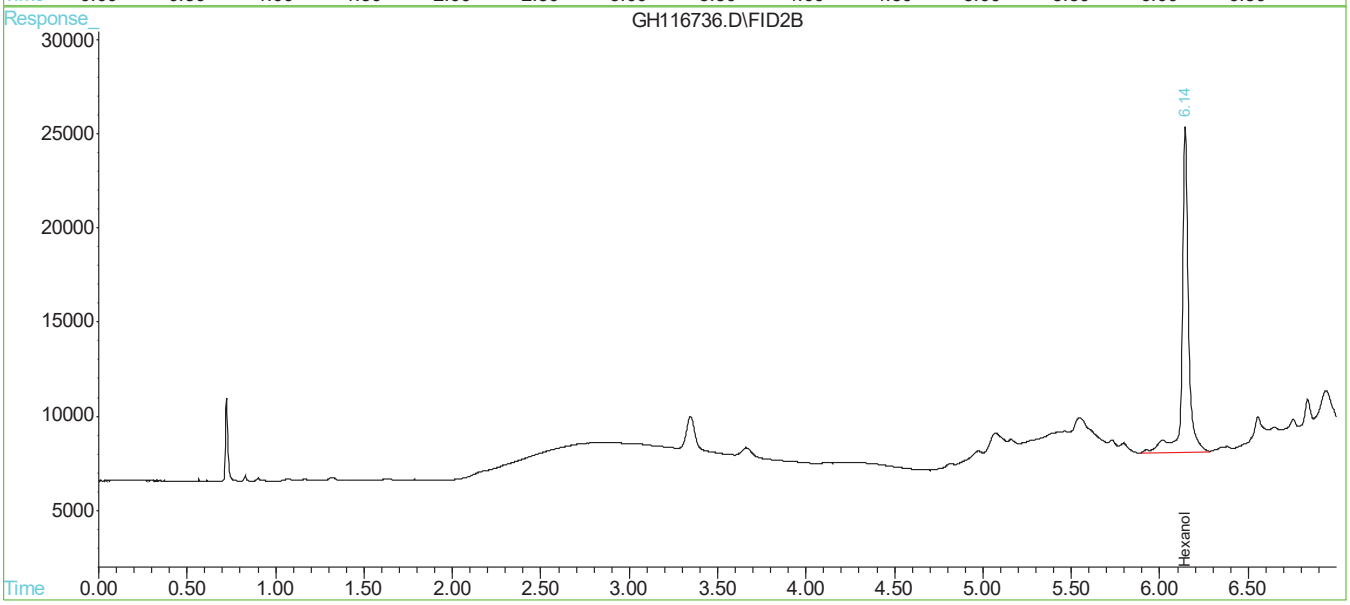
Data File : C:\HPCHEM\1\DATA\GH116736.D\FID1A.CH Vial: 34
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116736.D\FID2B.CH Vial: 34
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116737.D\FID1A.CH Vial: 35
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116737.D\FID2B.CH Vial: 35
Acq On : 9 Jan 2019 1:13 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:07 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	375396	391662	5080.164	4827.476
Spiked Amount 5000.000			Recovery =		101.60%	96.55%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116737.D MGH5519.M Wed Jan 09 14:07:34 2019 GCGH Page 1

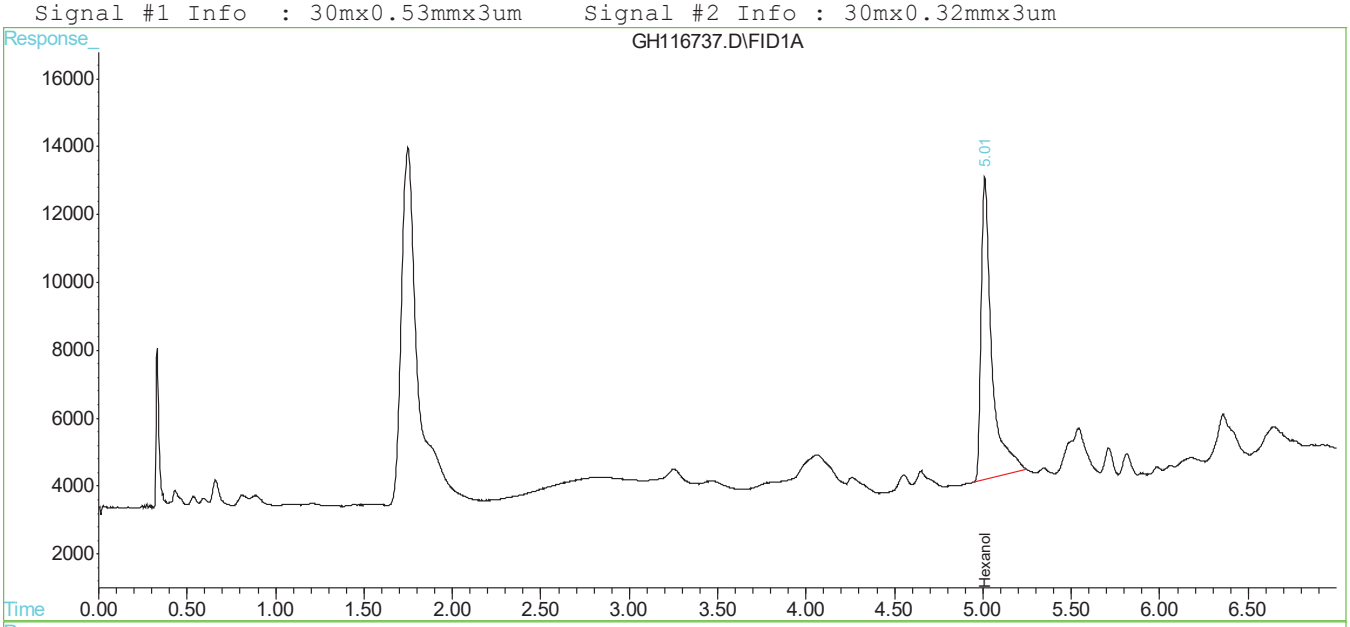
Quantitation Report (QT Reviewed)

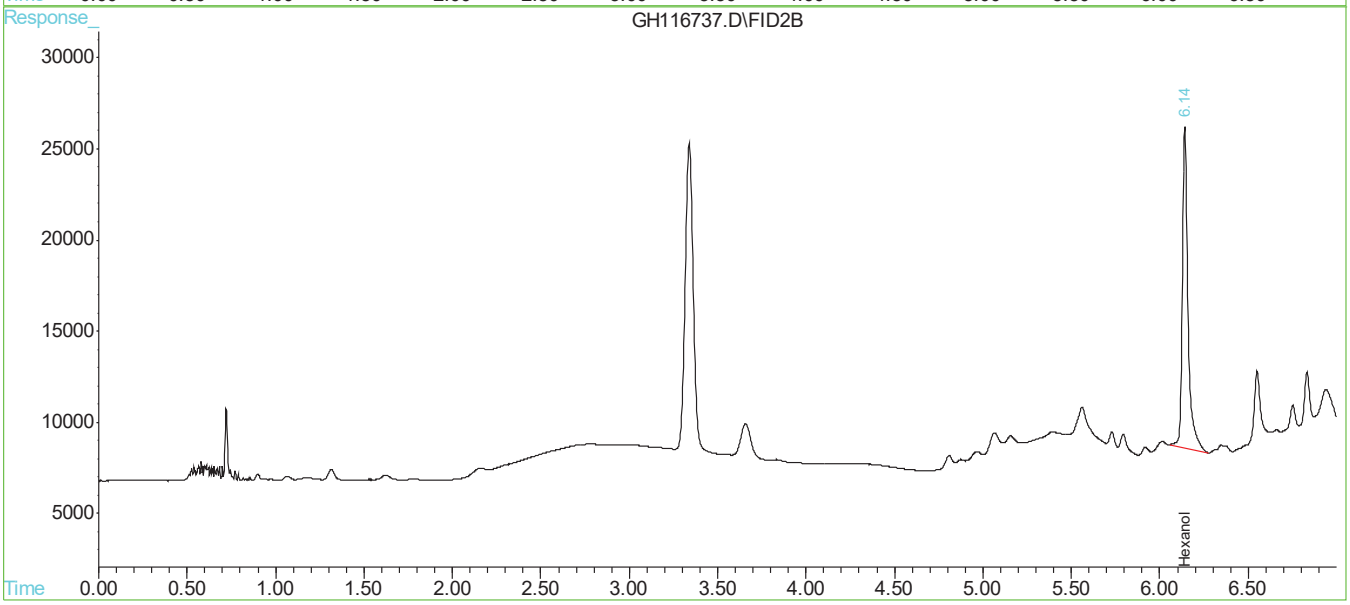
Data File : C:\HPCHEM\1\DATA\GH116737.D\FID1A.CH Vial: 35
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

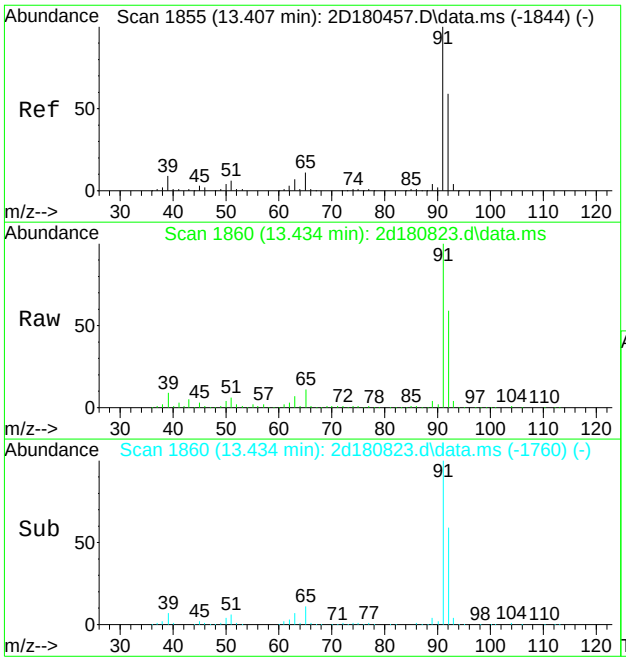
Data File : C:\HPCHEM\1\DATA\GH116737.D\FID2B.CH Vial: 35
Acq On : 9 Jan 2019 1:13 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:07 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um



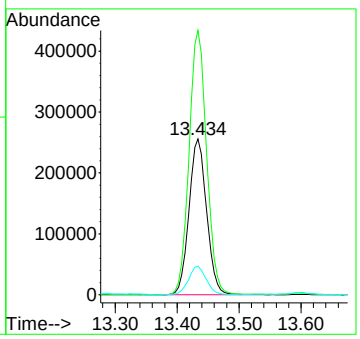


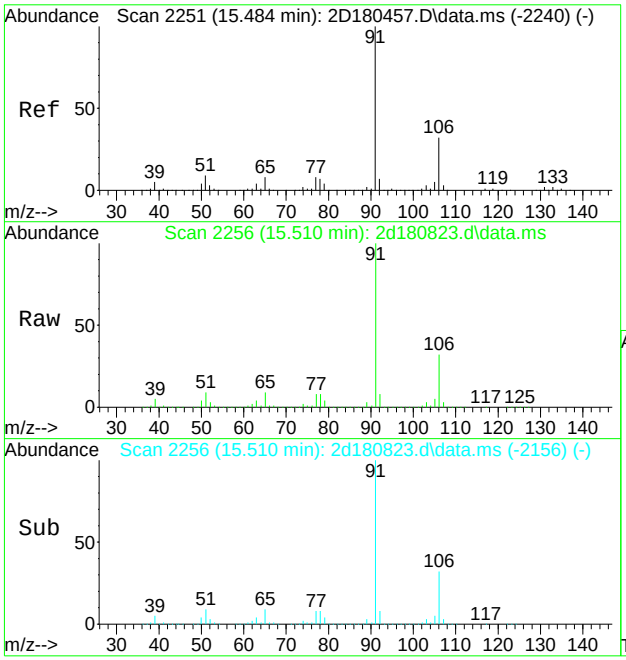


#76
toluene
Concen: 41.76 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 92 Resp: 506345

Ion	Ratio	Lower	Upper
92	100		
91	169.5	148.1	188.1
65	18.1	0.0	38.8

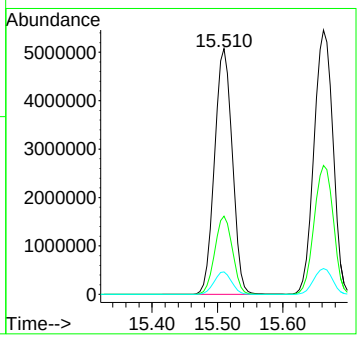


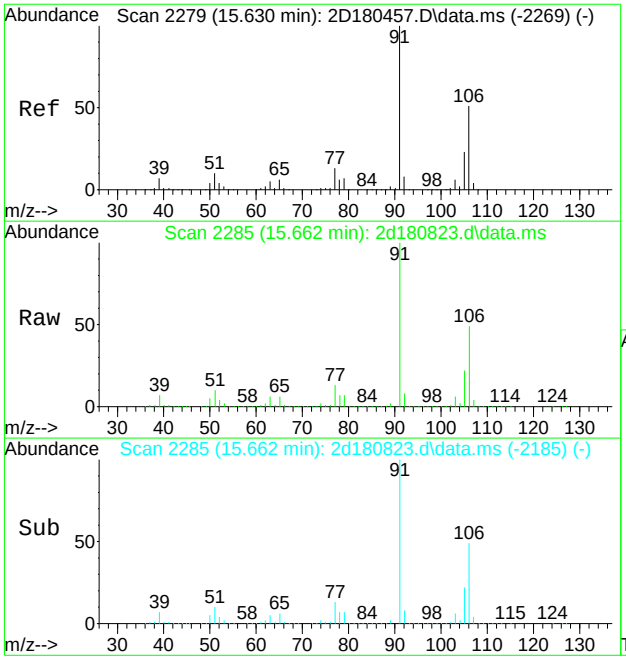


#89
ethylbenzene
Concen: 415.59 ug/L
RT: 15.510 min Scan# 2256
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 91 Resp: 9603869

Ion	Ratio	Lower	Upper
91	100		
106	31.8	1.6	61.6
51	9.1	0.0	39.0

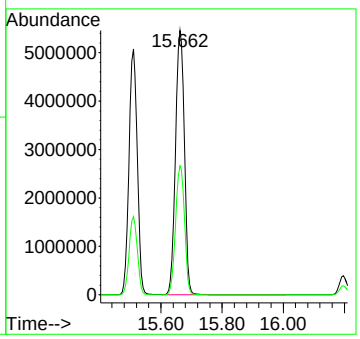


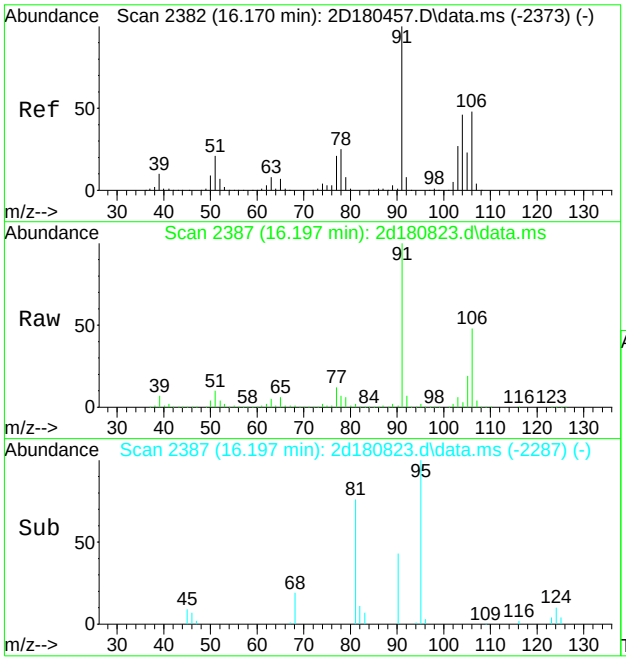


#90
m,p-xylene
Concen: 627.19 ug/L
RT: 15.662 min Scan# 2285
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion: 91 Resp:11017894

Ion	Ratio	Lower	Upper
91	100		
106	48.8	21.1	81.1

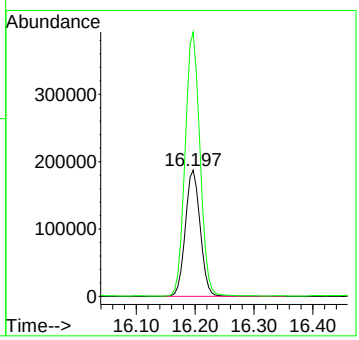


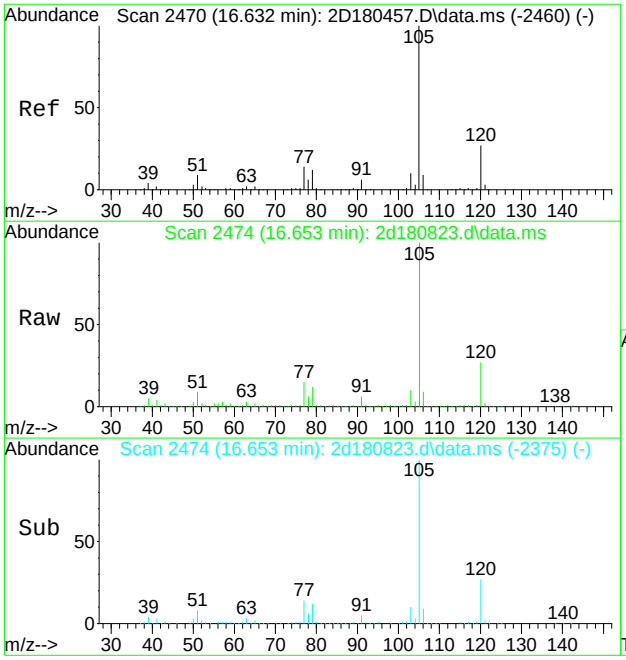


#91
o-xylene
Concen: 36.97 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:106 Resp: 328948

Ion	Ratio	Lower	Upper
106	100		
91	209.6	179.9	239.9

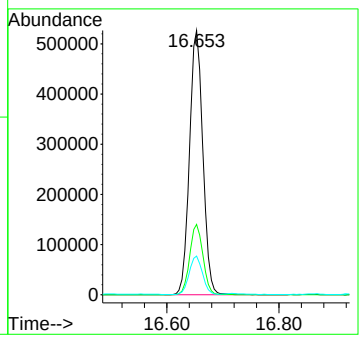


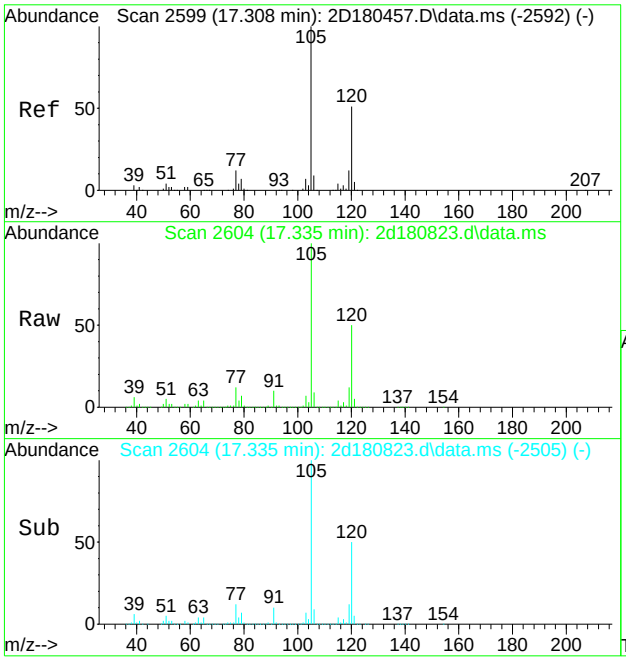


#96
isopropylbenzene
Concen: 37.61 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:105 Resp: 869405

Ion	Ratio	Lower	Upper
105	100		
120	26.6	6.7	46.7
77	14.5	0.0	34.2

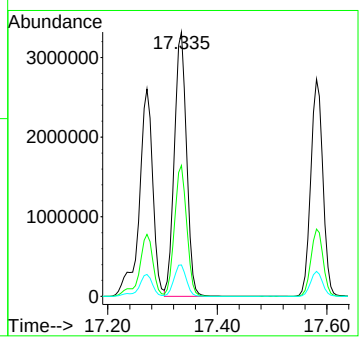


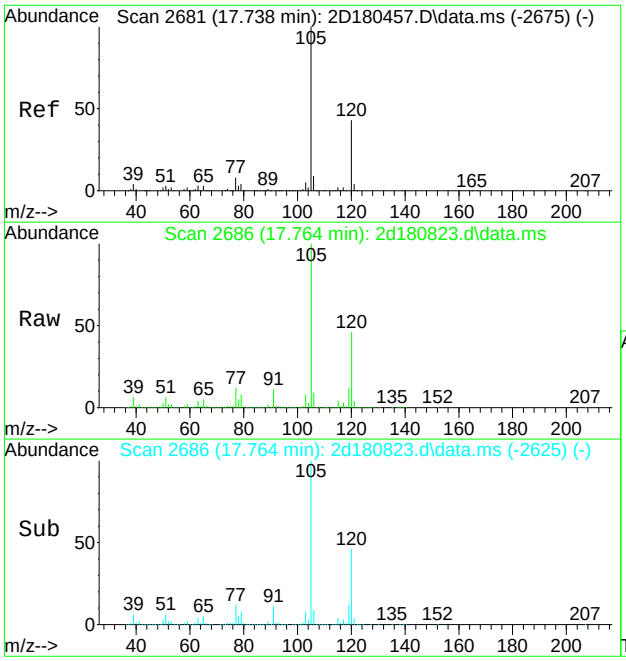


#107
1,3,5-trimethylbenzene
Concen: 263.52 ug/L
RT: 17.335 min Scan# 2604
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:105 Resp: 5111860

Ion	Ratio	Lower	Upper
105	100		
120	49.5	20.7	80.7
77	11.8	0.0	42.0

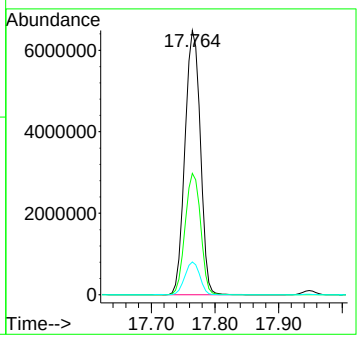


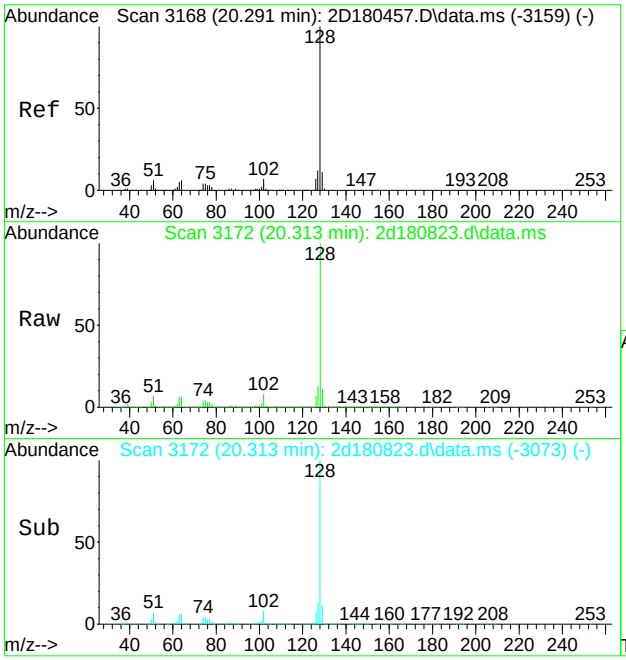


#109
1,2,4-trimethylbenzene
Concen: 549.84 ug/L
RT: 17.764 min Scan# 2686
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:105 Resp:10837769

Ion	Ratio	Lower	Upper
105	100		
120	45.9	16.7	76.7
77	12.4	0.0	41.8

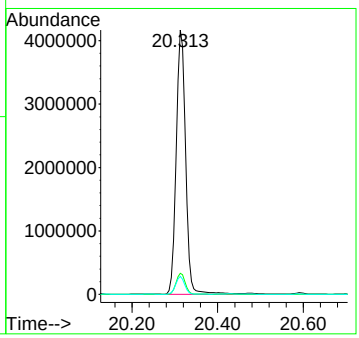




#121
naphthalene
Concen: 385.03 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180823.d
Acq: 9 Jan 2019 1:43 pm

Tgt Ion:128 Resp: 6393258

Ion	Ratio	Lower	Upper
128	100		
102	8.0	0.0	37.5
51	6.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180868.d
Acq On : 10 Jan 2019 1:19 pm
Operator : EddieH
Sample : JC80990-1 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 12 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

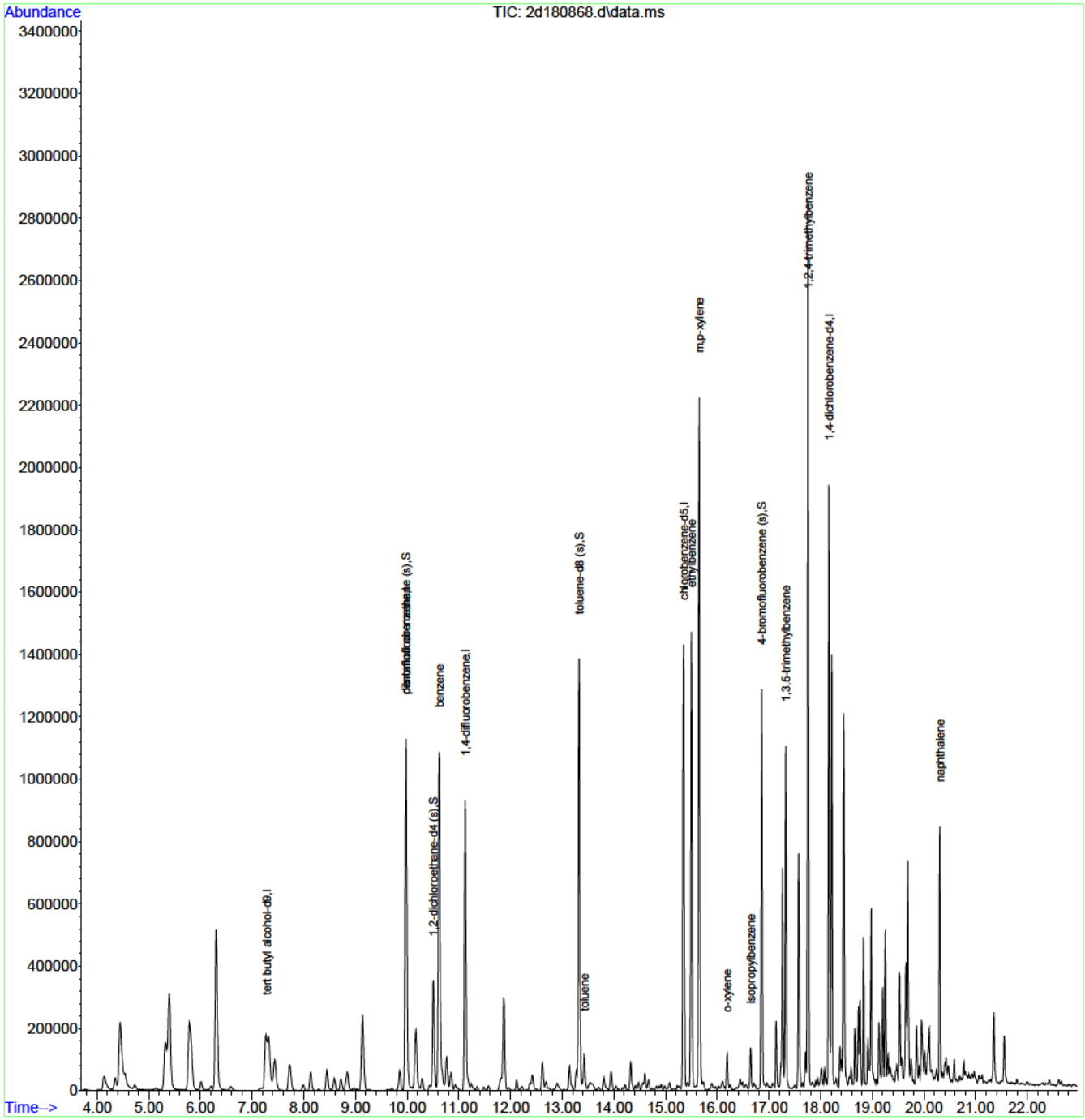
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	212997	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	712443	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	953854	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	928428	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.157	152	505387	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	288872	48.88	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.76%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	293869	50.12	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.24%			
75) toluene-d8 (s)	13.323	98	1093537	48.96	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.92%			
99) 4-bromofluorobenzene (s)	16.857	95	419230	46.79	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.58%			
Target Compounds						Qvalue
54) benzene	10.618	78	1229648	59.22	ug/L	98
76) toluene	13.423	92	51647	3.95	ug/L	98
89) ethylbenzene	15.499	91	1151718	46.24	ug/L	100
90) m,p-xylene	15.651	91	1422553	75.13	ug/L	100
91) o-xylene	16.186	106	33131	3.45	ug/L	92
96) isopropylbenzene	16.647	105	87765	3.52	ug/L	98
107) 1,3,5-trimethylbenzene	17.324	105	605963	28.52	ug/L	99
109) 1,2,4-trimethylbenzene	17.754	105	1531301	70.94	ug/L	99
121) naphthalene	20.307	128	642255	35.32	ug/L	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

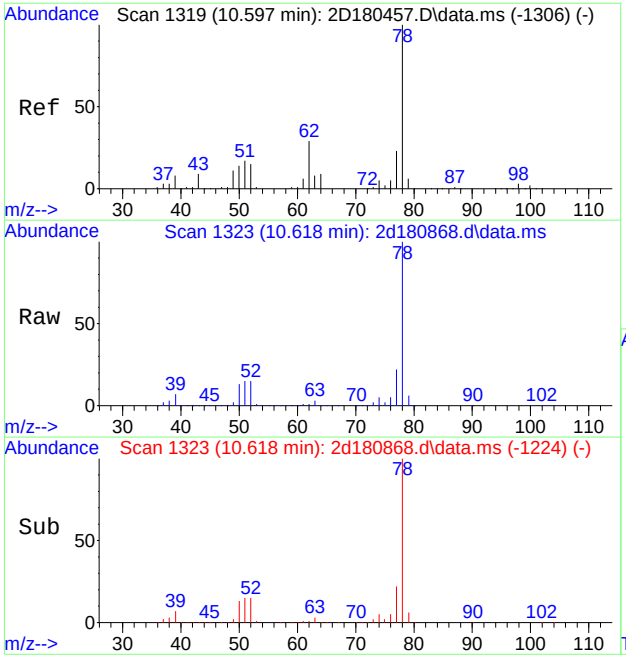
Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180868.d
Acq On : 10 Jan 2019 1:19 pm
Operator : EddieH
Sample : JC80990-1 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 12 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



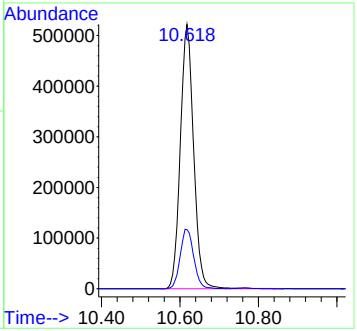
M2D7670.M Mon Jan 21 16:35:10 2019 Page: 2

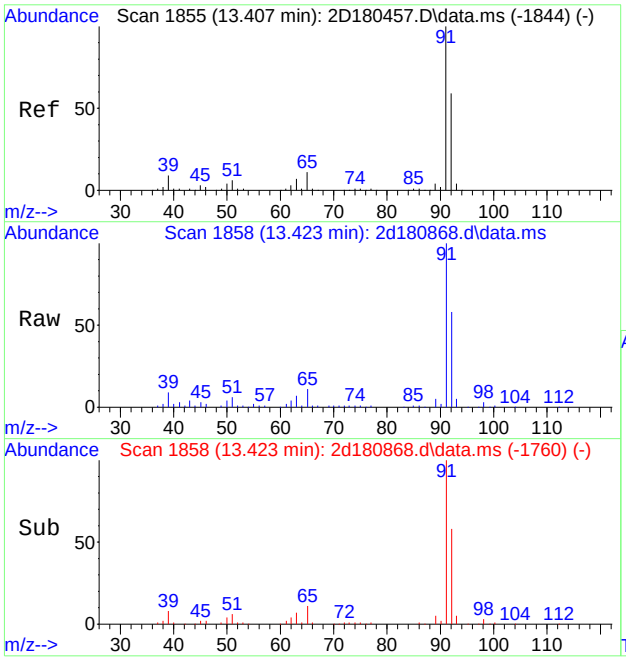


#54
benzene
Concen: 59.22 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 78 Resp: 1229648

Ion	Ratio	Lower	Upper
78	100		
77	22.4	0.0	53.2

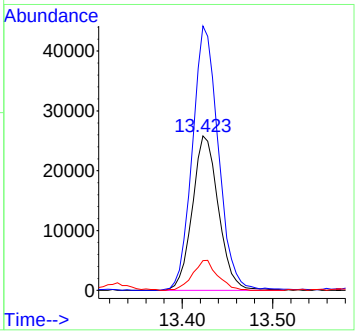


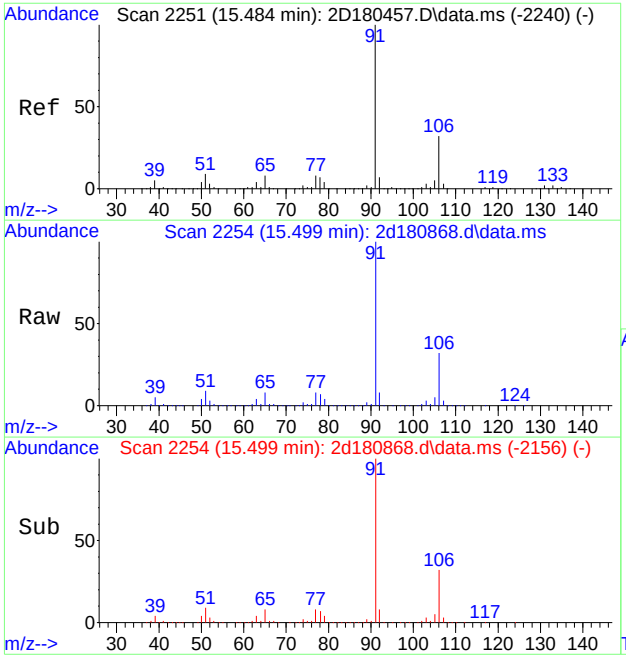


#76
toluene
Concen: 3.95 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 92 Resp: 51647

Ion	Ratio	Lower	Upper
92	100		
91	171.1	148.1	188.1
65	19.2	0.0	38.8

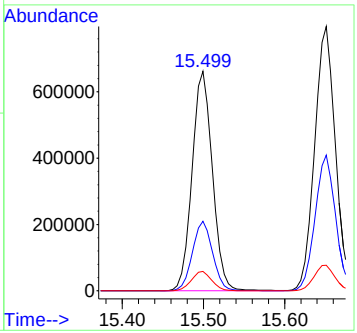


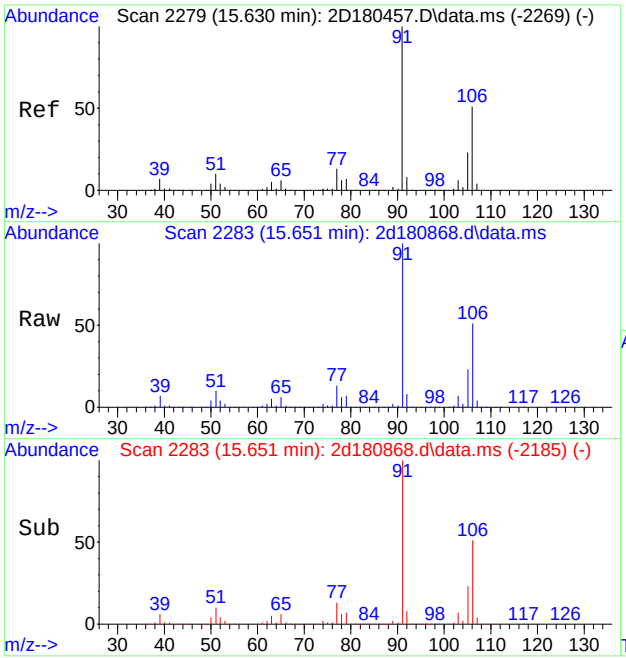


#89
ethylbenzene
Concen: 46.24 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 91 Resp: 1151718

Ion	Ratio	Lower	Upper
91	100		
106	31.7	1.6	61.6
51	8.8	0.0	39.0

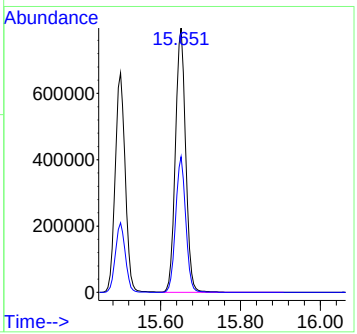


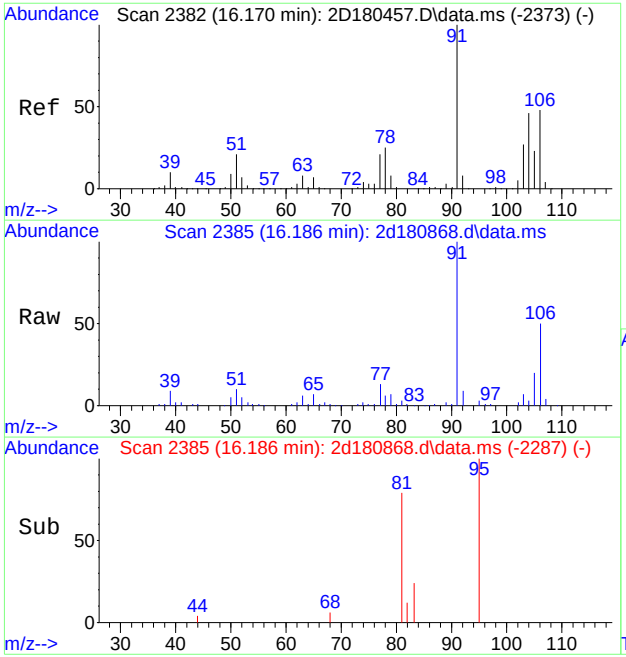


#90
m,p-xylene
Concen: 75.13 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion: 91 Resp: 1422553

Ion	Ratio	Lower	Upper
91	100		
106	51.3	21.1	81.1

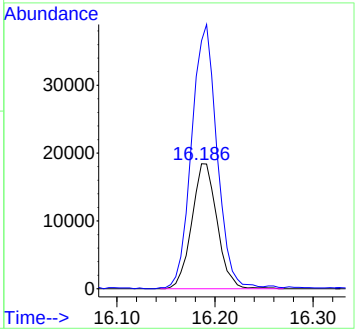


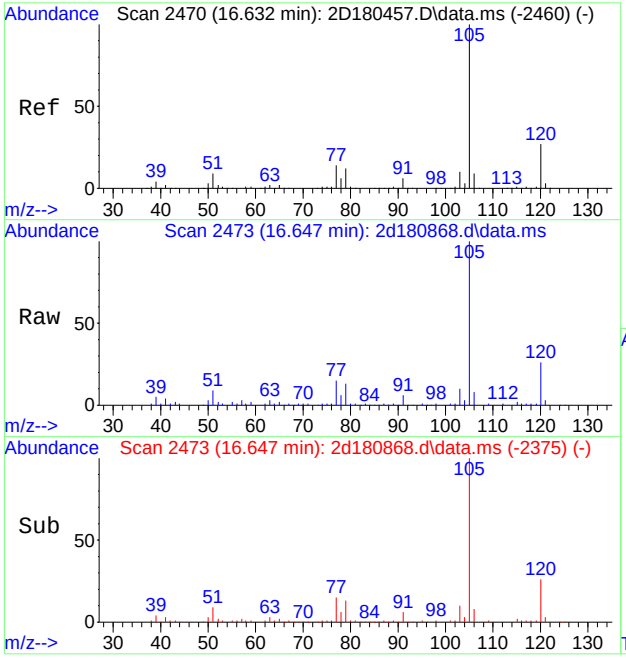


#91
o-xylene
Concen: 3.45 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:106 Resp: 33131

Ion	Ratio	Lower	Upper
106	100		
91	197.7	179.9	239.9

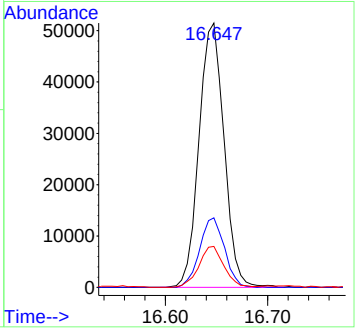


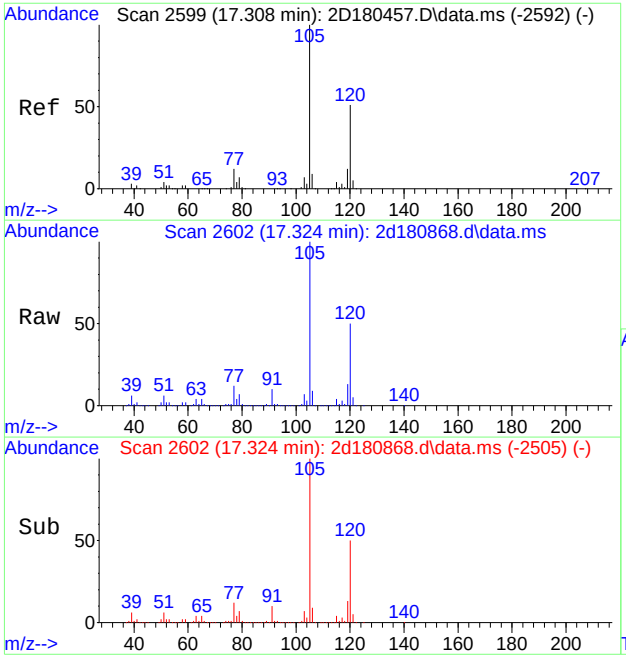


#96
isopropylbenzene
Concen: 3.52 ug/L
RT: 16.647 min Scan# 2473
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:105 Resp: 87765

Ion	Ratio	Lower	Upper
105	100		
120	26.3	6.7	46.7
77	15.5	0.0	34.2

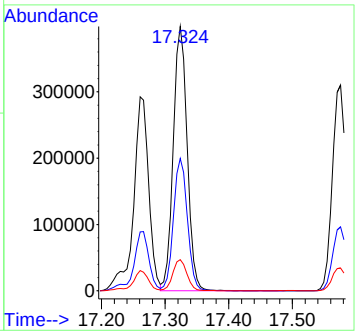


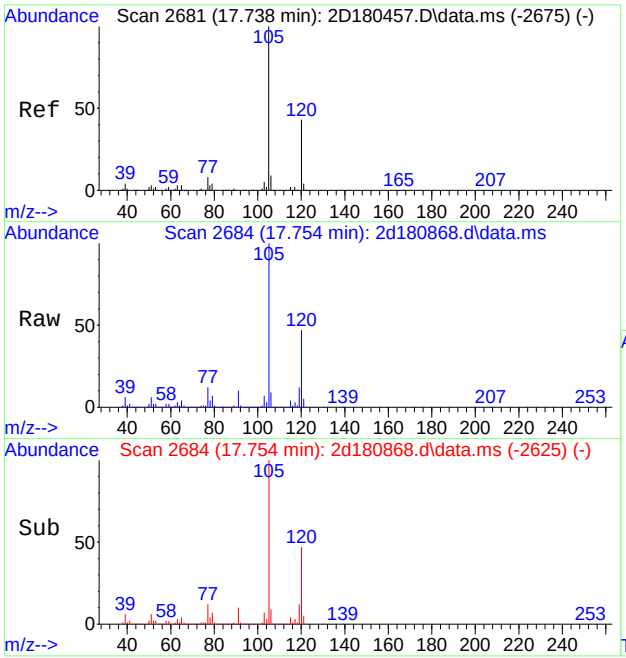


#107
1,3,5-trimethylbenzene
Concen: 28.52 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:105 Resp: 605963

Ion	Ratio	Lower	Upper
105	100		
120	50.0	20.7	80.7
77	11.7	0.0	42.0

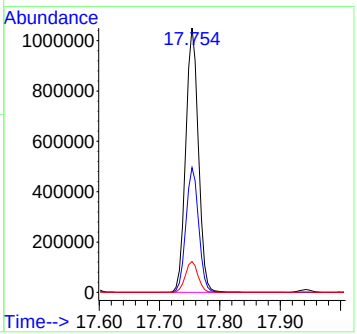


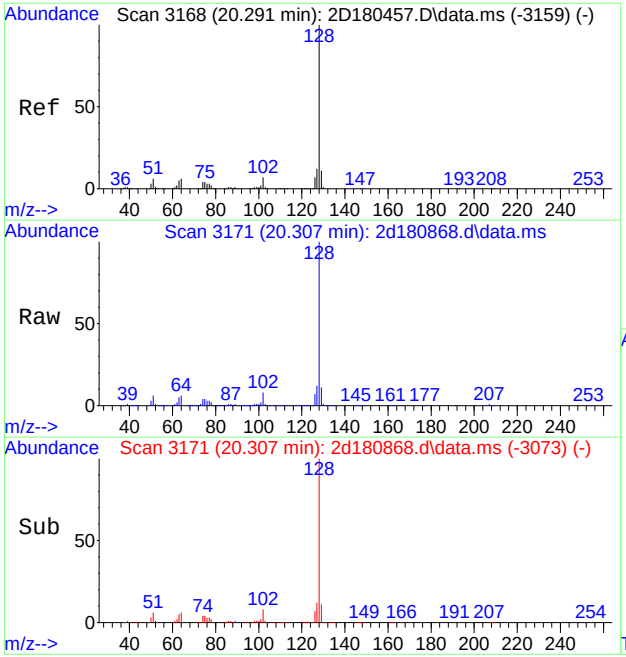


#109
1,2,4-trimethylbenzene
Concen: 70.94 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:105 Resp: 1531301

Ion	Ratio	Lower	Upper
105	100		
120	47.2	16.7	76.7
77	11.6	0.0	41.8

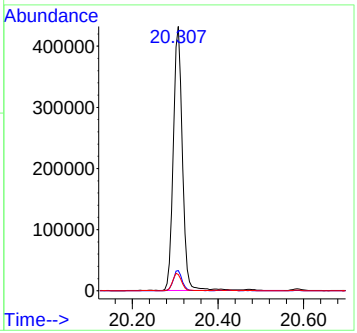




#121
naphthalene
Concen: 35.32 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180868.d
Acq: 10 Jan 2019 1:19 pm

Tgt Ion:128 Resp: 642255

Ion	Ratio	Lower	Upper
128	100		
102	7.6	0.0	37.5
51	6.1	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180865.d
Acq On : 10 Jan 2019 11:50 am
Operator : EddieH
Sample : JC80990-2 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 9 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:31 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

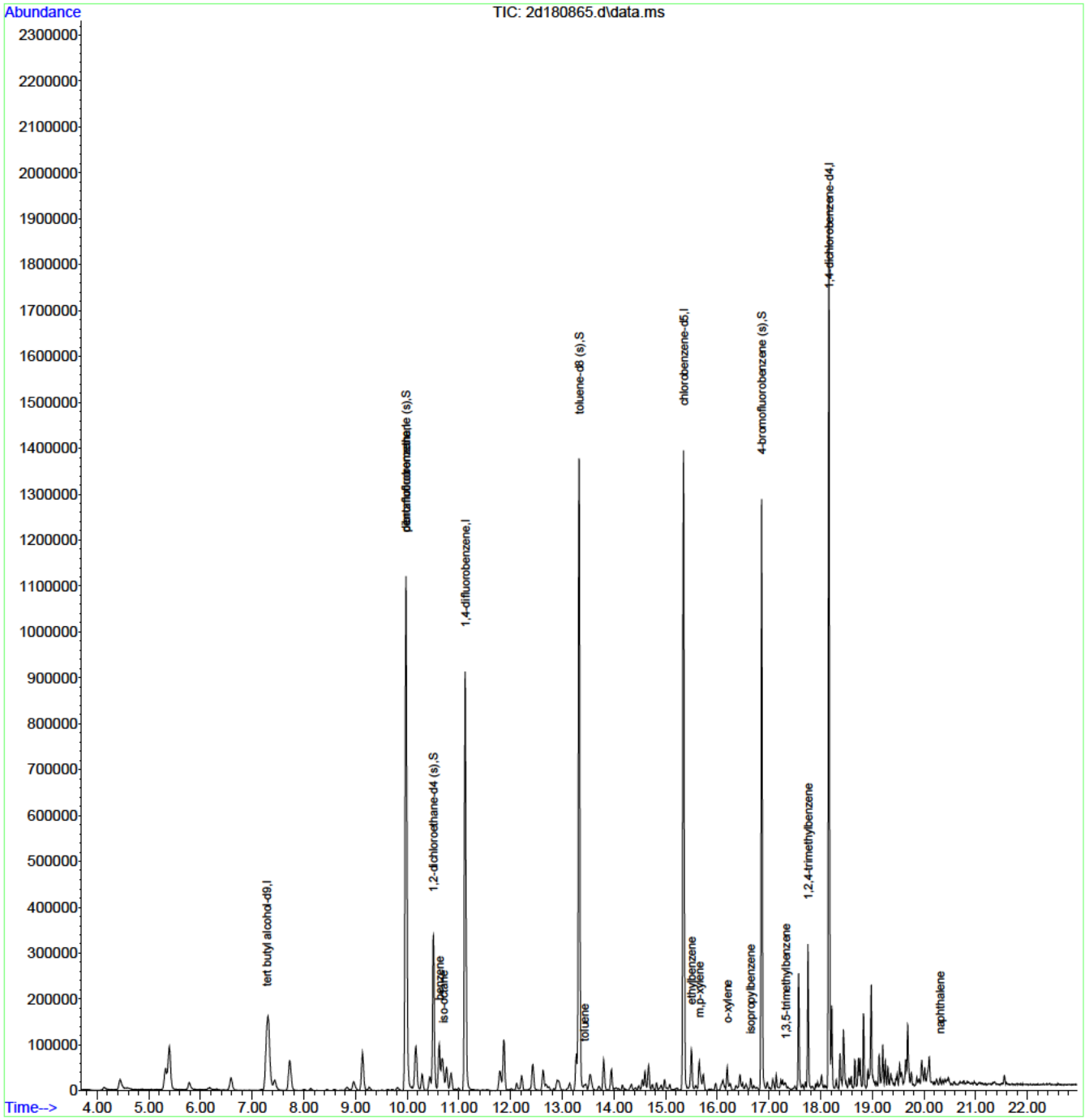
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	201807	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	704826	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	950921	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	914899	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	505056	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	290440	49.68	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.36%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	294175	50.33	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.66%			
75) toluene-d8 (s)	13.323	98	1080827	49.11	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.22%			
99) 4-bromofluorobenzene (s)	16.857	95	417511	46.63	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.26%			
Target Compounds						Qvalue
54) benzene	10.618	78	102471	4.95	ug/L	99
55) iso-octane	10.697	57	56409	2.92	ug/L	89
76) toluene	13.423	92	2966	0.23	ug/L	89
89) ethylbenzene	15.499	91	54426	2.22	ug/L	98
90) m,p-xylene	15.651	91	38181	2.05	ug/L	97
91) o-xylene	16.191	106	13251	1.40	ug/L	95
96) isopropylbenzene	16.642	105	13946	0.57	ug/L	97
107) 1,3,5-trimethylbenzene	17.329	105	3239	0.15	ug/L	91
109) 1,2,4-trimethylbenzene	17.754	105	166609	7.72	ug/L	100
121) naphthalene	20.307	128	11467	0.63	ug/L	98

(#) = qualifier out of range (m) = manual integration (+) = signals summed

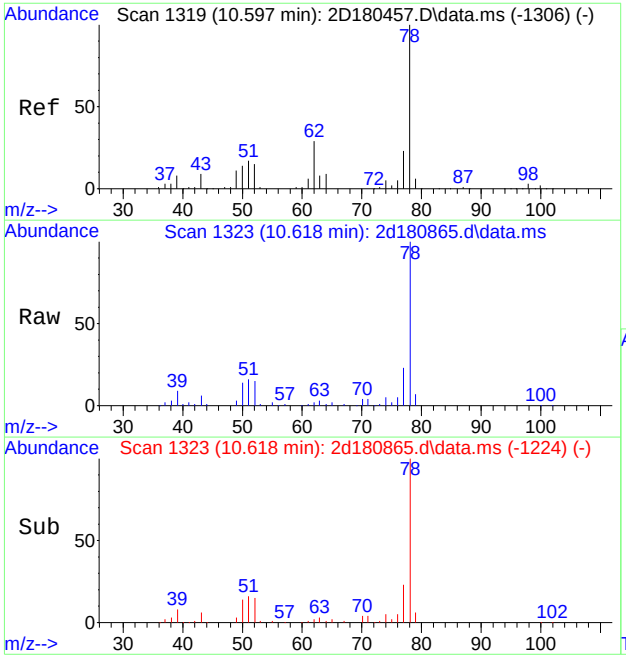
Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180865.d
Acq On : 10 Jan 2019 11:50 am
Operator : EddieH
Sample : JC80990-2 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 9 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:31 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



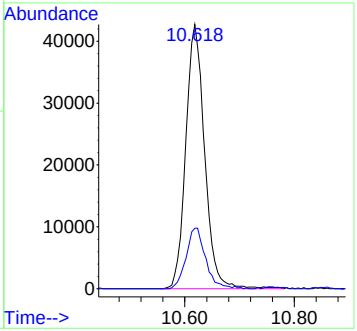
M2D7670.M Mon Jan 21 16:34:58 2019 Page: 2

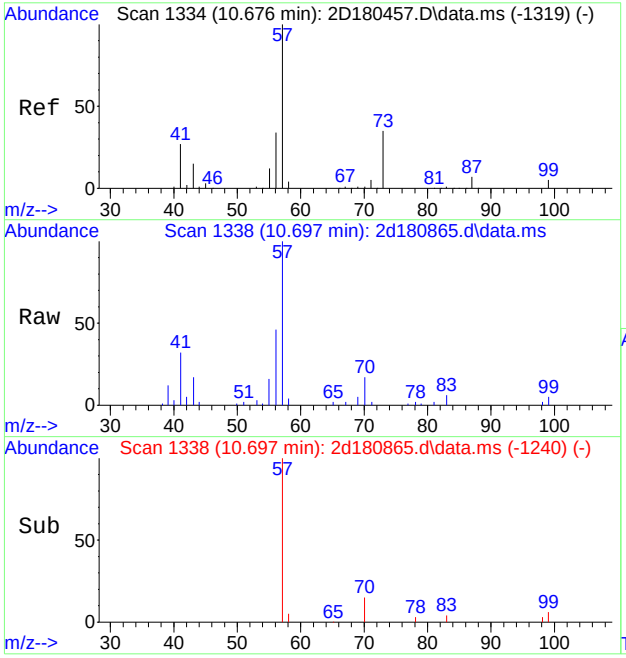


#54
benzene
Concen: 4.95 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 78 Resp: 102471

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

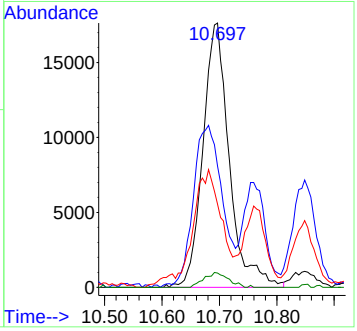


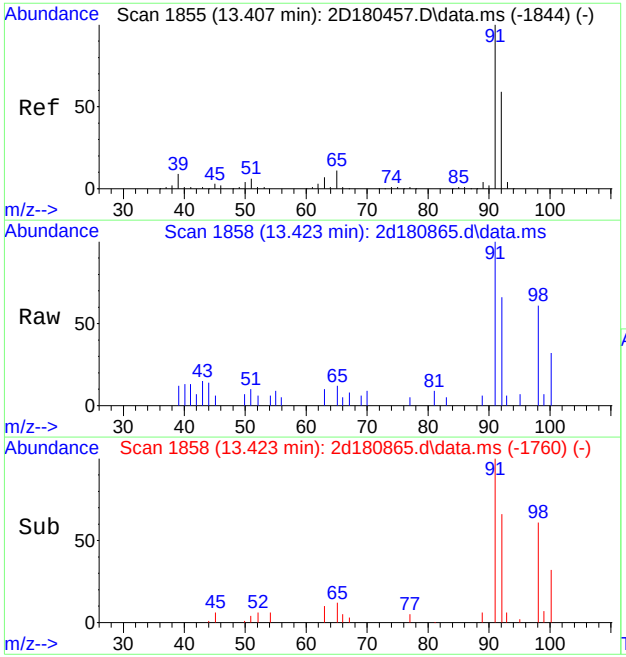


#55
iso-octane
Concen: 2.92 ug/L
RT: 10.697 min Scan# 1338
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 57 Resp: 56409

Ion	Ratio	Lower	Upper
57	100		
56	45.9	13.7	53.7
41	28.3	8.4	48.4
99	5.4	0.0	25.0

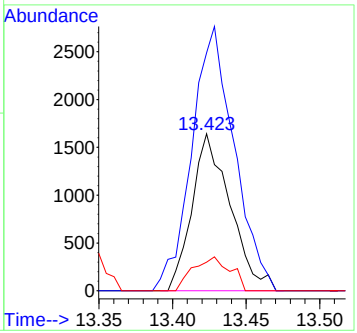


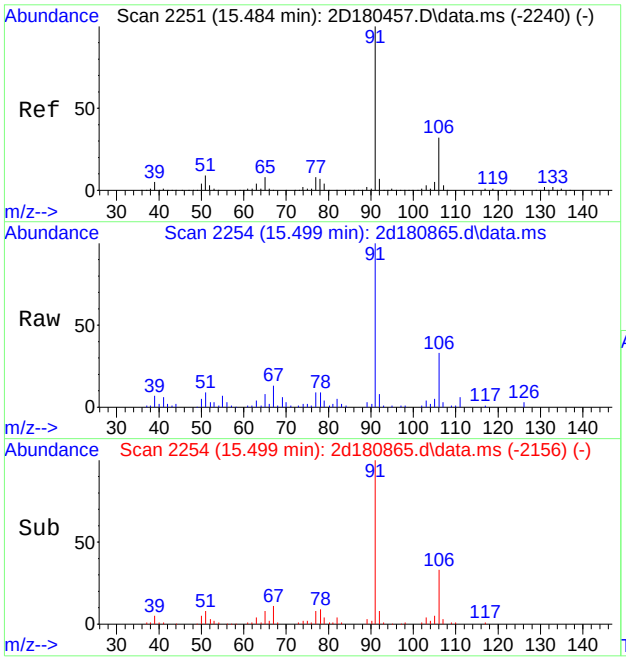


#76
toluene
Concen: 0.23 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 92 Resp: 2966

Ion	Ratio	Lower	Upper
92	100		
91	151.5	148.1	188.1
65	18.3	0.0	38.8

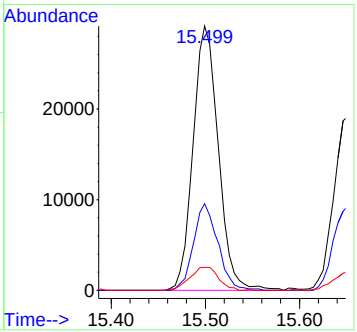


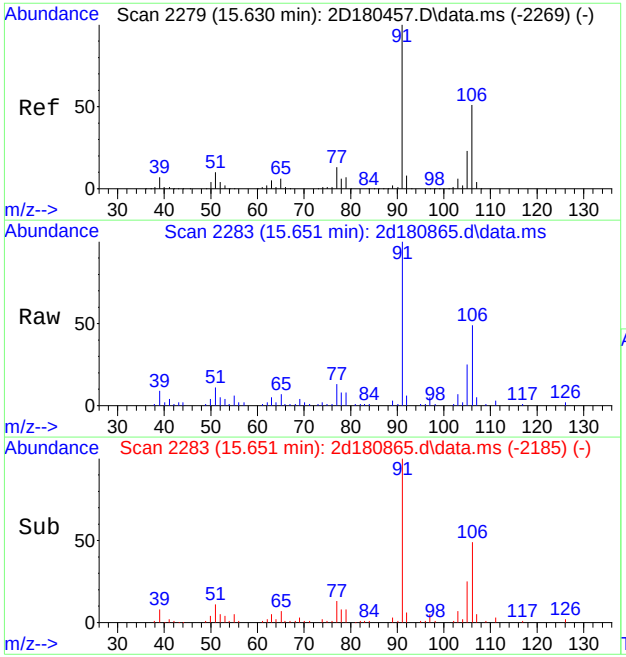


#89
ethylbenzene
Concen: 2.22 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 91 Resp: 54426

Ion	Ratio	Lower	Upper
91	100		
106	32.7	1.6	61.6
51	8.7	0.0	39.0

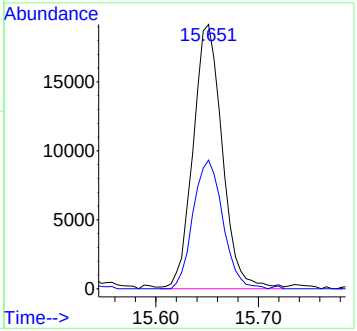


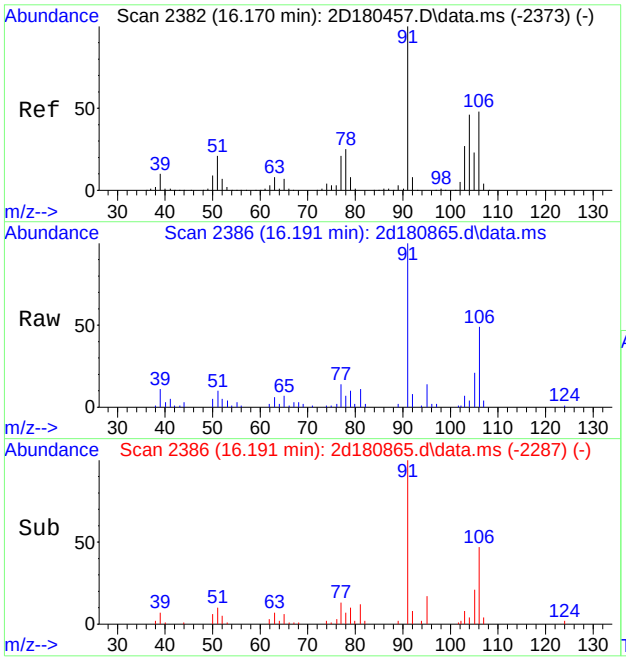


#90
m,p-xylene
Concen: 2.05 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion: 91 Resp: 38181

Ion	Ratio	Lower	Upper
91	100		
106	49.0	21.1	81.1

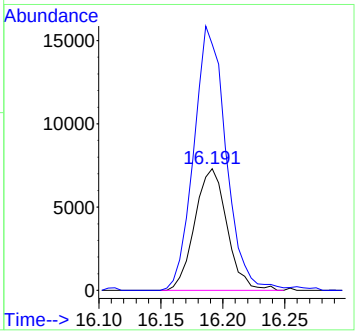


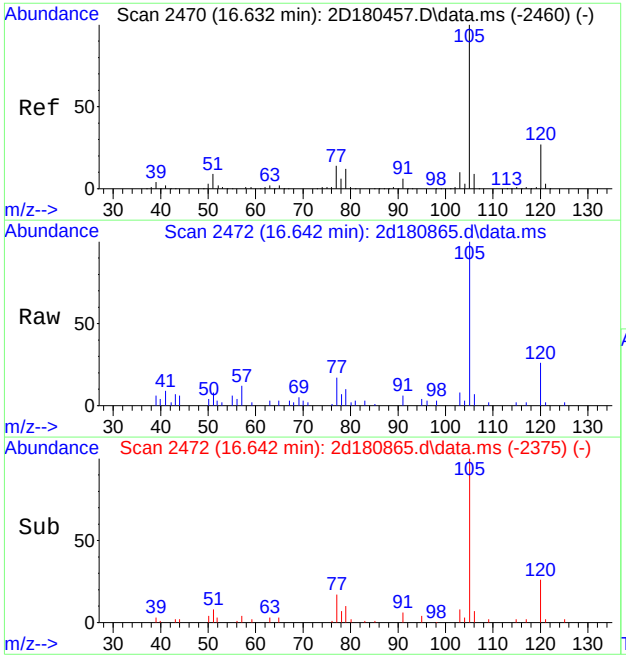


#91
o-xylene
Concen: 1.40 ug/L
RT: 16.191 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:106 Resp: 13251

Ion	Ratio	Lower	Upper
106	100		
91	202.4	179.9	239.9

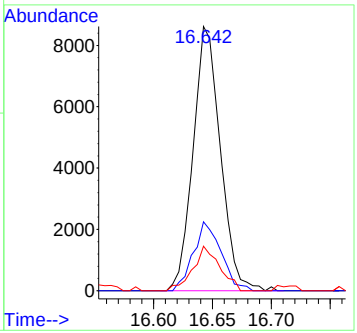


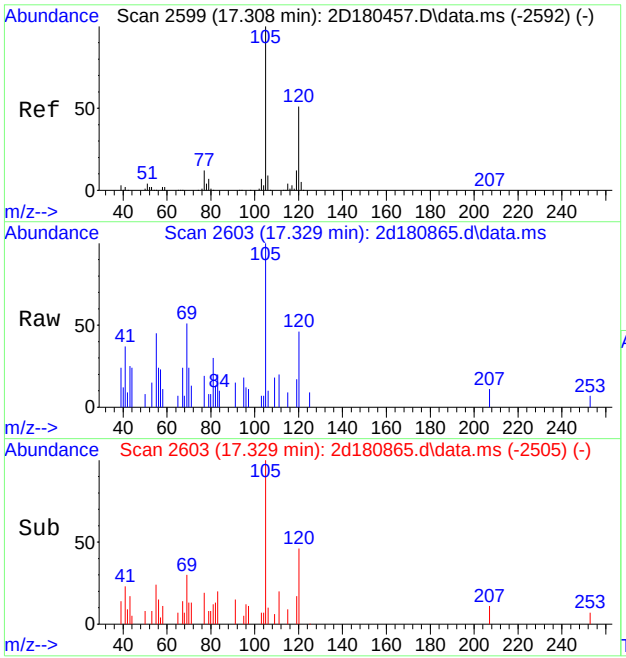


#96
isopropylbenzene
Concen: 0.57 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:105 Resp: 13946

Ion	Ratio	Lower	Upper
105	100		
120	26.0	6.7	46.7
77	16.9	0.0	34.2

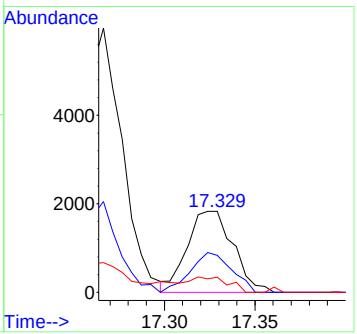


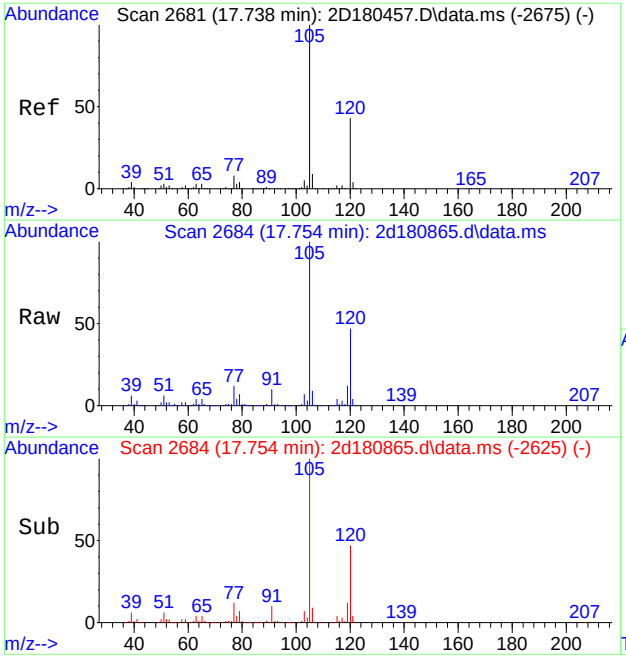


#107
1,3,5-trimethylbenzene
Concen: 0.15 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:105 Resp: 3239

Ion	Ratio	Lower	Upper
105	100		
120	45.9	20.7	80.7
77	18.8	0.0	42.0

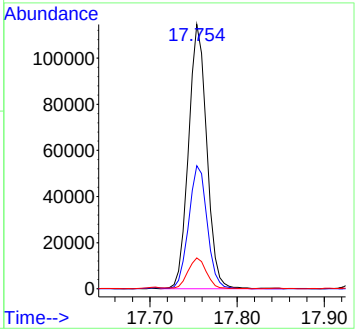


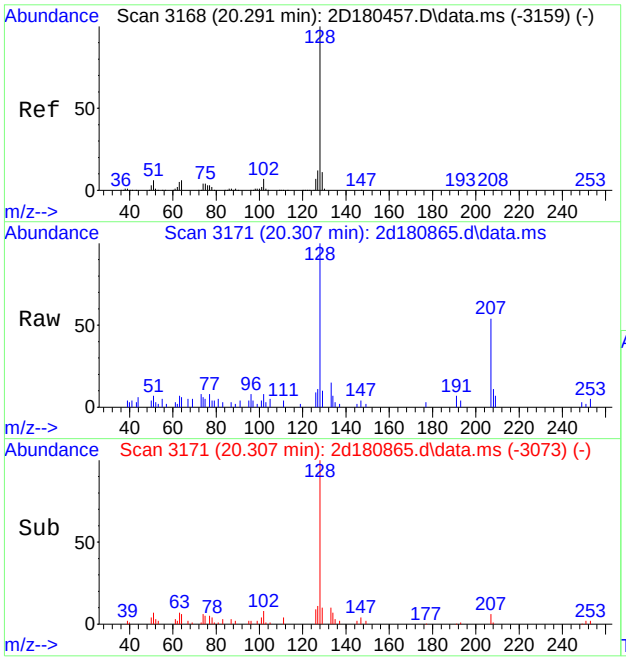


#109
1,2,4-trimethylbenzene
Concen: 7.72 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:105 Resp: 166609

Ion	Ratio	Lower	Upper
105	100		
120	46.5	16.7	76.7
77	11.5	0.0	41.8

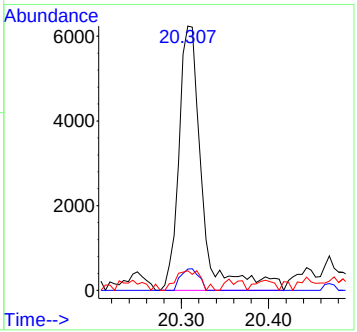




#121
naphthalene
Concen: 0.63 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180865.d
Acq: 10 Jan 2019 11:50 am

Tgt Ion:128 Resp: 11467

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.5
51	7.4	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180866.d
Acq On : 10 Jan 2019 12:19 pm
Operator : EddieH
Sample : JC80990-3 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 10 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:09 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

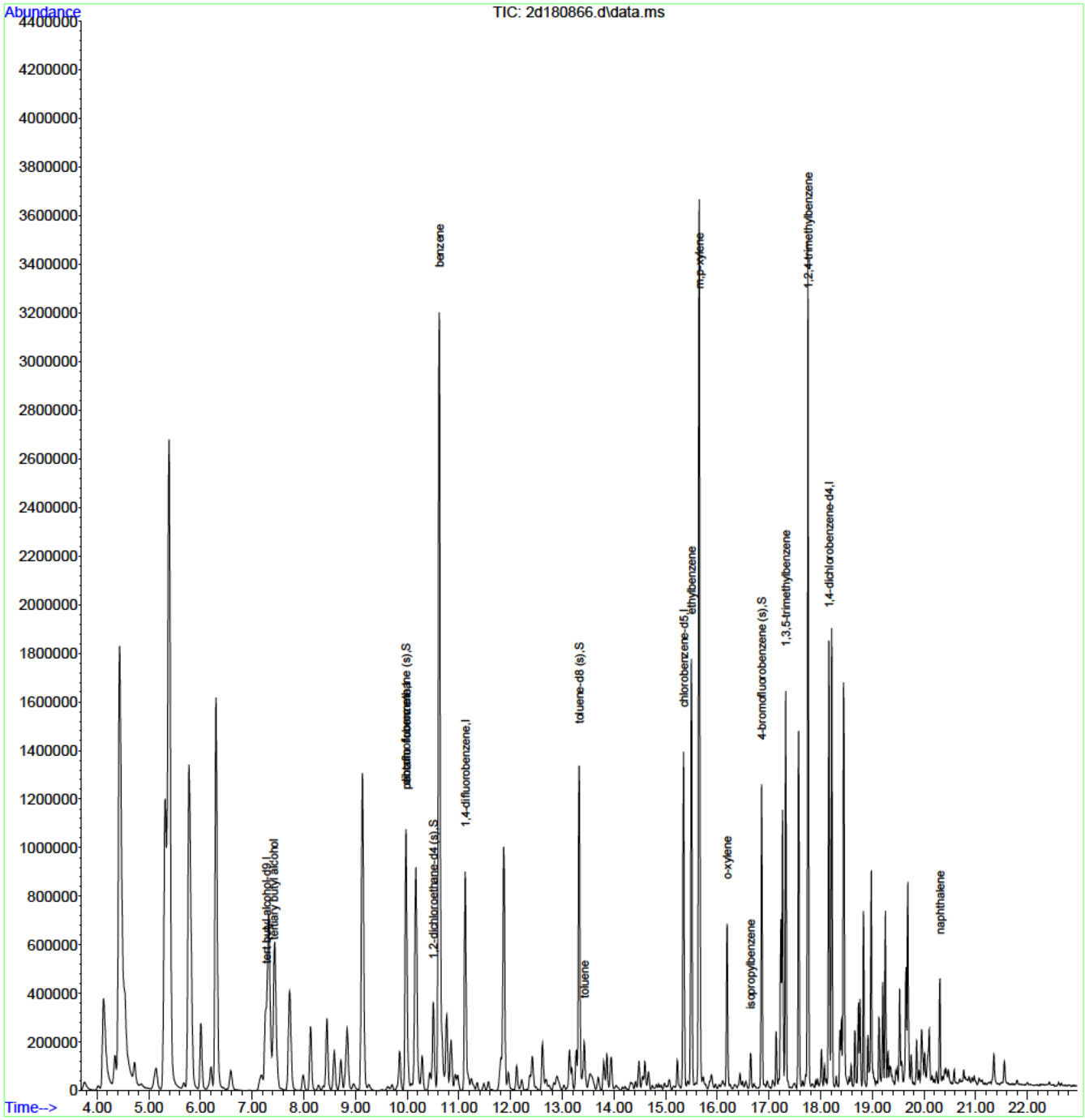
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	221784	500.00	ug/L	0.02
5) pentafluorobenzene	9.978	168	688155	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	920040	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	901572	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	485327	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	281088	49.24	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.48%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	281067	49.70	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 99.40%			
75) toluene-d8 (s)	13.329	98	1051070	48.46	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.92%			
99) 4-bromofluorobenzene (s)	16.857	95	406274	47.22	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.44%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.414	59	7192	16.72	ug/L	# 1
54) benzene	10.618	78	3667351	183.12	ug/L	100
76) toluene	13.428	92	93577	7.37	ug/L	97
89) ethylbenzene	15.499	91	1404864	58.08	ug/L	99
90) m,p-xylene	15.651	91	2421411	131.68	ug/L	99
91) o-xylene	16.186	106	210245	22.57	ug/L	97
96) isopropylbenzene	16.642	105	97594	4.03	ug/L	98
107) 1,3,5-trimethylbenzene	17.324	105	881178	43.19	ug/L	99
109) 1,2,4-trimethylbenzene	17.754	105	1872016	90.31	ug/L	100
121) naphthalene	20.307	128	342356	19.61	ug/L	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

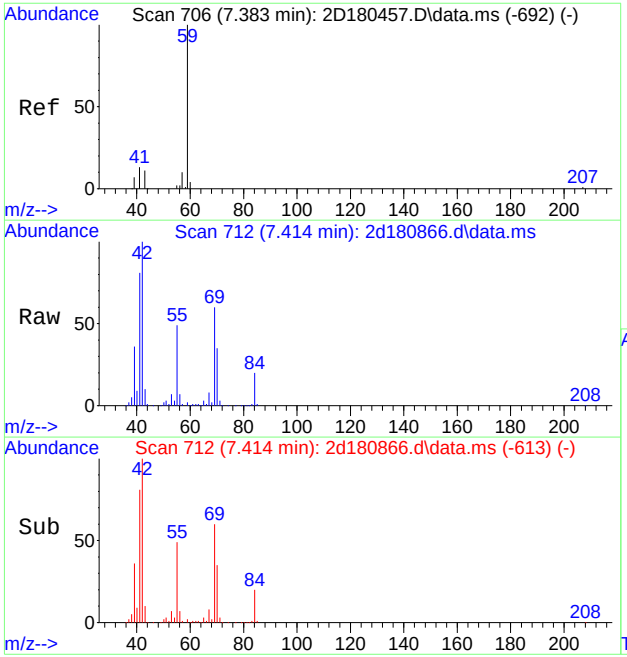
Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180866.d
Acq On : 10 Jan 2019 12:19 pm
Operator : EddieH
Sample : JC80990-3 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 10 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:31:09 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



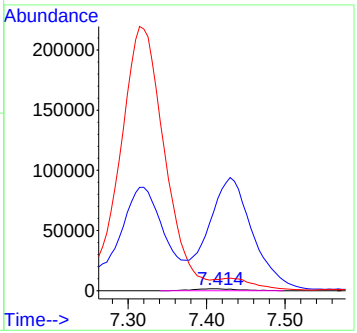
M2D7670.M Mon Jan 21 16:35:04 2019 Page: 2

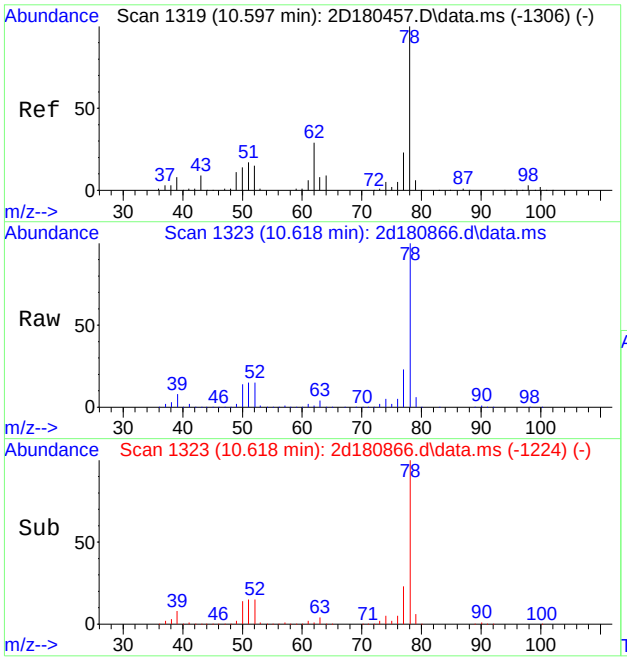


#2
tertiary butyl alcohol
Concen: 16.72 ug/L
RT: 7.414 min Scan# 712
Delta R.T. 0.021 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 59 Resp: 7192

Ion	Ratio	Lower	Upper
59	100		
41	3863.3	0.0	45.0#
43	438.0	0.0	40.6#

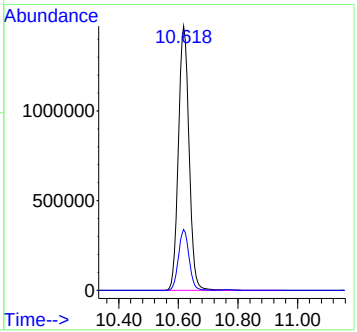


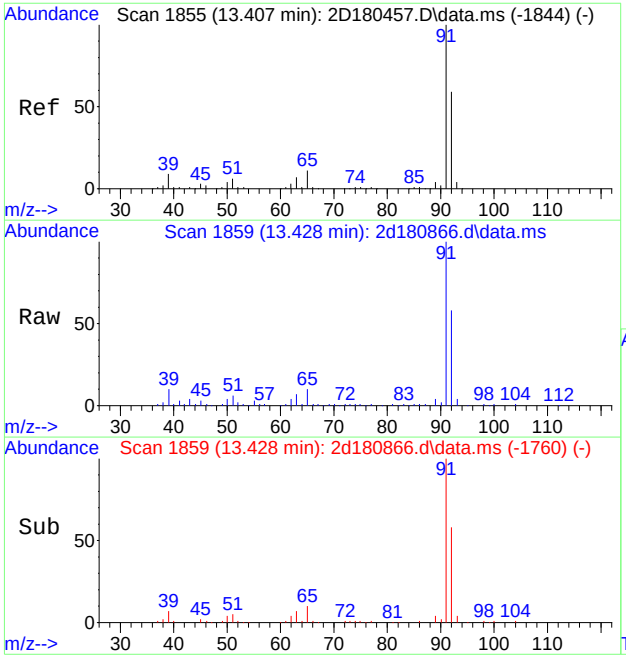


#54
benzene
Concen: 183.12 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 78 Resp: 3667351

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

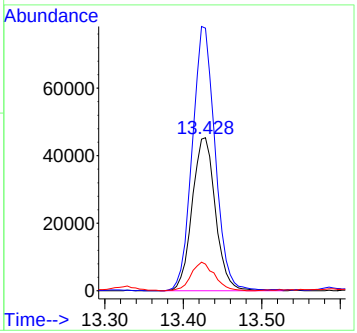


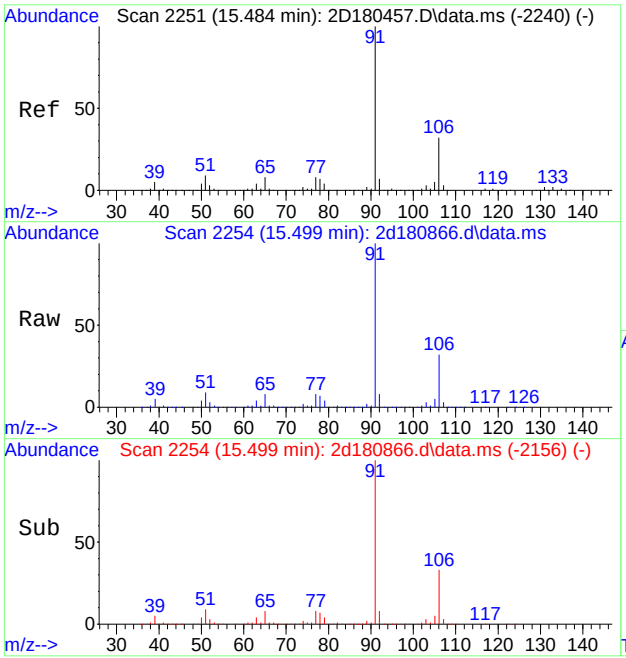


#76
toluene
Concen: 7.37 ug/L
RT: 13.428 min Scan# 1859
Delta R.T. 0.021 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 92 Resp: 93577

Ion	Ratio	Lower	Upper
92	100		
91	171.6	148.1	188.1
65	17.4	0.0	38.8

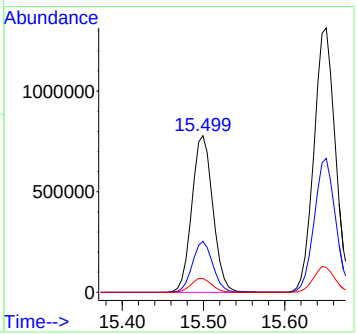


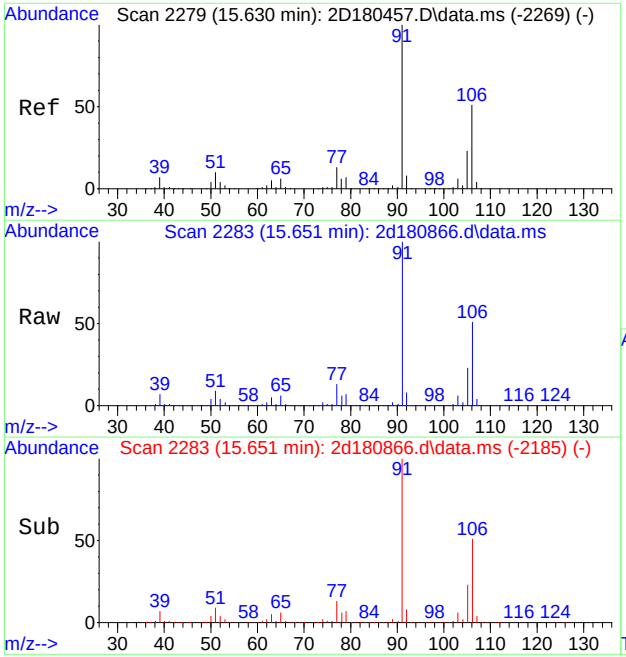


#89
ethylbenzene
Concen: 58.08 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 91 Resp: 1404864

Ion	Ratio	Lower	Upper
91	100		
106	32.5	1.6	61.6
51	8.7	0.0	39.0

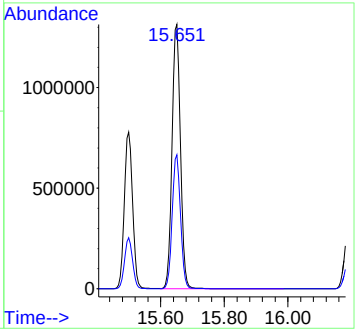


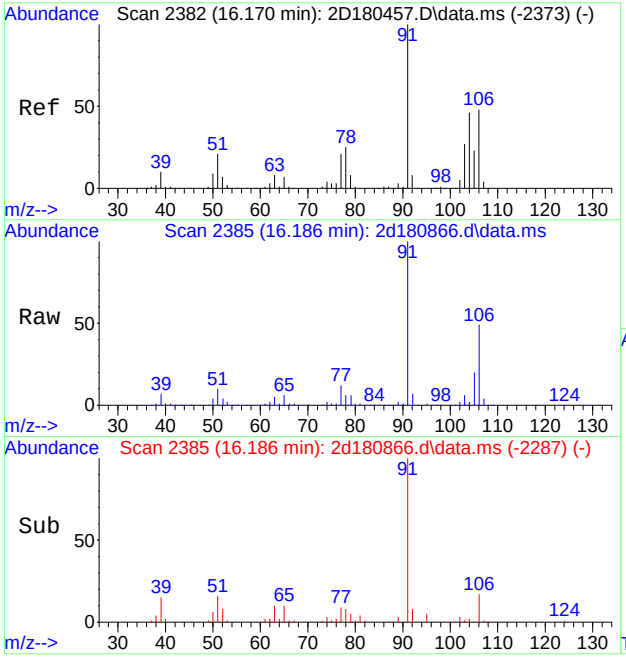


#90
m,p-xylene
Concen: 131.68 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion: 91 Resp: 2421411

Ion	Ratio	Lower	Upper
91	100		
106	50.7	21.1	81.1

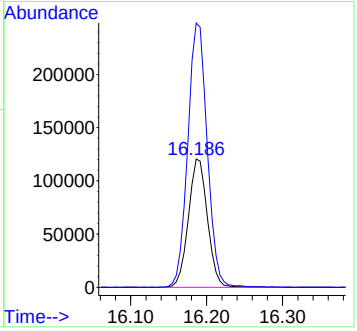


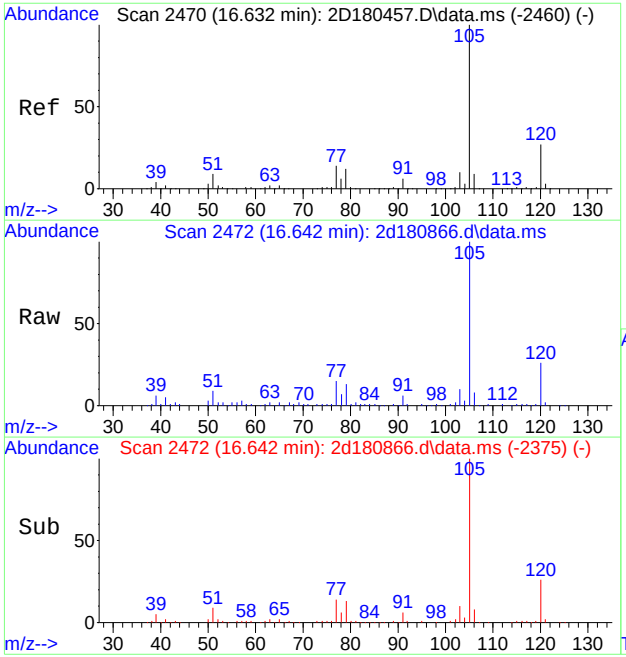


#91
o-xylene
Concen: 22.57 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:106 Resp: 210245

Ion	Ratio	Lower	Upper
106	100		
91	205.7	179.9	239.9

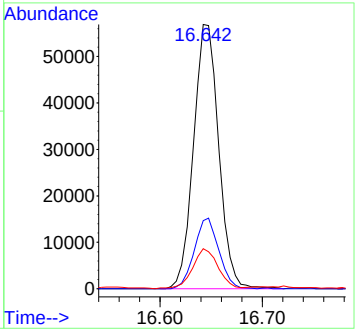


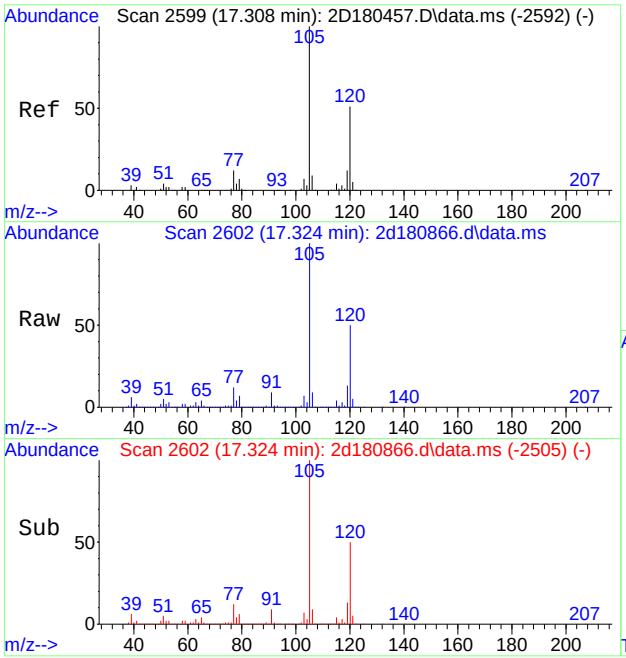


#96
isopropylbenzene
Concen: 4.03 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:105 Resp: 97594

Ion	Ratio	Lower	Upper
105	100		
120	25.8	6.7	46.7
77	14.8	0.0	34.2

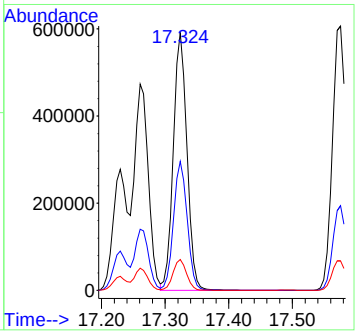


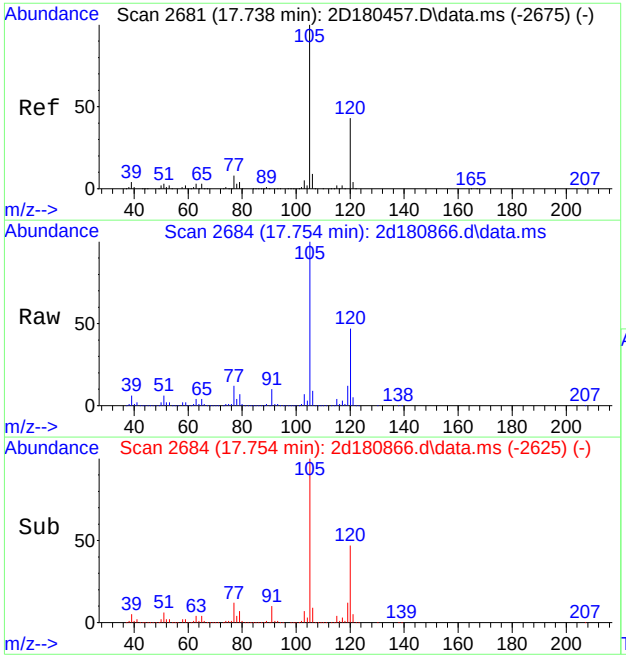


#107
1,3,5-trimethylbenzene
Concen: 43.19 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:105 Resp: 881178

Ion	Ratio	Lower	Upper
105	100		
120	50.0	20.7	80.7
77	11.9	0.0	42.0

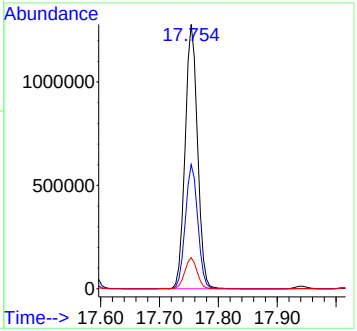


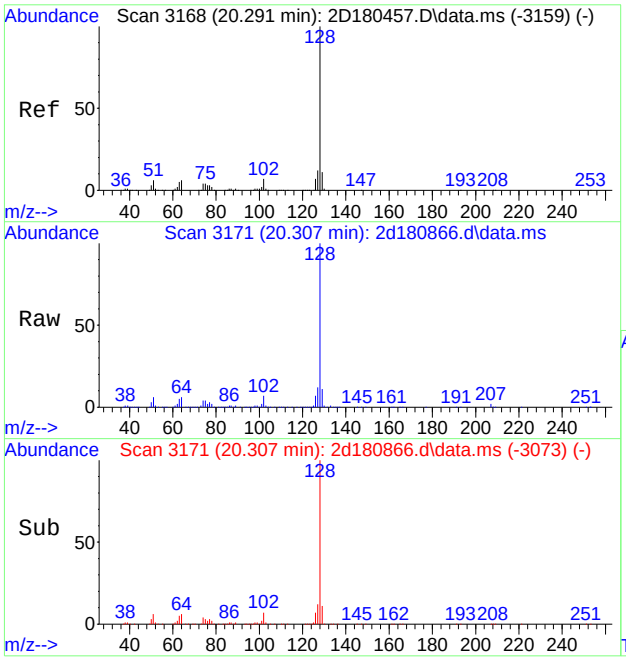


#109
1,2,4-trimethylbenzene
Concen: 90.31 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:105 Resp: 1872016

Ion	Ratio	Lower	Upper
105	100		
120	47.0	16.7	76.7
77	11.7	0.0	41.8

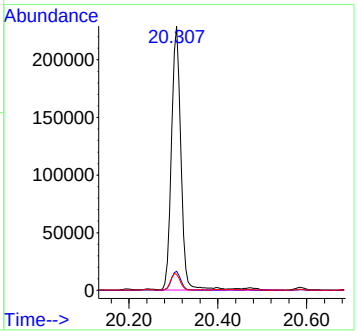




#121
naphthalene
Concen: 19.61 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180866.d
Acq: 10 Jan 2019 12:19 pm

Tgt Ion:128 Resp: 342356

Ion	Ratio	Lower	Upper
128	100		
102	7.2	0.0	37.5
51	6.0	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180822.d
Acq On : 9 Jan 2019 1:13 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 12 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:57 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

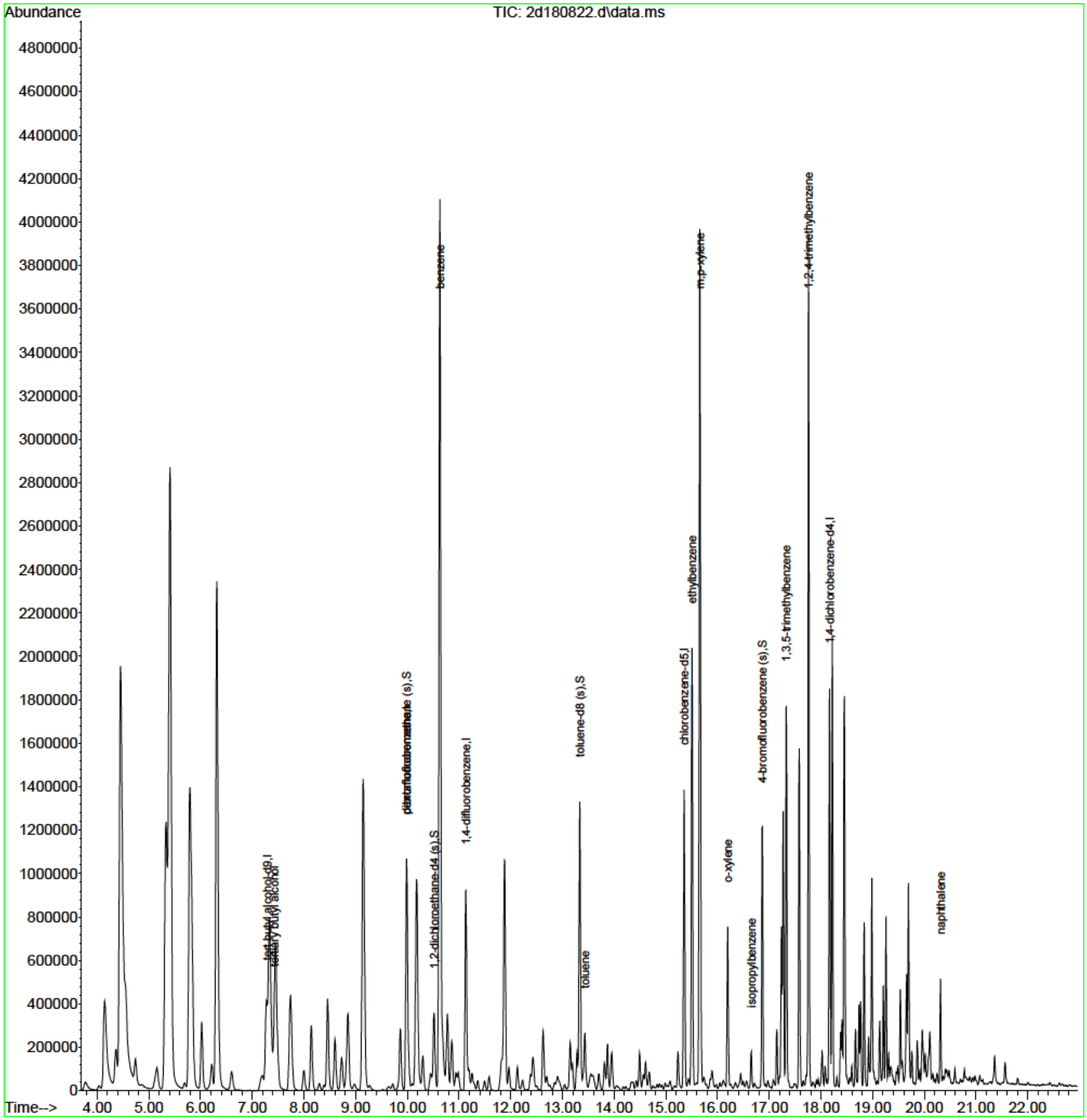
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.289	65	239729	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	660564	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.132	114	876996	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	872712	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.168	152	479062	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.984	113	267833	48.88	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.76%			
53) 1,2-dichloroethane-d4 (s)	10.519	65	271194	50.31	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.62%			
75) toluene-d8 (s)	13.334	98	1019132	48.54	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.08%			
99) 4-bromofluorobenzene (s)	16.863	95	400293	47.13	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.26%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.420	59	7910	17.02	ug/L	# 1
54) benzene	10.629	78	4542687	237.95	ug/L	99
76) toluene	13.434	92	120979	9.85	ug/L	96
89) ethylbenzene	15.505	91	1609124	68.72	ug/L	100
90) m,p-xylene	15.657	91	2633669	147.96	ug/L	99
91) o-xylene	16.197	106	225948	25.06	ug/L	99
96) isopropylbenzene	16.653	105	106185	4.53	ug/L	98
107) 1,3,5-trimethylbenzene	17.329	105	957891	47.57	ug/L	99
109) 1,2,4-trimethylbenzene	17.759	105	2095900	102.43	ug/L	100
121) naphthalene	20.312	128	380033	22.05	ug/L	100

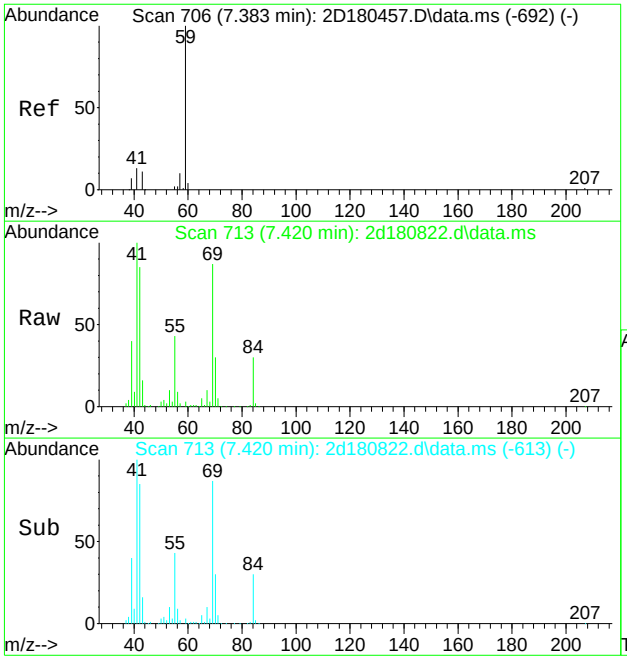
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180822.d
Acq On : 9 Jan 2019 1:13 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 12 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:57 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

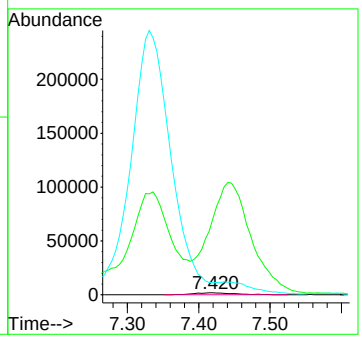


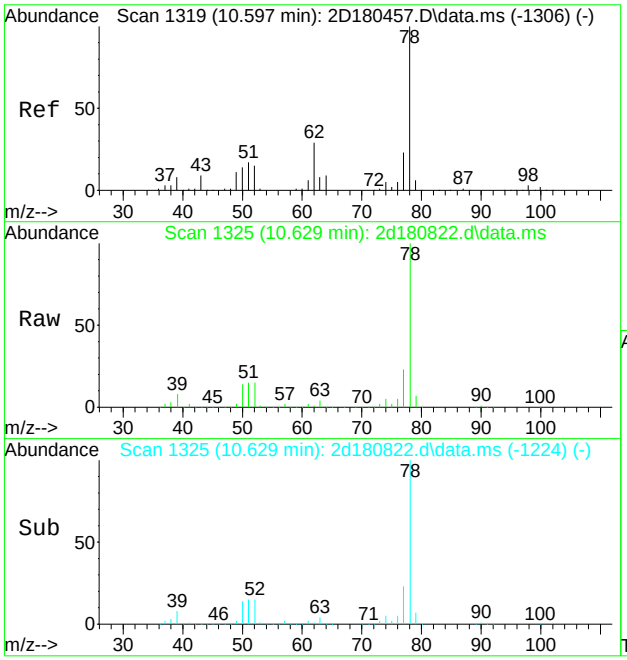


#2
tertiary butyl alcohol
Concen: 17.02 ug/L
RT: 7.420 min Scan# 713
Delta R.T. 0.026 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 59 Resp: 7910

Ion	Ratio	Lower	Upper
59	100		
41	3271.4	0.0	45.0#
43	502.6	0.0	40.6#

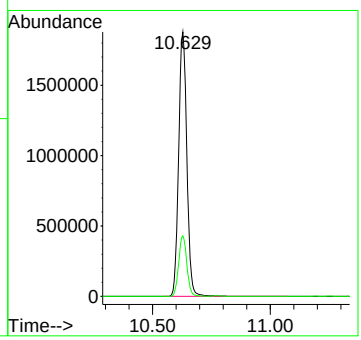


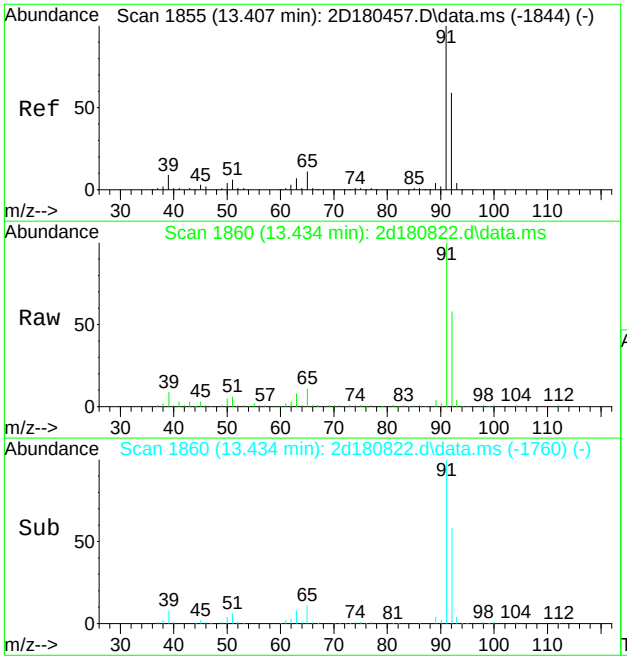


#54
benzene
Concen: 237.95 ug/L
RT: 10.629 min Scan# 1325
Delta R.T. 0.031 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 78 Resp: 4542687

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

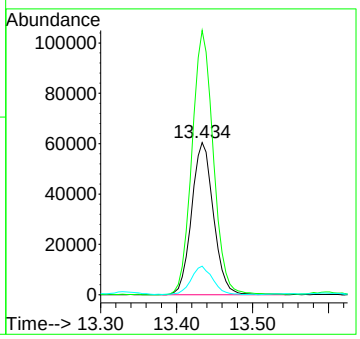


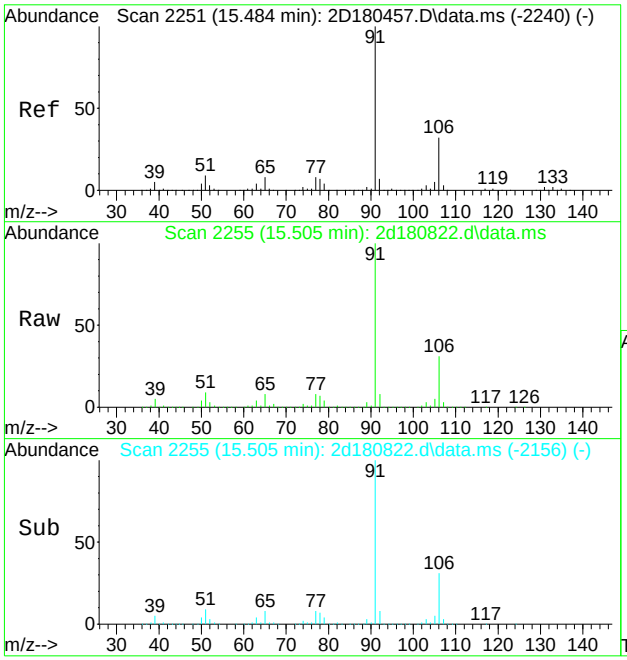


#76
toluene
Concen: 9.85 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 92 Resp: 120979

Ion	Ratio	Lower	Upper
92	100		
91	173.7	148.1	188.1
65	18.7	0.0	38.8

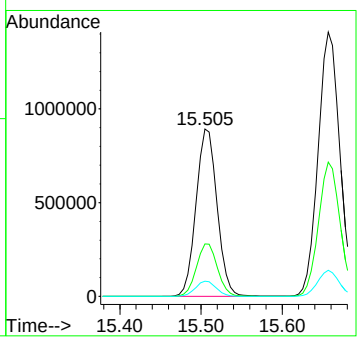


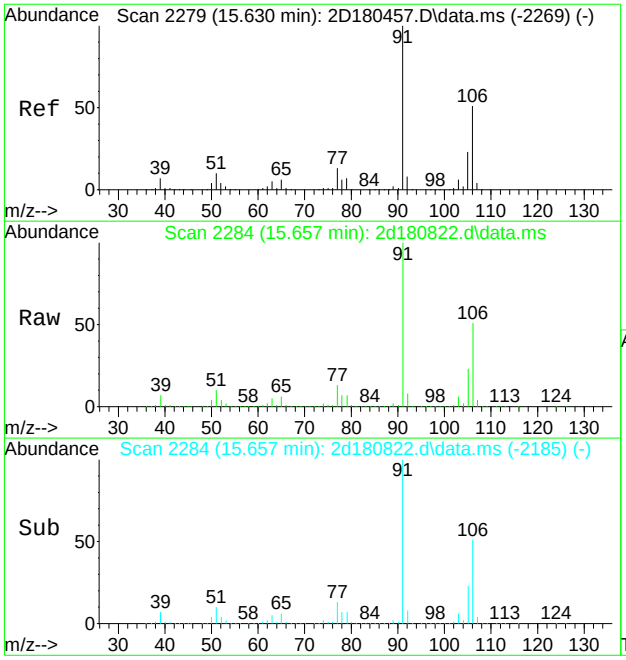


#89
ethylbenzene
Concen: 68.72 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 91 Resp: 1609124

Ion	Ratio	Lower	Upper
91	100		
106	31.4	1.6	61.6
51	9.1	0.0	39.0

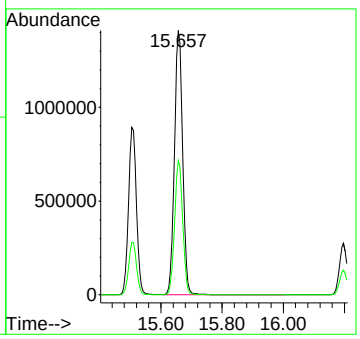


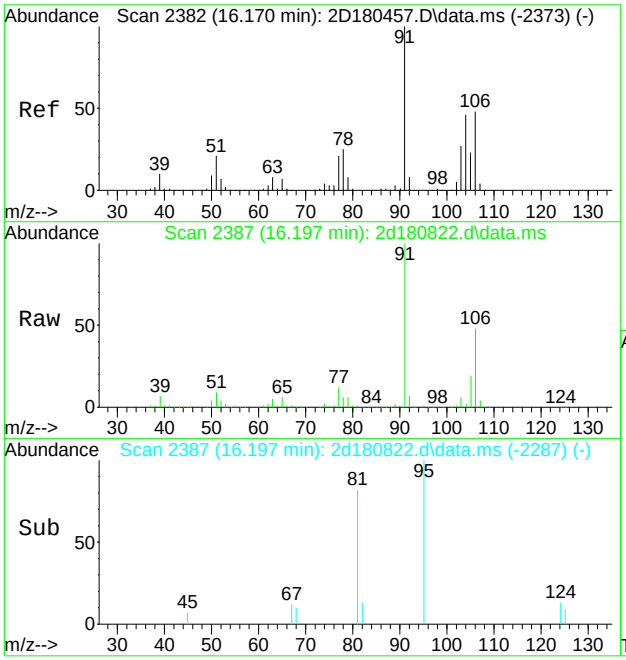


#90
m,p-xylene
Concen: 147.96 ug/L
RT: 15.657 min Scan# 2284
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion: 91 Resp: 2633669

Ion	Ratio	Lower	Upper
91	100		
106	50.7	21.1	81.1

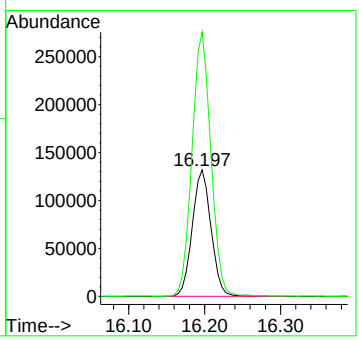


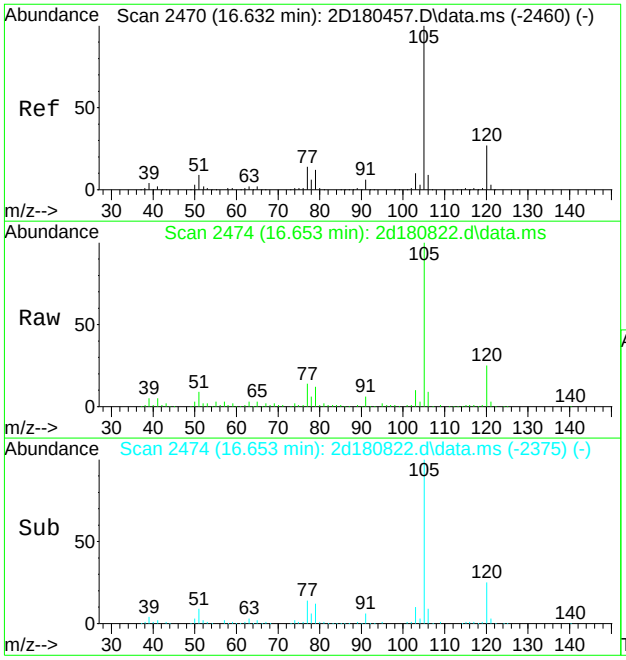


#91
o-xylene
Concen: 25.06 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:106 Resp: 225948

Ion	Ratio	Lower	Upper
106	100		
91	209.0	179.9	239.9

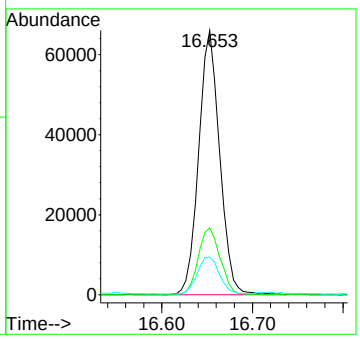


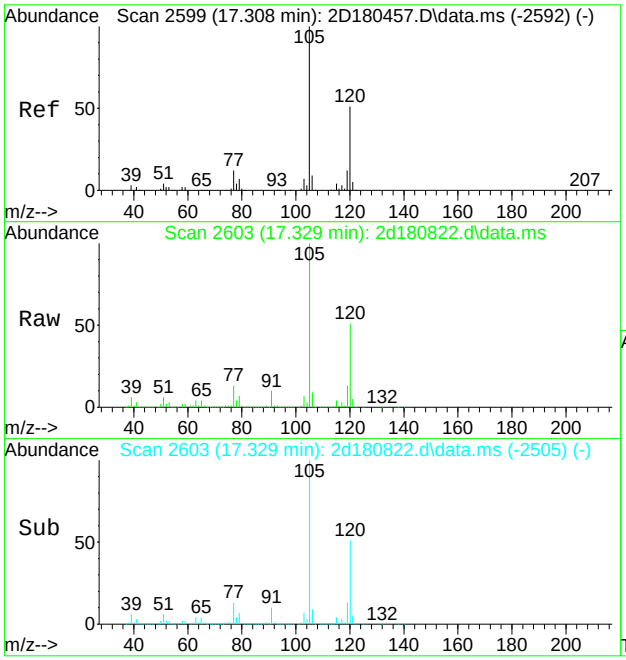


#96
isopropylbenzene
Concen: 4.53 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:105 Resp: 106185

Ion	Ratio	Lower	Upper
105	100		
120	25.3	6.7	46.7
77	14.0	0.0	34.2

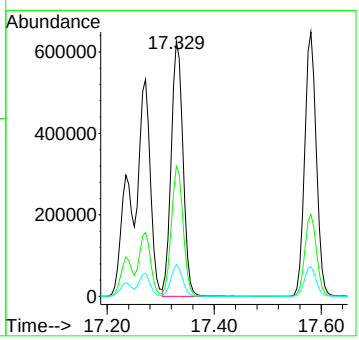


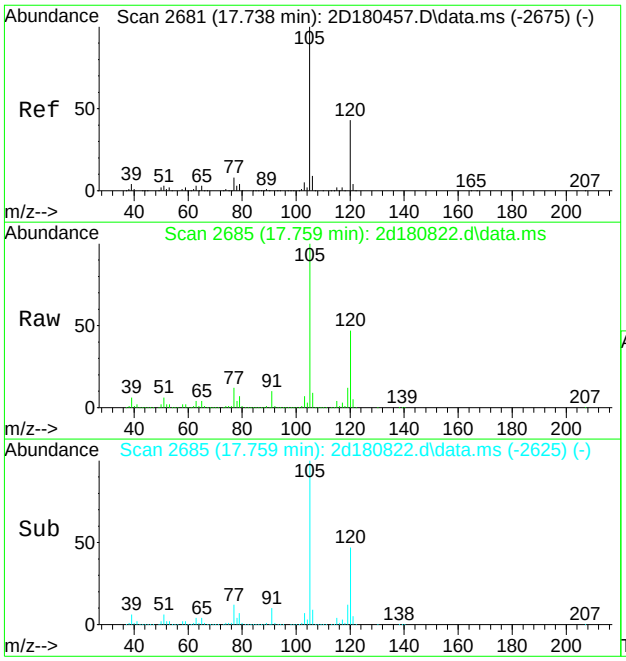


#107
1,3,5-trimethylbenzene
Concen: 47.57 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:105 Resp: 957891

Ion	Ratio	Lower	Upper
105	100		
120	51.0	20.7	80.7
77	12.5	0.0	42.0

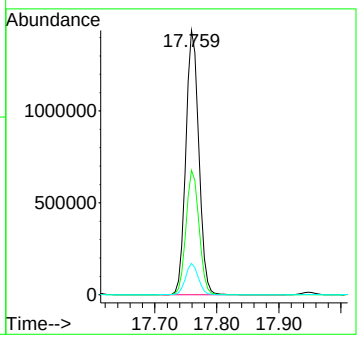


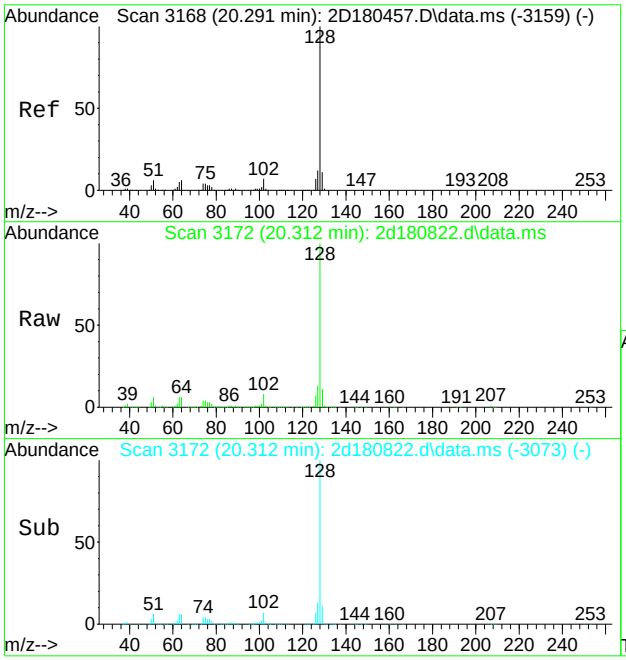


#109
1,2,4-trimethylbenzene
Concen: 102.43 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:105 Resp: 2095900

Ion	Ratio	Lower	Upper
105	100		
120	47.0	16.7	76.7
77	11.9	0.0	41.8

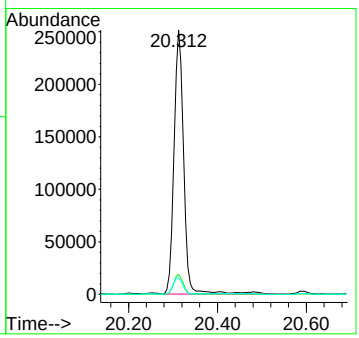




#121
naphthalene
Concen: 22.05 ug/L
RT: 20.312 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180822.d
Acq: 9 Jan 2019 1:13 pm

Tgt Ion:128 Resp: 380033

Ion	Ratio	Lower	Upper
128	100		
102	7.5	0.0	37.5
51	6.2	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180870.d
Acq On : 10 Jan 2019 2:18 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 14 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:18 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

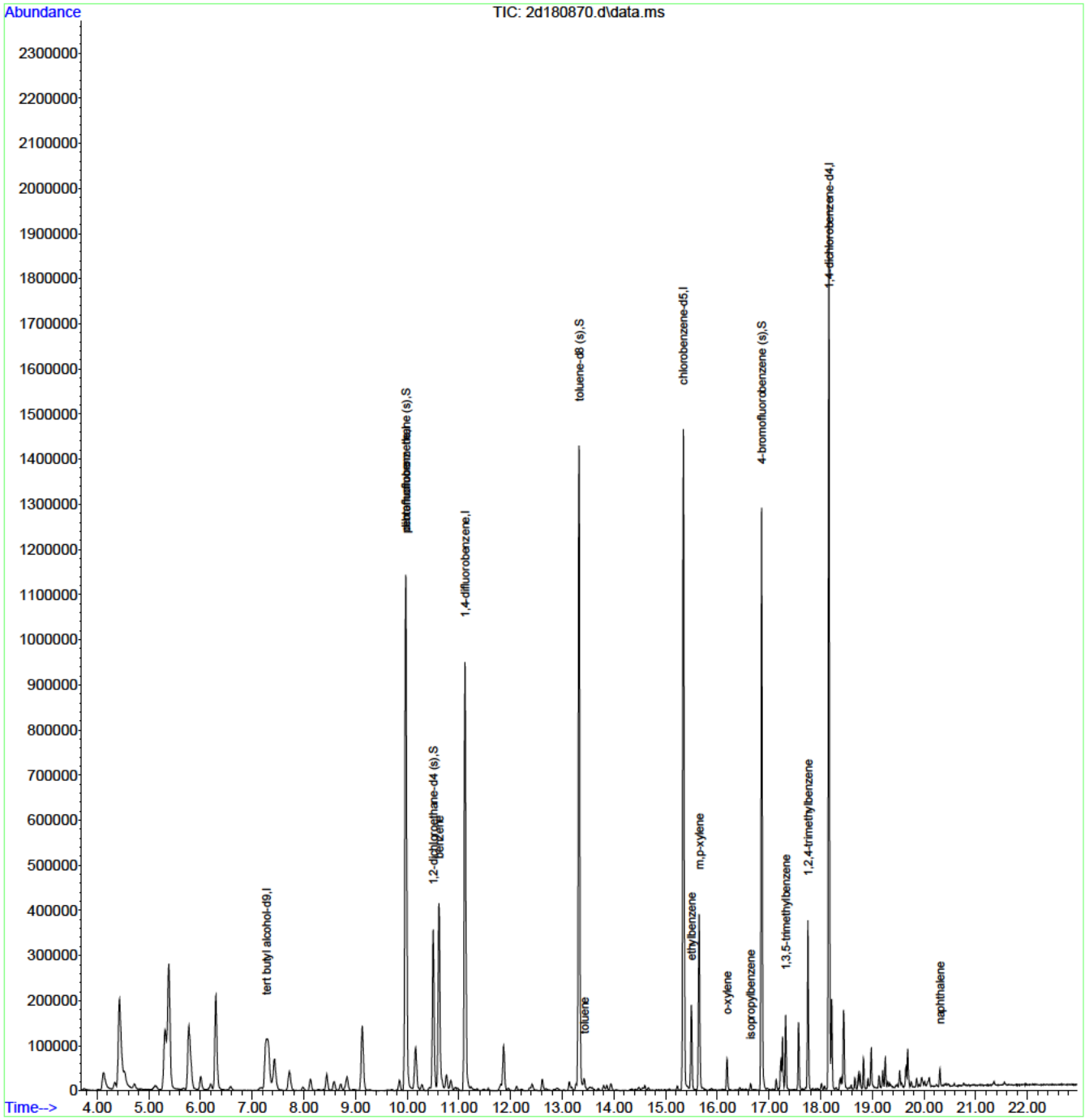
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	210801	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	729249	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	987254	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	958320	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	519057	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	297188	49.13	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.26%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	300122	49.46	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 98.92%			
75) toluene-d8 (s)	13.323	98	1125331	48.81	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.62%			
99) 4-bromofluorobenzene (s)	16.857	95	435773	47.36	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.72%			
Target Compounds						Qvalue
54) benzene	10.613	78	456473	21.24	ug/L	99
76) toluene	13.423	92	11746	0.87	ug/L	94
89) ethylbenzene	15.499	91	153133	5.96	ug/L	98
90) m,p-xylene	15.646	91	267056	13.66	ug/L	98
91) o-xylene	16.186	106	21569	2.18	ug/L	95
96) isopropylbenzene	16.642	105	9773	0.38	ug/L	96
107) 1,3,5-trimethylbenzene	17.324	105	93503	4.29	ug/L	98
109) 1,2,4-trimethylbenzene	17.754	105	201834	9.10	ug/L	99
121) naphthalene	20.307	128	30477	1.63	ug/L	98

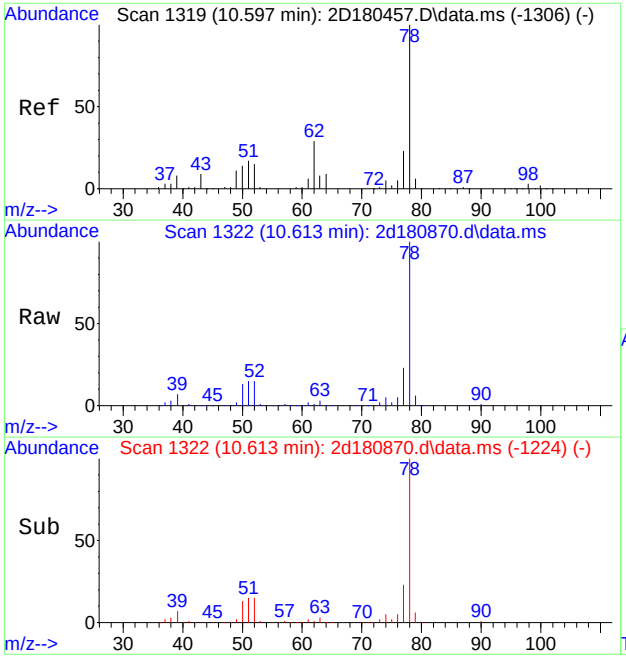
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180870.d
Acq On : 10 Jan 2019 2:18 pm
Operator : EddieH
Sample : JC80990-4 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,10
ALS Vial : 14 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:18 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

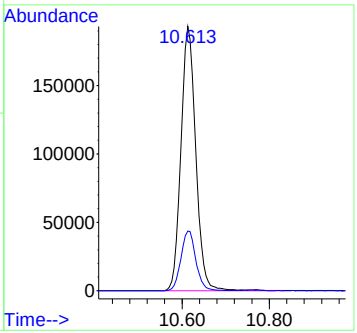


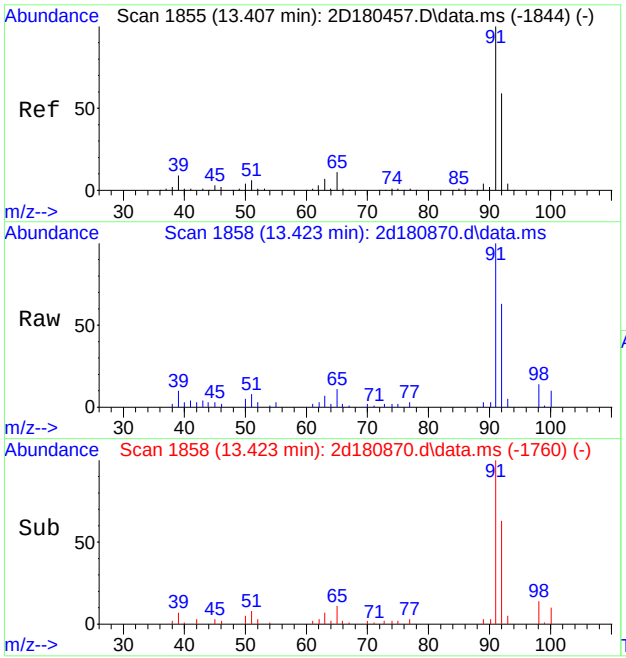


#54
benzene
Concen: 21.24 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 78 Resp: 456473

Ion	Ratio	Lower	Upper
78	100		
77	22.6	0.0	53.2

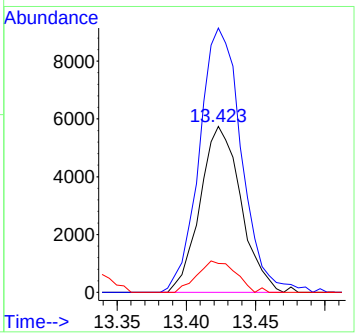


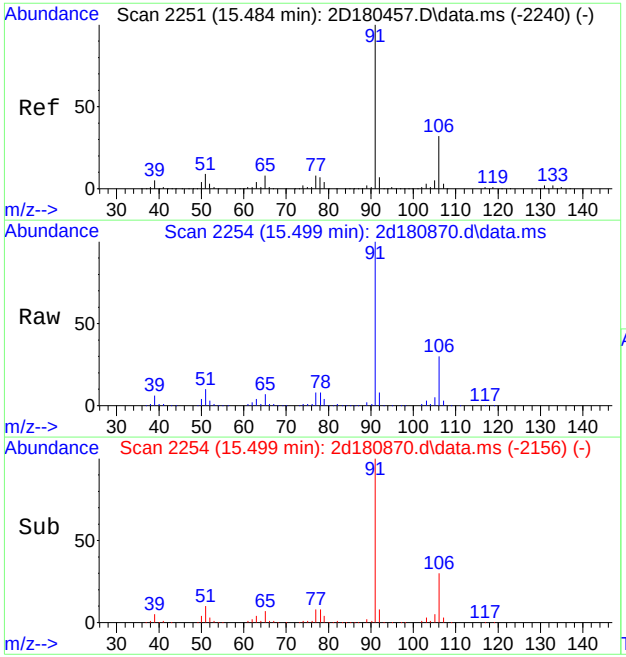


#76
toluene
Concen: 0.87 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 92 Resp: 11746

Ion	Ratio	Lower	Upper
92	100		
91	159.4	148.1	188.1
65	17.4	0.0	38.8

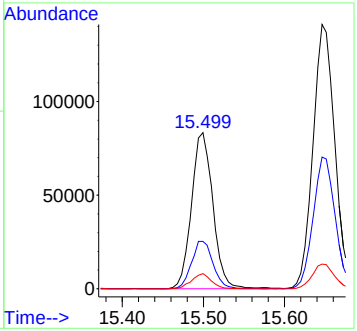


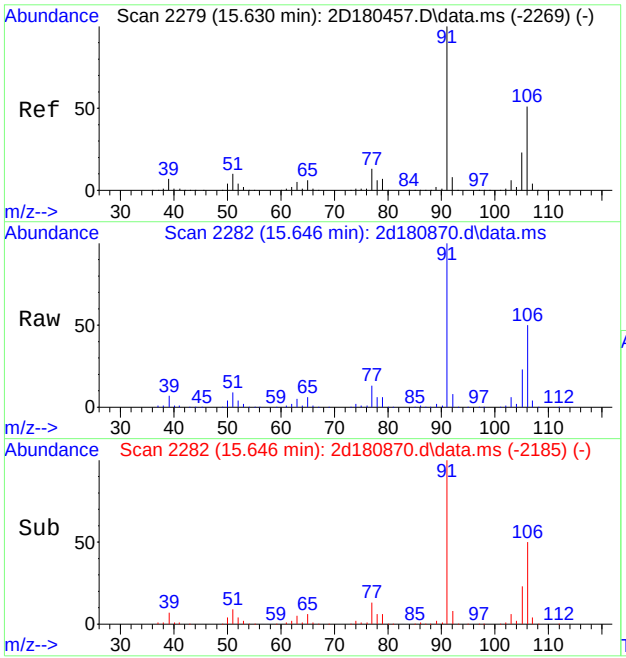


#89
ethylbenzene
Concen: 5.96 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 91 Resp: 153133

Ion	Ratio	Lower	Upper
91	100		
106	30.4	1.6	61.6
51	9.7	0.0	39.0

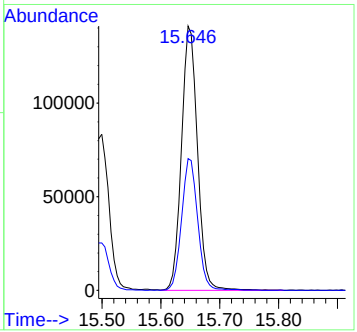


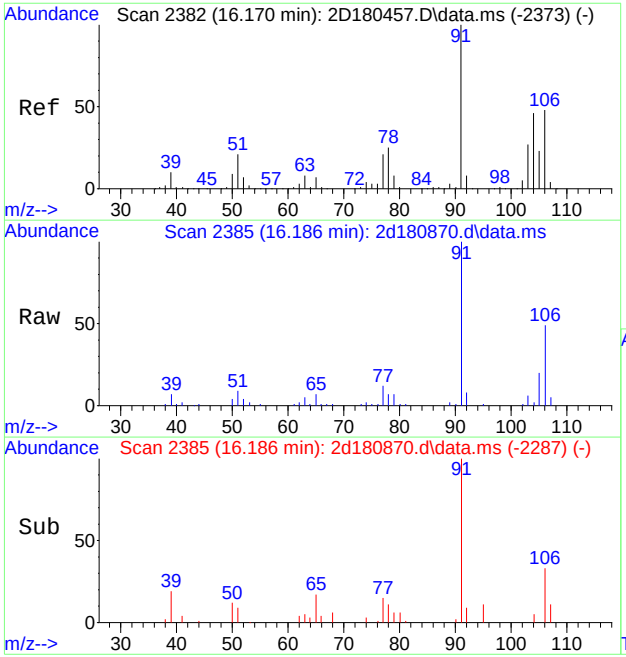


#90
m,p-xylene
Concen: 13.66 ug/L
RT: 15.646 min Scan# 2282
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion: 91 Resp: 267056

Ion	Ratio	Lower	Upper
91	100		
106	49.8	21.1	81.1

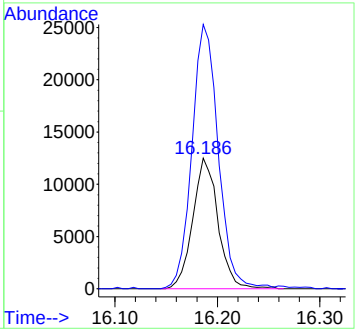


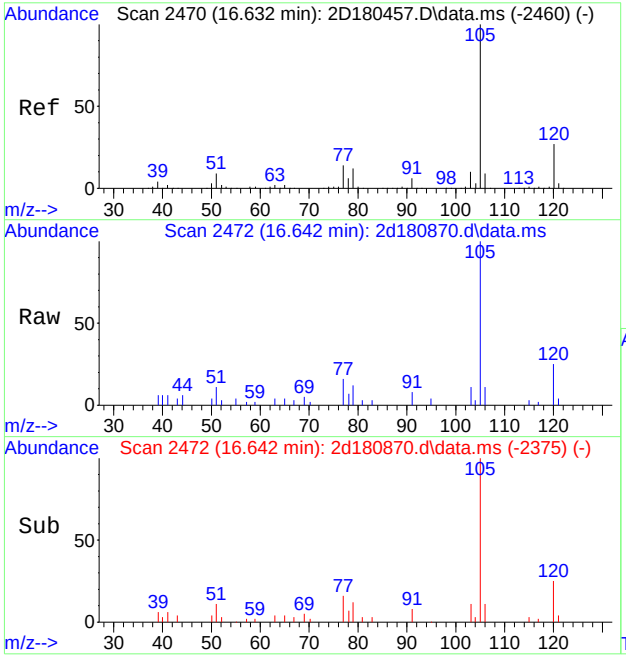


#91
o-xylene
Concen: 2.18 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:106 Resp: 21569

Ion	Ratio	Lower	Upper
106	100		
91	202.5	179.9	239.9

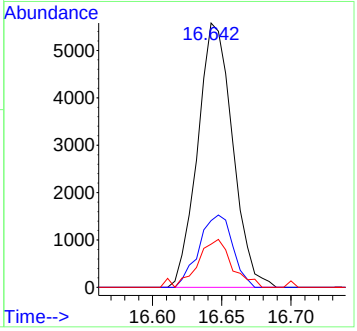


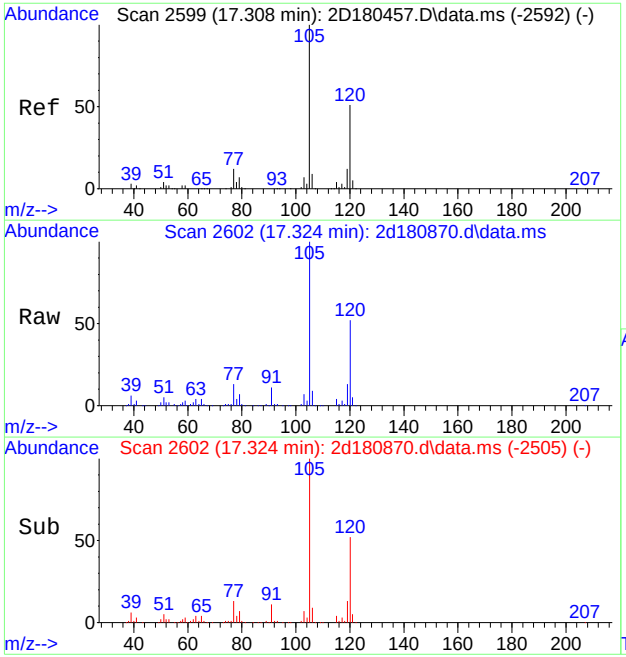


#96
isopropylbenzene
Concen: 0.38 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:105 Resp: 9773

Ion	Ratio	Lower	Upper
105	100		
120	25.2	6.7	46.7
77	16.3	0.0	34.2

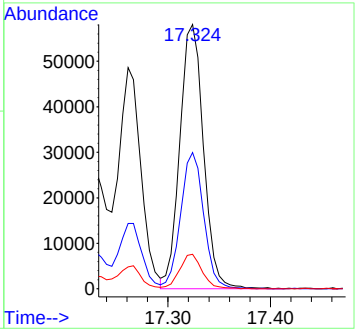


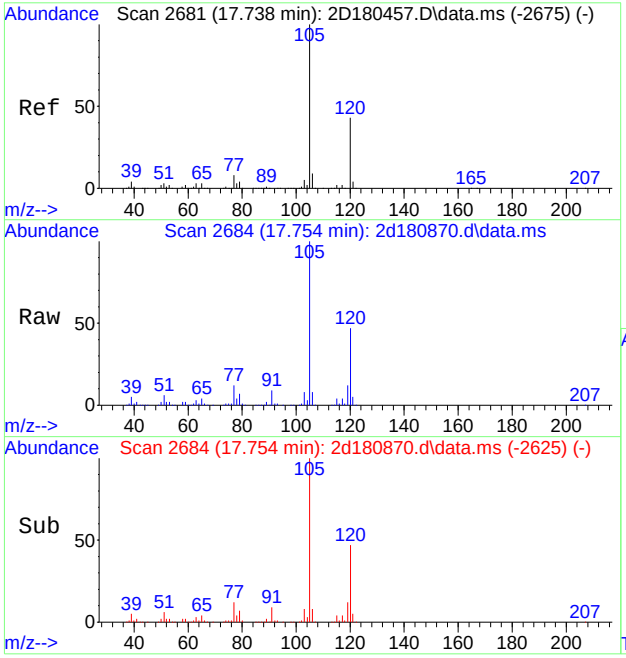


#107
1,3,5-trimethylbenzene
Concen: 4.29 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:105 Resp: 93503

Ion	Ratio	Lower	Upper
105	100		
120	51.6	20.7	80.7
77	13.1	0.0	42.0

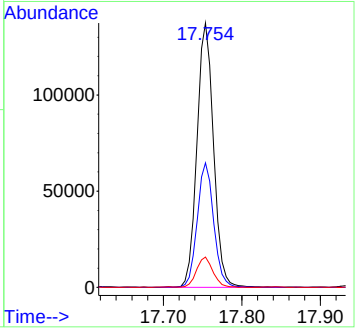


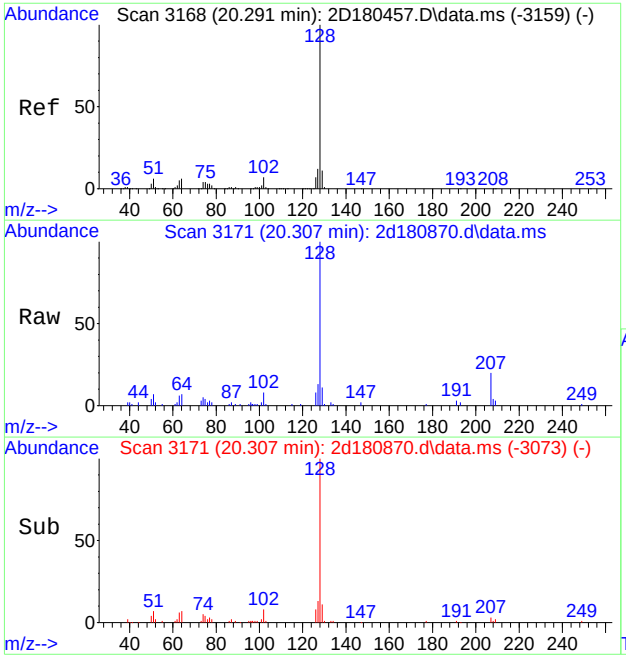


#109
1,2,4-trimethylbenzene
Concen: 9.10 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:105 Resp: 201834

Ion	Ratio	Lower	Upper
105	100		
120	47.0	16.7	76.7
77	11.4	0.0	41.8

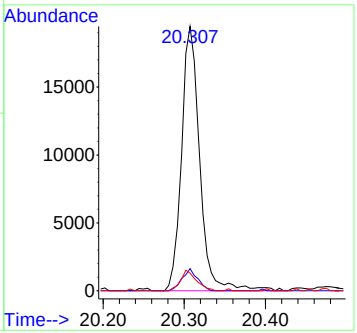




#121
naphthalene
Concen: 1.63 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180870.d
Acq: 10 Jan 2019 2:18 pm

Tgt Ion:128 Resp: 30477

Ion	Ratio	Lower	Upper
128	100		
102	8.4	0.0	37.5
51	6.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180830.d
Acq On : 9 Jan 2019 5:10 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,10
ALS Vial : 20 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:39:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

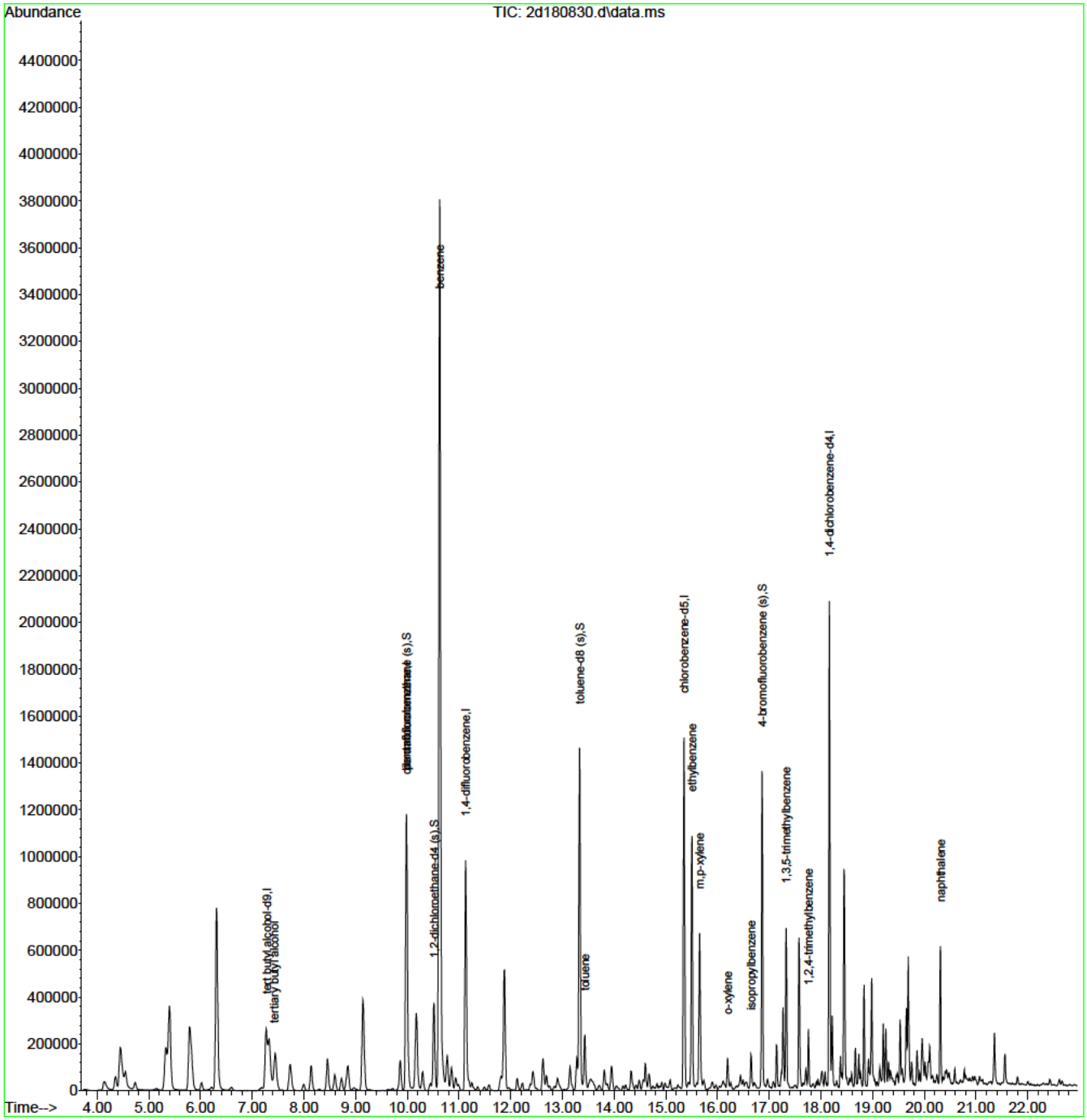
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.284	65	248493	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	764978	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	1011593	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	973972	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	540758	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	304082	47.92	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.84%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	309899	49.84	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 99.68%			
75) toluene-d8 (s)	13.334	98	1166205	49.77	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.54%			
99) 4-bromofluorobenzene (s)	16.863	95	449983	46.94	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.88%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.420	59	5979	12.41	ug/L	# 1
54) benzene	10.623	78	4489025	203.86	ug/L	99
76) toluene	13.434	92	110626	8.07	ug/L	99
89) ethylbenzene	15.505	91	855254	32.73	ug/L	99
90) m,p-xylene	15.651	91	447172	22.51	ug/L	99
91) o-xylene	16.191	106	37933	3.77	ug/L	93
96) isopropylbenzene	16.648	105	87250	3.34	ug/L	96
107) 1,3,5-trimethylbenzene	17.329	105	371901	16.36	ug/L	100
109) 1,2,4-trimethylbenzene	17.759	105	130584	5.65	ug/L	99
121) naphthalene	20.313	128	471865	24.25	ug/L	100

(#) = qualifier out of range (m) = manual integration (+) = signals summed

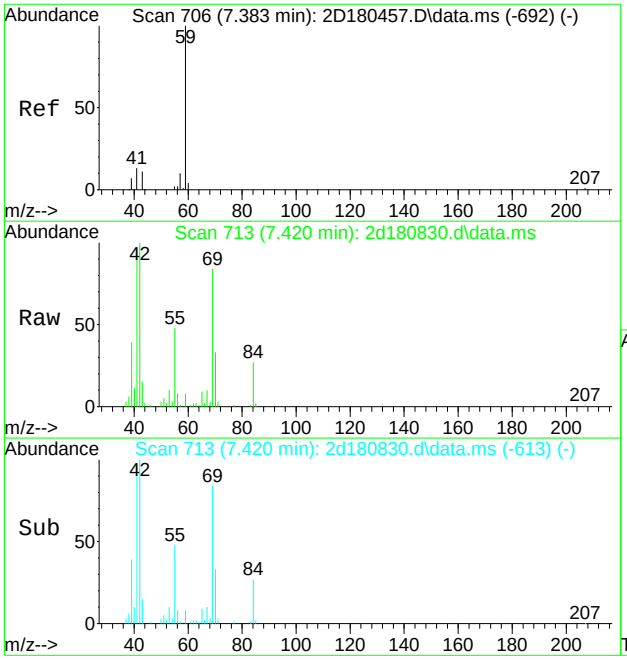
Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180830.d
Acq On : 9 Jan 2019 5:10 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,10
ALS Vial : 20 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:39:37 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



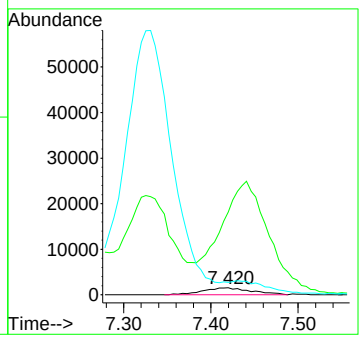
M2D7670.M Mon Jan 21 16:40:06 2019 Page: 2

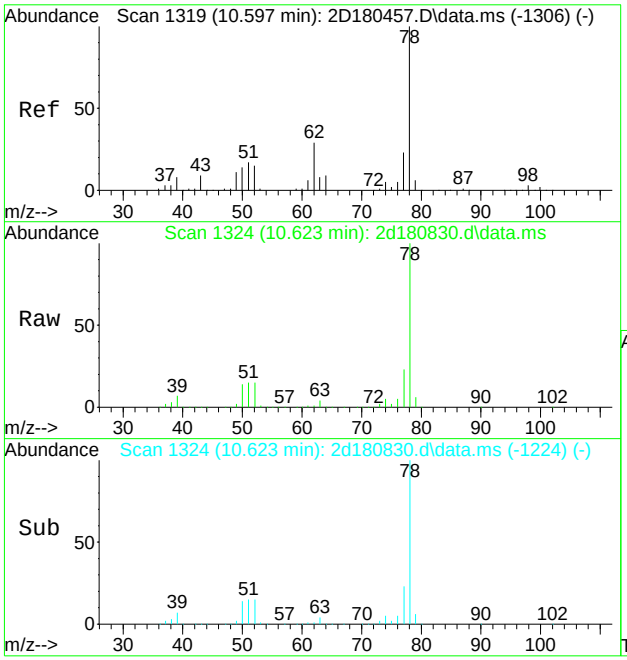


#2
tertiary butyl alcohol
Concen: 12.41 ug/L
RT: 7.420 min Scan# 713
Delta R.T. 0.026 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 59 Resp: 5979

Ion	Ratio	Lower	Upper
59	100		
41	861.1	0.0	45.0#
43	131.3	0.0	40.6#

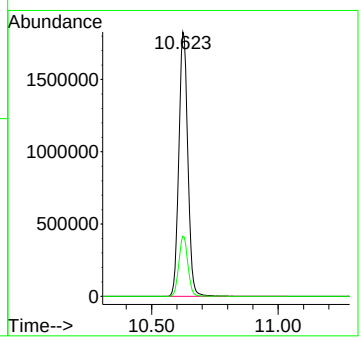


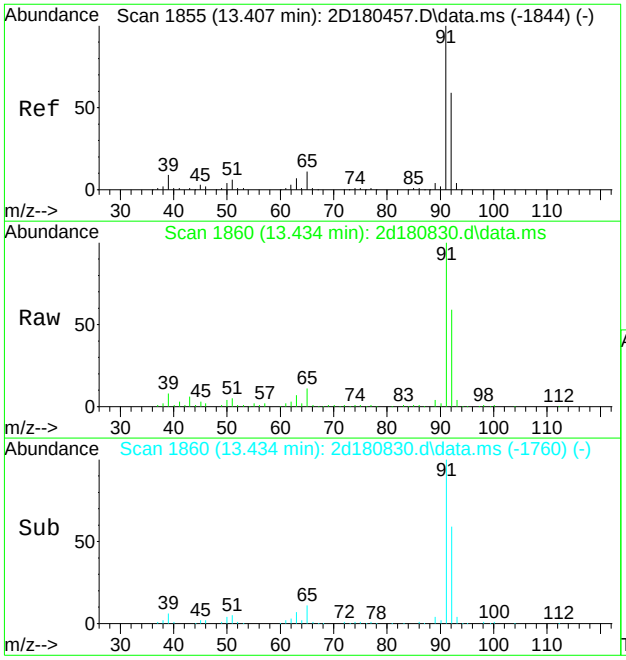


#54
benzene
Concen: 203.86 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 78 Resp: 4489025

Ion	Ratio	Lower	Upper
78	100		
77	22.8	0.0	53.2

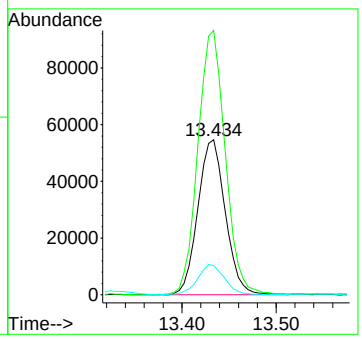


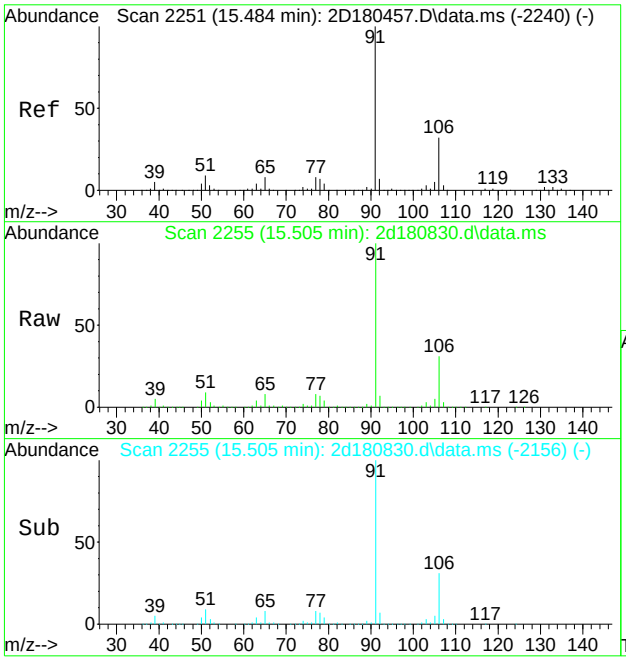


#76
toluene
Concen: 8.07 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 92 Resp: 110626

Ion	Ratio	Lower	Upper
92	100		
91	170.2	148.1	188.1
65	18.8	0.0	38.8

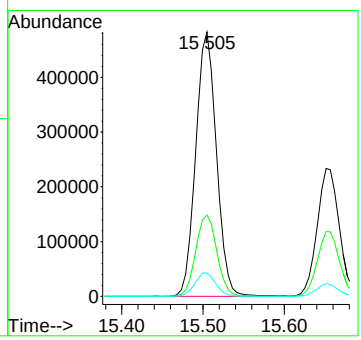


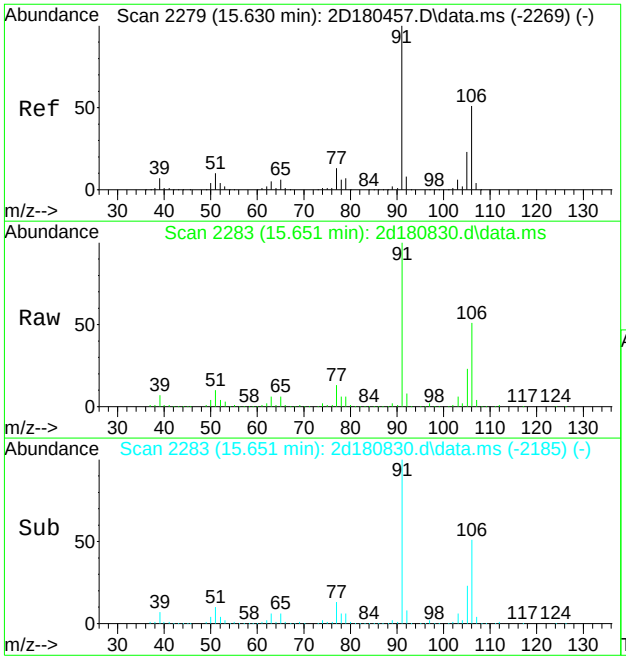


#89
ethylbenzene
Concen: 32.73 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 91 Resp: 855254

Ion	Ratio	Lower	Upper
91	100		
106	30.8	1.6	61.6
51	8.8	0.0	39.0

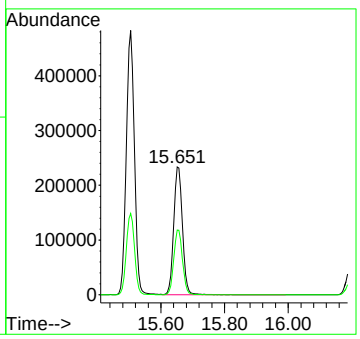


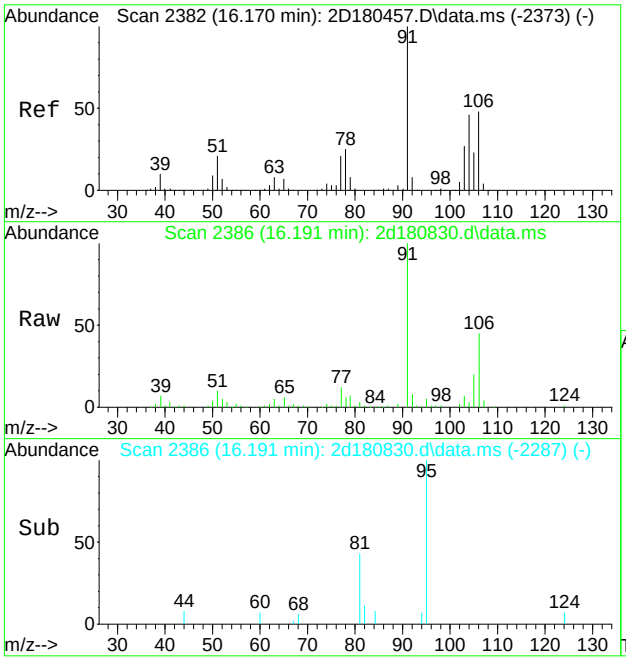


#90
m,p-xylene
Concen: 22.51 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion: 91 Resp: 447172

Ion	Ratio	Lower	Upper
91	100		
106	50.5	21.1	81.1

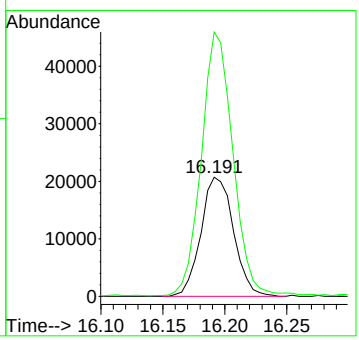


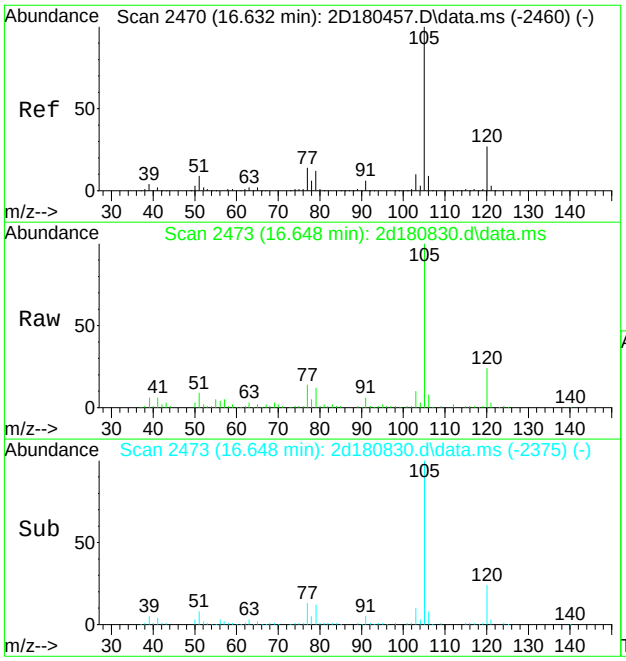


#91
o-xylene
Concen: 3.77 ug/L
RT: 16.191 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:106 Resp: 37933

Ion	Ratio	Lower	Upper
106	100		
91	221.0	179.9	239.9

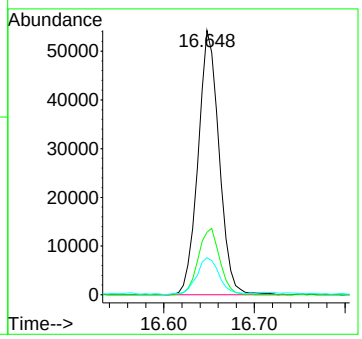


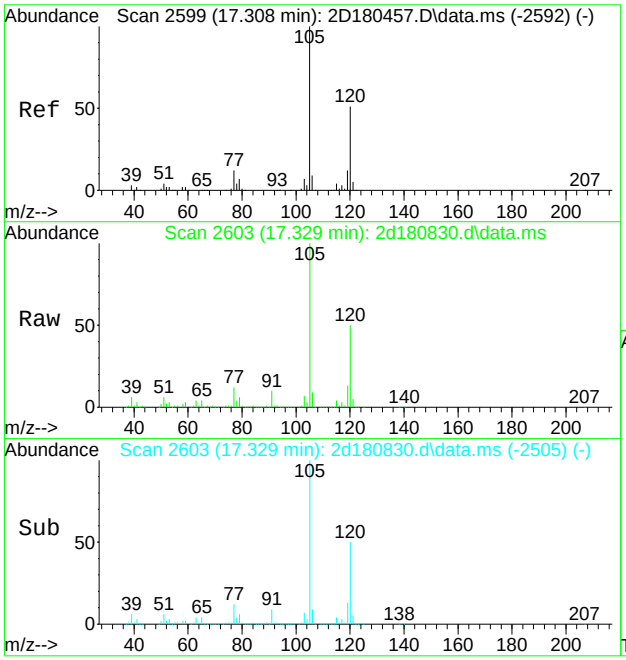


#96
isopropylbenzene
Concen: 3.34 ug/L
RT: 16.648 min Scan# 2473
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:105 Resp: 87250

Ion	Ratio	Lower	Upper
105	100		
120	23.7	6.7	46.7
77	14.1	0.0	34.2

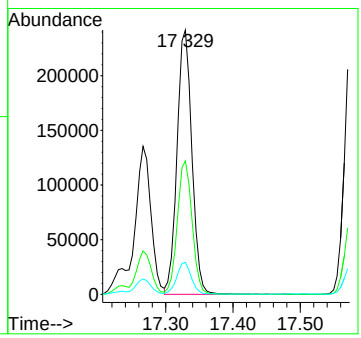


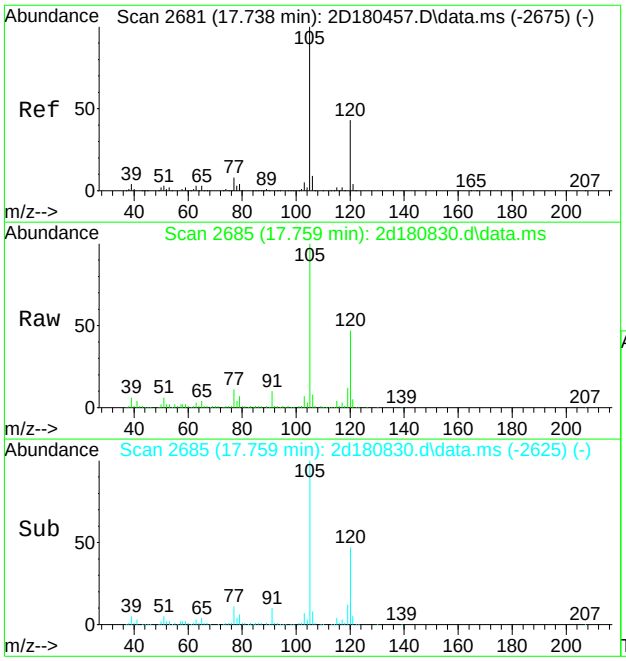


#107
1,3,5-trimethylbenzene
Concen: 16.36 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:105 Resp: 371901

Ion	Ratio	Lower	Upper
105	100		
120	50.4	20.7	80.7
77	11.9	0.0	42.0

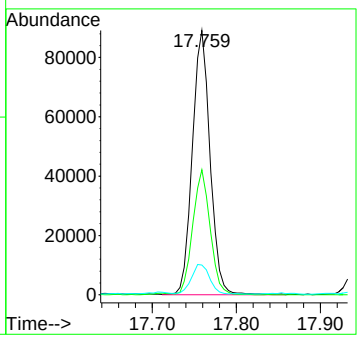


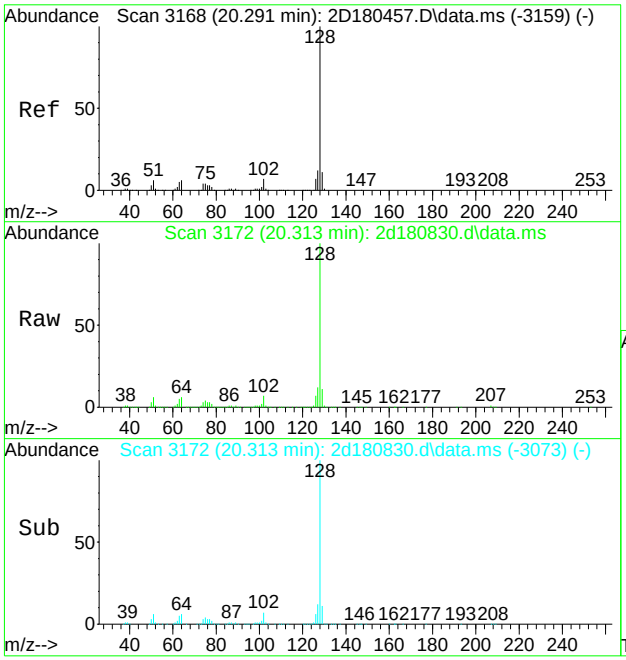


#109
1,2,4-trimethylbenzene
Concen: 5.65 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:105 Resp: 130584

Ion	Ratio	Lower	Upper
105	100		
120	47.2	16.7	76.7
77	10.8	0.0	41.8

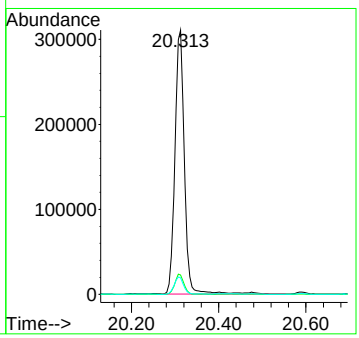




#121
naphthalene
Concen: 24.25 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180830.d
Acq: 9 Jan 2019 5:10 pm

Tgt Ion:128 Resp: 471865

Ion	Ratio	Lower	Upper
128	100		
102	7.4	0.0	37.5
51	6.2	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180869.d
Acq On : 10 Jan 2019 1:48 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,50
ALS Vial : 13 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:00 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

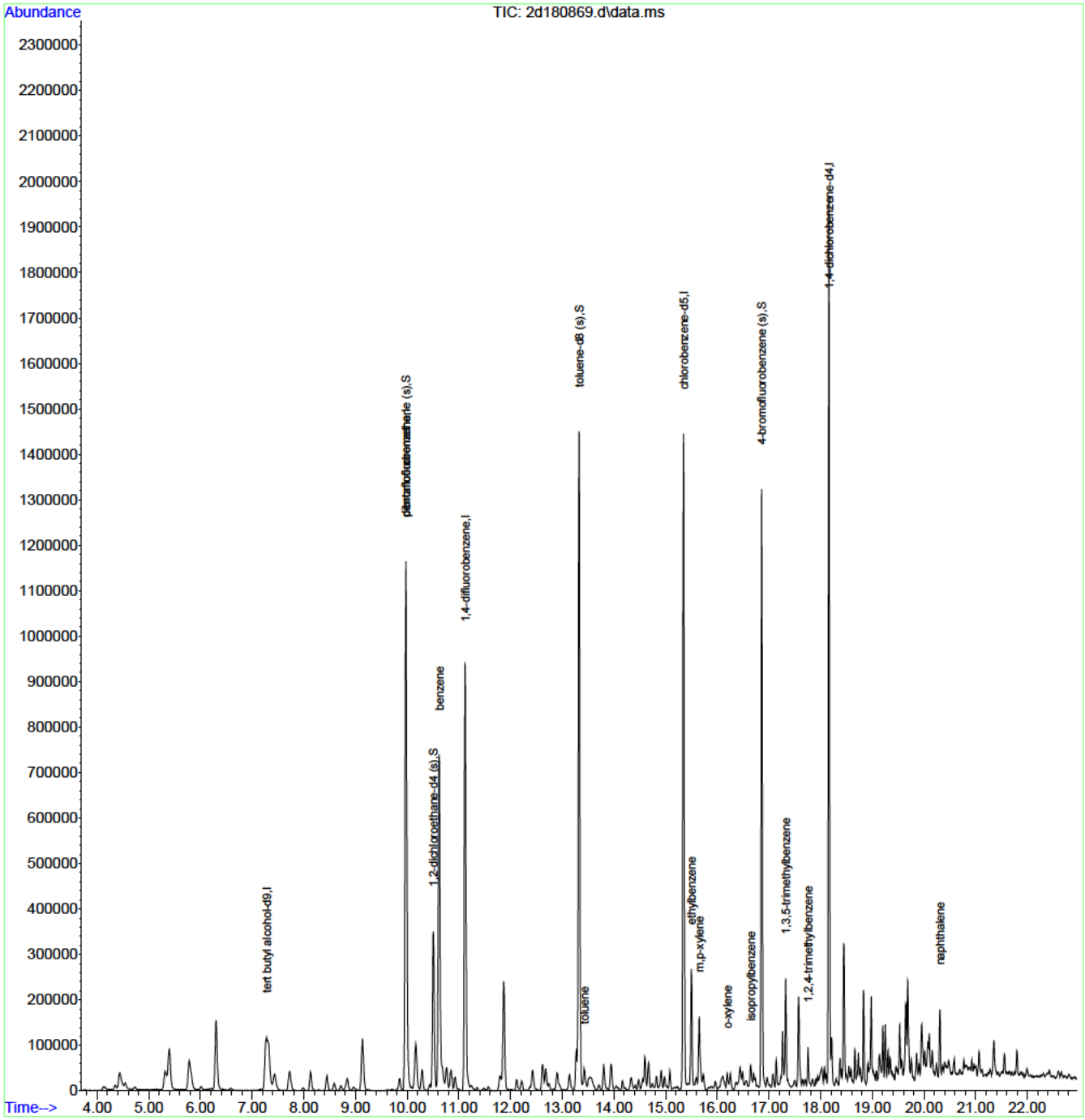
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	208496	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	730156	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.122	114	978618	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	945999	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	519645	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	298880	49.35	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.70%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	302592	50.30	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.60%			
75) toluene-d8 (s)	13.324	98	1116444	49.06	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.12%			
99) 4-bromofluorobenzene (s)	16.857	95	429982	46.67	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.34%			
Target Compounds						Qvalue
54) benzene	10.618	78	841567	39.51	ug/L	100
76) toluene	13.423	92	20965	1.57	ug/L	89
89) ethylbenzene	15.499	91	192564	7.59	ug/L	98
90) m,p-xylene	15.652	91	102652	5.32	ug/L	98
91) o-xylene	16.192	106	8866	0.91	ug/L	91
96) isopropylbenzene	16.648	105	25443	1.00	ug/L	96
107) 1,3,5-trimethylbenzene	17.324	105	122806	5.62	ug/L	100
109) 1,2,4-trimethylbenzene	17.754	105	40784	1.84	ug/L	98
121) naphthalene	20.307	128	117498	6.28	ug/L	100

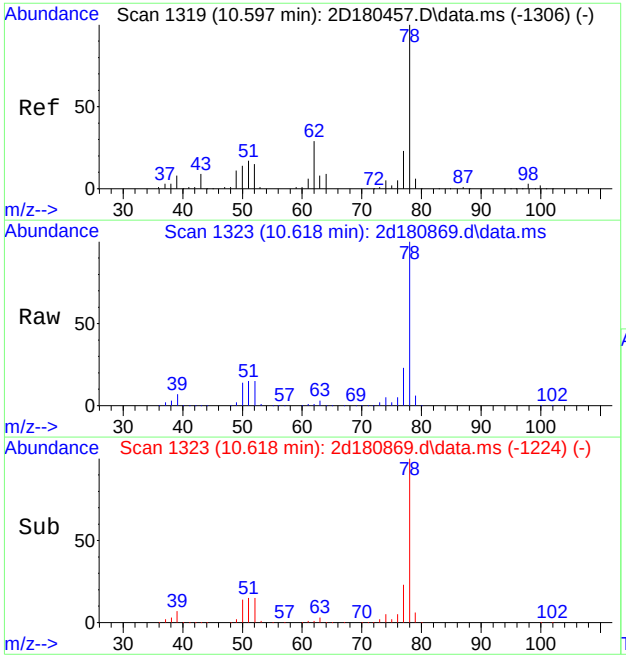
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180869.d
Acq On : 10 Jan 2019 1:48 pm
Operator : EddieH
Sample : JC80990-5 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,50
ALS Vial : 13 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:32:00 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

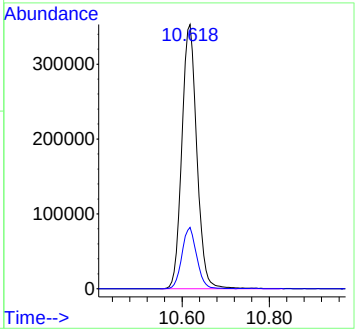


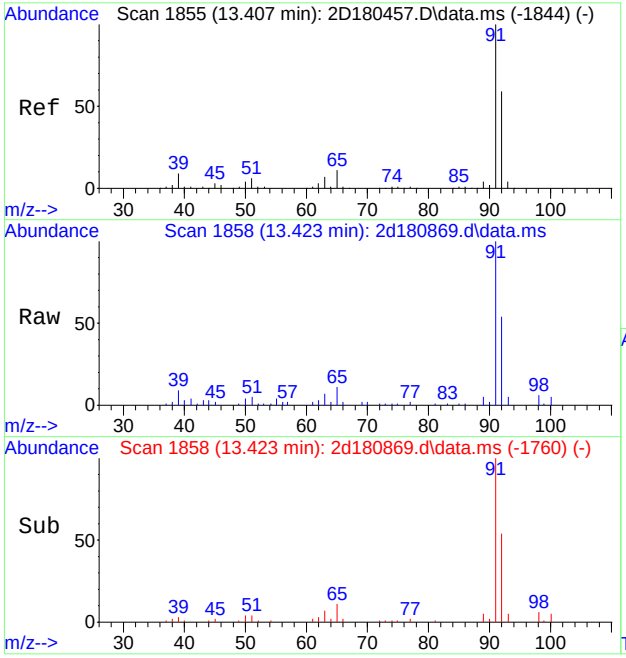


#54
benzene
Concen: 39.51 ug/L
RT: 10.618 min Scan# 1323
Delta R.T. 0.021 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 78 Resp: 841567

Ion	Ratio	Lower	Upper
78	100		
77	23.2	0.0	53.2

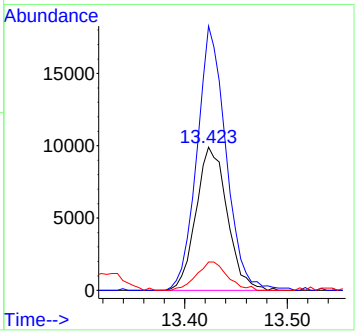


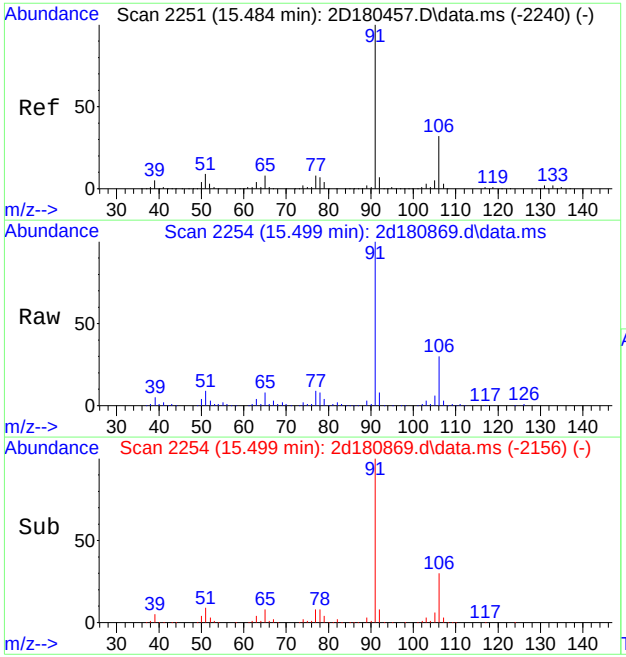


#76
toluene
Concen: 1.57 ug/L
RT: 13.423 min Scan# 1858
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 92 Resp: 20965

Ion	Ratio	Lower	Upper
92	100		
91	184.6	148.1	188.1
65	19.9	0.0	38.8

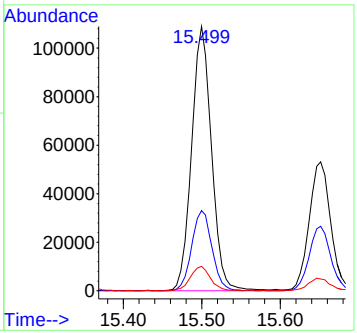


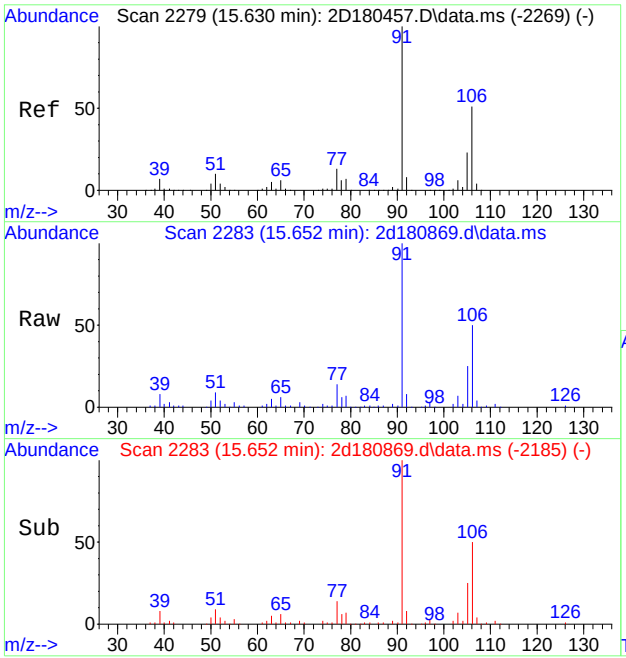


#89
ethylbenzene
Concen: 7.59 ug/L
RT: 15.499 min Scan# 2254
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 91 Resp: 192564

Ion	Ratio	Lower	Upper
91	100		
106	30.3	1.6	61.6
51	9.2	0.0	39.0

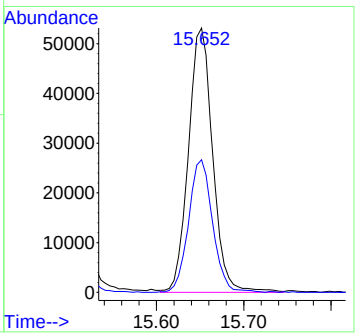


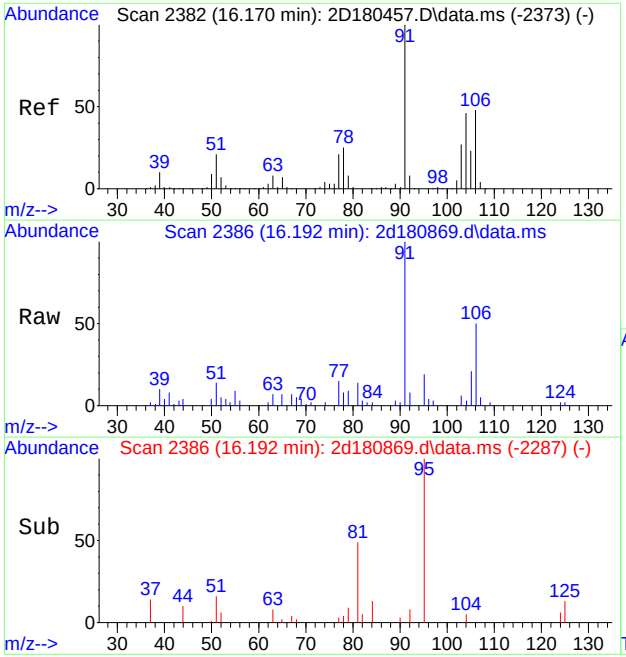


#90
m,p-xylene
Concen: 5.32 ug/L
RT: 15.652 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion: 91 Resp: 102652

Ion	Ratio	Lower	Upper
91	100		
106	50.0	21.1	81.1

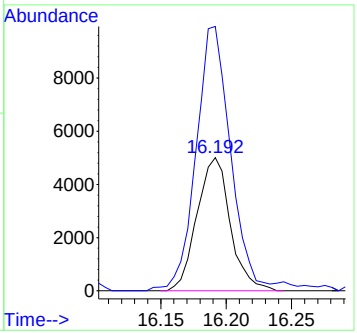


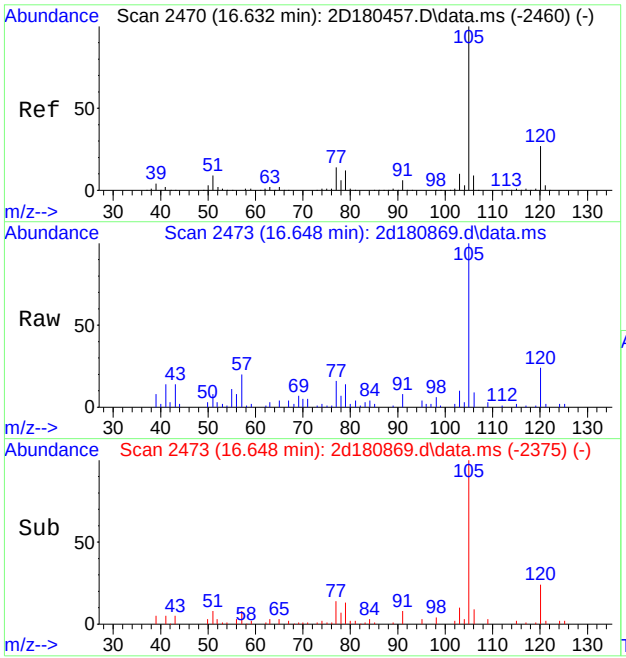


#91
o-xylene
Concen: 0.91 ug/L
RT: 16.192 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:106 Resp: 8866

Ion	Ratio	Lower	Upper
106	100		
91	195.5	179.9	239.9

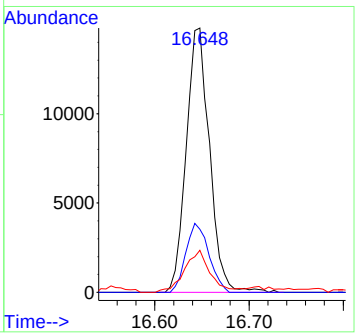


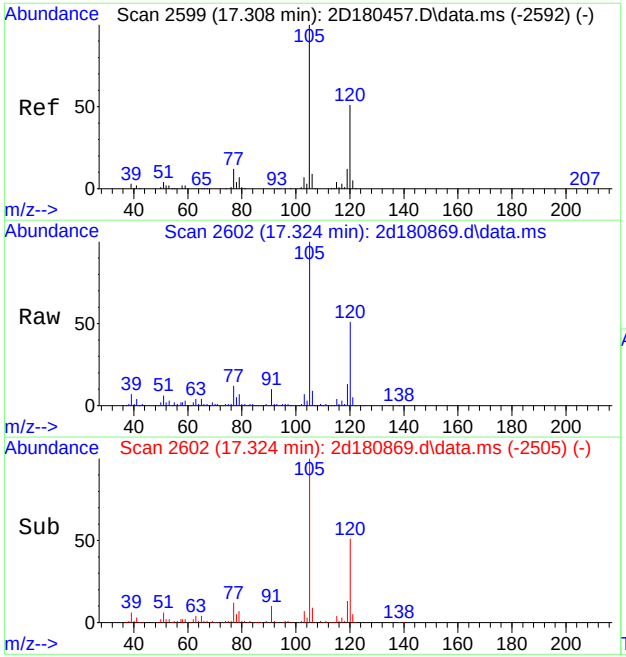


#96
isopropylbenzene
Concen: 1.00 ug/L
RT: 16.648 min Scan# 2473
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:105 Resp: 25443

Ion	Ratio	Lower	Upper
105	100		
120	23.9	6.7	46.7
77	15.1	0.0	34.2

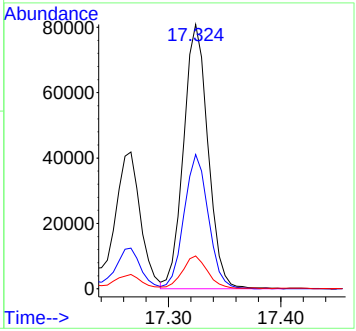


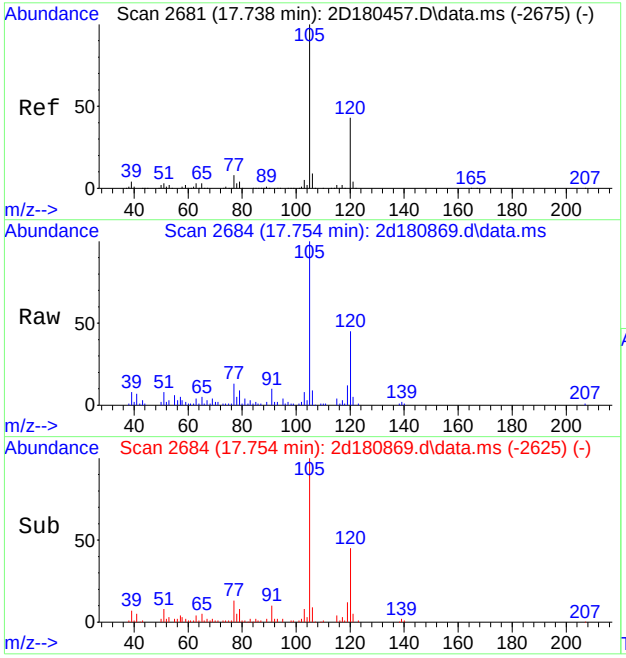


#107
1,3,5-trimethylbenzene
Concen: 5.62 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.011 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:105 Resp: 122806

Ion	Ratio	Lower	Upper
105	100		
120	50.8	20.7	80.7
77	12.2	0.0	42.0

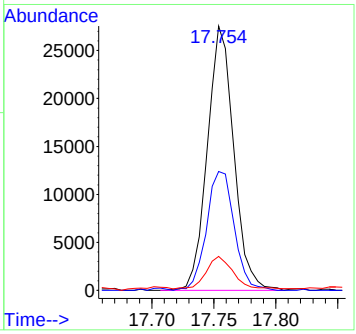


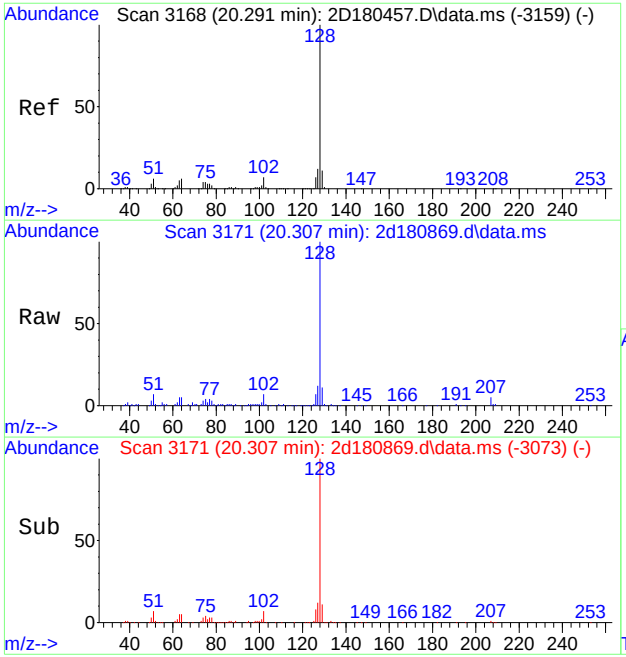


#109
1,2,4-trimethylbenzene
Concen: 1.84 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.011 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:105 Resp: 40784

Ion	Ratio	Lower	Upper
105	100		
120	45.0	16.7	76.7
77	12.1	0.0	41.8

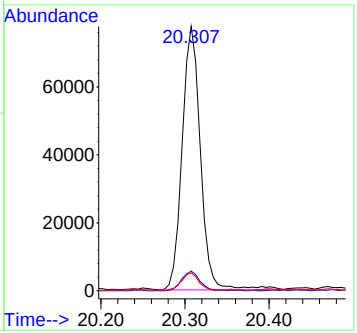




#121
naphthalene
Concen: 6.28 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180869.d
Acq: 10 Jan 2019 1:48 pm

Tgt Ion:128 Resp: 117498

Ion	Ratio	Lower	Upper
128	100		
102	7.5	0.0	37.5
51	6.5	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180828.d
Acq On : 9 Jan 2019 4:11 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 18 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:05:03 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

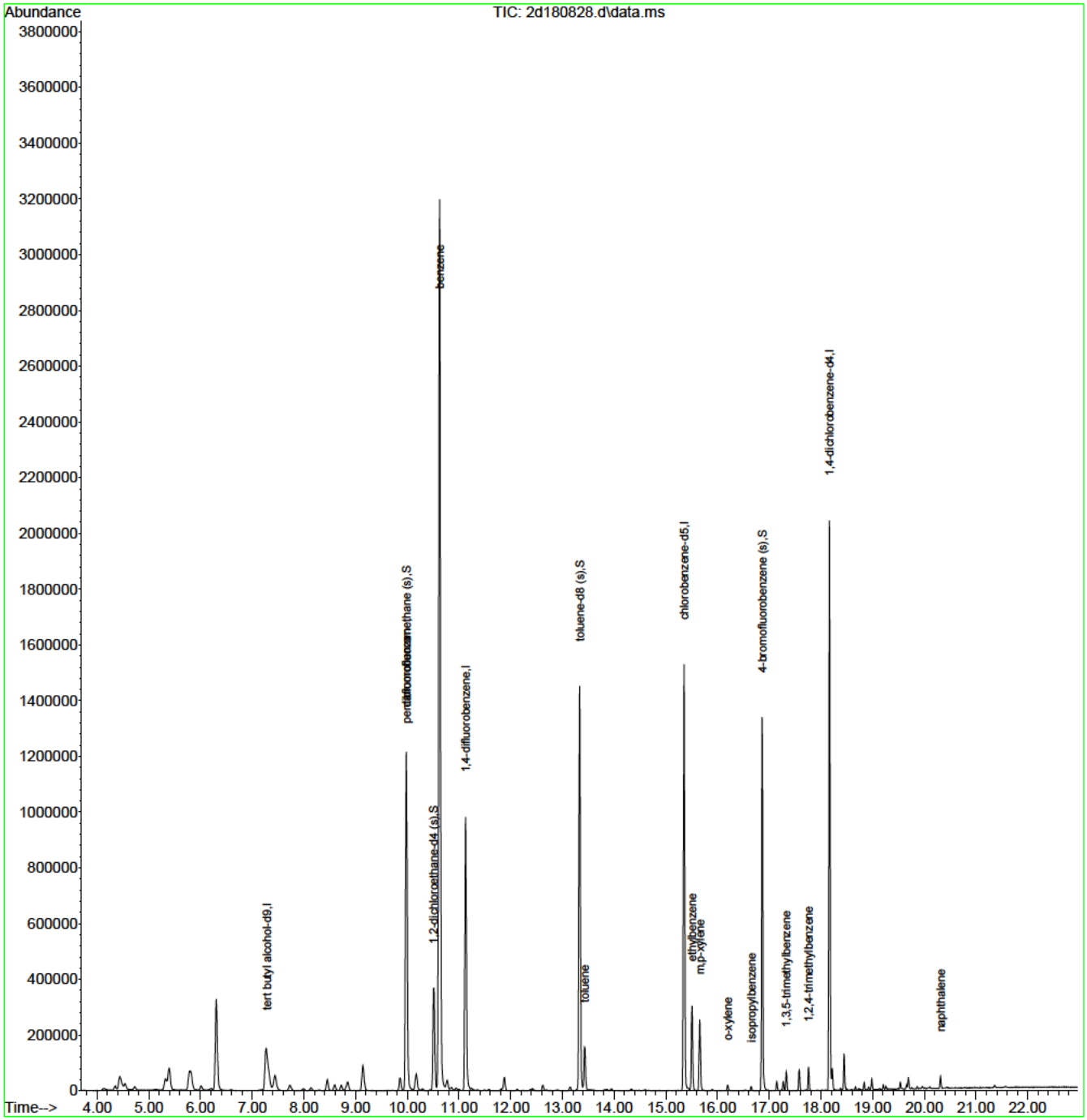
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.284	65	228589	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	772630	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	1015550	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	986611	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	533990	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	311037	48.53	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.06%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	313440	50.21	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.42%			
75) toluene-d8 (s)	13.334	98	1167270	49.18	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.36%			
99) 4-bromofluorobenzene (s)	16.863	95	450147	47.55	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.10%			
Target Compounds						Qvalue
54) benzene	10.623	78	3652442	165.22	ug/L	100
76) toluene	13.428	92	78532	5.65	ug/L	98
89) ethylbenzene	15.505	91	247520	9.35	ug/L	97
90) m,p-xylene	15.657	91	170145	8.46	ug/L	99
91) o-xylene	16.197	106	6748	0.66	ug/L	86
96) isopropylbenzene	16.653	105	9446	0.36	ug/L	96
107) 1,3,5-trimethylbenzene	17.329	105	37688	1.68	ug/L	94
109) 1,2,4-trimethylbenzene	17.759	105	46858	2.05	ug/L	97
121) naphthalene	20.313	128	35018	1.82	ug/L	99

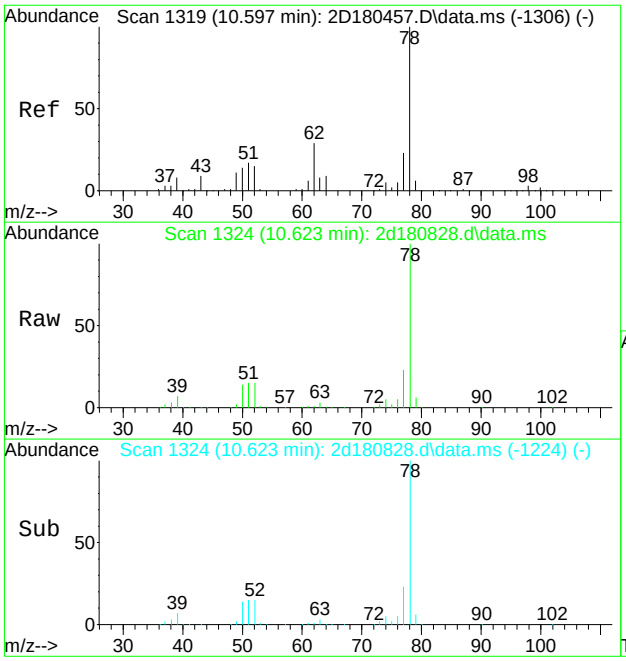
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180828.d
Acq On : 9 Jan 2019 4:11 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 18 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:05:03 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

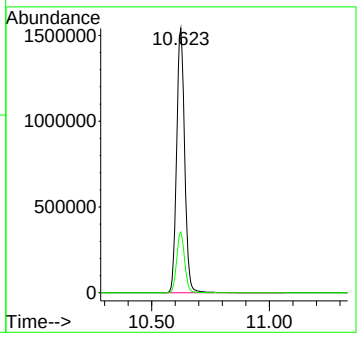


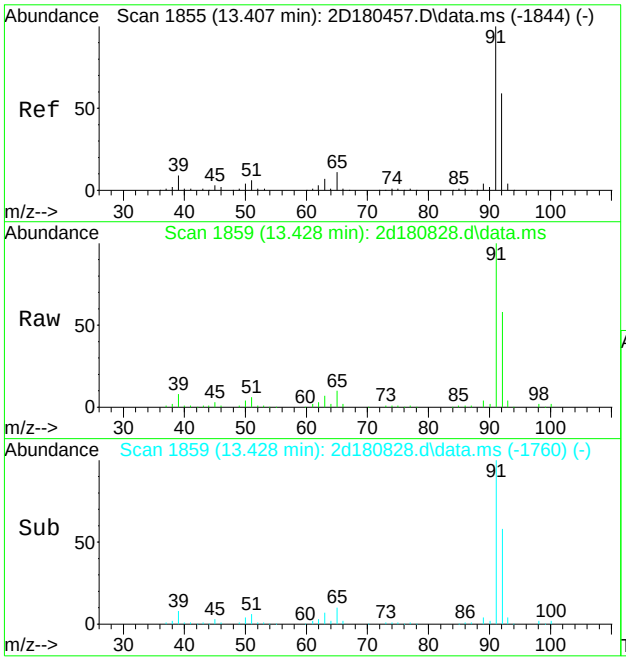


#54
benzene
Concen: 165.22 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 78 Resp: 3652442

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

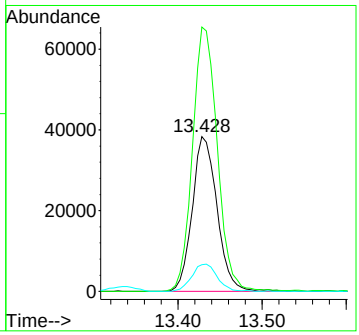


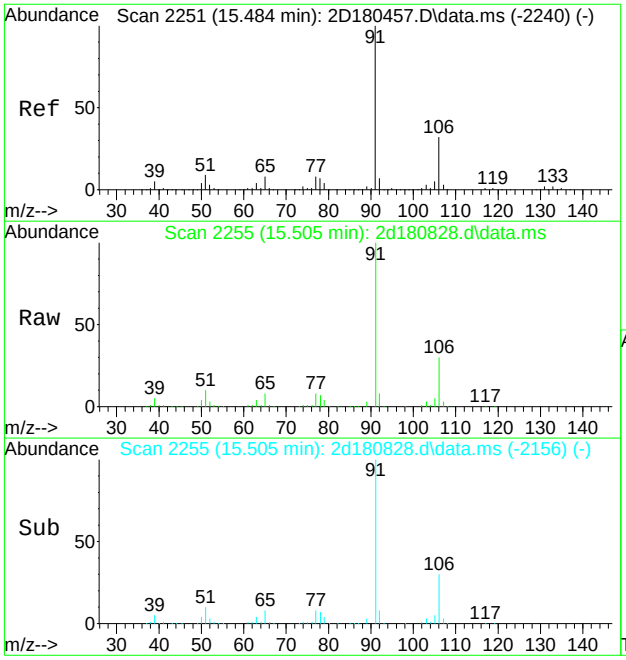


#76
toluene
Concen: 5.65 ug/L
RT: 13.428 min Scan# 1859
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 92 Resp: 78532

Ion	Ratio	Lower	Upper
92	100		
91	171.0	148.1	188.1
65	17.3	0.0	38.8

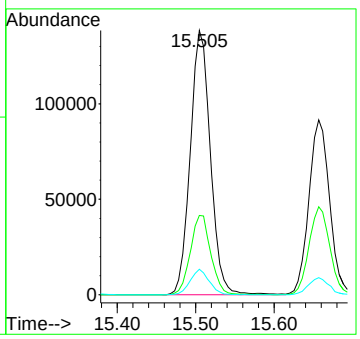


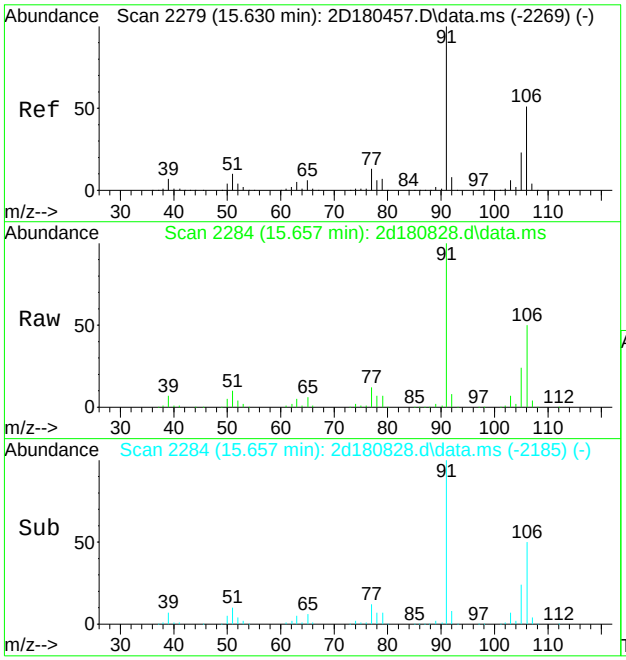


#89
ethylbenzene
Concen: 9.35 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 91 Resp: 247520

Ion	Ratio	Lower	Upper
91	100		
106	30.0	1.6	61.6
51	9.7	0.0	39.0

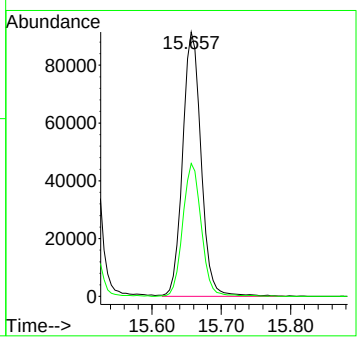


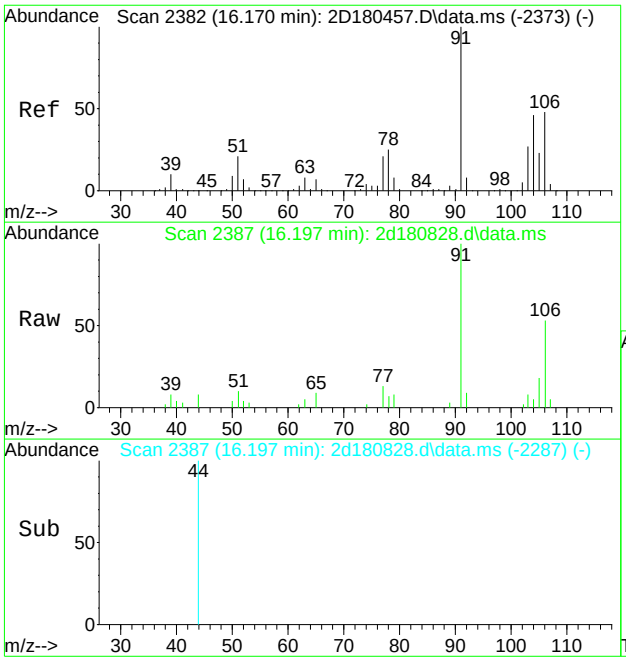


#90
m,p-xylene
Concen: 8.46 ug/L
RT: 15.657 min Scan# 2284
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion: 91 Resp: 170145

Ion	Ratio	Lower	Upper
91	100		
106	50.3	21.1	81.1

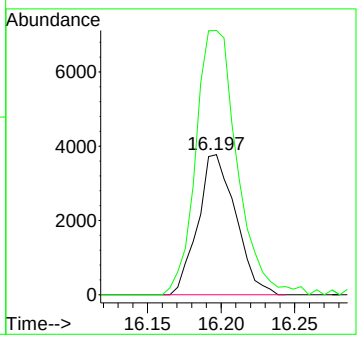


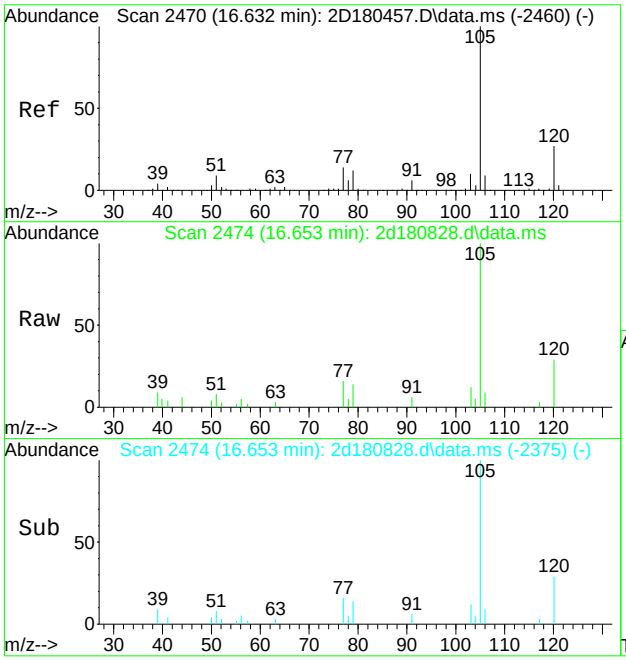


#91
o-xylene
Concen: 0.66 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:106 Resp: 6748

Ion	Ratio	Lower	Upper
106	100		
91	188.6	179.9	239.9

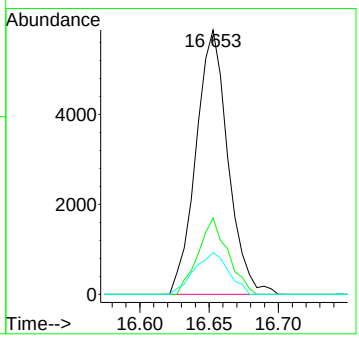


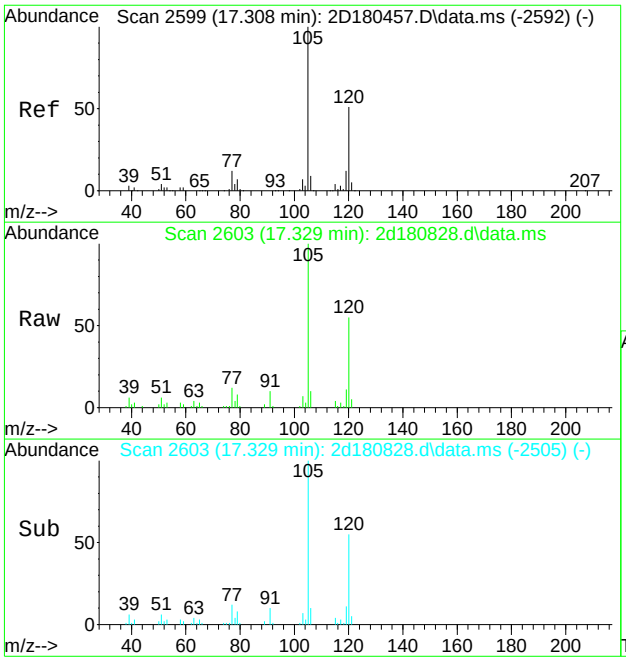


#96
isopropylbenzene
Concen: 0.36 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:105 Resp: 9446

Ion	Ratio	Lower	Upper
105	100		
120	28.8	6.7	46.7
77	15.8	0.0	34.2

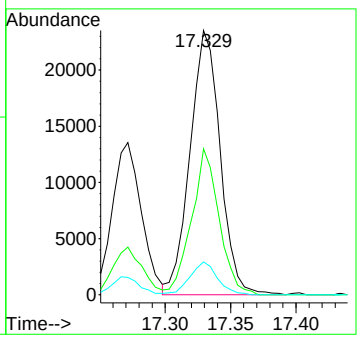


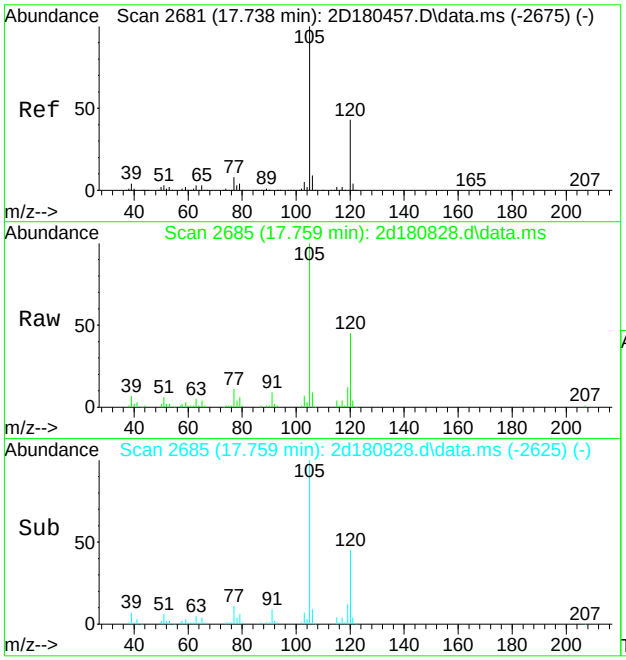


#107
1,3,5-trimethylbenzene
Concen: 1.68 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:105 Resp: 37688

Ion	Ratio	Lower	Upper
105	100		
120	55.2	20.7	80.7
77	12.5	0.0	42.0

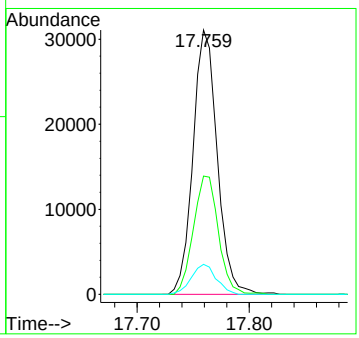


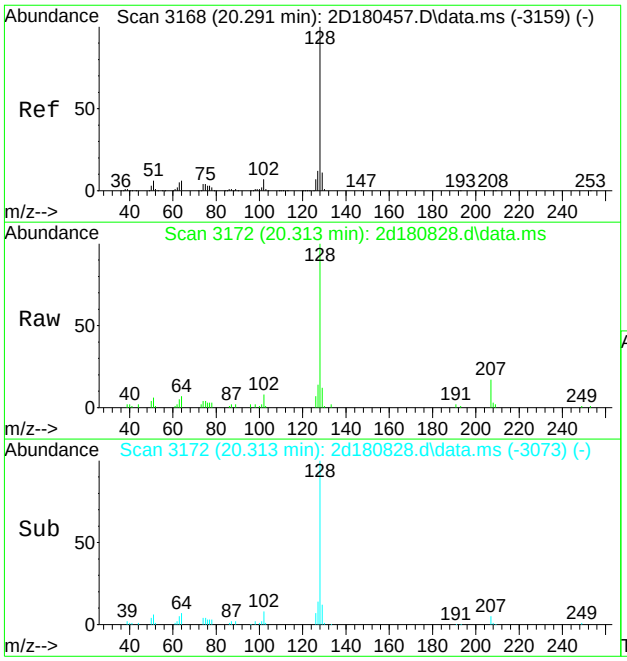


#109
1,2,4-trimethylbenzene
Concen: 2.05 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:105 Resp: 46858

Ion	Ratio	Lower	Upper
105	100		
120	44.7	16.7	76.7
77	11.4	0.0	41.8

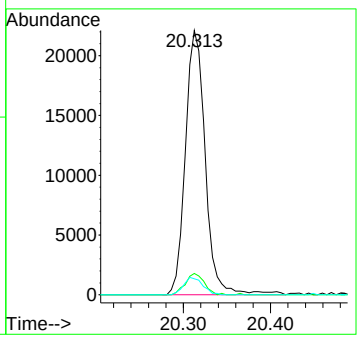




#121
naphthalene
Concen: 1.82 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180828.d
Acq: 9 Jan 2019 4:11 pm

Tgt Ion:128 Resp: 35018

Ion	Ratio	Lower	Upper
128	100		
102	8.0	0.0	37.5
51	6.0	0.0	36.4



7.1.9

7

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180871.d
Acq On : 10 Jan 2019 2:48 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 15 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:02 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

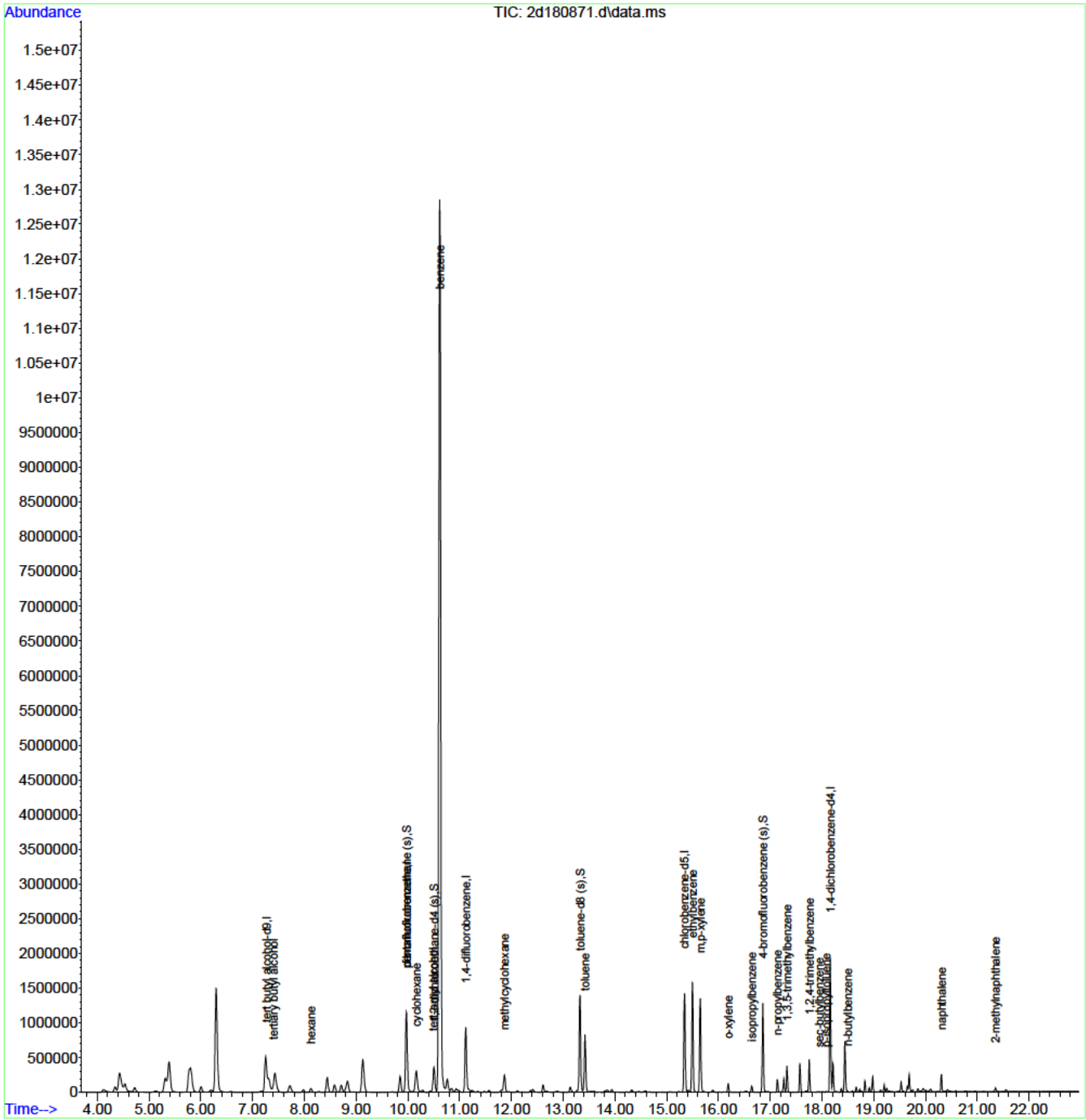
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.268	65	246230	500.00	ug/L	0.01
5) pentafluorobenzene	9.973	168	732659	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	946716	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	938628	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	511895	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	297270	48.92	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.84%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	301546	51.82	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 103.64%			
75) toluene-d8 (s)	13.323	98	1103640	48.88	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.76%			
99) 4-bromofluorobenzene (s)	16.857	95	426088	46.95	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.90%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.399	59	8420	17.63	ug/L #	1
28) hexane	8.122	57	38963	4.63	ug/L	97
47) cyclohexane	10.162	84	174297	22.97	ug/L #	54
51) tert-amyl alcohol	10.487	73	19190	84.85	ug/L	94
54) benzene	10.613	78	15788047	766.10	ug/L	100
68) methylcyclohexane	11.866	83	132820	14.69	ug/L	96
76) toluene	13.418	92	415702	31.46	ug/L	99
89) ethylbenzene	15.494	91	1301743	51.69	ug/L	99
90) m,p-xylene	15.646	91	884138	46.18	ug/L	99
91) o-xylene	16.186	106	36644	3.78	ug/L	99
96) isopropylbenzene	16.642	105	54211	2.15	ug/L	99
104) n-propylbenzene	17.135	91	147146	4.86	ug/L	96
107) 1,3,5-trimethylbenzene	17.324	105	210520	9.78	ug/L	100
109) 1,2,4-trimethylbenzene	17.754	105	258177	11.81	ug/L	97
110) sec-butylbenzene	17.943	105	6709	0.24	ug/L	93
112) p-isopropyltoluene	18.074	119	6094	0.26	ug/L	98
116) n-butylbenzene	18.493	92	4797	0.42	ug/L	92
121) naphthalene	20.307	128	194988	10.59	ug/L	99
126) 2-methylnaphthalene	21.351	142	25808	4.71	ug/L	95

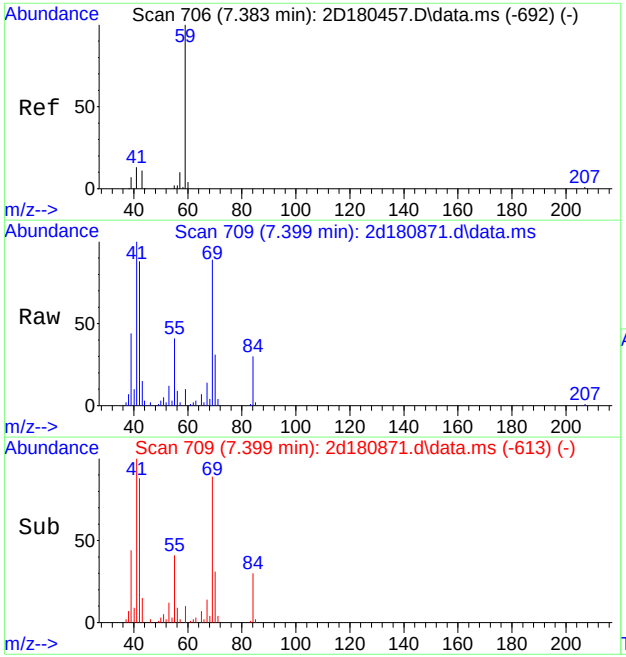
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180871.d
Acq On : 10 Jan 2019 2:48 pm
Operator : EddieH
Sample : JC80990-6 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 15 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:02 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

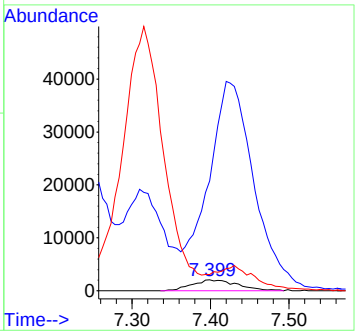


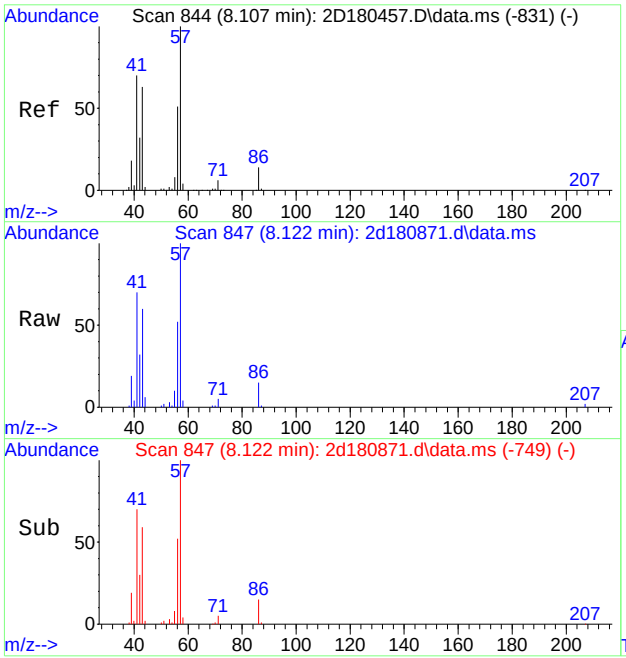


#2
tertiary butyl alcohol
Concen: 17.63 ug/L
RT: 7.399 min Scan# 709
Delta R.T. 0.005 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 59 Resp: 8420

Ion	Ratio	Lower	Upper
59	100		
41	803.5	0.0	45.0#
43	114.2	0.0	40.6#

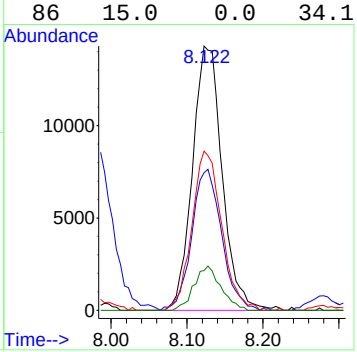


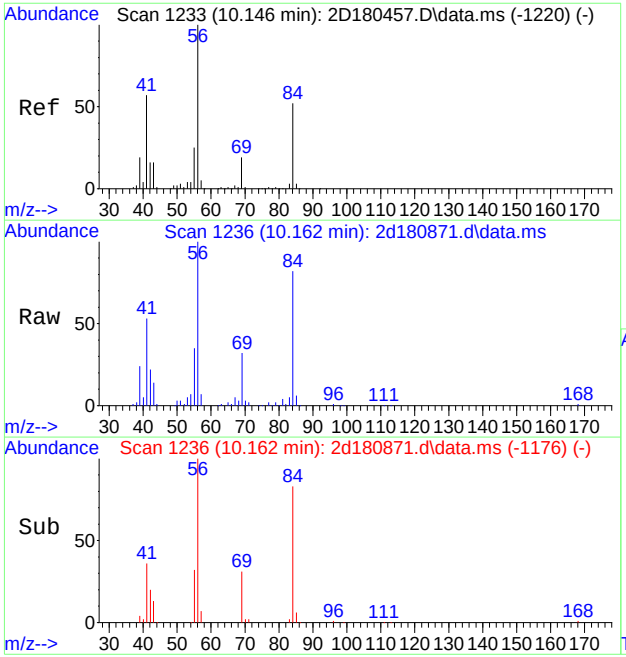


#28
hexane
Concen: 4.63 ug/L
RT: 8.122 min Scan# 847
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 57 Resp: 38963

Ion	Ratio	Lower	Upper
57	100		
56	52.1	30.6	70.6
43	60.2	43.2	83.2
86	15.0	0.0	34.1

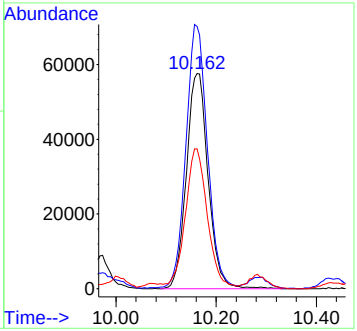


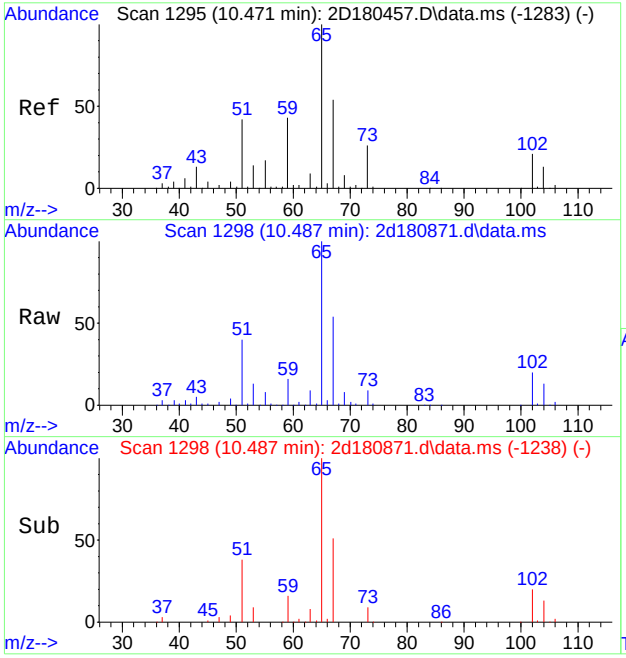


#47
cyclohexane
Concen: 22.97 ug/L
RT: 10.162 min Scan# 1236
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 84 Resp: 174297

Ion	Ratio	Lower	Upper
84	100		
56	121.6	163.0	223.0#
41	64.6	79.6	139.6#

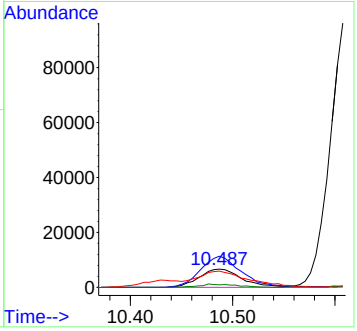


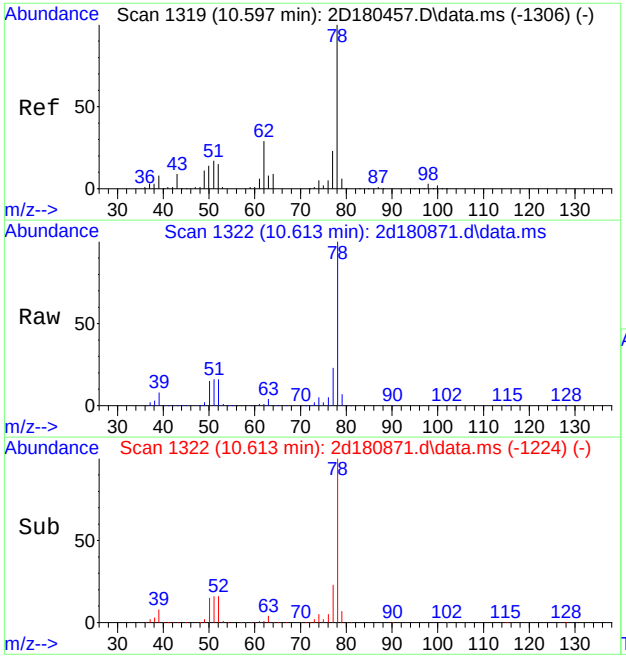


#51
tert-amyl alcohol
Concen: 84.85 ug/L
RT: 10.487 min Scan# 1298
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 73 Resp: 19190

Ion	Ratio	Lower	Upper
73	100		
59	169.8	145.1	185.1
55	76.5	46.9	86.9
45	14.1	0.0	44.9

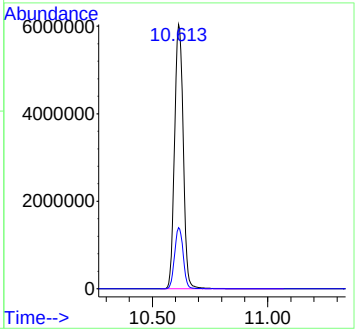


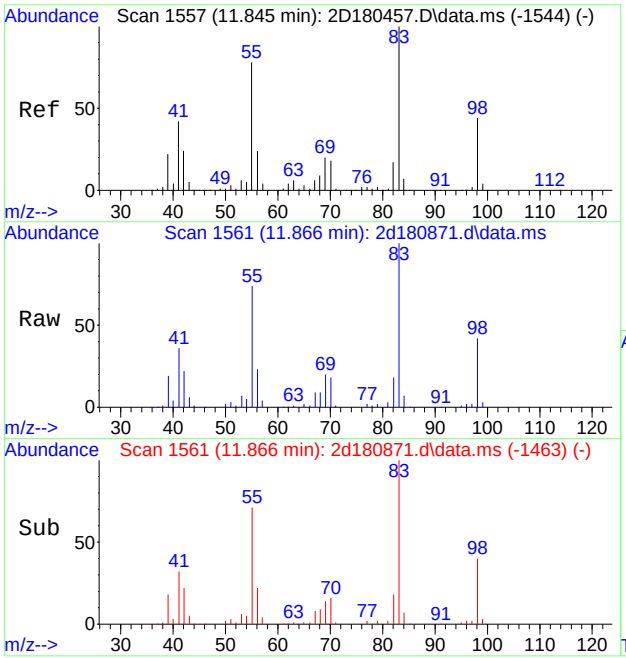


#54
benzene
Concen: 766.10 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 78 Resp:15788047

Ion	Ratio	Lower	Upper
78	100		
77	23.1	0.0	53.2

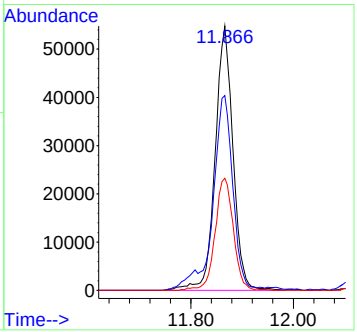


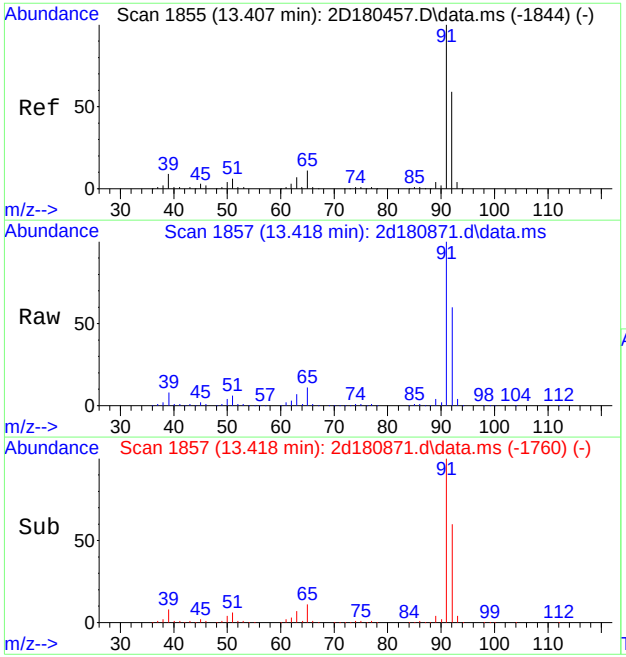


#68
methylcyclohexane
Concen: 14.69 ug/L
RT: 11.866 min Scan# 1561
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 83 Resp: 132820

Ion	Ratio	Lower	Upper
83	100		
55	73.7	47.8	107.8
98	42.4	13.7	73.7

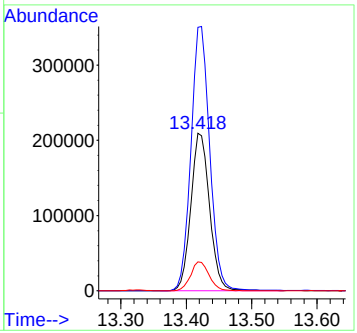


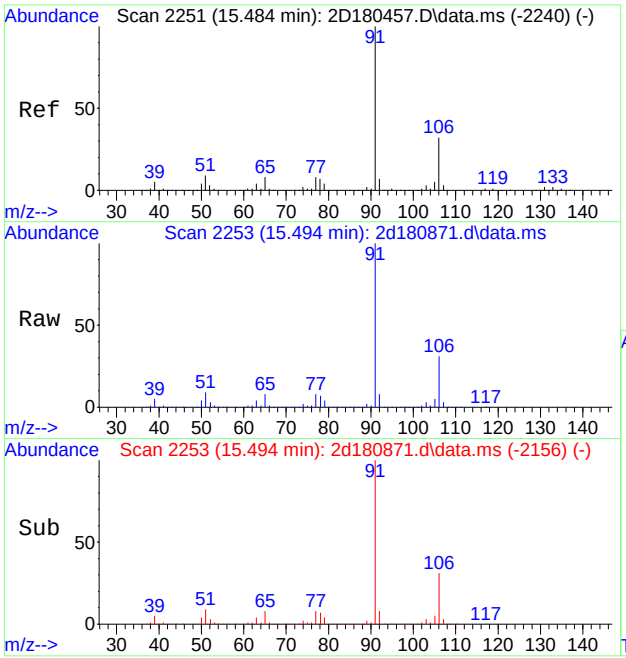


#76
toluene
Concen: 31.46 ug/L
RT: 13.418 min Scan# 1857
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 92 Resp: 415702

Ion	Ratio	Lower	Upper
92	100		
91	167.2	148.1	188.1
65	18.4	0.0	38.8

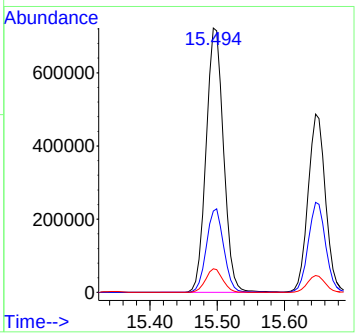


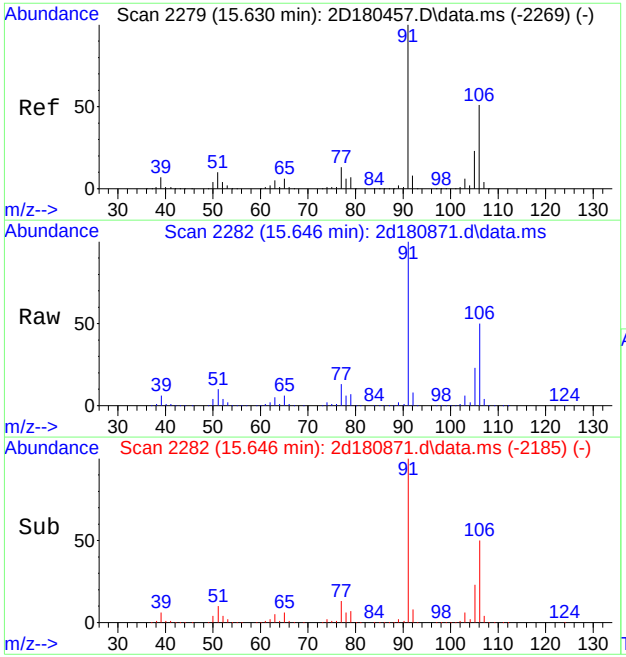


#89
ethylbenzene
Concen: 51.69 ug/L
RT: 15.494 min Scan# 2253
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 91 Resp: 1301743

Ion	Ratio	Lower	Upper
91	100		
106	30.7	1.6	61.6
51	9.0	0.0	39.0

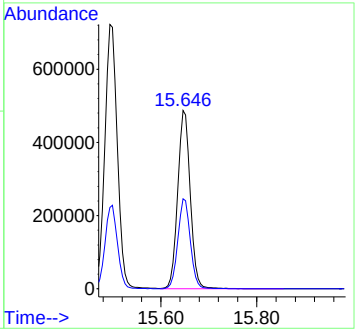


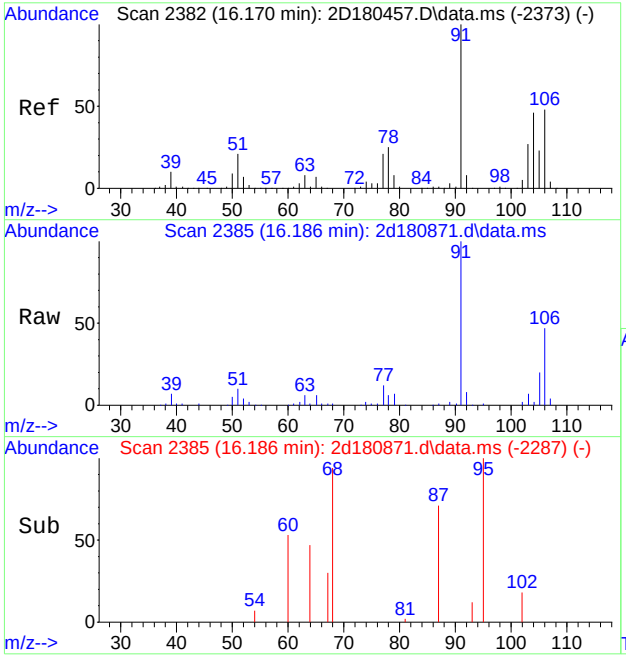


#90
m,p-xylene
Concen: 46.18 ug/L
RT: 15.646 min Scan# 2282
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 91 Resp: 884138

Ion	Ratio	Lower	Upper
91	100		
106	50.5	21.1	81.1

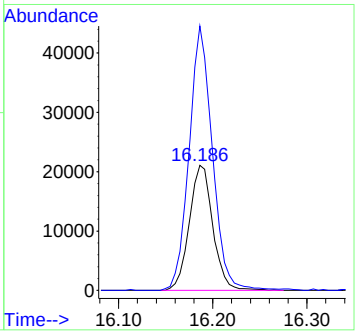


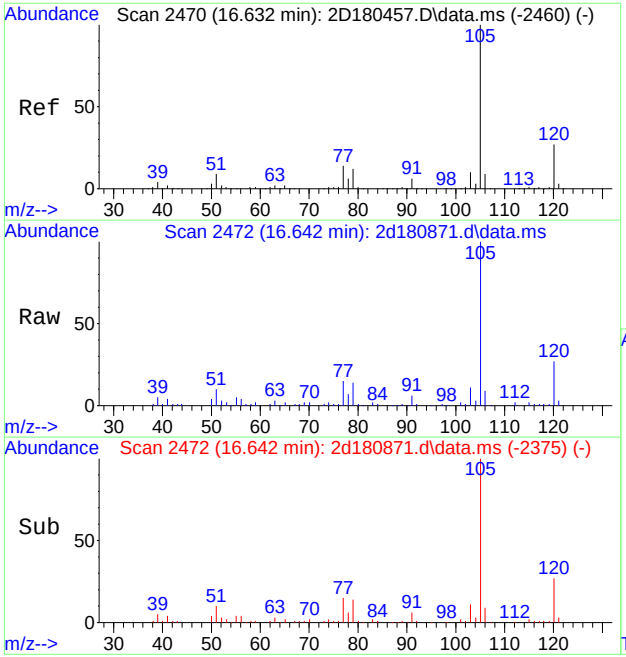


#91
o-xylene
Concen: 3.78 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:106 Resp: 36644

Ion	Ratio	Lower	Upper
106	100		
91	211.3	179.9	239.9

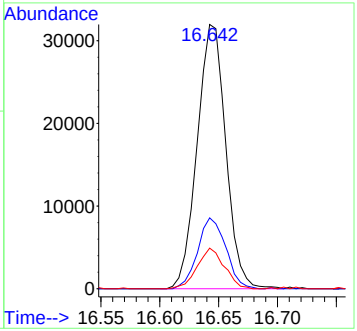


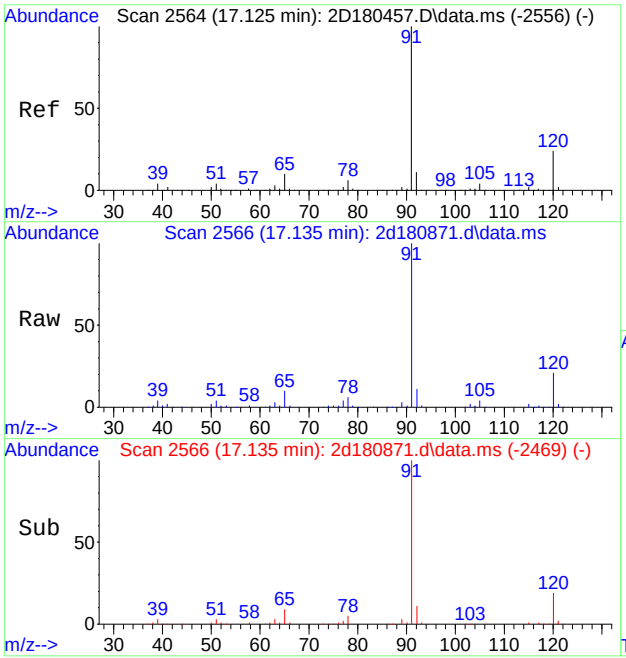


#96
isopropylbenzene
Concen: 2.15 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 54211

Ion	Ratio	Lower	Upper
105	100		
120	26.8	6.7	46.7
77	15.4	0.0	34.2

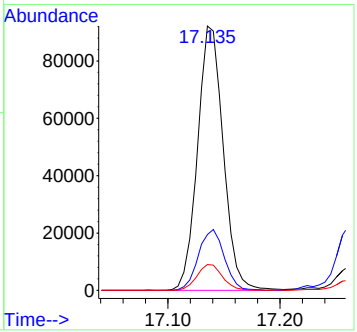


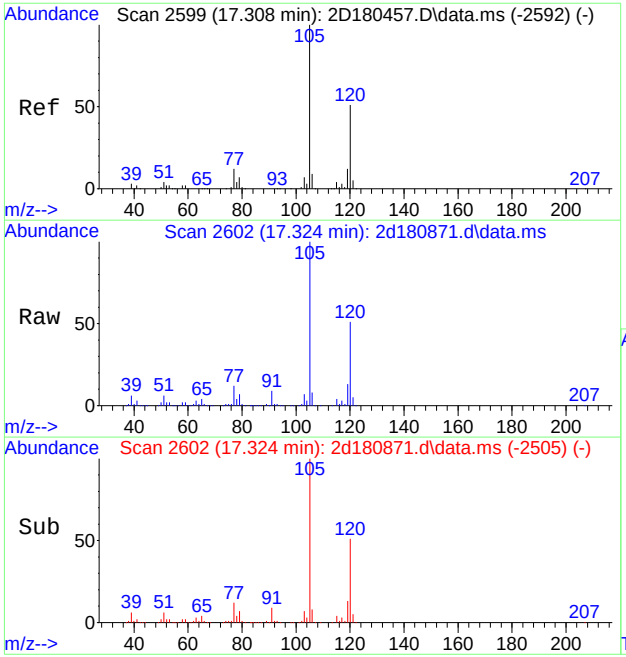


#104
n-propylbenzene
Concen: 4.86 ug/L
RT: 17.135 min Scan# 2566
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 91 Resp: 147146

Ion	Ratio	Lower	Upper
91	100		
120	21.1	0.0	53.6
65	9.8	0.0	39.5

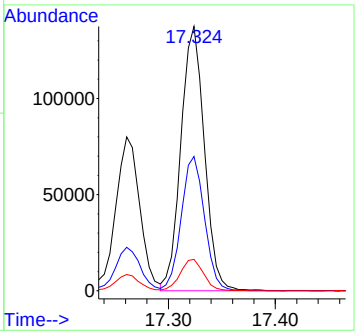


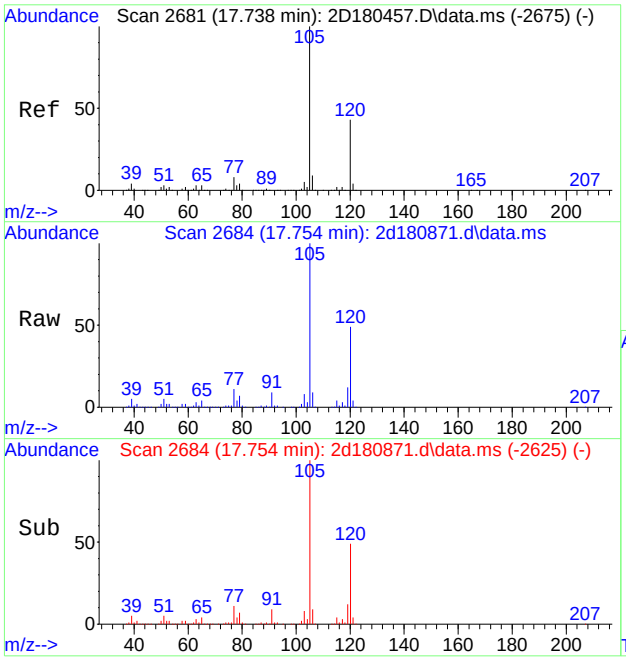


#107
1,3,5-trimethylbenzene
Concen: 9.78 ug/L
RT: 17.324 min Scan# 2602
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 210520

Ion	Ratio	Lower	Upper
105	100		
120	50.8	20.7	80.7
77	11.9	0.0	42.0

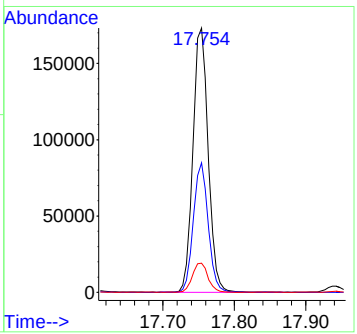


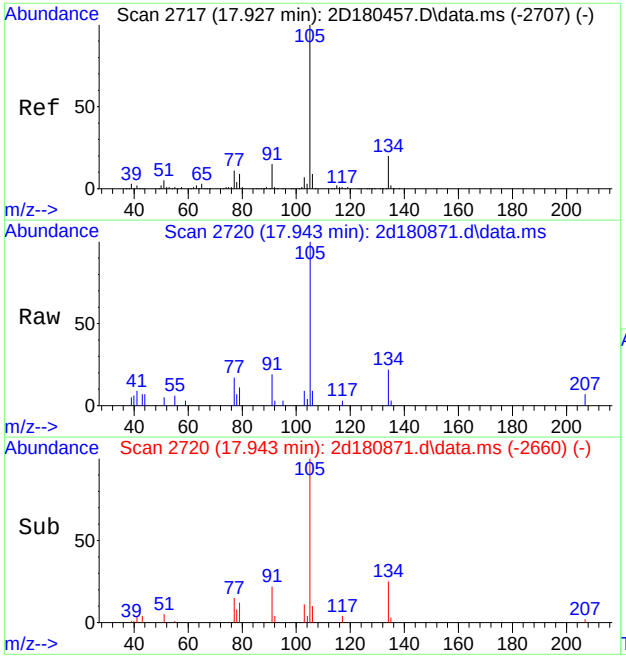


#109
1,2,4-trimethylbenzene
Concen: 11.81 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 258177

Ion	Ratio	Lower	Upper
105	100		
120	49.0	16.7	76.7
77	11.0	0.0	41.8

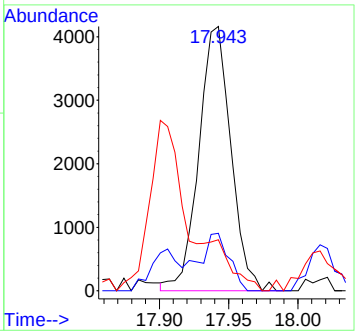


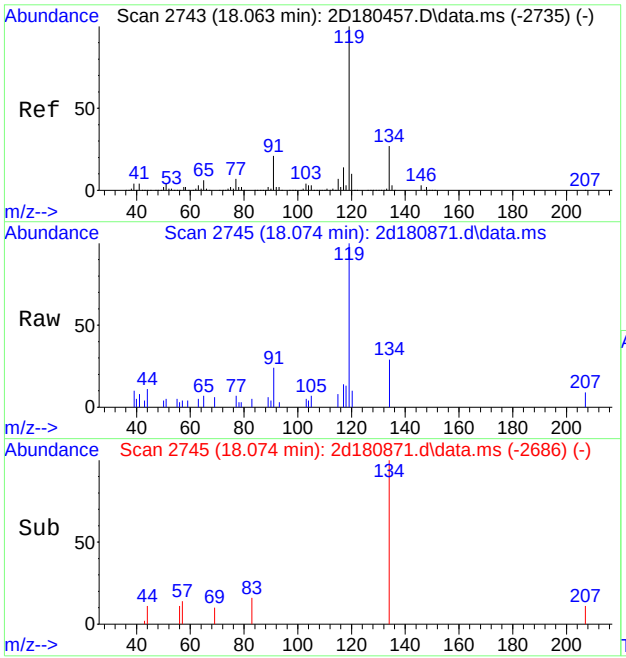


#110
sec-butylbenzene
Concen: 0.24 ug/L
RT: 17.943 min Scan# 2720
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:105 Resp: 6709

Ion	Ratio	Lower	Upper
105	100		
134	21.7	0.0	49.8
91	19.4	0.0	44.9

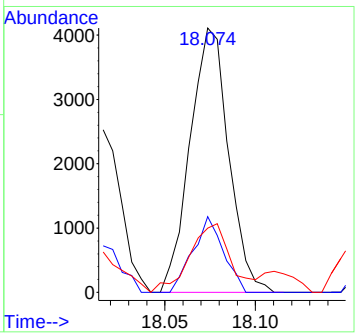


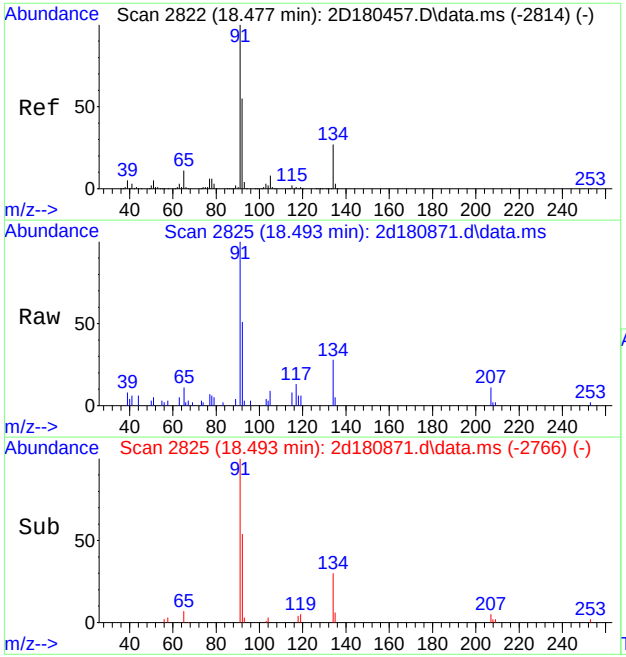


#112
p-isopropyltoluene
Concen: 0.26 ug/L
RT: 18.074 min Scan# 2745
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:119 Resp: 6094

Ion	Ratio	Lower	Upper
119	100		
134	28.6	0.0	57.4
91	20.6	0.0	51.5

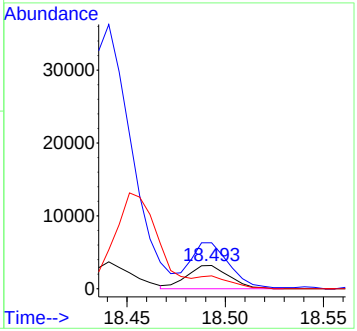


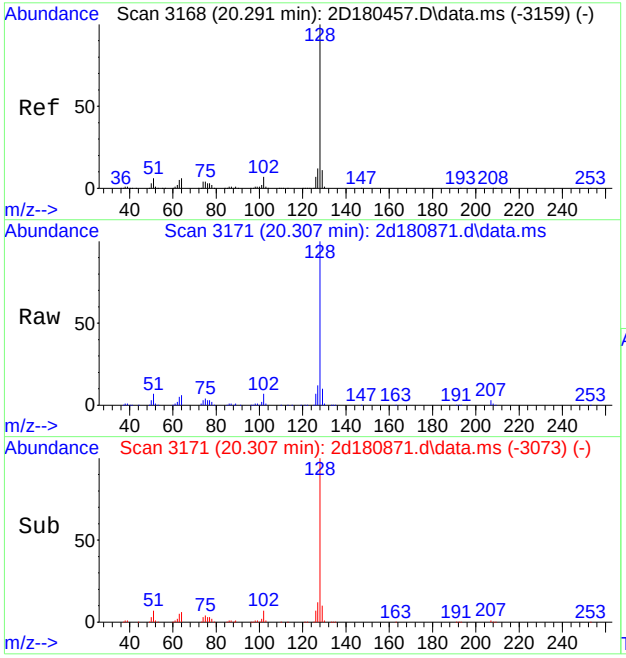


#116
n-butylbenzene
Concen: 0.42 ug/L
RT: 18.493 min Scan# 2825
Delta R.T. 0.010 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion: 92 Resp: 4797

Ion	Ratio	Lower	Upper
92	100		
91	192.0	151.0	211.0
134	54.9	18.3	78.3

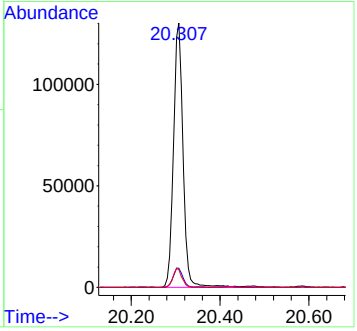


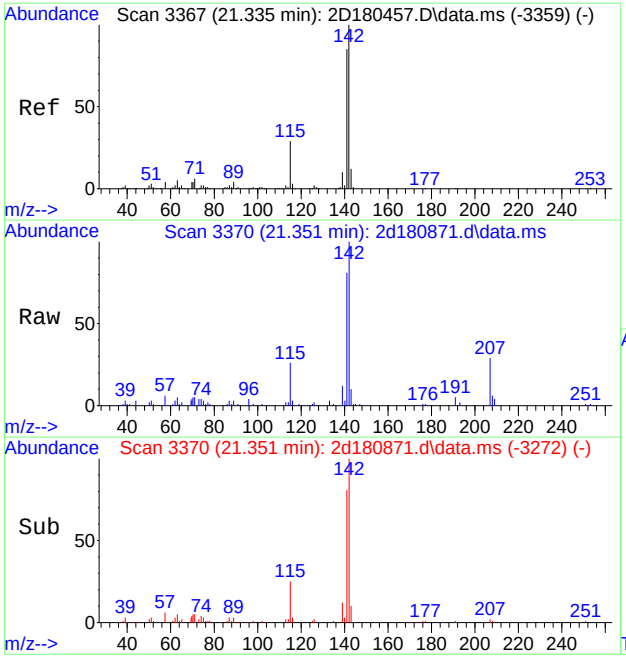


#121
naphthalene
Concen: 10.59 ug/L
RT: 20.307 min Scan# 3171
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:128 Resp: 194988

Ion	Ratio	Lower	Upper
128	100		
102	7.3	0.0	37.5
51	6.7	0.0	36.4

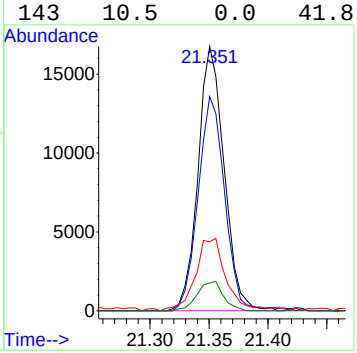




#126
2-methylnaphthalene
Concen: 4.71 ug/L
RT: 21.351 min Scan# 3370
Delta R.T. 0.016 min
Lab File: 2d180871.d
Acq: 10 Jan 2019 2:48 pm

Tgt Ion:142 Resp: 25808

Ion	Ratio	Lower	Upper
142	100		
141	81.0	65.4	105.4
115	26.1	0.0	58.6
143	10.5	0.0	41.8



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180821.d
Acq On : 9 Jan 2019 12:44 pm
Operator : EddieH
Sample : JC80990-7 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 11 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:35:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

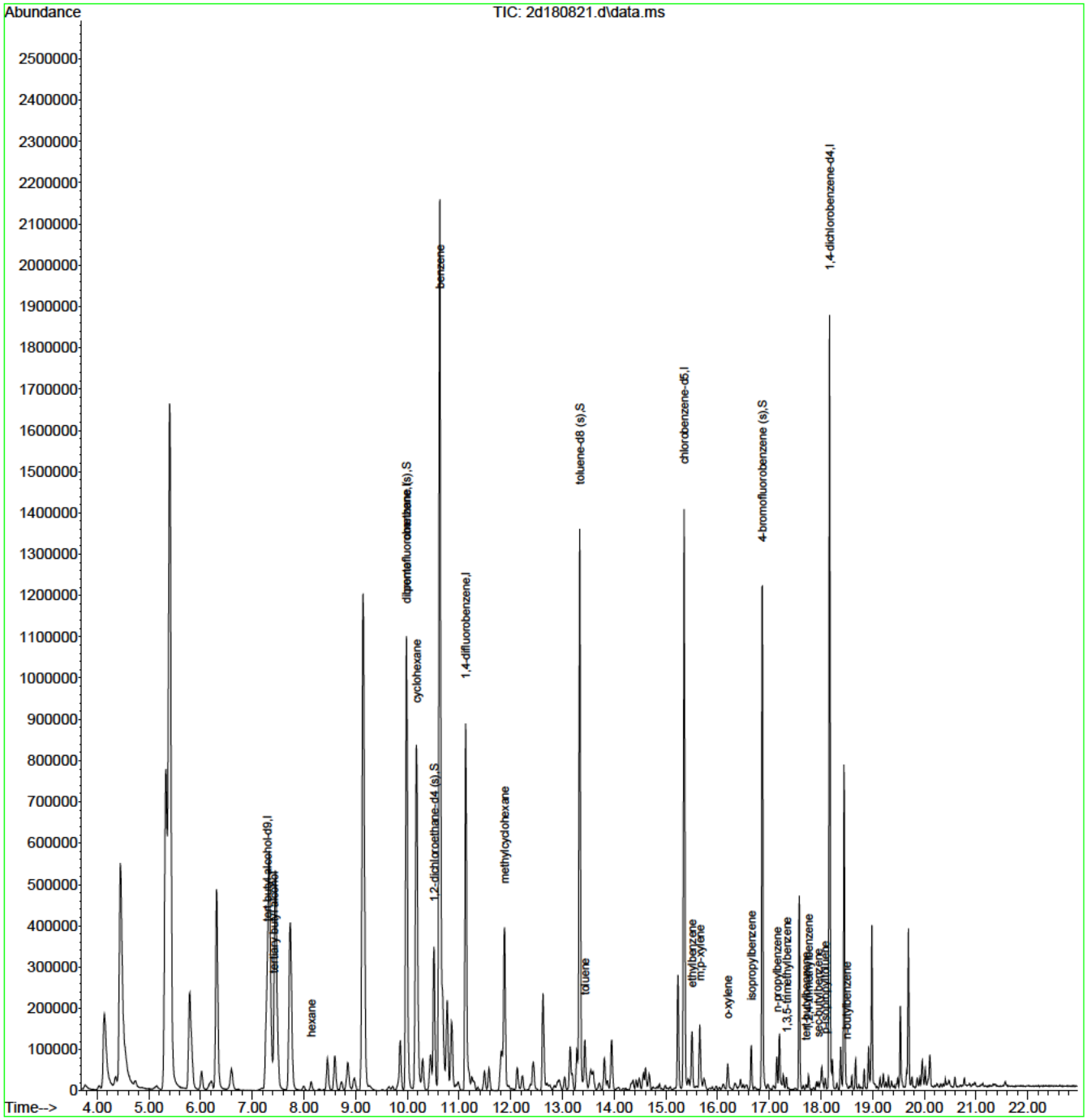
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.289	65	231471	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	685778	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	918048	50.00	ug/L	0.03
74) chlorobenzene-d5	15.352	117	905254	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.168	152	496790	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	283960	49.92	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.84%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	285336	50.56	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 101.12%			
75) toluene-d8 (s)	13.334	98	1057061	48.54	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.08%			
99) 4-bromofluorobenzene (s)	16.863	95	414359	47.05	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.10%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.415	59	2946	6.56	ug/L #	1
28) hexane	8.138	57	14663	1.86	ug/L	96
47) cyclohexane	10.178	84	477638	67.25	ug/L #	55
54) benzene	10.629	78	2423401	121.27	ug/L	100
68) methylcyclohexane	11.876	83	210365	24.00	ug/L	96
76) toluene	13.434	92	56543	4.44	ug/L	99
89) ethylbenzene	15.505	91	93833	3.86	ug/L	99
90) m,p-xylene	15.657	91	103955	5.63	ug/L	95
91) o-xylene	16.197	106	17125	1.83	ug/L	97
96) isopropylbenzene	16.653	105	70913	2.92	ug/L	99
104) n-propylbenzene	17.146	91	64087	2.18	ug/L	97
107) 1,3,5-trimethylbenzene	17.334	105	14391	0.69	ug/L	92
108) tert-butylbenzene	17.712	119	4636	0.25	ug/L	98
109) 1,2,4-trimethylbenzene	17.759	105	17095	0.81	ug/L	100
110) sec-butylbenzene	17.948	105	11507	0.42	ug/L	97
112) p-isopropyltoluene	18.079	119	13650	0.59	ug/L	95
116) n-butylbenzene	18.498	92	2766	0.25	ug/L	88

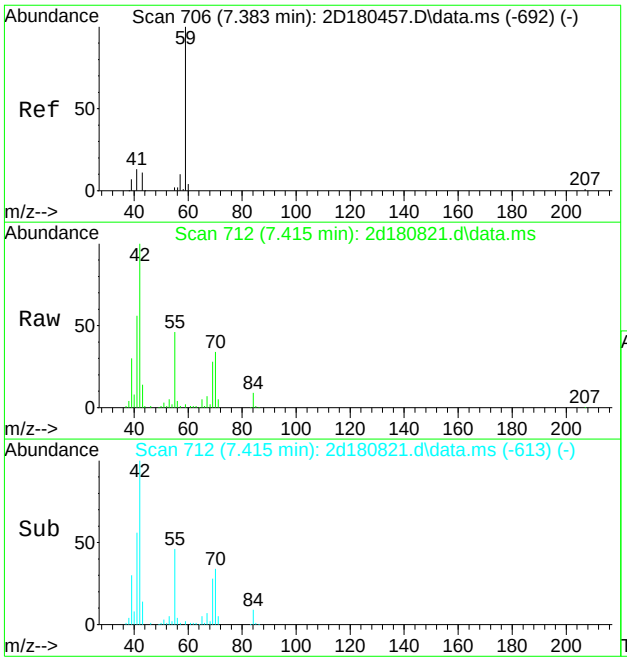
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180821.d
Acq On : 9 Jan 2019 12:44 pm
Operator : EddieH
Sample : JC80990-7 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,1
ALS Vial : 11 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:35:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

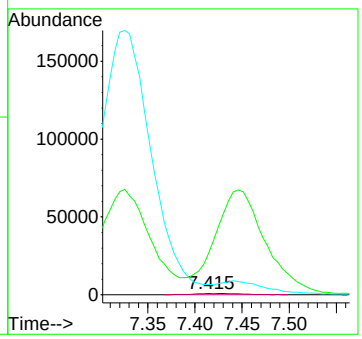


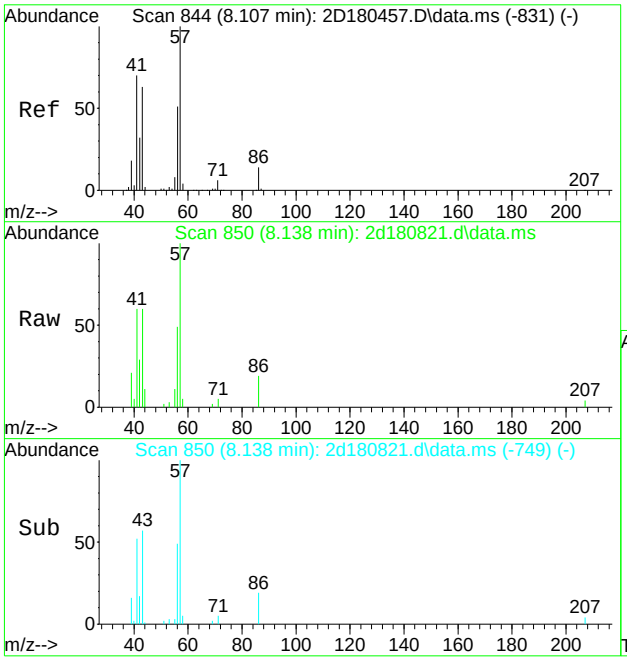


#2
tertiary butyl alcohol
Concen: 6.56 ug/L
RT: 7.415 min Scan# 712
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 59 Resp: 2946

Ion	Ratio	Lower	Upper
59	100		
41	1517.0	0.0	45.0#
43	546.3	0.0	40.6#

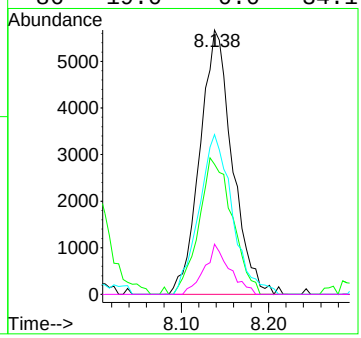


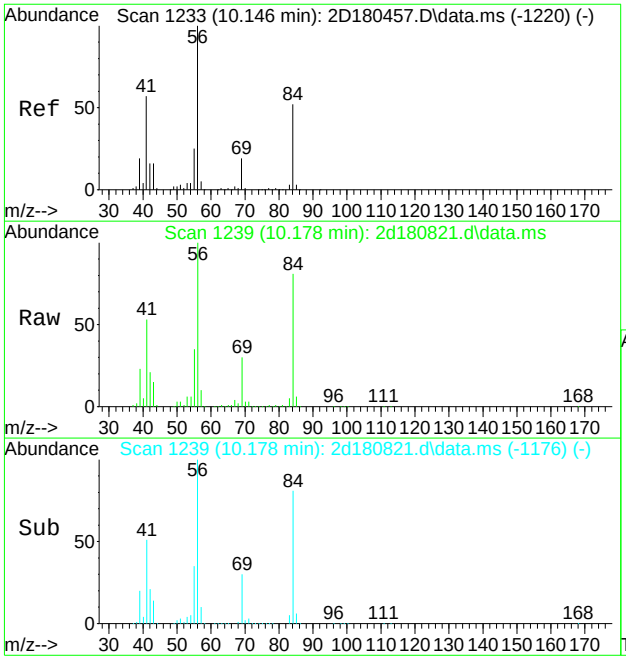


#28
hexane
Concen: 1.86 ug/L
RT: 8.138 min Scan# 850
Delta R.T. 0.031 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 57 Resp: 14663

Ion	Ratio	Lower	Upper
57	100		
56	49.2	30.6	70.6
43	60.4	43.2	83.2
86	19.0	0.0	34.1

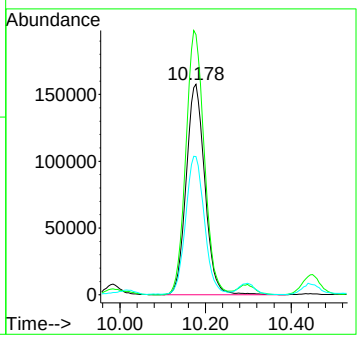


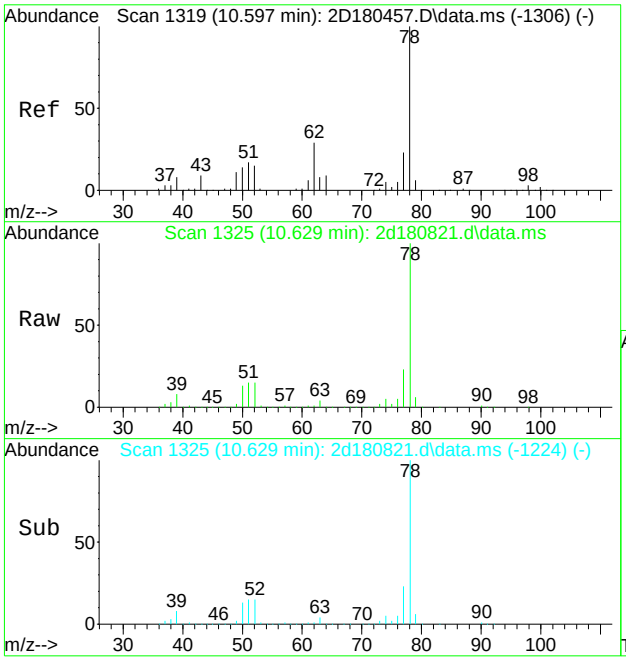


#47
cyclohexane
Concen: 67.25 ug/L
RT: 10.178 min Scan# 1239
Delta R.T. 0.031 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 84 Resp: 477638

Ion	Ratio	Lower	Upper
84	100		
56	123.4	163.0	223.0#
41	65.5	79.6	139.6#

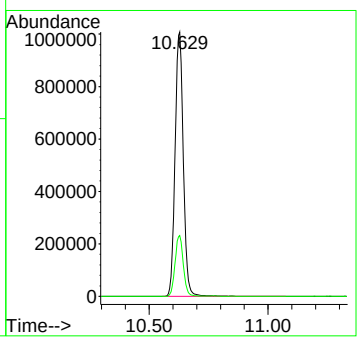


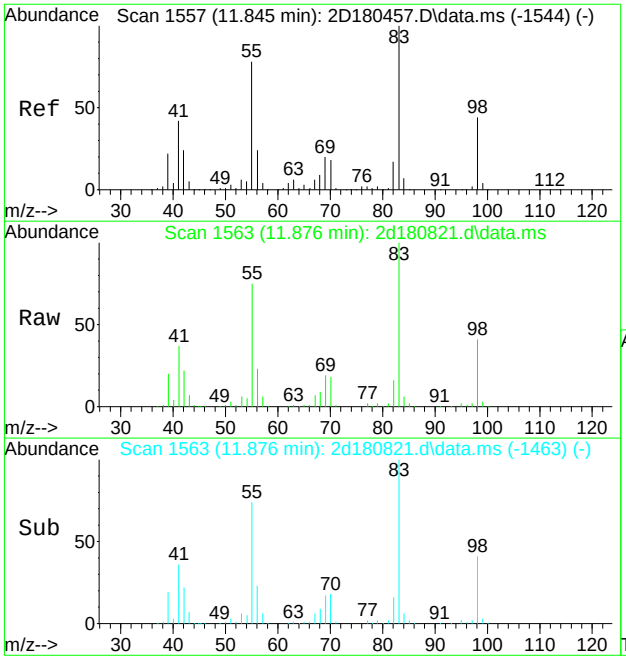


#54
benzene
Concen: 121.27 ug/L
RT: 10.629 min Scan# 1325
Delta R.T. 0.031 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 78 Resp: 2423401

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

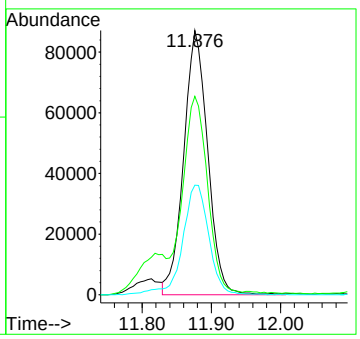


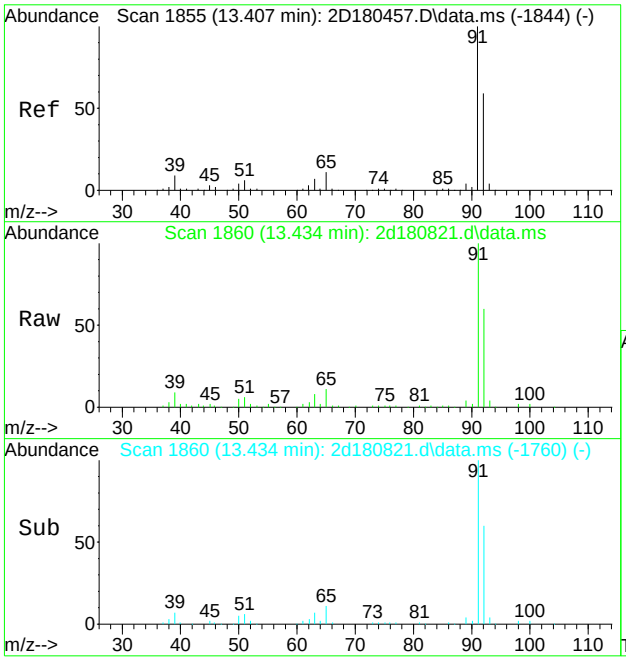


#68
methylcyclohexane
Concen: 24.00 ug/L
RT: 11.876 min Scan# 1563
Delta R.T. 0.026 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 83 Resp: 210365

Ion	Ratio	Lower	Upper
83	100		
55	74.5	47.8	107.8
98	41.4	13.7	73.7

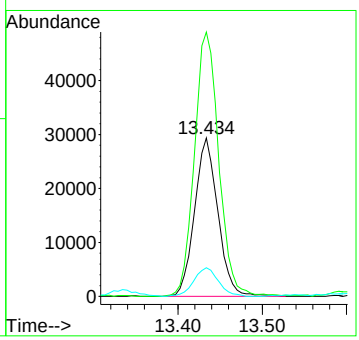


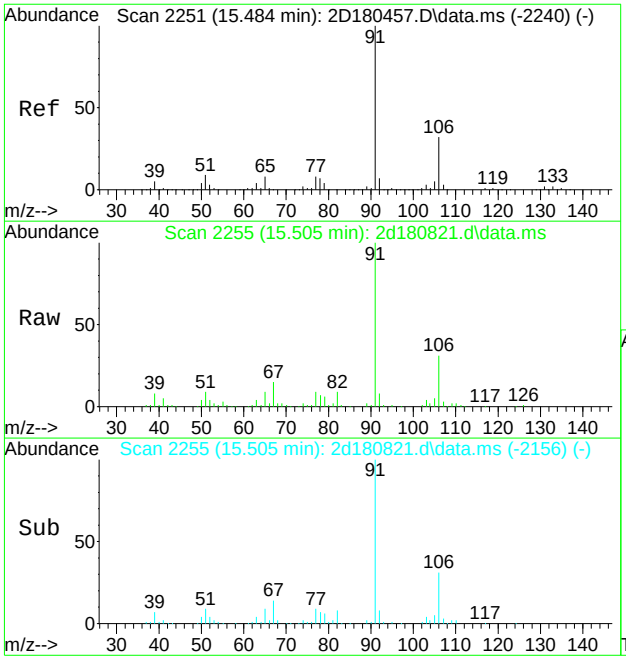


#76
toluene
Concen: 4.44 ug/L
RT: 13.434 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 92 Resp: 56543

Ion	Ratio	Lower	Upper
92	100		
91	167.1	148.1	188.1
65	18.1	0.0	38.8

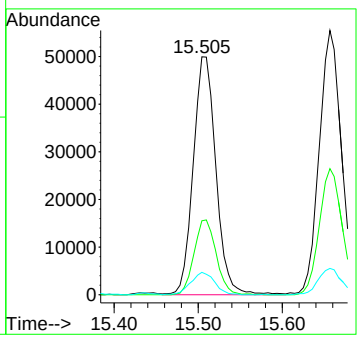


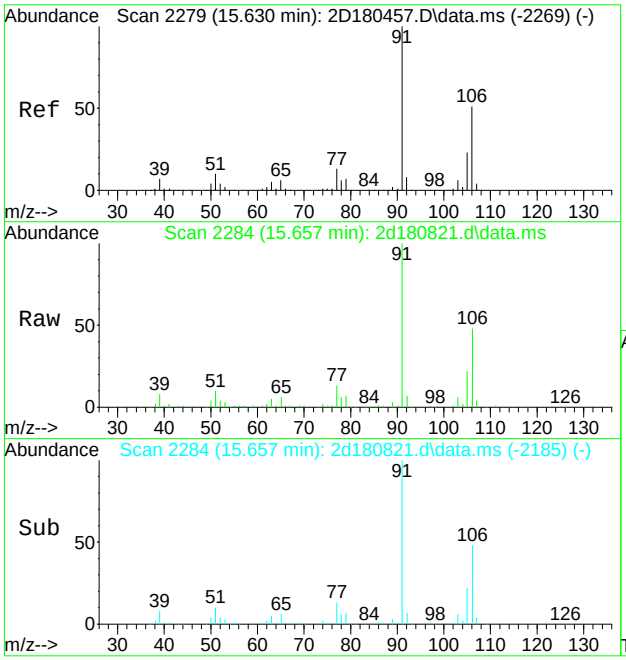


#89
ethylbenzene
Concen: 3.86 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 91 Resp: 93833

Ion	Ratio	Lower	Upper
91	100		
106	31.2	1.6	61.6
51	9.5	0.0	39.0

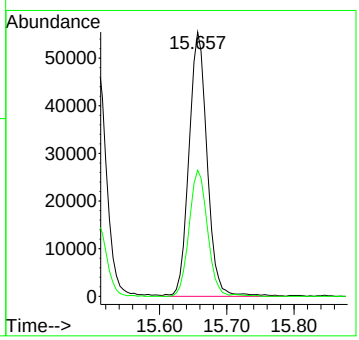


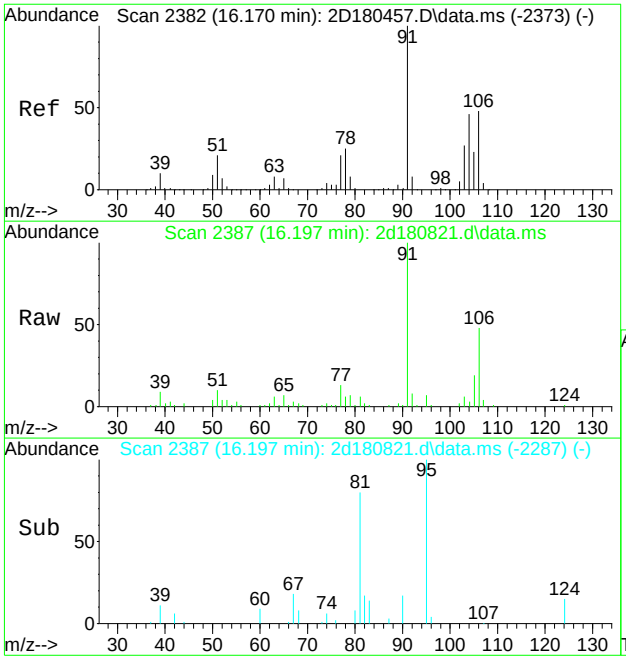


#90
m,p-xylene
Concen: 5.63 ug/L
RT: 15.657 min Scan# 2284
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 91 Resp: 103955

Ion	Ratio	Lower	Upper
91	100		
106	47.7	21.1	81.1

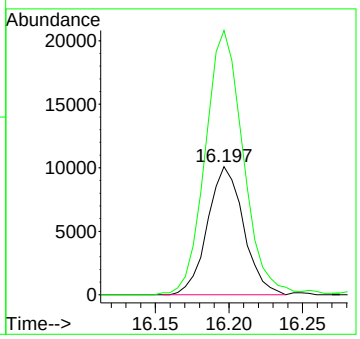


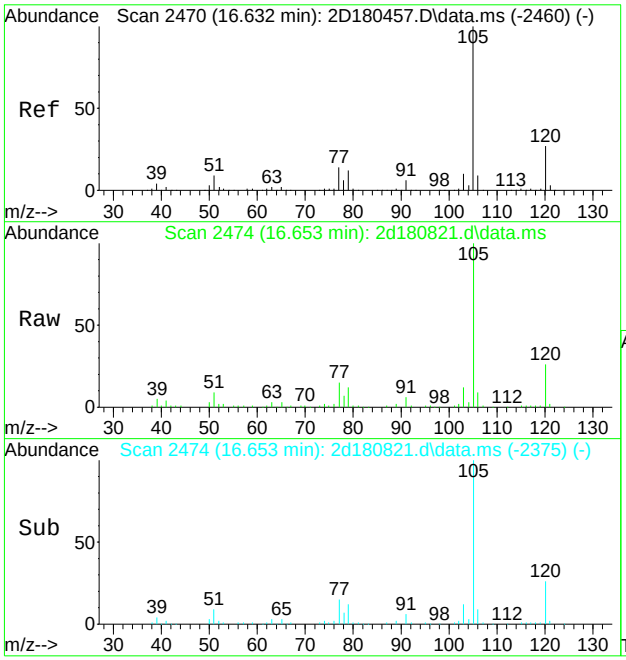


#91
o-xylene
Concen: 1.83 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:106 Resp: 17125

Ion	Ratio	Lower	Upper
106	100		
91	205.1	179.9	239.9

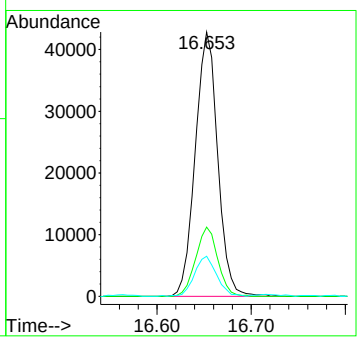


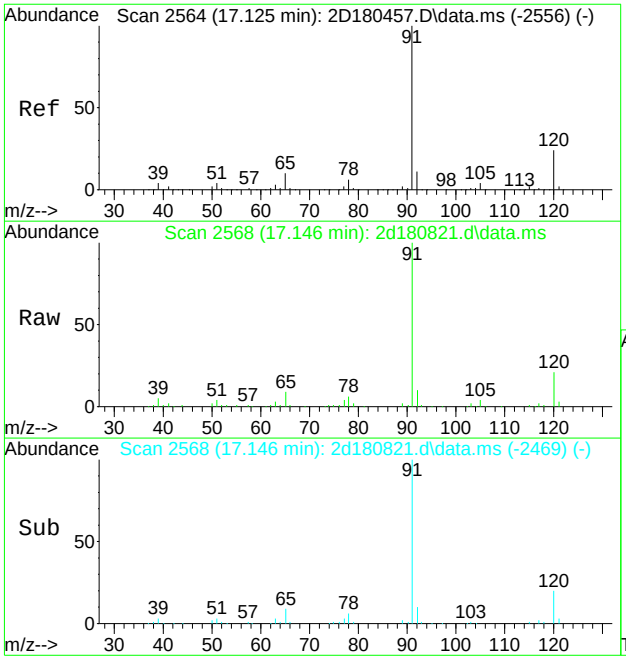


#96
isopropylbenzene
Concen: 2.92 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 70913

Ion	Ratio	Lower	Upper
105	100		
120	26.2	6.7	46.7
77	14.8	0.0	34.2

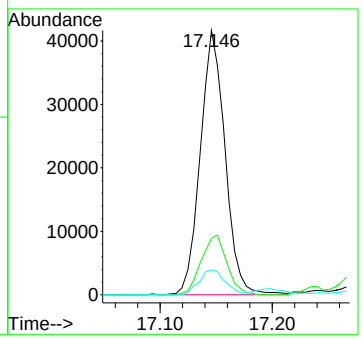


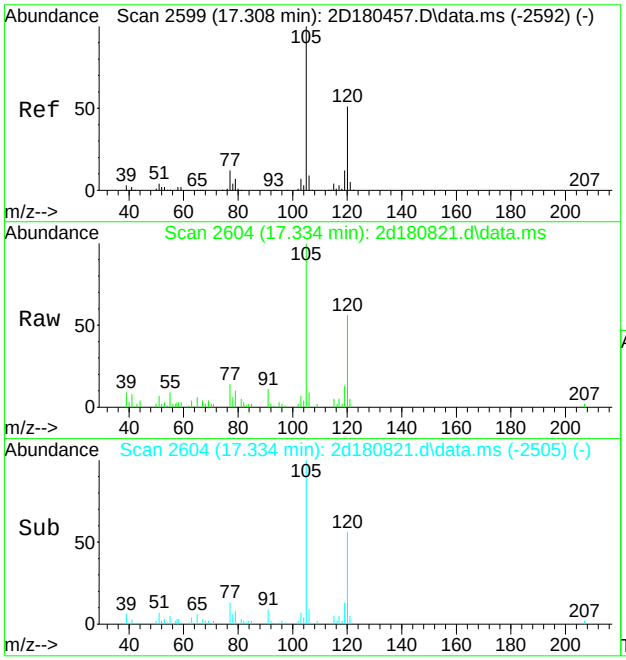


#104
n-propylbenzene
Concen: 2.18 ug/L
RT: 17.146 min Scan# 2568
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 91 Resp: 64087

Ion	Ratio	Lower	Upper
91	100		
120	21.4	0.0	53.6
65	9.5	0.0	39.5

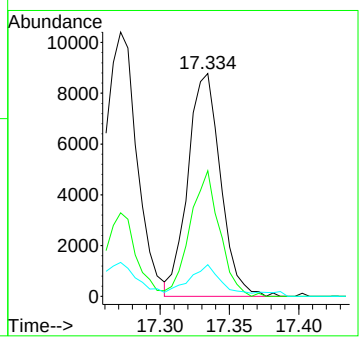


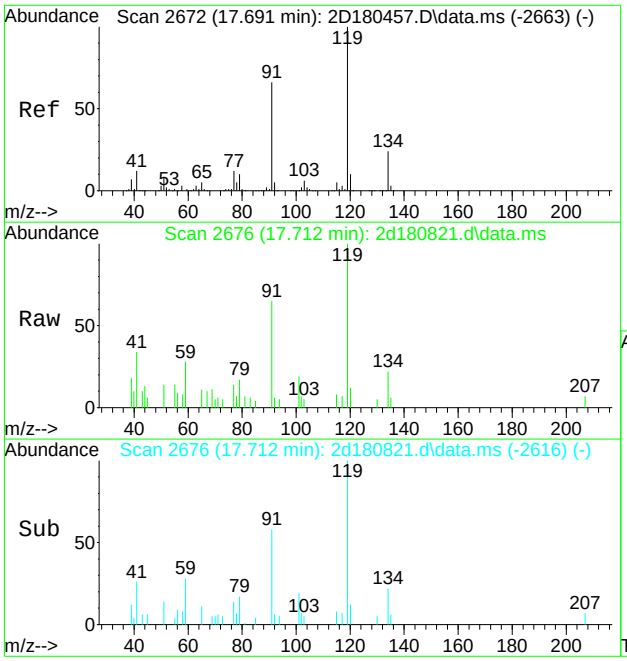


#107
1,3,5-trimethylbenzene
Concen: 0.69 ug/L
RT: 17.334 min Scan# 2604
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 14391

Ion	Ratio	Lower	Upper
105	100		
120	56.4	20.7	80.7
77	14.3	0.0	42.0

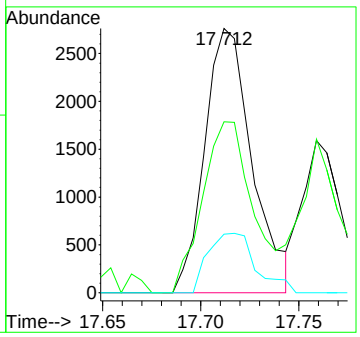


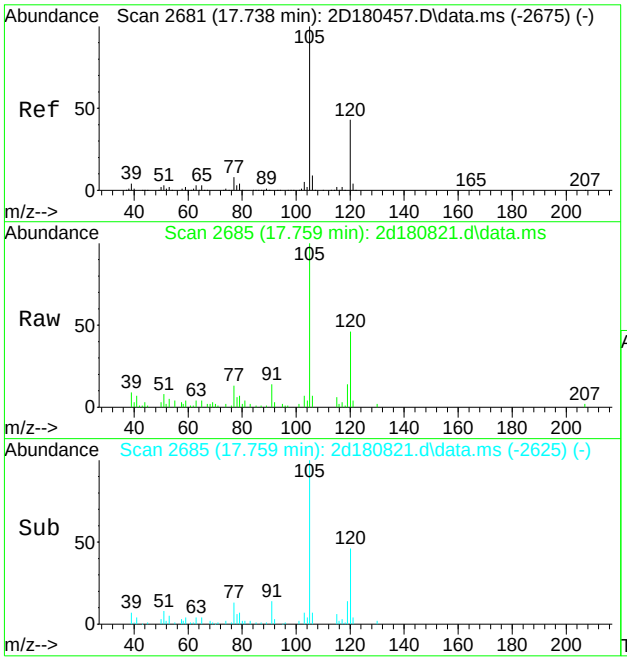


#108
tert-butylbenzene
Concen: 0.25 ug/L
RT: 17.712 min Scan# 2676
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:119 Resp: 4636

Ion	Ratio	Lower	Upper
119	100		
91	64.7	35.6	95.6
134	22.2	0.0	54.0

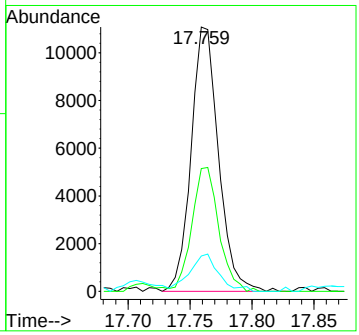


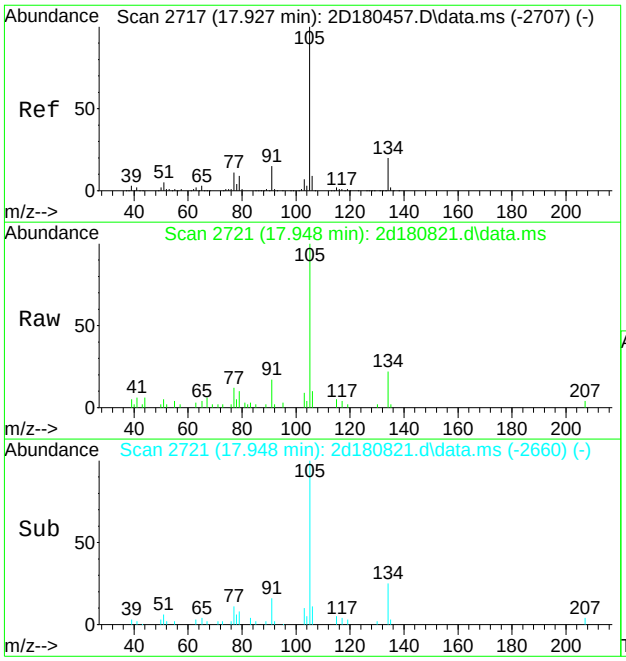


#109
1,2,4-trimethylbenzene
Concen: 0.81 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 17095

Ion	Ratio	Lower	Upper
105	100		
120	46.4	16.7	76.7
77	11.8	0.0	41.8

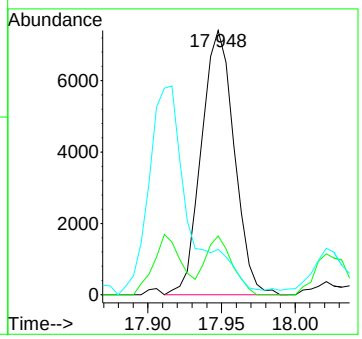


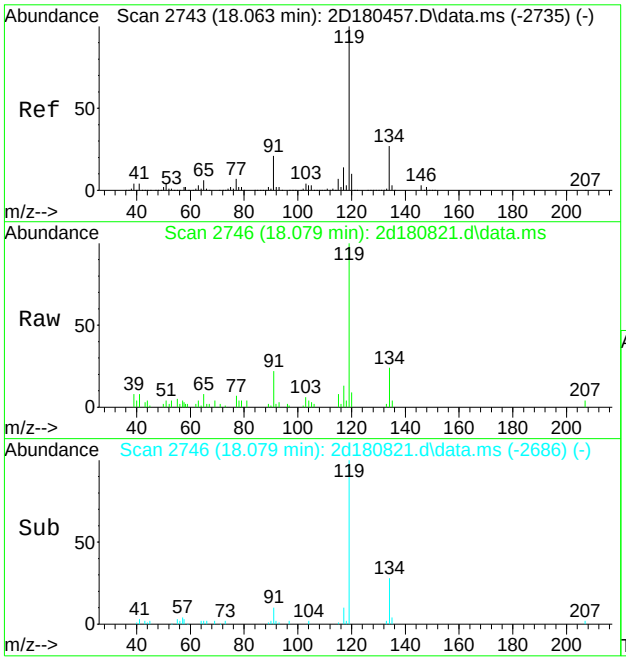


#110
sec-butylbenzene
Concen: 0.42 ug/L
RT: 17.948 min Scan# 2721
Delta R.T. 0.021 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:105 Resp: 11507

Ion	Ratio	Lower	Upper
105	100		
134	22.3	0.0	49.8
91	15.1	0.0	44.9

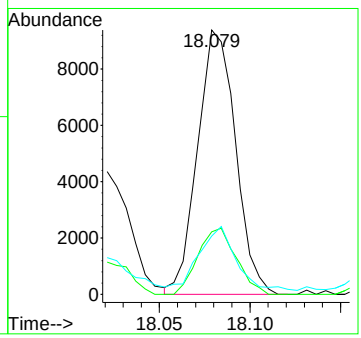


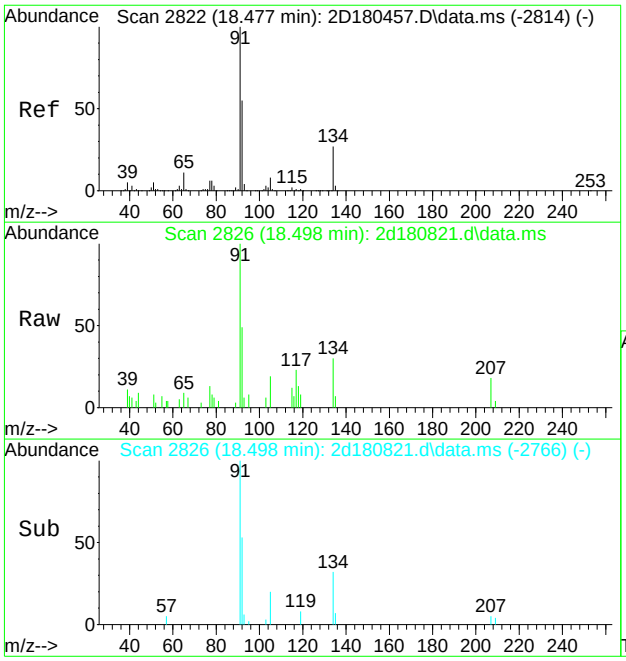


#112
p-isopropyltoluene
Concen: 0.59 ug/L
RT: 18.079 min Scan# 2746
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion:119 Resp: 13650

Ion	Ratio	Lower	Upper
119	100		
134	23.6	0.0	57.4
91	20.1	0.0	51.5

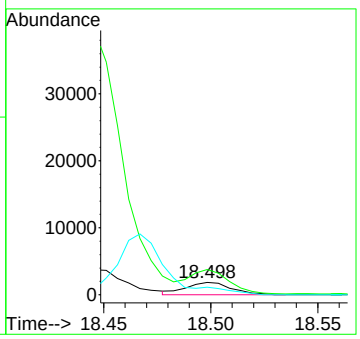




#116
n-butylbenzene
Concen: 0.25 ug/L
RT: 18.498 min Scan# 2826
Delta R.T. 0.016 min
Lab File: 2d180821.d
Acq: 9 Jan 2019 12:44 pm

Tgt Ion: 92 Resp: 2766

Ion	Ratio	Lower	Upper
92	100		
91	195.2	151.0	211.0
134	61.3	18.3	78.3



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-10-19\janellec\v2d7692\
Data File : 2d180829.d
Acq On : 9 Jan 2019 4:40 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 19 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 19:36:15 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

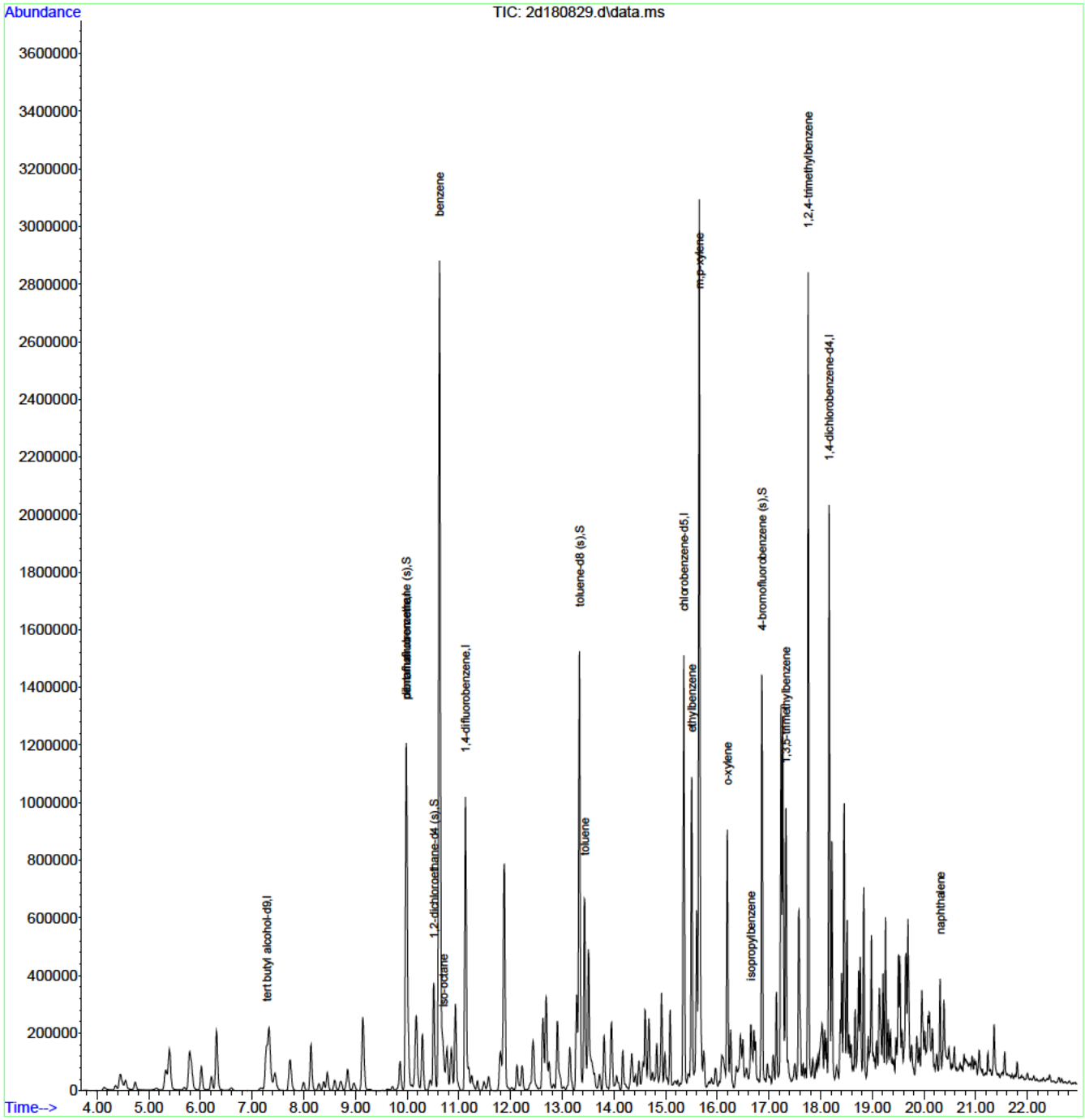
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.283	65	231911	500.00	ug/L	0.03
5) pentafluorobenzene	9.983	168	759840	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.126	114	998712	50.00	ug/L	0.03
74) chlorobenzene-d5	15.352	117	950313	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	526239	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.978	113	308484	48.94	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.88%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	311925	50.81	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 101.62%			
75) toluene-d8 (s)	13.334	98	1145345	50.10	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.20%			
99) 4-bromofluorobenzene (s)	16.862	95	442053	47.38	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.76%			
Target Compounds						Qvalue
54) benzene	10.623	78	3319053	152.67	ug/L	99
55) iso-octane	10.702	57	117257	5.79	ug/L	87
76) toluene	13.433	92	332450	24.85	ug/L	100
89) ethylbenzene	15.504	91	788976	30.94	ug/L	99
90) m,p-xylene	15.651	91	2034220	104.95	ug/L	98
91) o-xylene	16.191	106	275610	28.07	ug/L	97
96) isopropylbenzene	16.647	105	92844	3.64	ug/L	97
107) 1,3,5-trimethylbenzene	17.329	105	502235	22.71	ug/L	99
109) 1,2,4-trimethylbenzene	17.759	105	1467392	65.29	ug/L	100
121) naphthalene	20.312	128	259549	13.71	ug/L	98

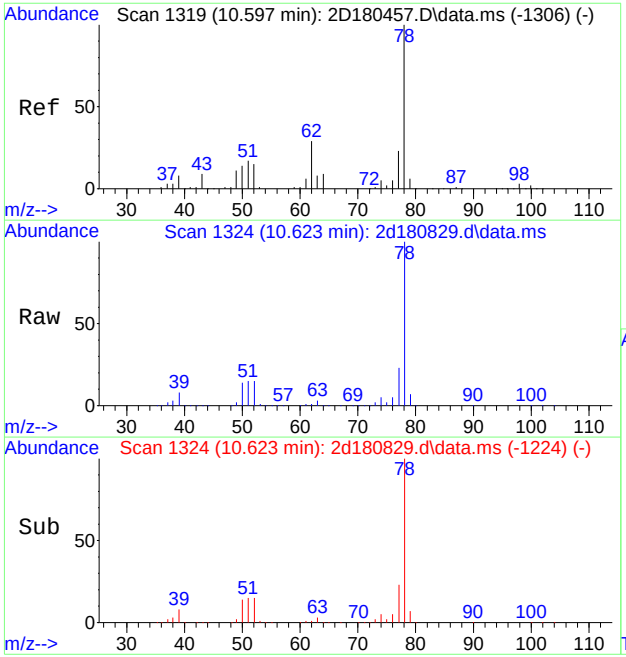
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-10-19\janellec\v2d7692\
Data File : 2d180829.d
Acq On : 9 Jan 2019 4:40 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 19 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 19:36:15 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

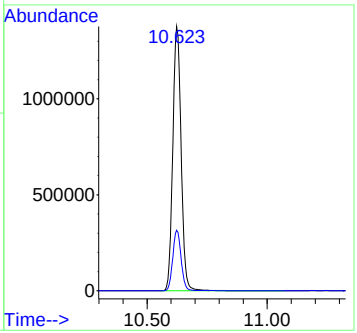


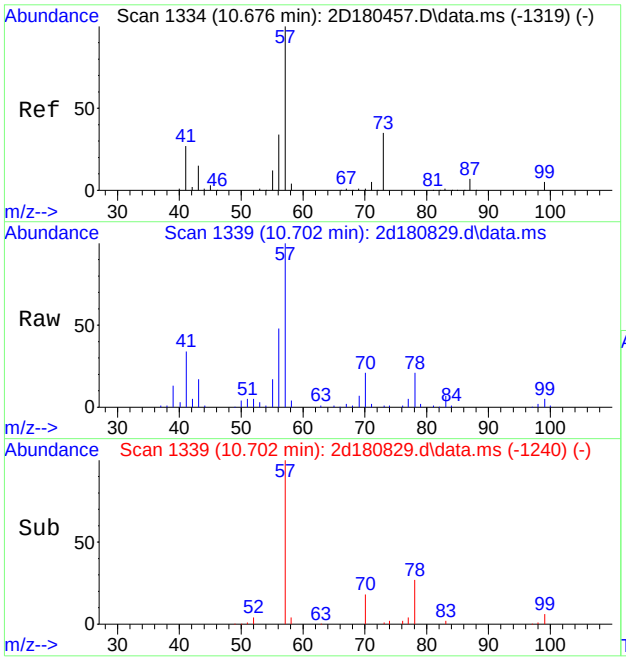


#54
benzene
Concen: 152.67 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 78 Resp: 3319053

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

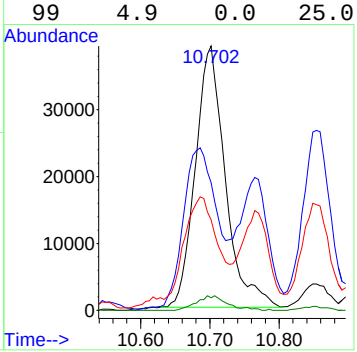


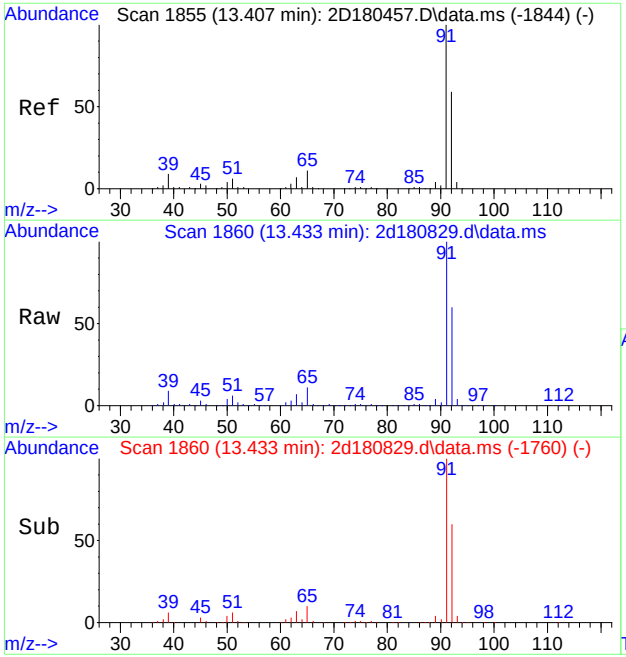


#55
iso-octane
Concen: 5.79 ug/L
RT: 10.702 min Scan# 1339
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 57 Resp: 117257

Ion	Ratio	Lower	Upper
57	100		
56	47.4	13.7	53.7
41	29.8	8.4	48.4
99	4.9	0.0	25.0

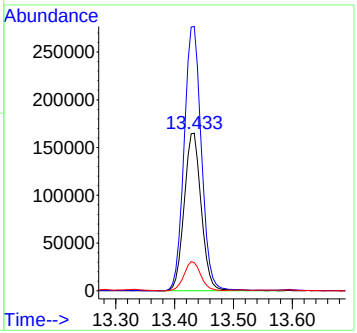


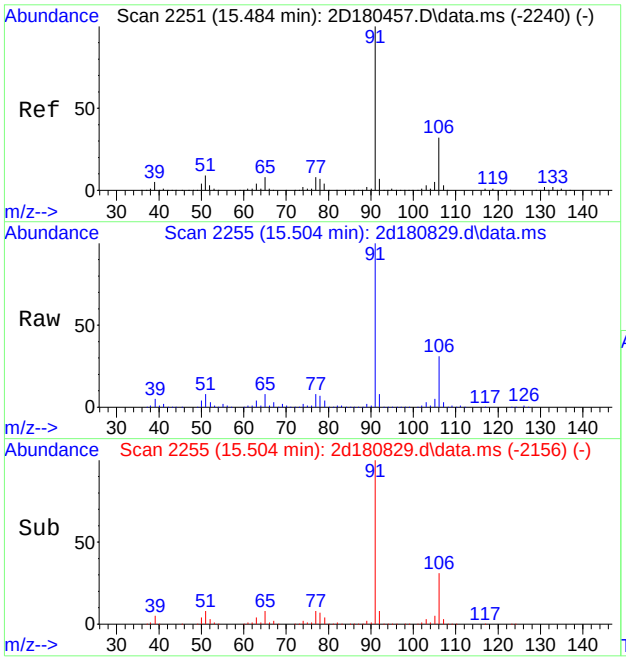


#76
toluene
Concen: 24.85 ug/L
RT: 13.433 min Scan# 1860
Delta R.T. 0.026 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 92 Resp: 332450

Ion	Ratio	Lower	Upper
92	100		
91	167.8	148.1	188.1
65	17.7	0.0	38.8

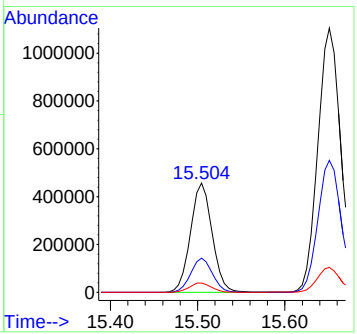


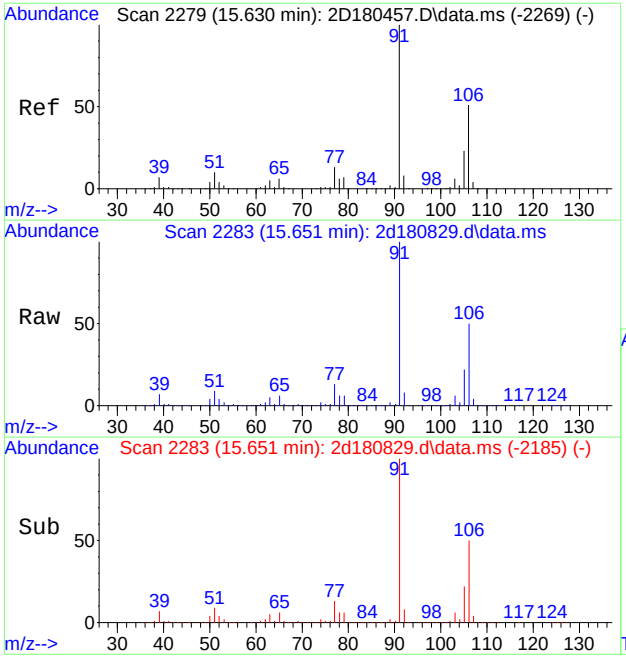


#89
ethylbenzene
Concen: 30.94 ug/L
RT: 15.504 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 91 Resp: 788976

Ion	Ratio	Lower	Upper
91	100		
106	31.4	1.6	61.6
51	8.3	0.0	39.0

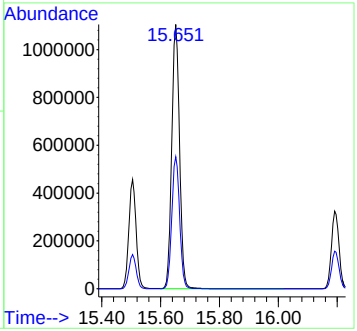


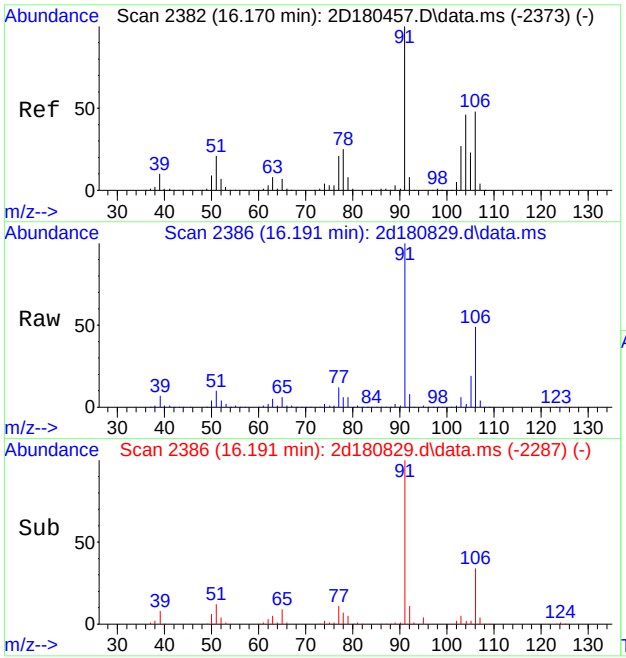


#90
m,p-xylene
Concen: 104.95 ug/L
RT: 15.651 min Scan# 2283
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion: 91 Resp: 2034220

Ion	Ratio	Lower	Upper
91	100		
106	49.9	21.1	81.1

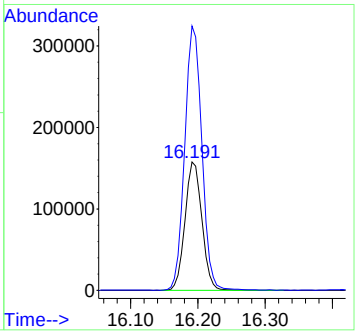


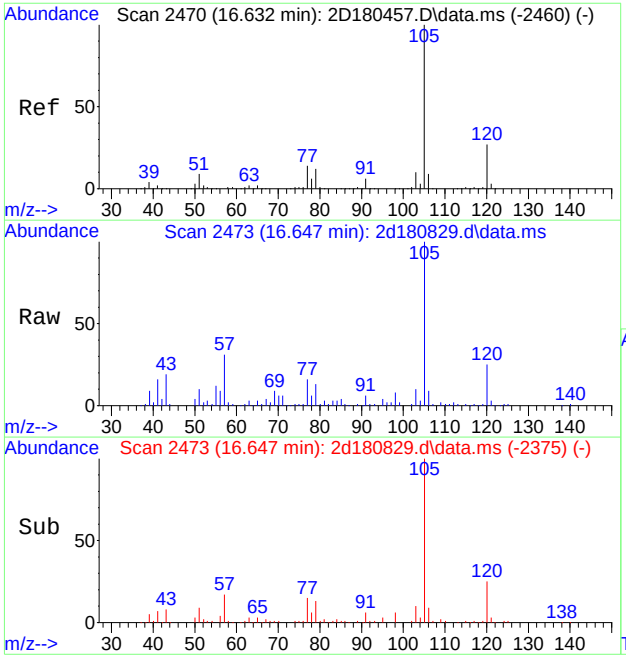


#91
o-xylene
Concen: 28.07 ug/L
RT: 16.191 min Scan# 2386
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:106 Resp: 275610

Ion	Ratio	Lower	Upper
106	100		
91	206.0	179.9	239.9

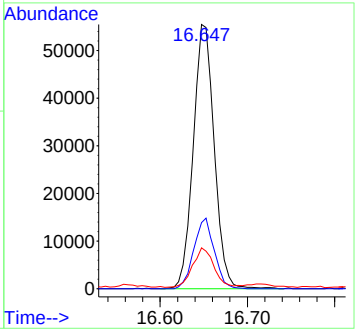


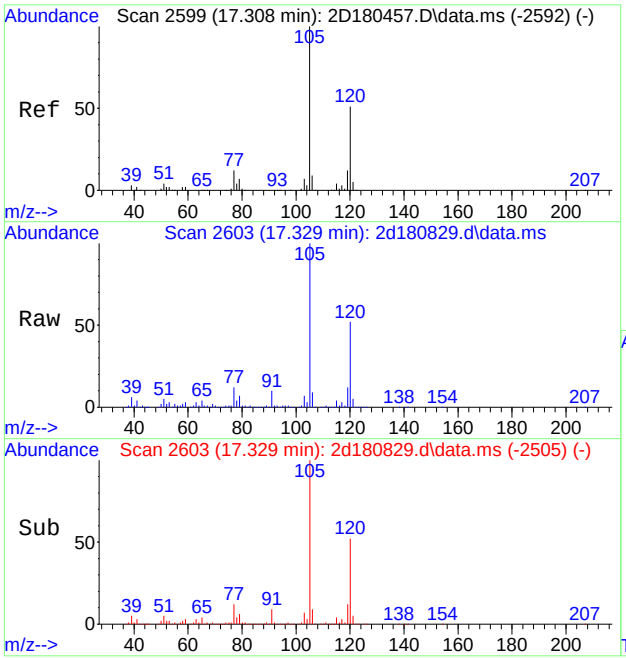


#96
isopropylbenzene
Concen: 3.64 ug/L
RT: 16.647 min Scan# 2473
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:105 Resp: 92844

Ion	Ratio	Lower	Upper
105	100		
120	25.0	6.7	46.7
77	14.6	0.0	34.2

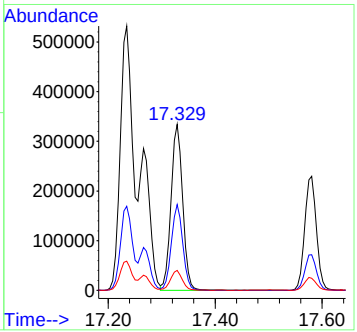


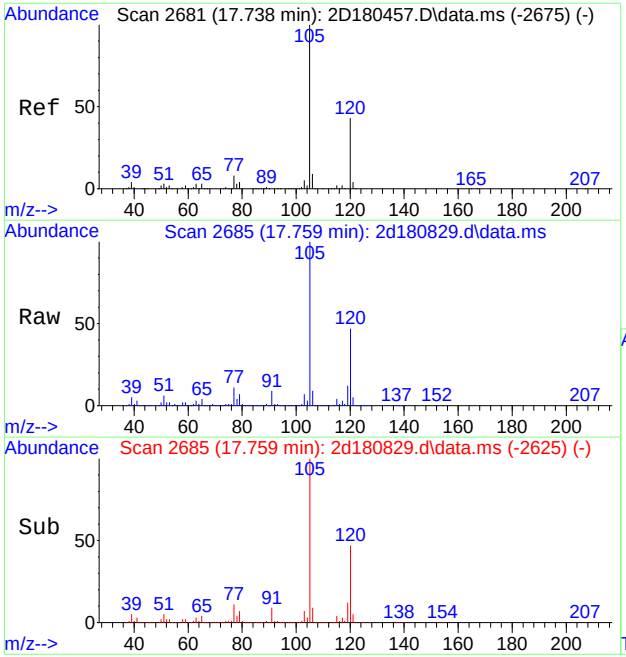


#107
1,3,5-trimethylbenzene
Concen: 22.71 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:105 Resp: 502235

Ion	Ratio	Lower	Upper
105	100		
120	51.6	20.7	80.7
77	11.8	0.0	42.0

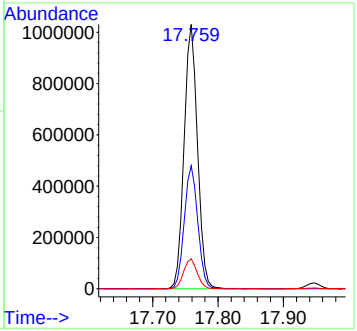


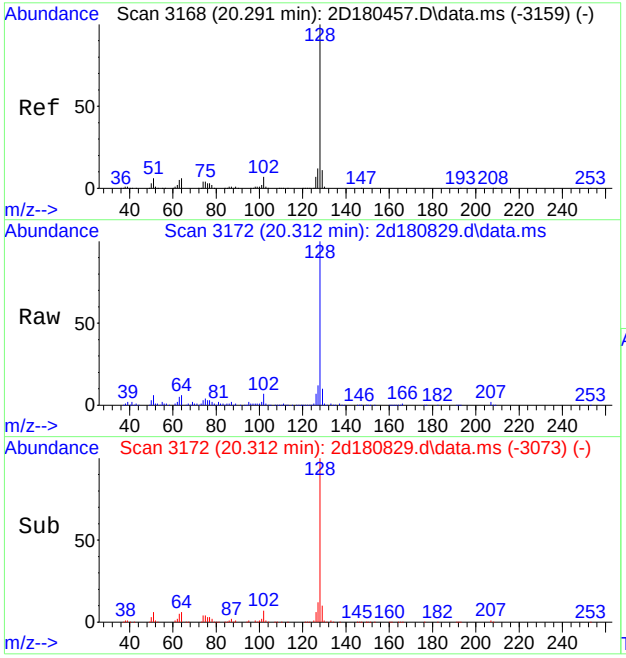


#109
1,2,4-trimethylbenzene
Concen: 65.29 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.015 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:105 Resp: 1467392

Ion	Ratio	Lower	Upper
105	100		
120	46.5	16.7	76.7
77	11.3	0.0	41.8

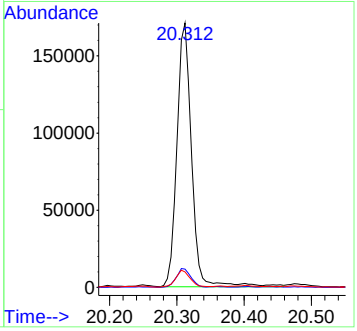




#121
naphthalene
Concen: 13.71 ug/L
RT: 20.312 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180829.d
Acq: 9 Jan 2019 4:40 pm

Tgt Ion:128 Resp: 259549

Ion	Ratio	Lower	Upper
128	100		
102	6.9	0.0	37.5
51	5.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\kenrickb\v2d7694\
Data File : 2d180873.d
Acq On : 10 Jan 2019 3:47 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 17 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 05:07:25 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

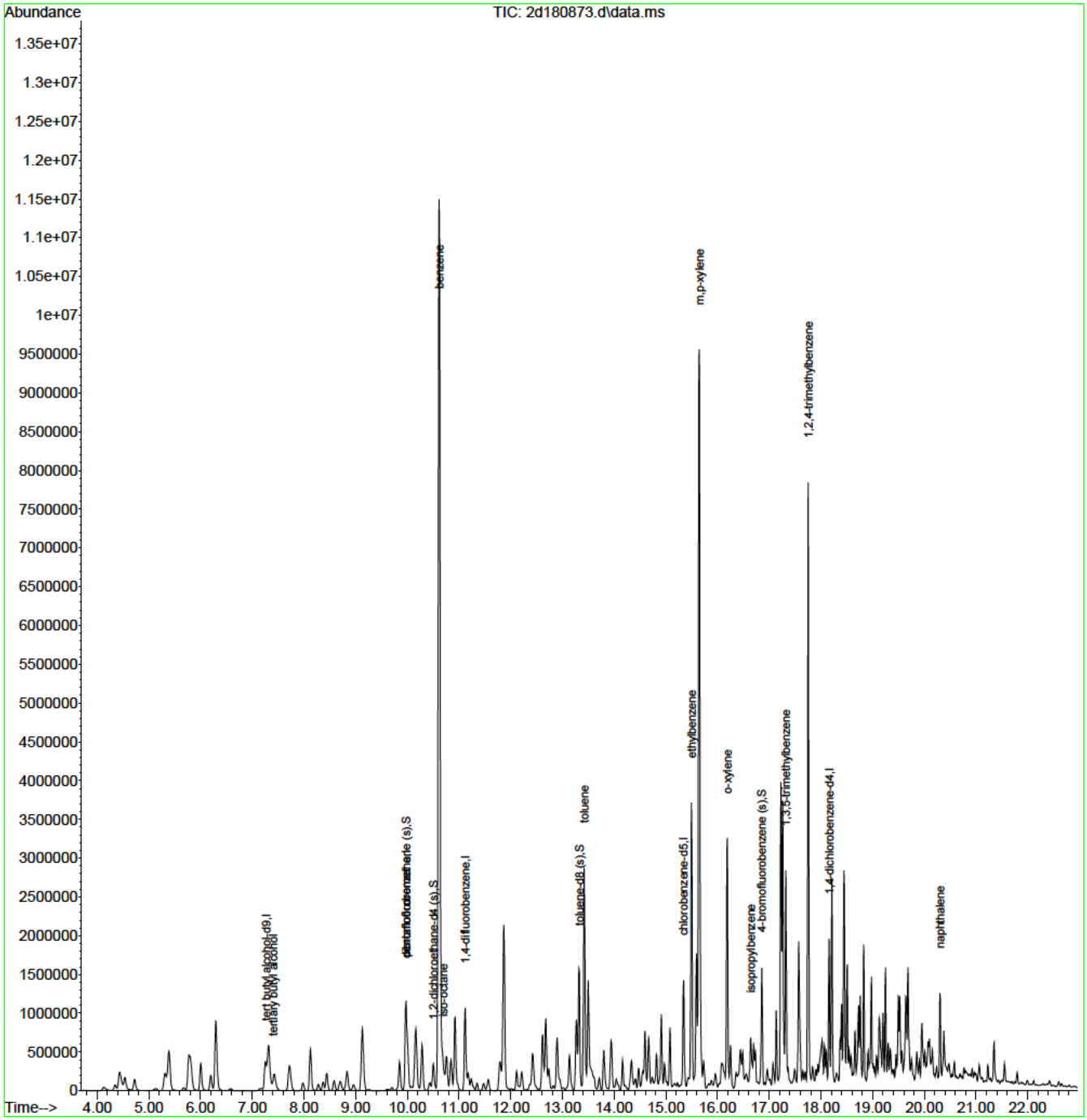
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.268	65	231177	500.00	ug/L	0.01
5) pentafluorobenzene	9.973	168	694886	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	897940	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	851120	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.157	152	466242	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	284366	49.34	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.68%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	283191	51.31	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 102.62%			
75) toluene-d8 (s)	13.323	98	1016159	49.63	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.26%			
99) 4-bromofluorobenzene (s)	16.852	95	399324	48.31	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.62%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.399	59	11704	26.11	ug/L	# 1
54) benzene	10.613	78	13992288	715.85	ug/L	100
55) iso-octane	10.691	57	336268	18.46	ug/L	84
76) toluene	13.418	92	1445049	120.61	ug/L	100
89) ethylbenzene	15.494	91	2834798	124.14	ug/L	100
90) m,p-xylene	15.646	91	6759351	389.38	ug/L	98
91) o-xylene	16.186	106	1000709	113.82	ug/L	99
96) isopropylbenzene	16.642	105	291975	12.78	ug/L	99
107) 1,3,5-trimethylbenzene	17.319	105	1473328	75.18	ug/L	99
109) 1,2,4-trimethylbenzene	17.754	105	4216046	211.72	ug/L	100
121) naphthalene	20.302	128	888668	52.98	ug/L	99

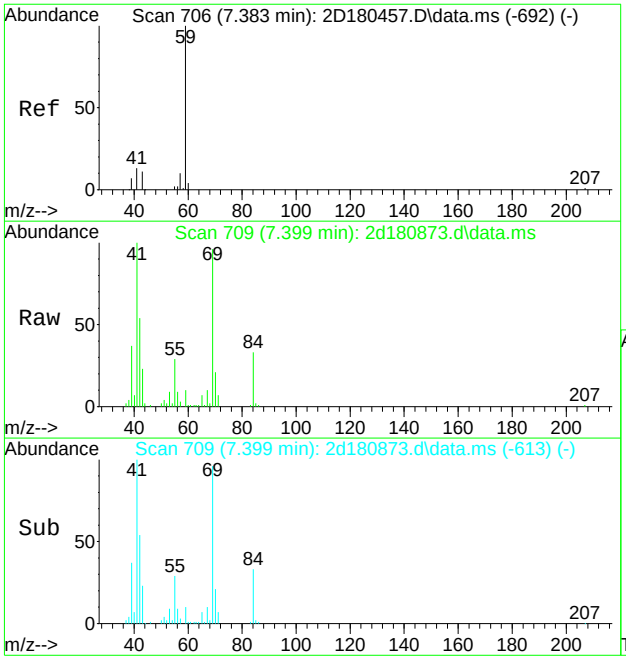
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\kenrickb\v2d7694\
Data File : 2d180873.d
Acq On : 10 Jan 2019 3:47 pm
Operator : EddieH
Sample : JC80990-8 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 17 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 05:07:25 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

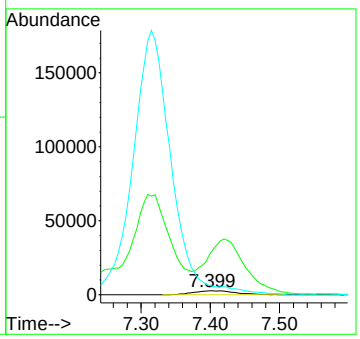


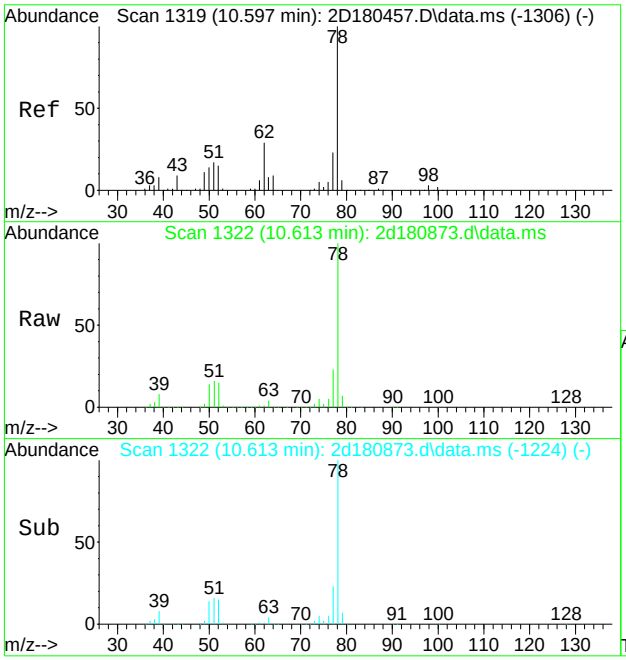


#2
tertiary butyl alcohol
Concen: 26.11 ug/L
RT: 7.399 min Scan# 709
Delta R.T. 0.005 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 59 Resp: 11704

Ion	Ratio	Lower	Upper
59	100		
41	918.6	0.0	45.0#
43	211.2	0.0	40.6#

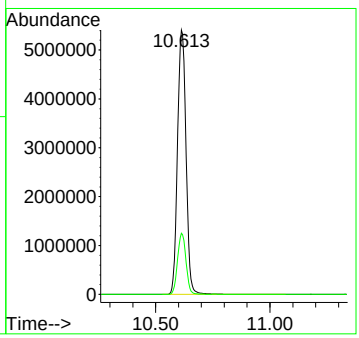


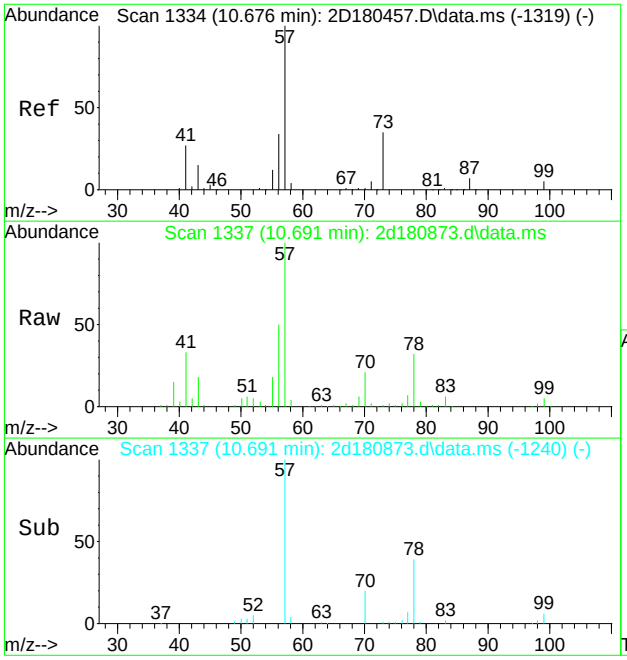


#54
benzene
Concen: 715.85 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 78 Resp:13992288

Ion	Ratio	Lower	Upper
78	100		
77	23.1	0.0	53.2

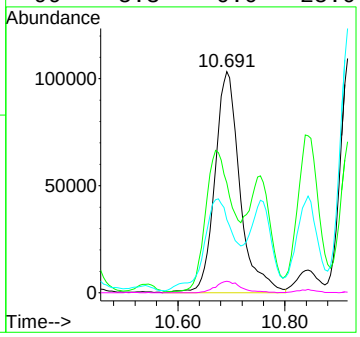


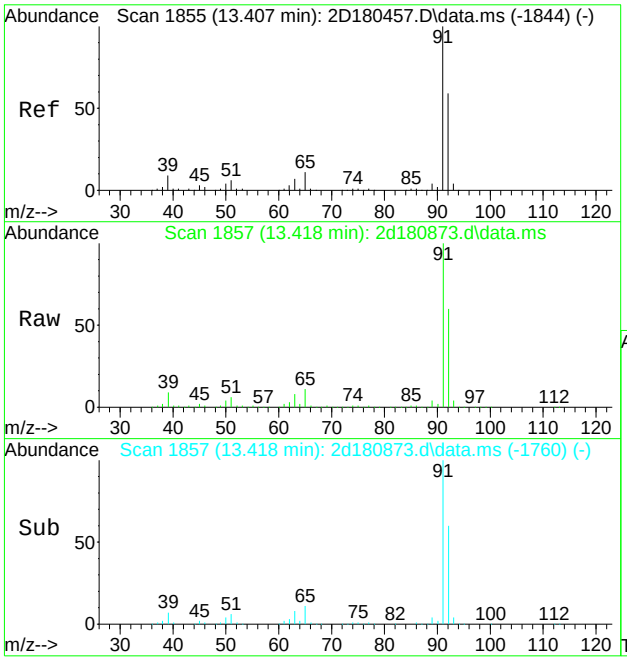


#55
iso-octane
Concen: 18.46 ug/L
RT: 10.691 min Scan# 1337
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 57 Resp: 336268

Ion	Ratio	Lower	Upper
57	100		
56	48.8	13.7	53.7
41	32.2	8.4	48.4
99	5.3	0.0	25.0

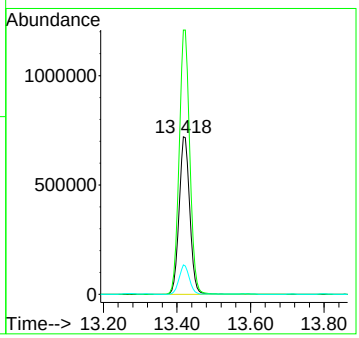


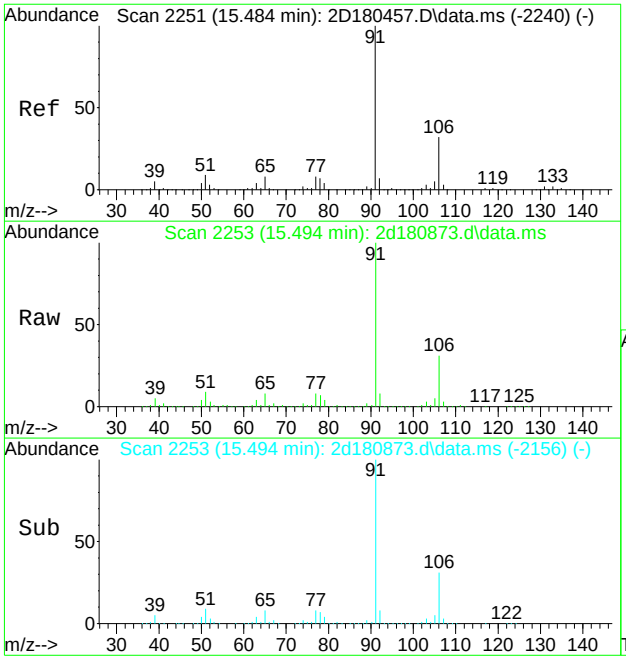


#76
toluene
Concen: 120.61 ug/L
RT: 13.418 min Scan# 1857
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 92 Resp: 1445049

Ion	Ratio	Lower	Upper
92	100		
91	167.6	148.1	188.1
65	18.6	0.0	38.8

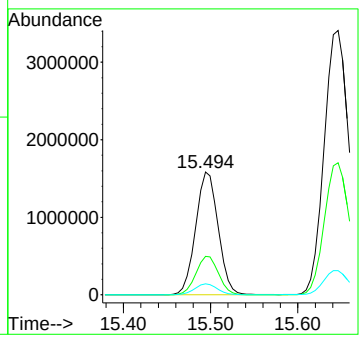


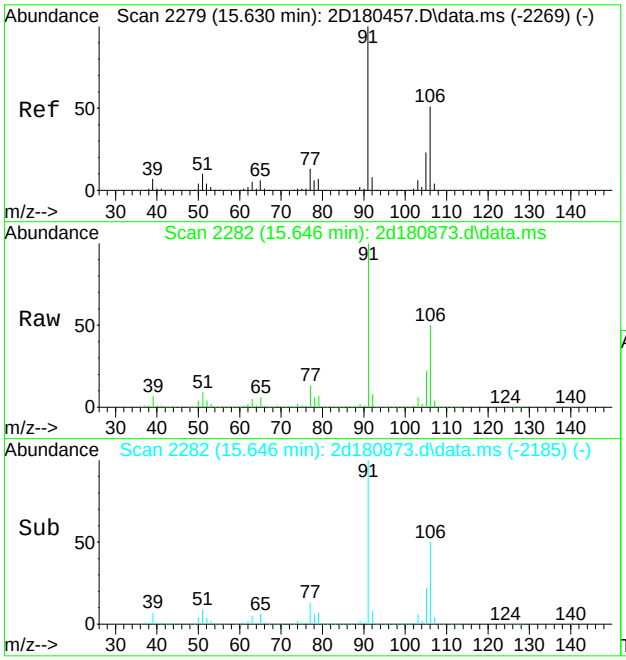


#89
ethylbenzene
Concen: 124.14 ug/L
RT: 15.494 min Scan# 2253
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 91 Resp: 2834798

Ion	Ratio	Lower	Upper
91	100		
106	31.4	1.6	61.6
51	8.8	0.0	39.0

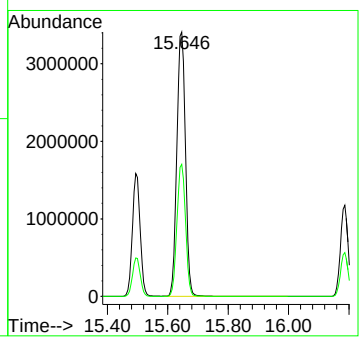


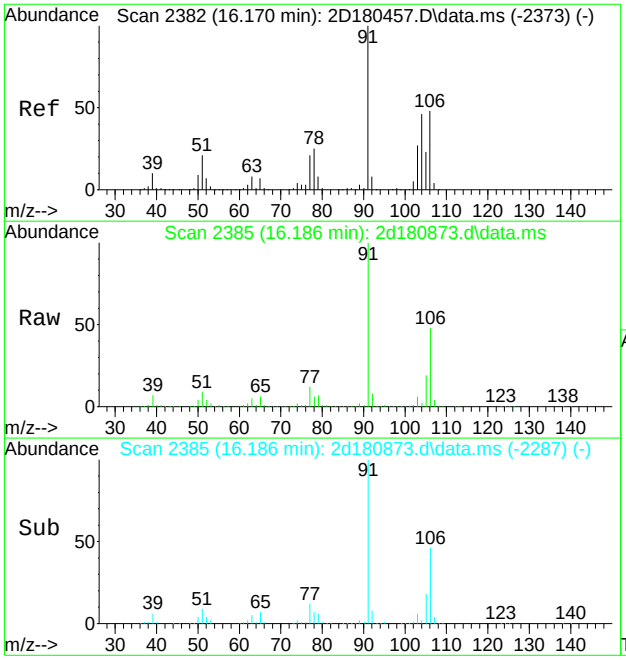


#90
m,p-xylene
Concen: 389.38 ug/L
RT: 15.646 min Scan# 2282
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion: 91 Resp: 6759351

Ion	Ratio	Lower	Upper
91	100		
106	49.9	21.1	81.1

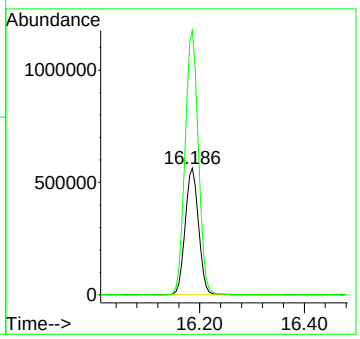


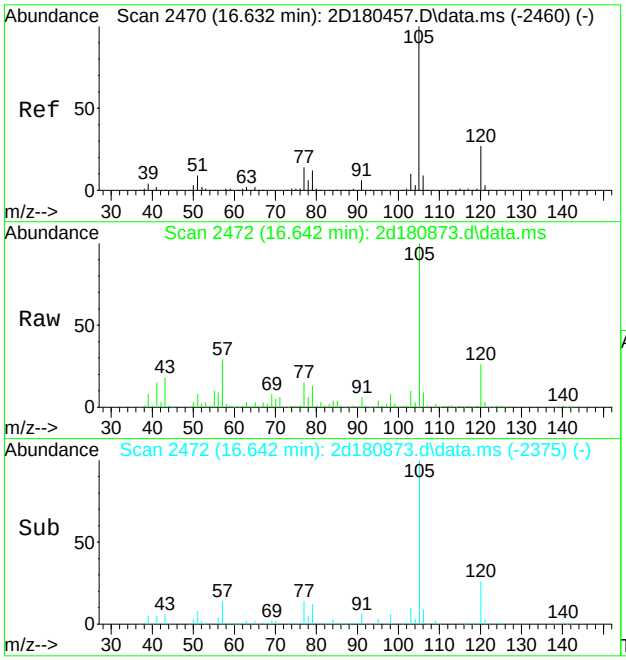


#91
o-xylene
Concen: 113.82 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:106 Resp: 1000709

Ion	Ratio	Lower	Upper
106	100		
91	208.4	179.9	239.9

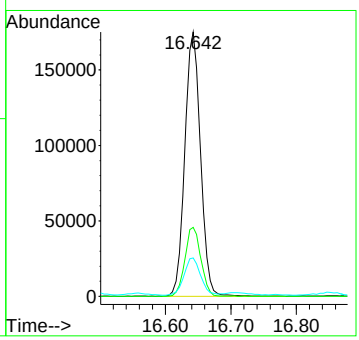


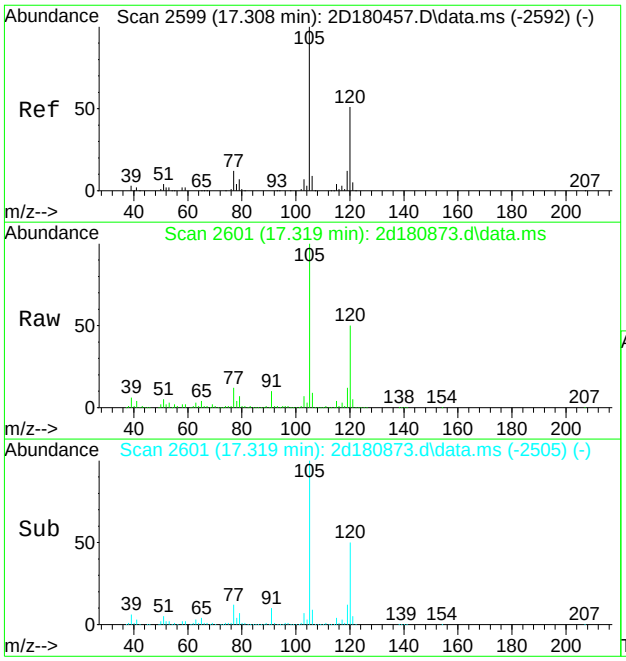


#96
isopropylbenzene
Concen: 12.78 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:105 Resp: 291975

Ion	Ratio	Lower	Upper
105	100		
120	26.1	6.7	46.7
77	14.1	0.0	34.2

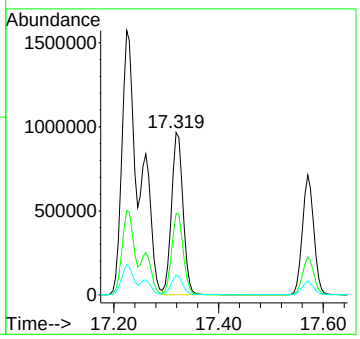


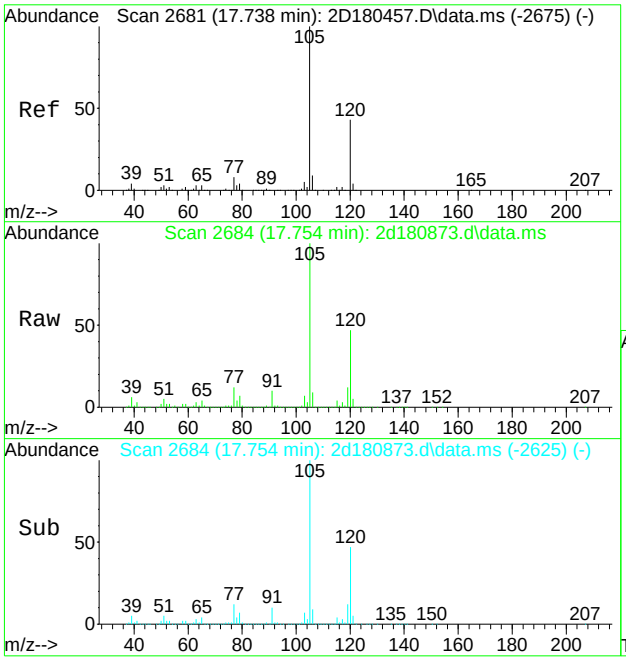


#107
1,3,5-trimethylbenzene
Concen: 75.18 ug/L
RT: 17.319 min Scan# 2601
Delta R.T. 0.005 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:105 Resp: 1473328

Ion	Ratio	Lower	Upper
105	100		
120	50.1	20.7	80.7
77	12.1	0.0	42.0

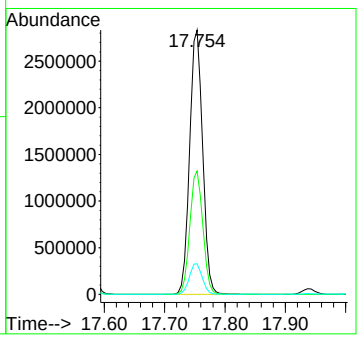


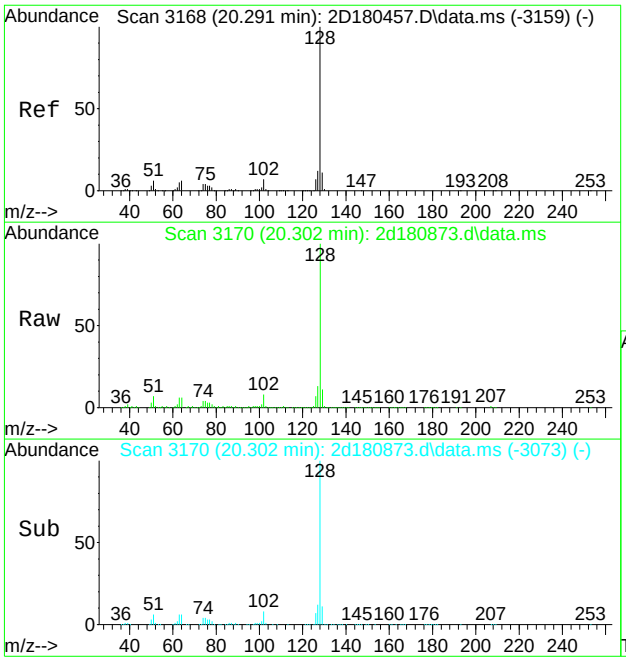


#109
1,2,4-trimethylbenzene
Concen: 211.72 ug/L
RT: 17.754 min Scan# 2684
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:105 Resp: 4216046

Ion	Ratio	Lower	Upper
105	100		
120	46.6	16.7	76.7
77	11.5	0.0	41.8

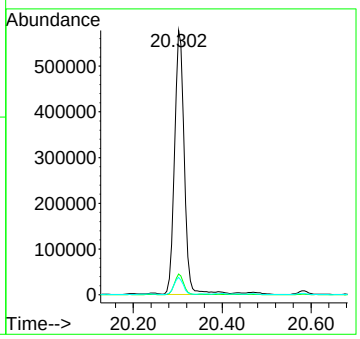




#121
naphthalene
Concen: 52.98 ug/L
RT: 20.302 min Scan# 3170
Delta R.T. 0.010 min
Lab File: 2d180873.d
Acq: 10 Jan 2019 3:47 pm

Tgt Ion:128 Resp: 888668

Ion	Ratio	Lower	Upper
128	100		
102	7.8	0.0	37.5
51	6.5	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180827.d
Acq On : 9 Jan 2019 3:41 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 17 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:23 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

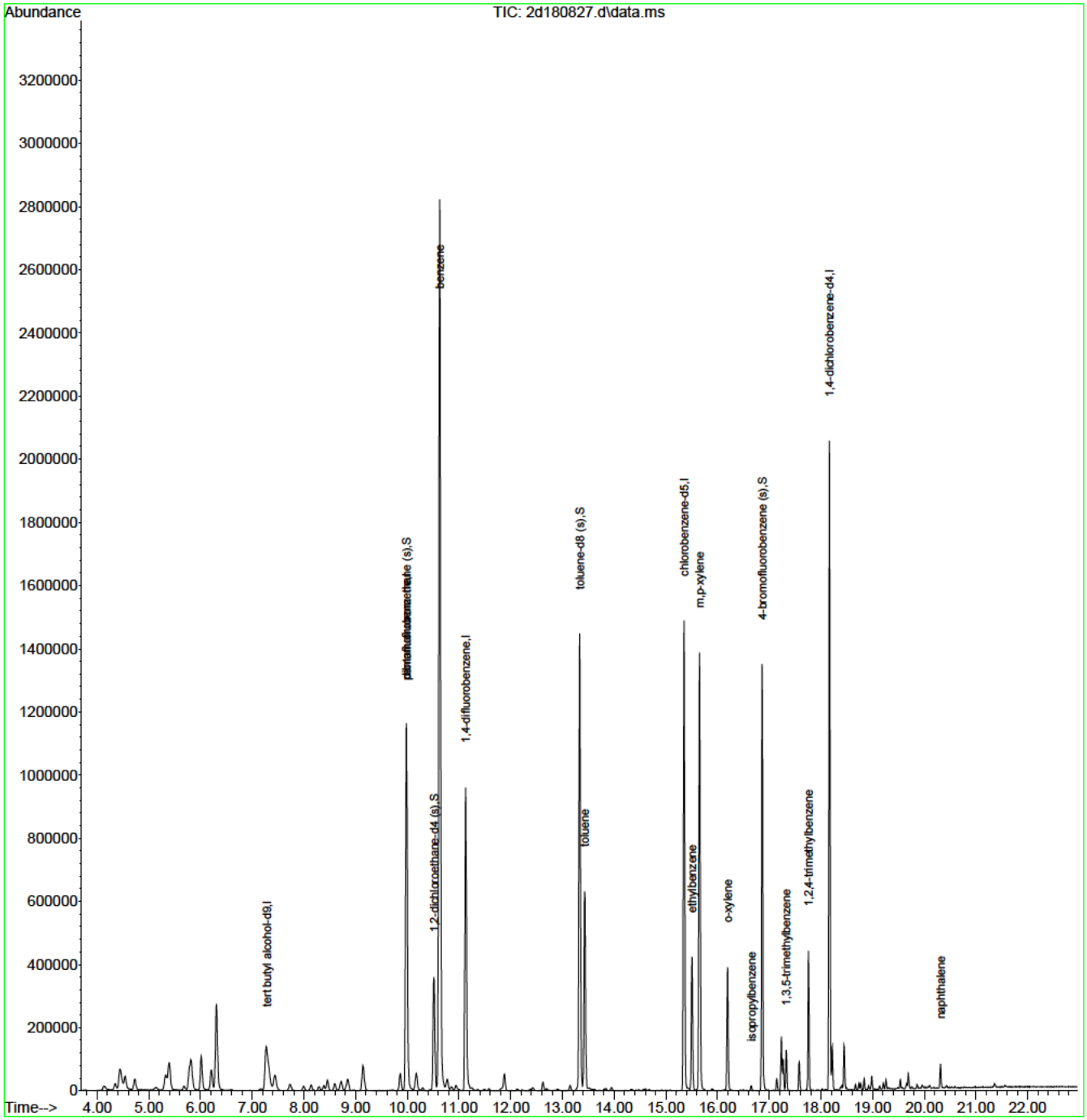
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.284	65	224498	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	757781	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	1007416	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	975320	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	540008	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.979	113	305293	48.57	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.14%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	308782	49.86	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 99.72%			
75) toluene-d8 (s)	13.334	98	1150095	49.02	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.04%			
99) 4-bromofluorobenzene (s)	16.863	95	445505	46.53	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 93.06%			
Target Compounds						Qvalue
54) benzene	10.623	78	3300803	150.52	ug/L	100
76) toluene	13.428	92	322087	23.46	ug/L	100
89) ethylbenzene	15.505	91	337241	12.89	ug/L	99
90) m,p-xylene	15.652	91	940686	47.29	ug/L	98
91) o-xylene	16.197	106	121997	12.11	ug/L	100
96) isopropylbenzene	16.653	105	11318	0.43	ug/L	94
107) 1,3,5-trimethylbenzene	17.329	105	70978	3.13	ug/L	98
109) 1,2,4-trimethylbenzene	17.759	105	238072	10.32	ug/L	100
121) naphthalene	20.313	128	60385	3.11	ug/L	98

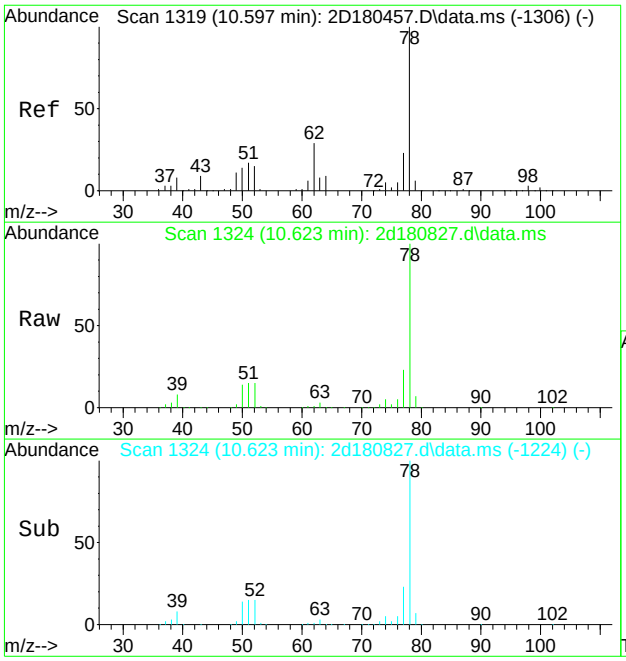
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180827.d
Acq On : 9 Jan 2019 3:41 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7692,5,,,,100
ALS Vial : 17 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 22:02:23 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

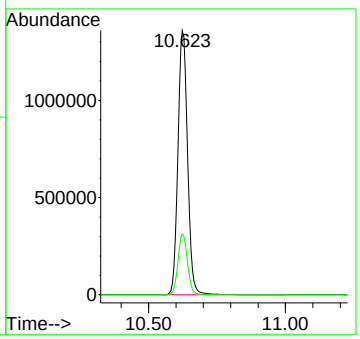


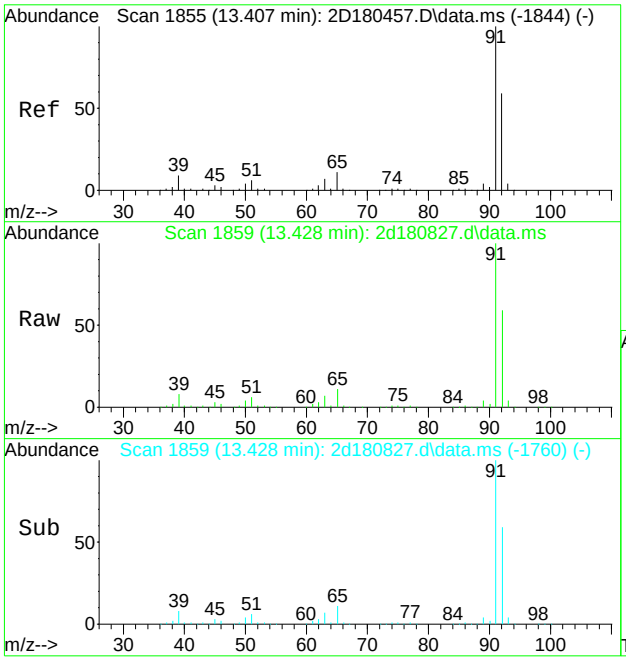


#54
benzene
Concen: 150.52 ug/L
RT: 10.623 min Scan# 1324
Delta R.T. 0.026 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 78 Resp: 3300803

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

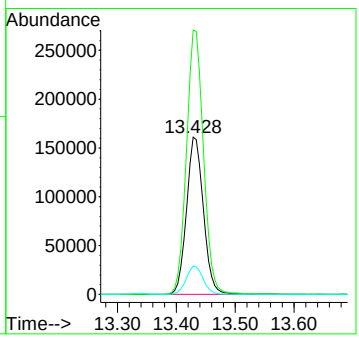


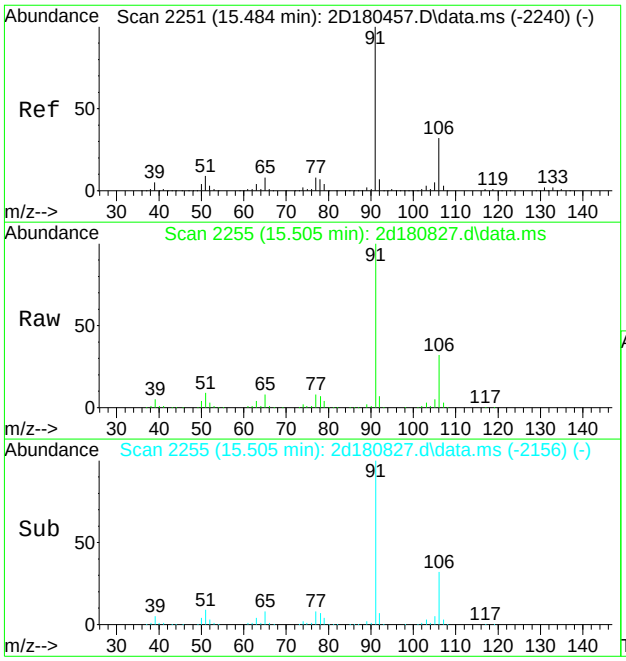


#76
toluene
Concen: 23.46 ug/L
RT: 13.428 min Scan# 1859
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 92 Resp: 322087

Ion	Ratio	Lower	Upper
92	100		
91	168.2	148.1	188.1
65	18.1	0.0	38.8

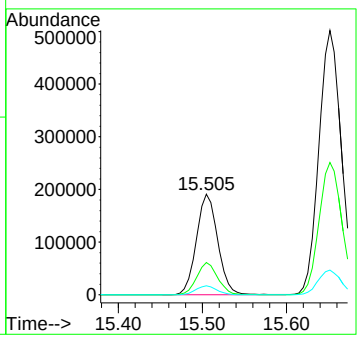


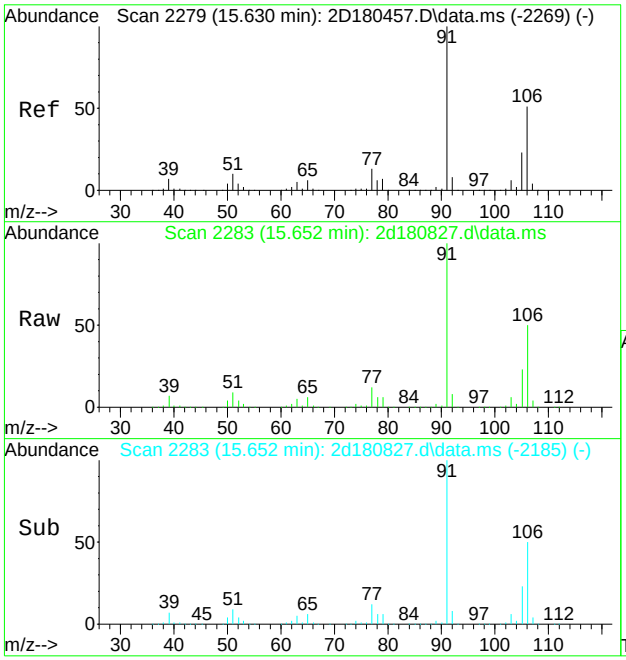


#89
ethylbenzene
Concen: 12.89 ug/L
RT: 15.505 min Scan# 2255
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 91 Resp: 337241

Ion	Ratio	Lower	Upper
91	100		
106	32.0	1.6	61.6
51	9.0	0.0	39.0

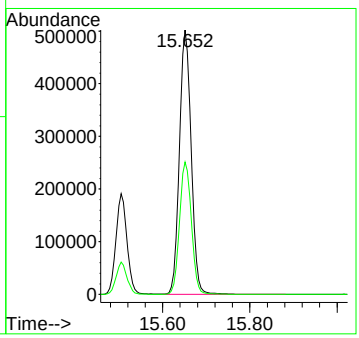


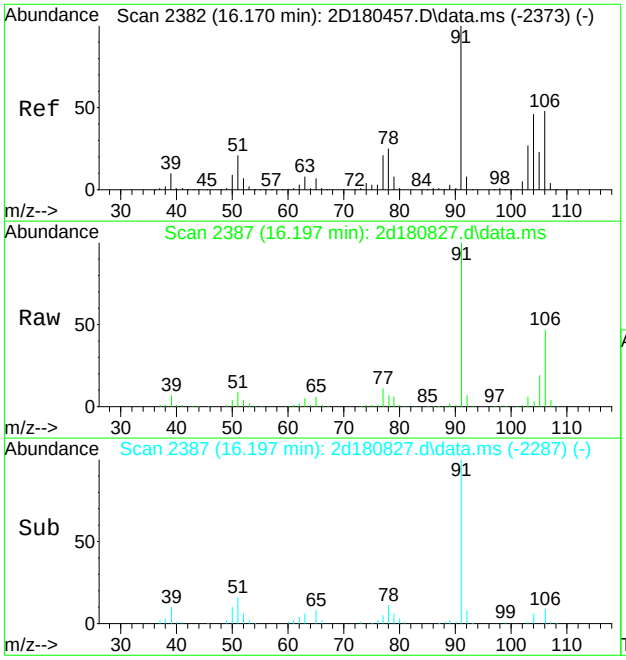


#90
m,p-xylene
Concen: 47.29 ug/L
RT: 15.652 min Scan# 2283
Delta R.T. 0.016 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion: 91 Resp: 940686

Ion	Ratio	Lower	Upper
91	100		
106	50.0	21.1	81.1

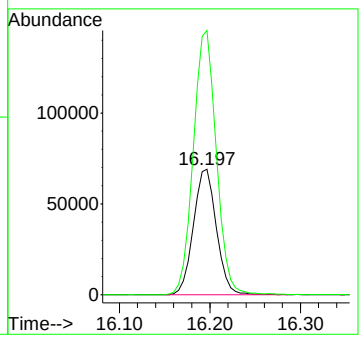


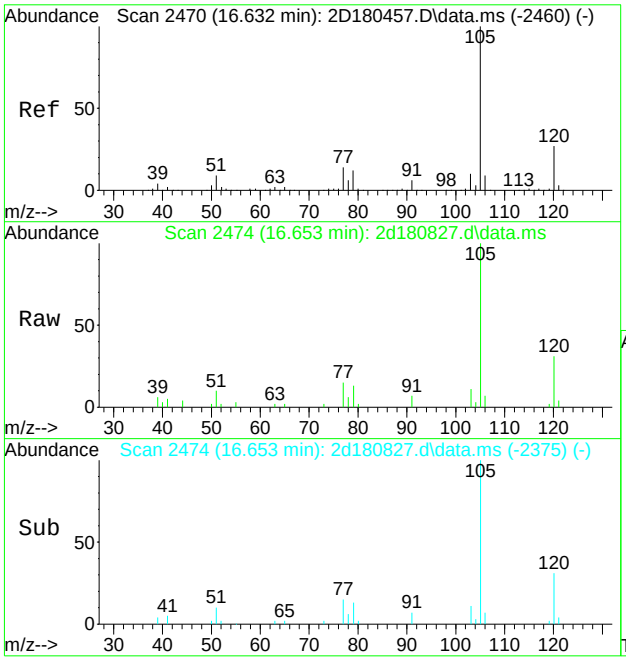


#91
o-xylene
Concen: 12.11 ug/L
RT: 16.197 min Scan# 2387
Delta R.T. 0.026 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:106 Resp: 121997

Ion	Ratio	Lower	Upper
106	100		
91	210.5	179.9	239.9

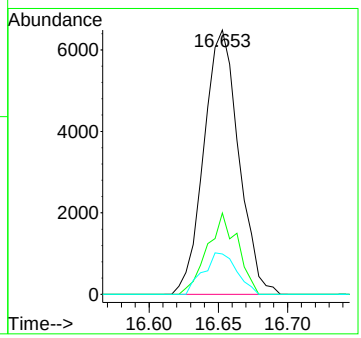


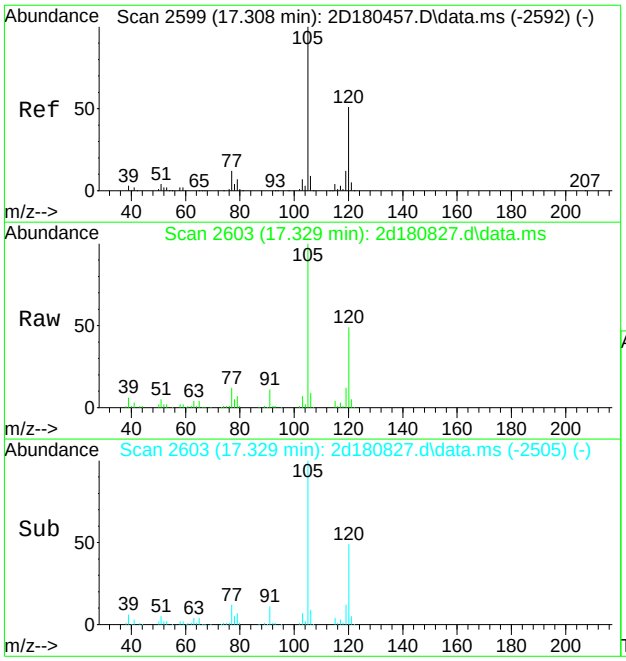


#96
isopropylbenzene
Concen: 0.43 ug/L
RT: 16.653 min Scan# 2474
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:105 Resp: 11318

Ion	Ratio	Lower	Upper
105	100		
120	30.7	6.7	46.7
77	15.3	0.0	34.2

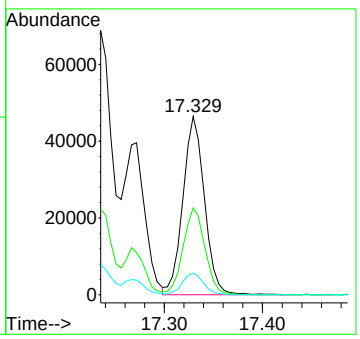


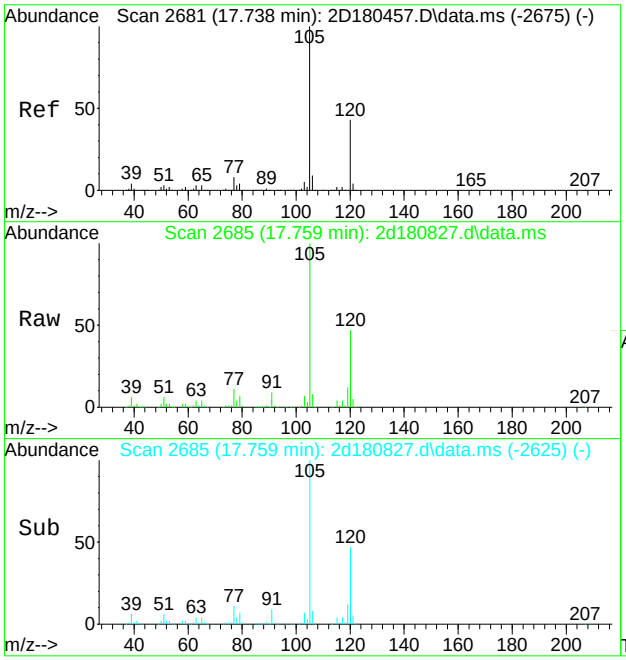


#107
1,3,5-trimethylbenzene
Concen: 3.13 ug/L
RT: 17.329 min Scan# 2603
Delta R.T. 0.016 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:105 Resp: 70978

Ion	Ratio	Lower	Upper
105	100		
120	48.7	20.7	80.7
77	12.1	0.0	42.0

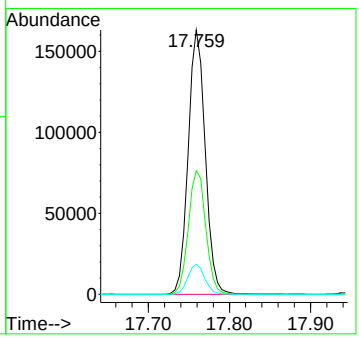


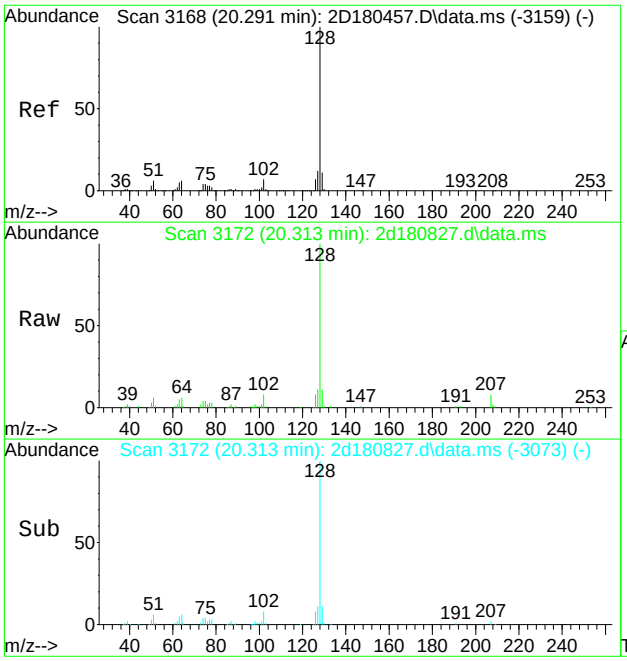


#109
1,2,4-trimethylbenzene
Concen: 10.32 ug/L
RT: 17.759 min Scan# 2685
Delta R.T. 0.016 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:105 Resp: 238072

Ion	Ratio	Lower	Upper
105	100		
120	46.8	16.7	76.7
77	11.3	0.0	41.8

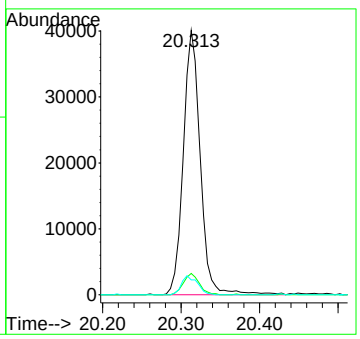




#121
naphthalene
Concen: 3.11 ug/L
RT: 20.313 min Scan# 3172
Delta R.T. 0.021 min
Lab File: 2d180827.d
Acq: 9 Jan 2019 3:41 pm

Tgt Ion:128 Resp: 60385

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.5
51	5.7	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180872.d
Acq On : 10 Jan 2019 3:18 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 16 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:28 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

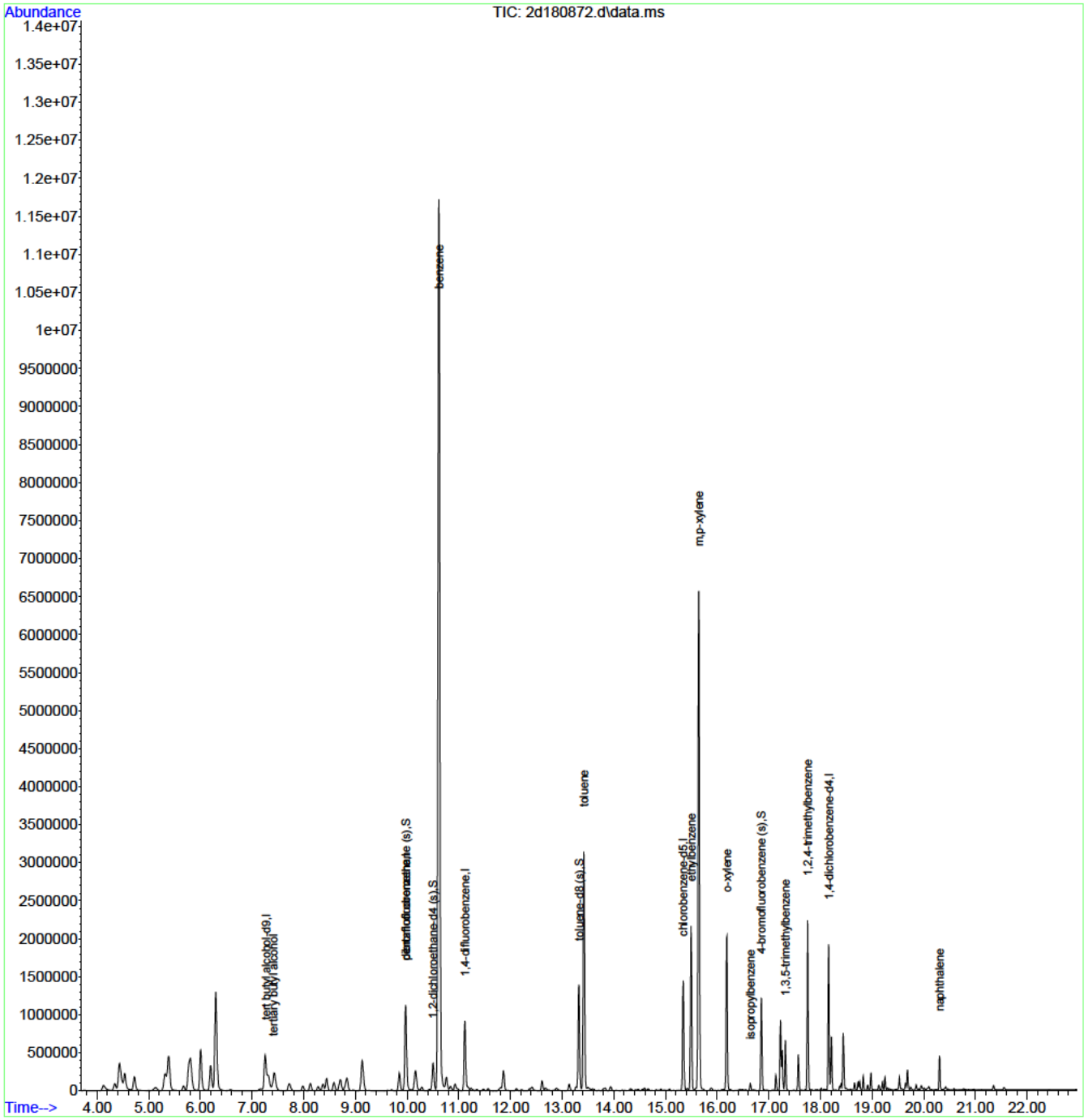
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.268	65	250364	500.00	ug/L	0.01
5) pentafluorobenzene	9.968	168	717665	50.00	ug/L	0.01
52) 1,4-difluorobenzene	11.116	114	924533	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	919236	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	503114	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	290299	48.77	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.54%			
53) 1,2-dichloroethane-d4 (s)	10.498	65	295217	51.95	ug/L	0.01
Spiked Amount 50.000	Range 81 - 124		Recovery = 103.90%			
75) toluene-d8 (s)	13.324	98	1081619	48.91	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.82%			
99) 4-bromofluorobenzene (s)	16.852	95	413249	46.33	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 92.66%			
Target Compounds						Qvalue
2) tertiary butyl alcohol	7.404	59	4660	9.60	ug/L	# 1
54) benzene	10.613	78	14427527	716.88	ug/L	100
76) toluene	13.418	92	1612864	124.64	ug/L	99
89) ethylbenzene	15.494	91	1731763	70.22	ug/L	100
90) m,p-xylene	15.641	91	4531304	241.69	ug/L	98
91) o-xylene	16.186	106	628857	66.22	ug/L	99
96) isopropylbenzene	16.642	105	57678	2.34	ug/L	100
107) 1,3,5-trimethylbenzene	17.319	105	367619	17.38	ug/L	100
109) 1,2,4-trimethylbenzene	17.749	105	1223214	56.92	ug/L	100
121) naphthalene	20.302	128	346747	19.16	ug/L	100

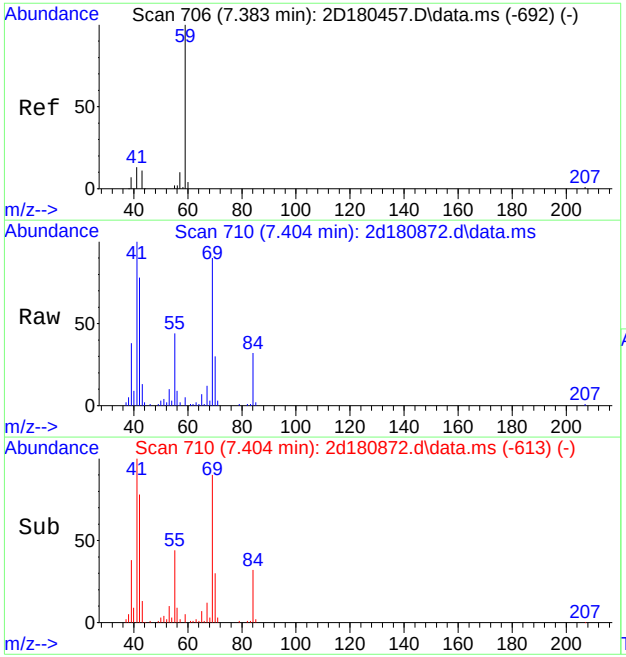
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180872.d
Acq On : 10 Jan 2019 3:18 pm
Operator : EddieH
Sample : JC80990-9 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,20
ALS Vial : 16 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:33:28 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

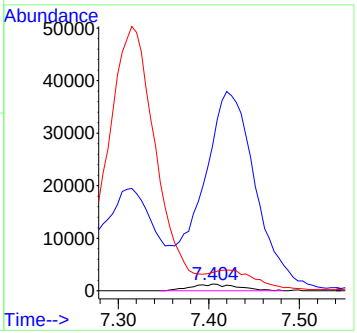


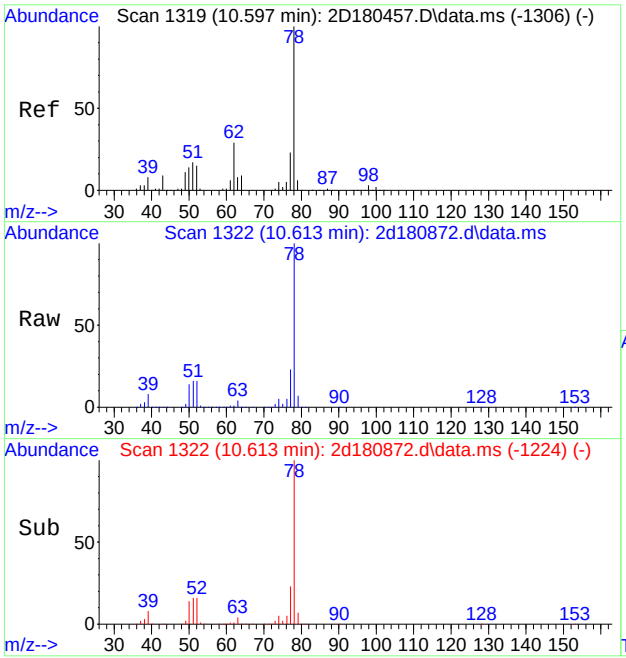


#2
tertiary butyl alcohol
Concen: 9.60 ug/L
RT: 7.404 min Scan# 710
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 59 Resp: 4660

Ion	Ratio	Lower	Upper
59	100		
41	1777.7	0.0	45.0#
43	228.4	0.0	40.6#

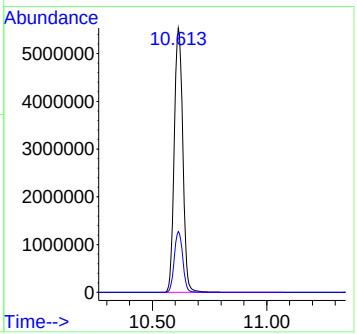


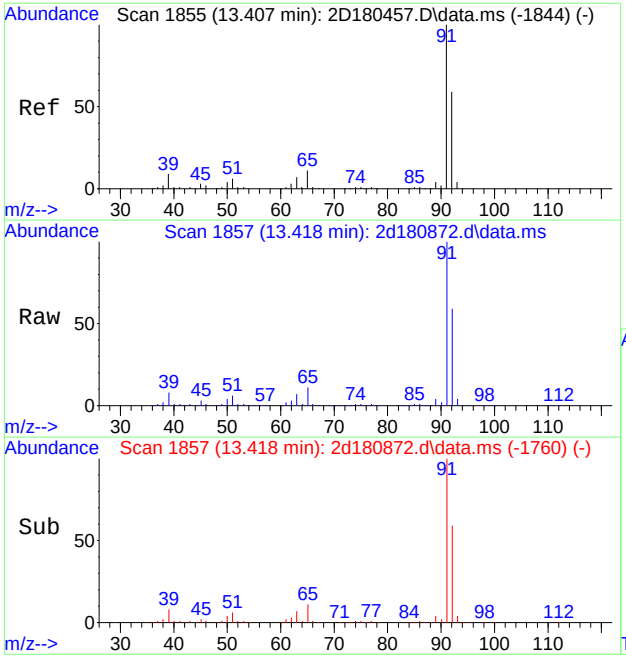


#54
benzene
Concen: 716.88 ug/L
RT: 10.613 min Scan# 1322
Delta R.T. 0.016 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 78 Resp:14427527

Ion	Ratio	Lower	Upper
78	100		
77	23.0	0.0	53.2

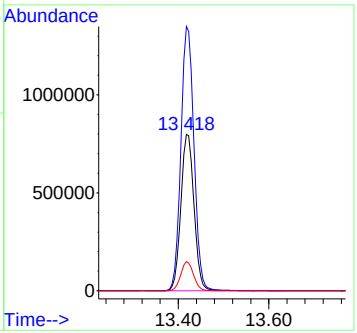


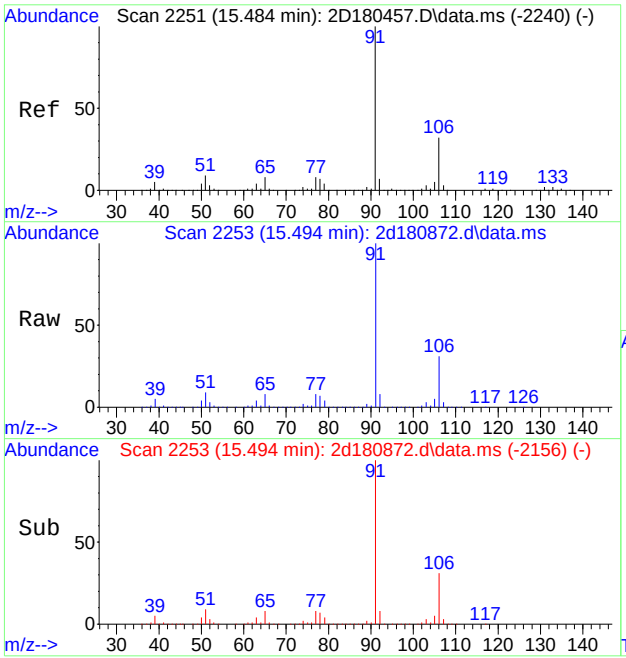


#76
toluene
Concen: 124.64 ug/L
RT: 13.418 min Scan# 1857
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 92 Resp: 1612864

Ion	Ratio	Lower	Upper
92	100		
91	169.0	148.1	188.1
65	18.7	0.0	38.8

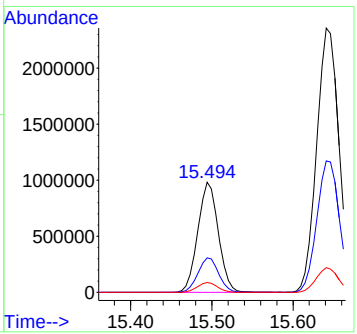


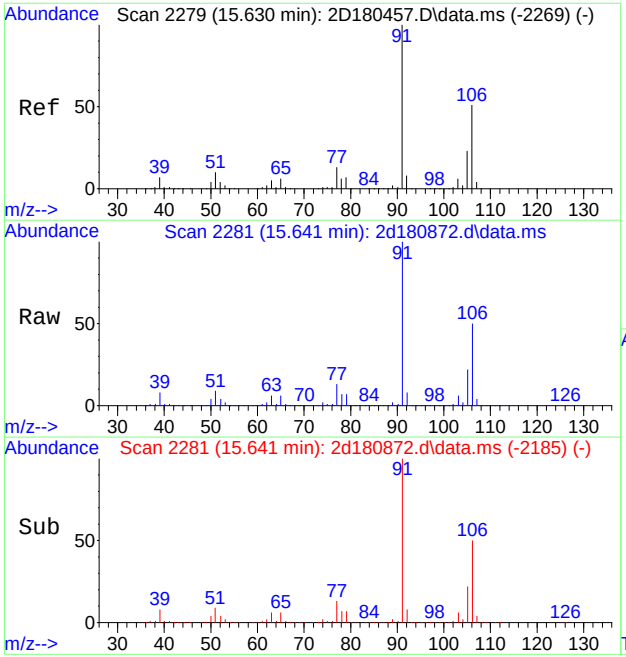


#89
ethylbenzene
Concen: 70.22 ug/L
RT: 15.494 min Scan# 2253
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 91 Resp: 1731763

Ion	Ratio	Lower	Upper
91	100		
106	31.3	1.6	61.6
51	9.0	0.0	39.0

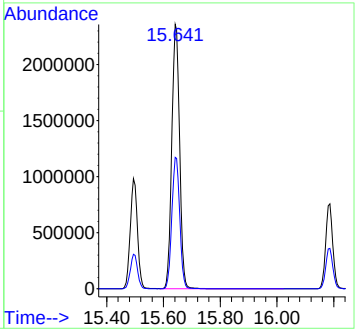


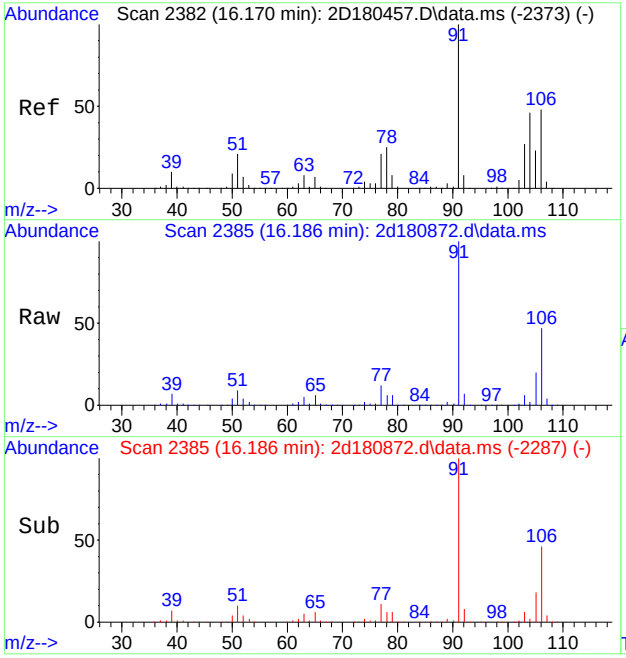


#90
m,p-xylene
Concen: 241.69 ug/L
RT: 15.641 min Scan# 2281
Delta R.T. 0.005 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion: 91 Resp: 4531304

Ion	Ratio	Lower	Upper
91	100		
106	49.7	21.1	81.1

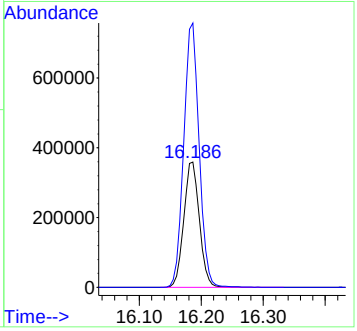


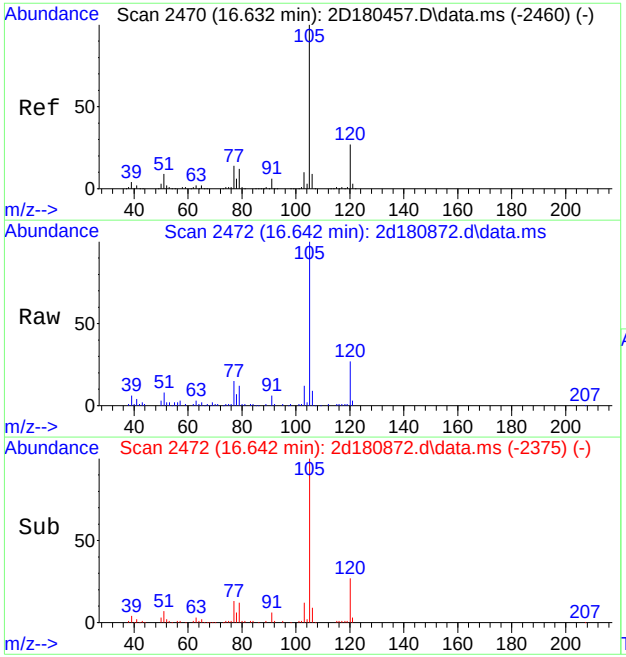


#91
o-xylene
Concen: 66.22 ug/L
RT: 16.186 min Scan# 2385
Delta R.T. 0.016 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:106 Resp: 628857

Ion	Ratio	Lower	Upper
106	100		
91	210.8	179.9	239.9

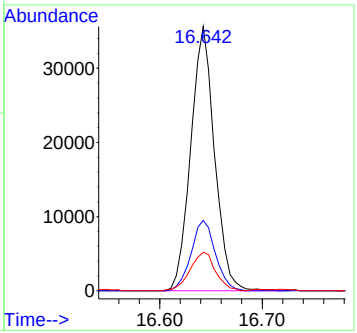


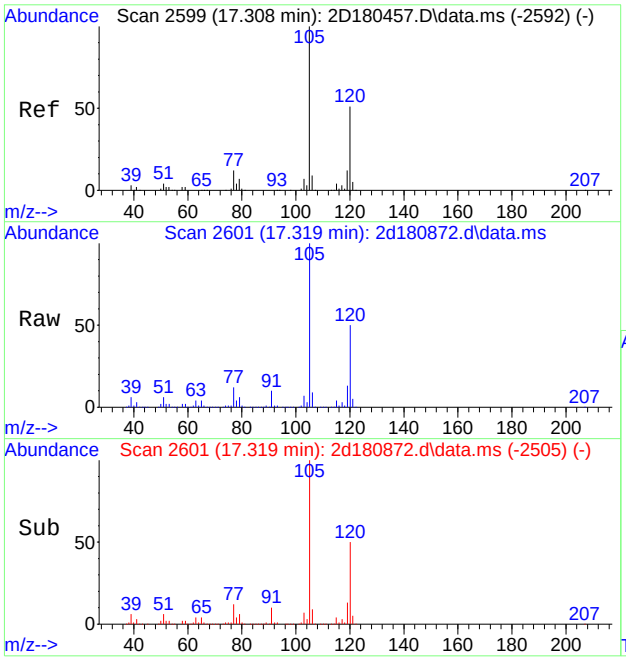


#96
isopropylbenzene
Concen: 2.34 ug/L
RT: 16.642 min Scan# 2472
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:105 Resp: 57678

Ion	Ratio	Lower	Upper
105	100		
120	26.6	6.7	46.7
77	14.6	0.0	34.2

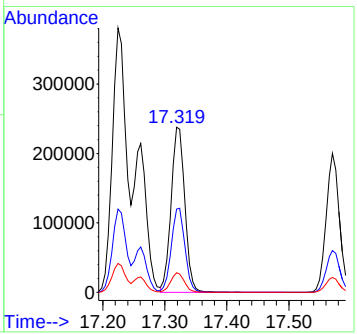


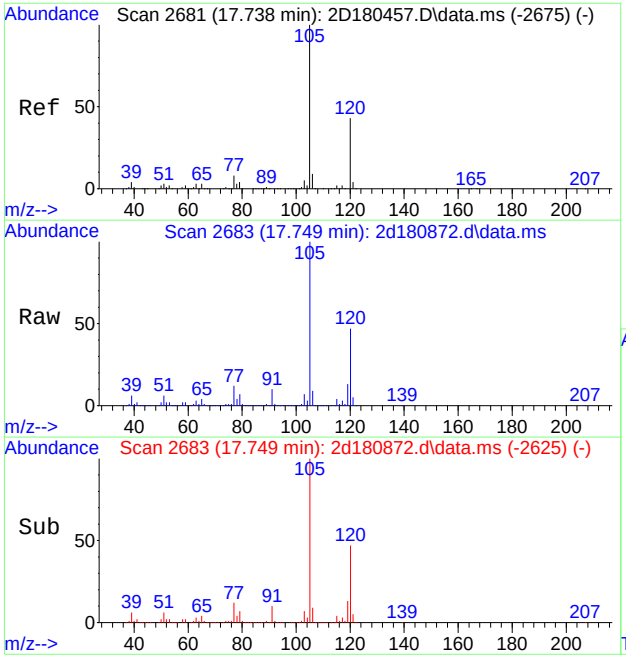


#107
1,3,5-trimethylbenzene
Concen: 17.38 ug/L
RT: 17.319 min Scan# 2601
Delta R.T. 0.005 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:105 Resp: 367619

Ion	Ratio	Lower	Upper
105	100		
120	50.3	20.7	80.7
77	11.9	0.0	42.0

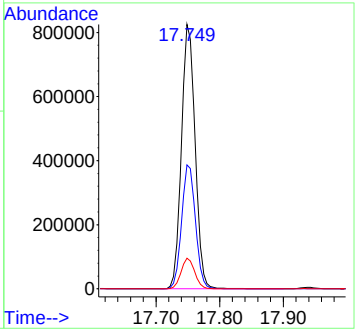


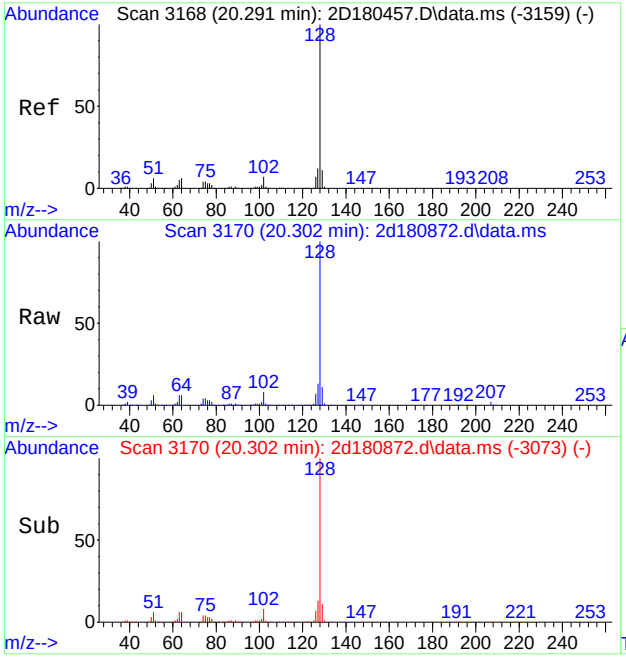


#109
1,2,4-trimethylbenzene
Concen: 56.92 ug/L
RT: 17.749 min Scan# 2683
Delta R.T. 0.005 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:105 Resp: 1223214

Ion	Ratio	Lower	Upper
105	100		
120	46.8	16.7	76.7
77	11.6	0.0	41.8

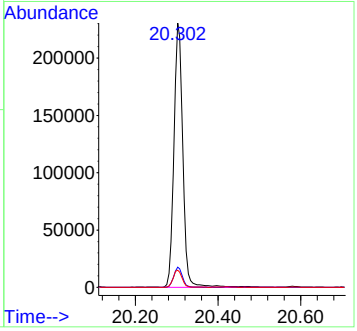




#121
naphthalene
Concen: 19.16 ug/L
RT: 20.302 min Scan# 3170
Delta R.T. 0.010 min
Lab File: 2d180872.d
Acq: 10 Jan 2019 3:18 pm

Tgt Ion:128 Resp: 346747

Ion	Ratio	Lower	Upper
128	100		
102	7.7	0.0	37.5
51	6.5	0.0	36.4



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180864.d
Acq On : 10 Jan 2019 11:20 am
Operator : EddieH
Sample : JC80990-10 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 8 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:04 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.273	65	198203	500.00	ug/L	0.02
5) pentafluorobenzene	9.978	168	706736	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	961290	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	914377	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	484844	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	292061	49.82	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.64%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	296122	50.11	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.22%			
75) toluene-d8 (s)	13.329	98	1080888	49.14	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.28%			
99) 4-bromofluorobenzene (s)	16.857	95	411658	47.89	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.78%			
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration (+) = signals summed

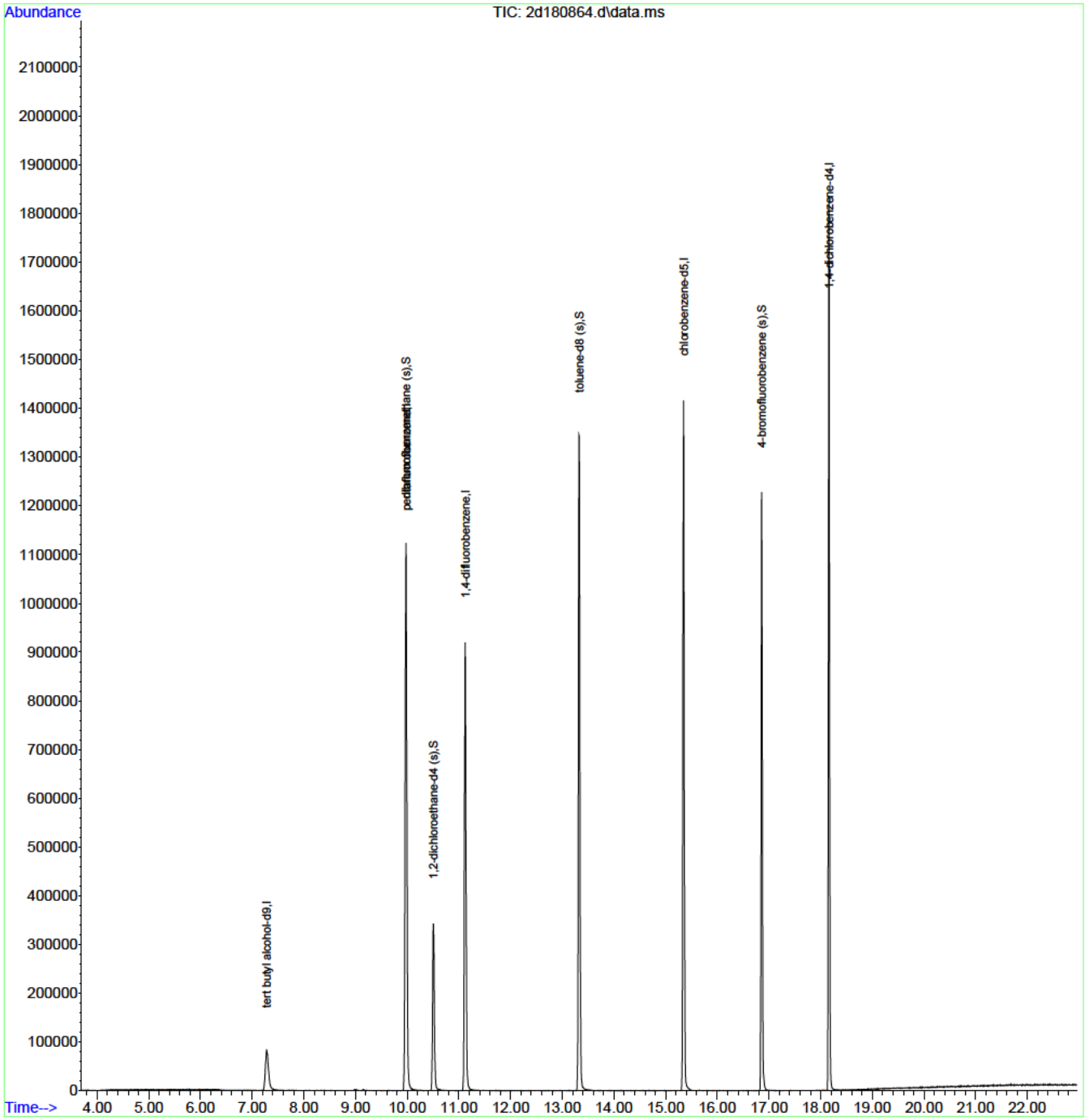
7.1.16

7

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180864.d
Acq On : 10 Jan 2019 11:20 am
Operator : EddieH
Sample : JC80990-10 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 8 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:30:04 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180863.d
Acq On : 10 Jan 2019 10:51 am
Operator : EddieH
Sample : JC80990-11 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 7 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:28:33 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	198132	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	702511	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	961271	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	912114	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	485471	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	289966	49.76	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.52%			
53) 1,2-dichloroethane-d4 (s)	10.508	65	296365	50.16	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.32%			
75) toluene-d8 (s)	13.329	98	1078674	49.16	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.32%			
99) 4-bromofluorobenzene (s)	16.857	95	408117	47.42	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.84%			
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration (+) = signals summed

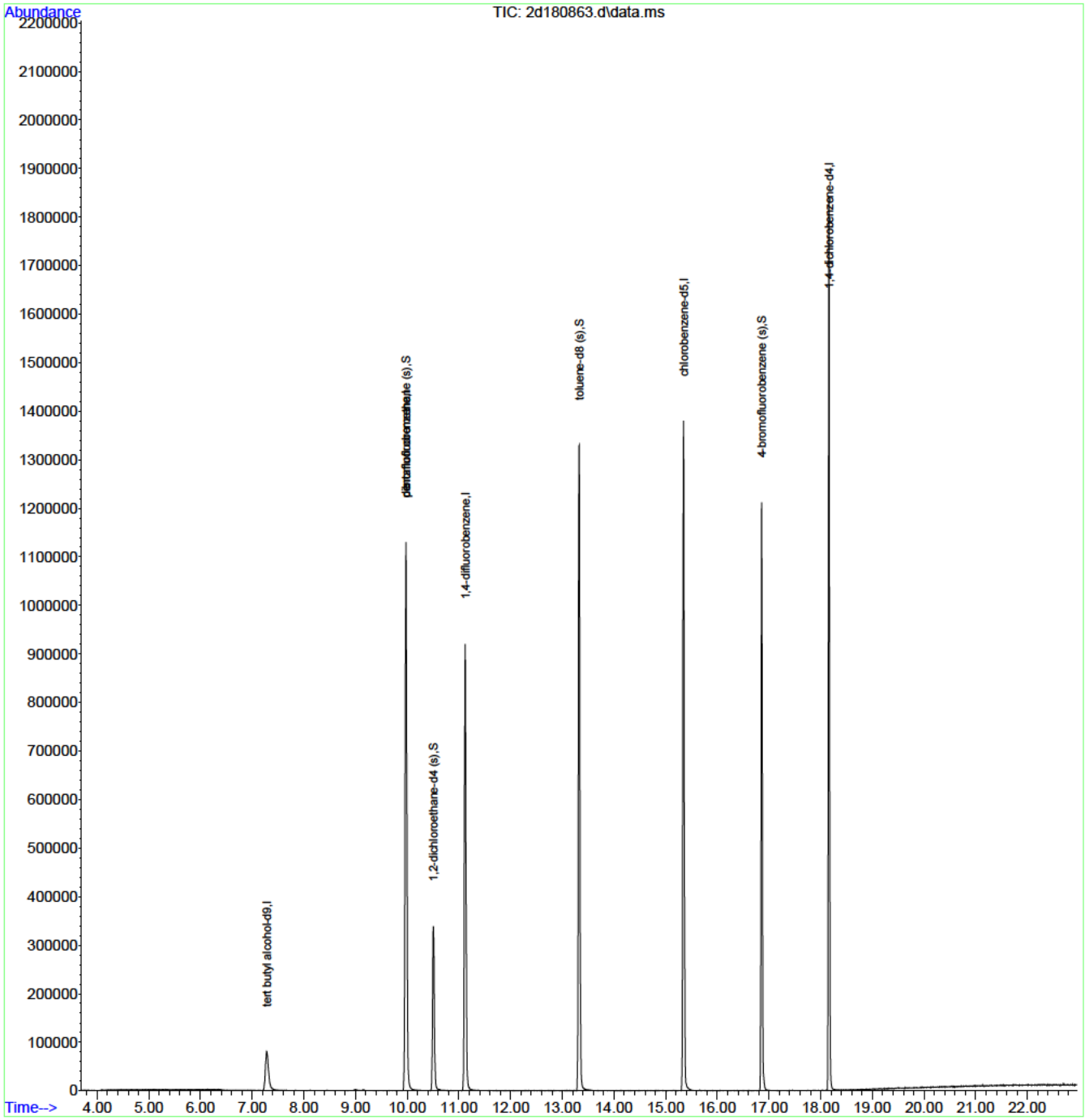
7.1.17

7

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180863.d
Acq On : 10 Jan 2019 10:51 am
Operator : EddieH
Sample : JC80990-11 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 7 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:28:33 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



Quantitation Report (QT Reviewed)

Data Path : [redacted]data\kenrickb\v2d7694\
Data File : 2d180862.d
Acq On : 10 Jan 2019 10:21 am
Operator : EddieH
Sample : JC80990-12 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 6 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 04:47:19 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	199055	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	718034	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.116	114	971540	50.00	ug/L	0.02
74) chlorobenzene-d5	15.342	117	925119	50.00	ug/L	0.01
98) 1,4-dichlorobenzene-d4	18.158	152	490006	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.968	113	297329	49.92	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.84%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	300849	50.38	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.76%			
75) toluene-d8 (s)	13.323	98	1088241	48.90	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.80%			
99) 4-bromofluorobenzene (s)	16.857	95	413702	47.62	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 95.24%			
Target Compounds						Qvalue

(#) = qualifier out of range (m) = manual integration (+) = signals summed

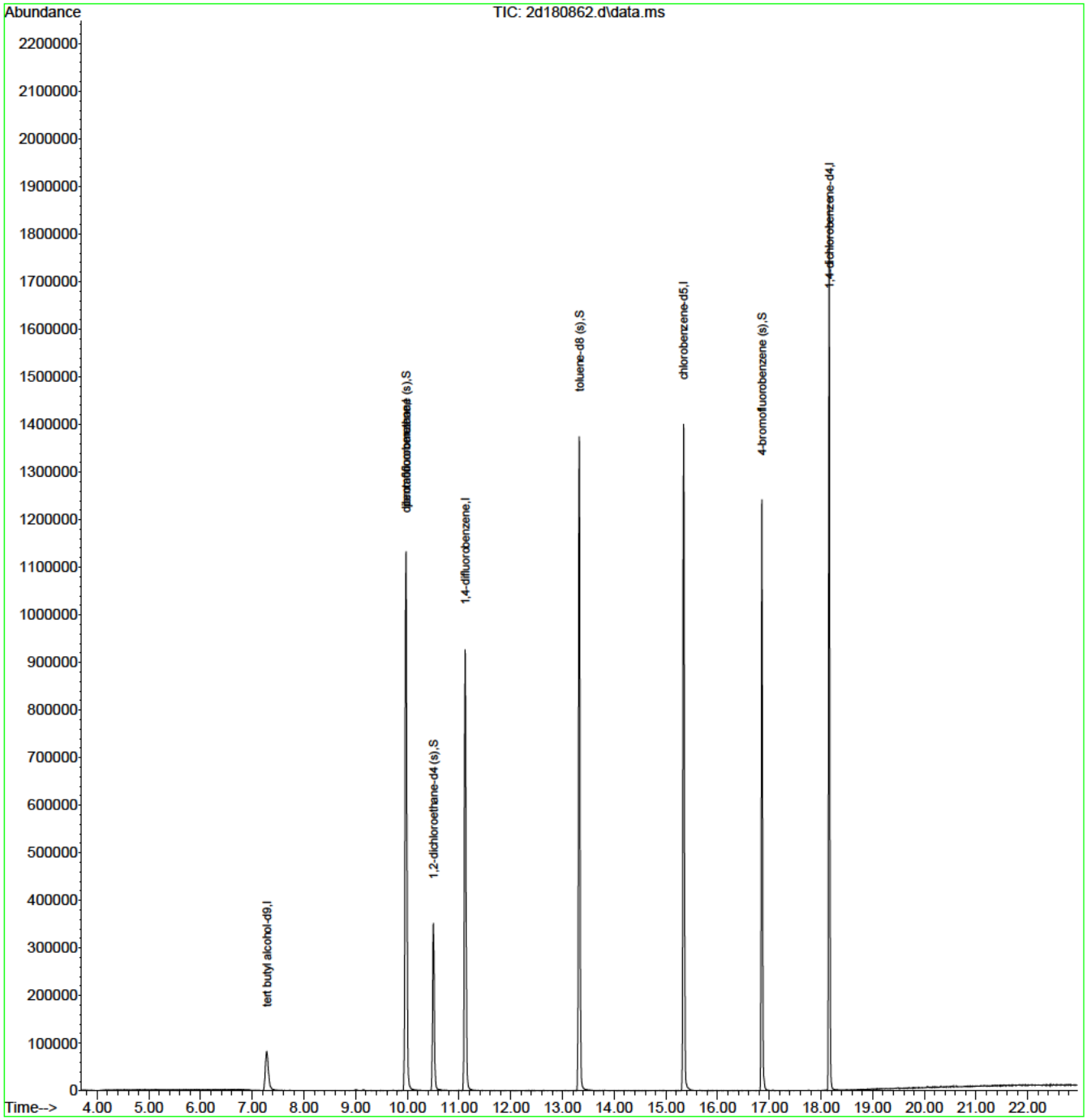
7.1.18

7

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\kenrickb\v2d7694\
Data File : 2d180862.d
Acq On : 10 Jan 2019 10:21 am
Operator : EddieH
Sample : JC80990-12 Inst : MS2D
Misc : MS31843,V2D7694,5,,,,1
ALS Vial : 6 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 11 04:47:19 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration



M2D7670.M Fri Jan 11 05:17:25 2019 Page: 2

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180815.d
Acq On : 9 Jan 2019 8:52 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS31817,V2D7692,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:15:46 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

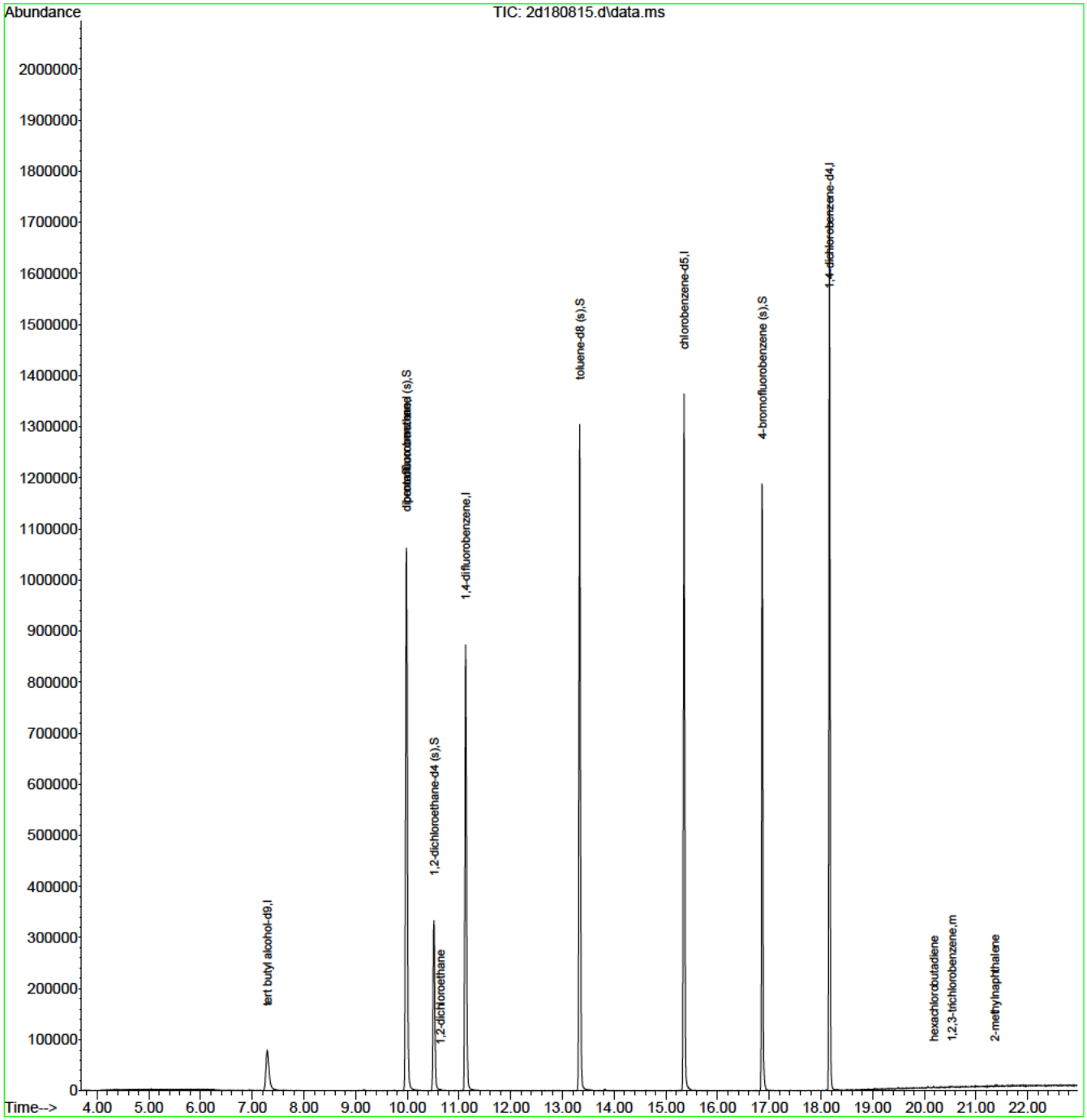
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.289	65	191374	500.00	ug/L	0.03
5) pentafluorobenzene	9.984	168	668765	50.00	ug/L	0.03
52) 1,4-difluorobenzene	11.127	114	909192	50.00	ug/L	0.03
74) chlorobenzene-d5	15.353	117	876449	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.163	152	464601	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.979	113	279277	50.35	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.70%			
53) 1,2-dichloroethane-d4 (s)	10.513	65	286365	51.24	ug/L	0.03
Spiked Amount 50.000	Range 81 - 124		Recovery = 102.48%			
75) toluene-d8 (s)	13.334	98	1026060	48.66	ug/L	0.03
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.32%			
99) 4-bromofluorobenzene (s)	16.863	95	395994	48.08	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.16%			
Target Compounds						Qvalue
59) 1,2-dichloroethane	10.634	62	1098	0.18	ug/L	89
120) hexachlorobutadiene	20.181	225	644	0.13	ug/L	94
124) 1,2,3-trichlorobenzene	20.533	180	786	0.10	ug/L	86
126) 2-methylnaphthalene	21.366	142	275	2.42	ug/L #	64

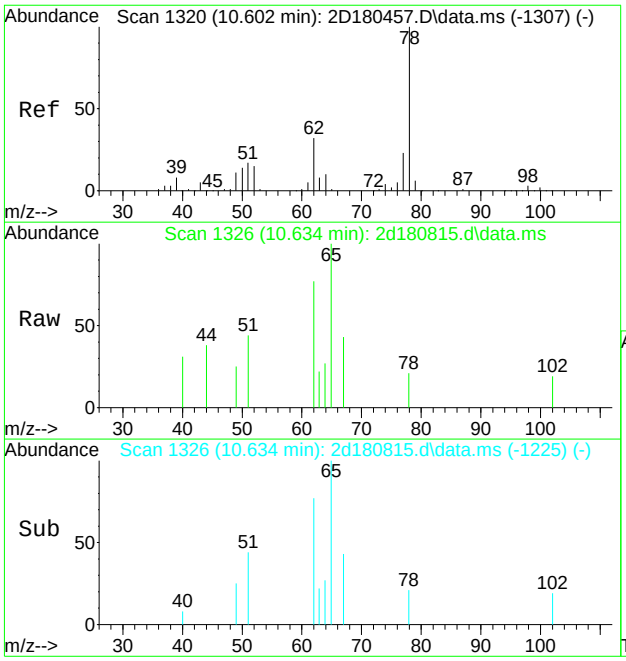
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : [redacted]data\janellac\01-10-19\v2d7692\
Data File : 2d180815.d
Acq On : 9 Jan 2019 8:52 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS31817,V2D7692,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 09 21:15:46 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

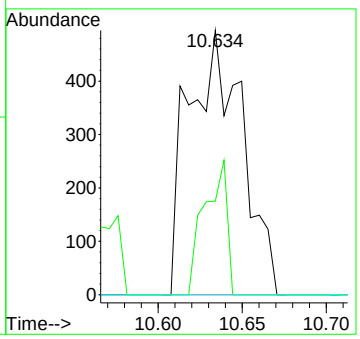


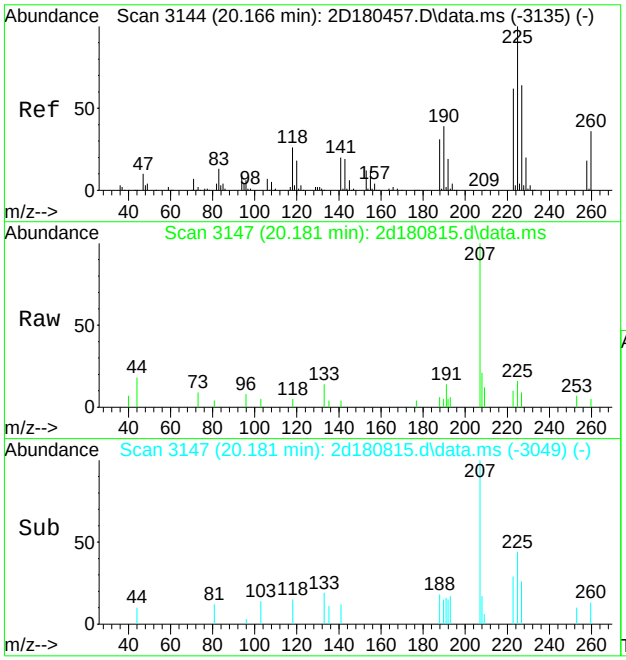


#59
1,2-dichloroethane
Concen: 0.18 ug/L
RT: 10.634 min Scan# 1326
Delta R.T. 0.032 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion: 62 Resp: 1098

Ion	Ratio	Lower	Upper
62	100		
64	35.4	1.9	61.9
98	0.0	0.0	39.6

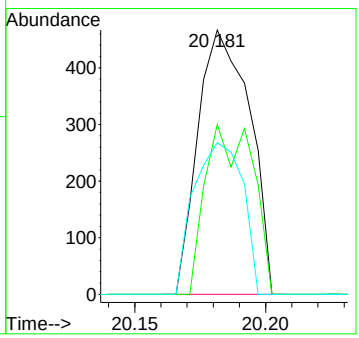


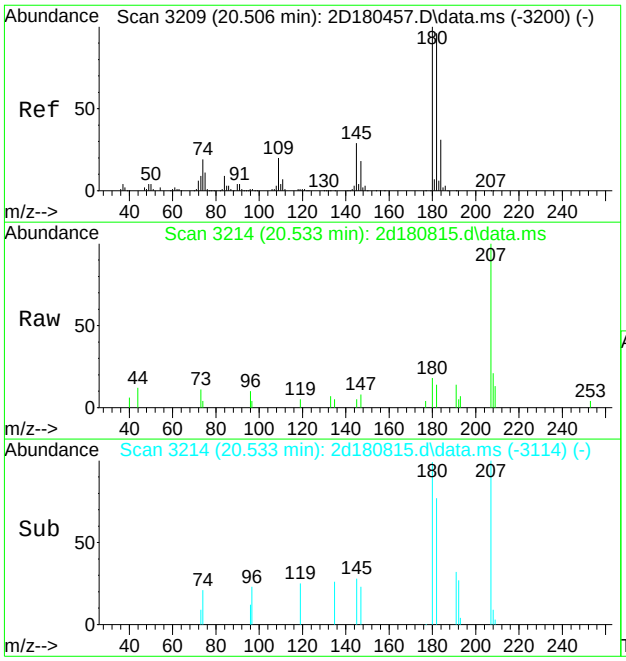


#120
hexachlorobutadiene
Concen: 0.13 ug/L
RT: 20.181 min Scan# 3147
Delta R.T. 0.016 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion:225 Resp: 644

Ion	Ratio	Lower	Upper
225	100		
223	64.2	31.8	91.8
227	57.4	33.7	93.7

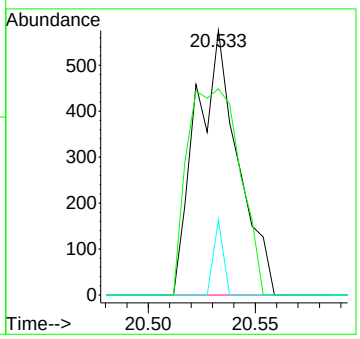


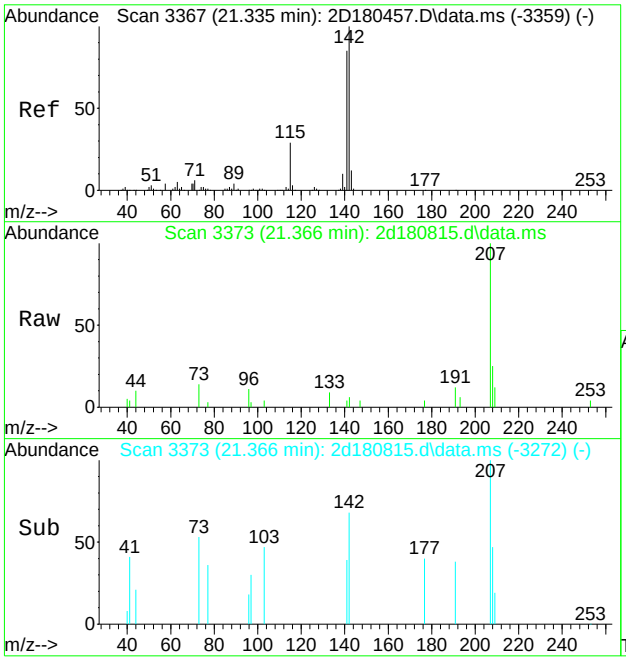


#124
1,2,3-trichlorobenzene
Concen: 0.10 ug/L
RT: 20.533 min Scan# 3214
Delta R.T. 0.026 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion:180 Resp: 786

Ion	Ratio	Lower	Upper
180	100		
182	78.0	65.6	125.6
145	28.3	0.0	58.8

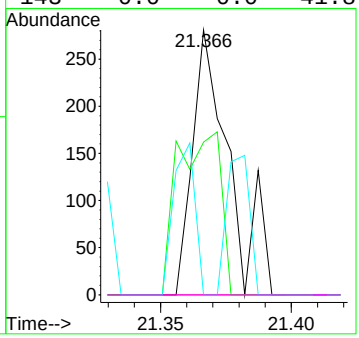




#126
2-methylnaphthalene
Concen: 2.42 ug/L
RT: 21.366 min Scan# 3373
Delta R.T. 0.032 min
Lab File: 2d180815.d
Acq: 9 Jan 2019 8:52 am

Tgt Ion:142 Resp: 275

Ion	Ratio	Lower	Upper
142	100		
141	57.7	65.4	105.4#
115	0.0	0.0	58.6
143	0.0	0.0	41.8



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180861.d
Acq On : 10 Jan 2019 9:40 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS30376,V2D7694,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:27:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

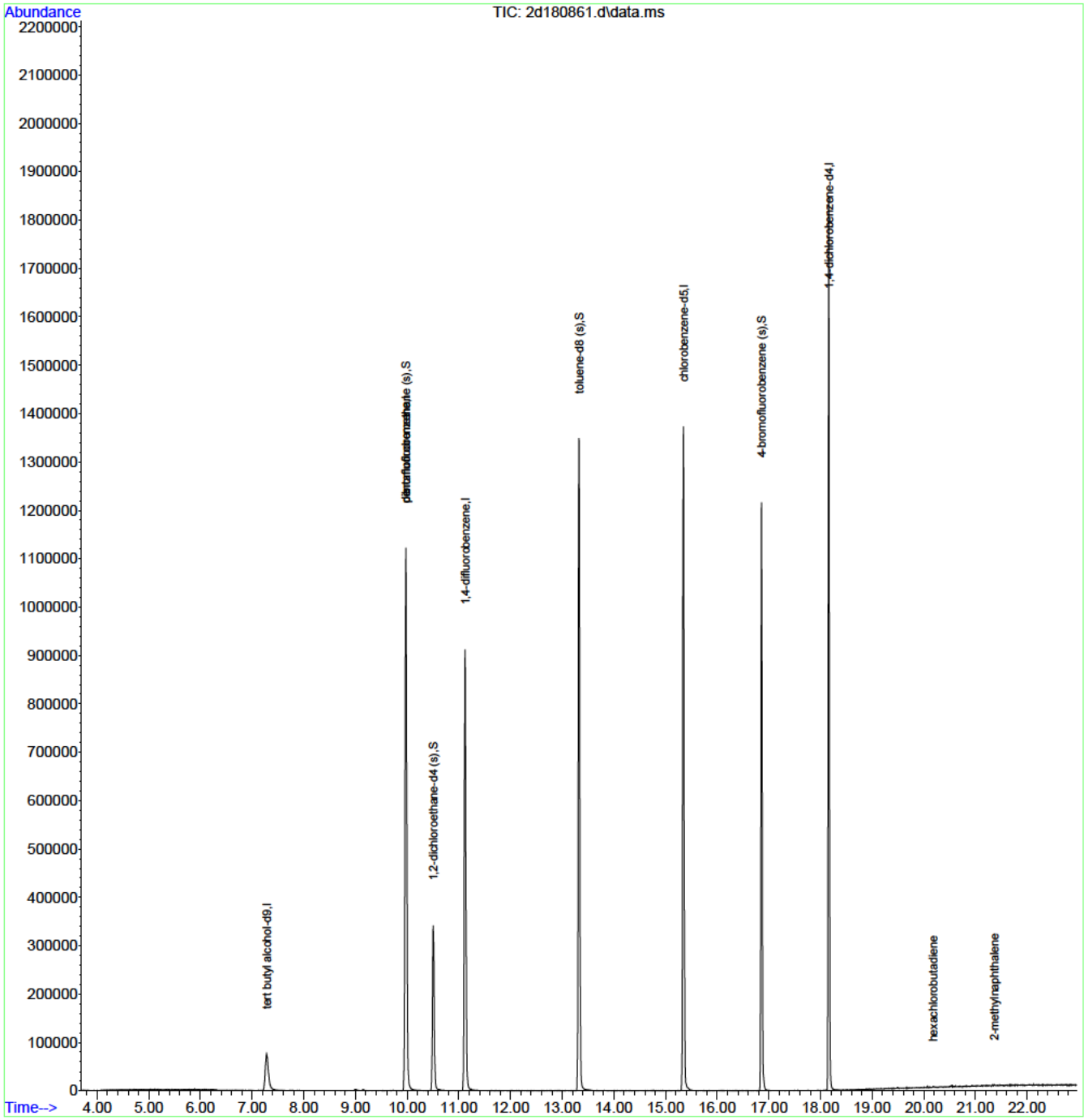
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.278	65	188785	500.00	ug/L	0.02
5) pentafluorobenzene	9.973	168	707549	50.00	ug/L	0.02
52) 1,4-difluorobenzene	11.121	114	956305	50.00	ug/L	0.02
74) chlorobenzene-d5	15.347	117	915285	50.00	ug/L	0.02
98) 1,4-dichlorobenzene-d4	18.158	152	487870	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	9.973	113	289116	49.26	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.52%			
53) 1,2-dichloroethane-d4 (s)	10.503	65	296612	50.46	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.92%			
75) toluene-d8 (s)	13.323	98	1076753	48.90	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.80%			
99) 4-bromofluorobenzene (s)	16.857	95	409716	47.37	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.74%			
Target Compounds						Qvalue
120) hexachlorobutadiene	20.176	225	667	0.12	ug/L	82
126) 2-methylnaphthalene	21.361	142	293	2.42	ug/L #	62

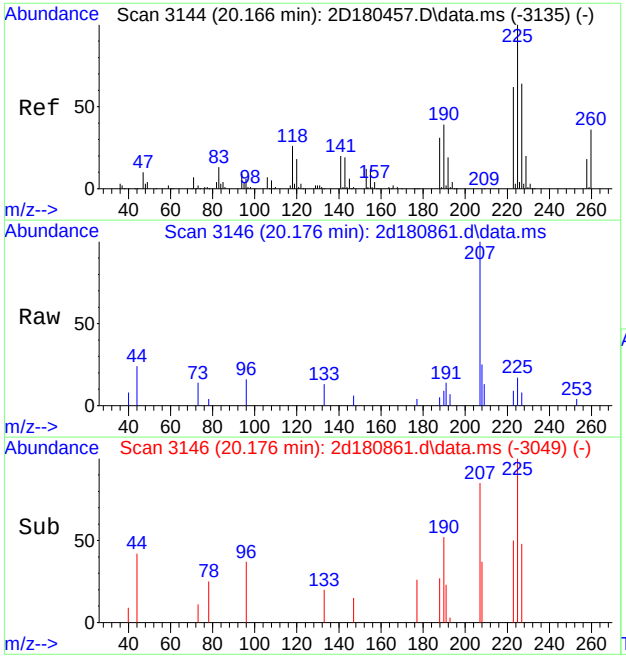
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201901\01-11-19\kenrickb\v2d7694\
Data File : 2d180861.d
Acq On : 10 Jan 2019 9:40 am
Operator : EddieH
Sample : mb Inst : MS2D
Misc : MS30376,V2D7694,5,,,,1
ALS Vial : 5 Sample Multiplier: 1

Quant Method : [redacted]M2D7670.M
Quant Results File: M2D7670.RES
Quant Time: Jan 21 16:27:51 2019
Quant Title : SW-846 Method 8260C / EPA 624, DB624 60m x 0.25mm Thu Dec 20 13:34:34 2018
QLast Update : Thu Dec 20 13:34:34 2018
Response via : Initial Calibration

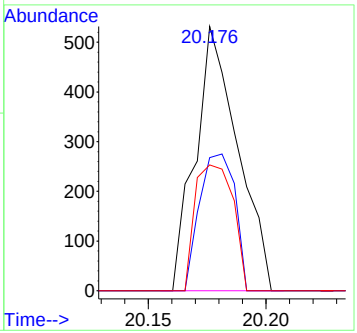


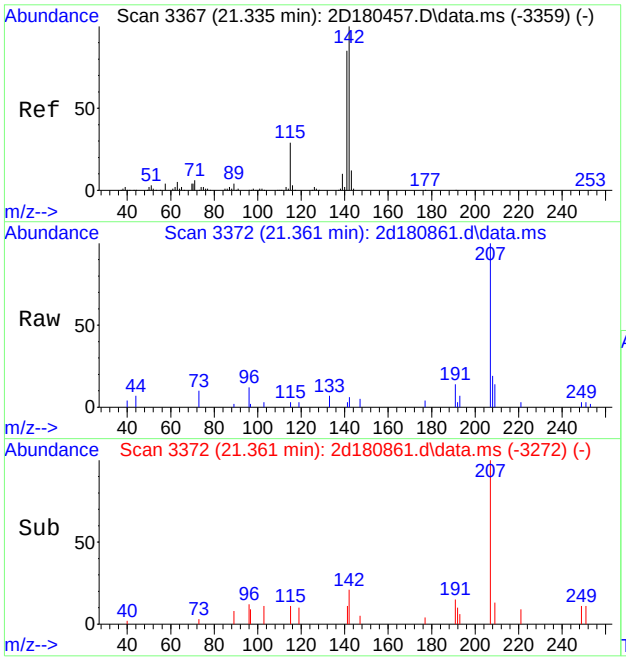


#120
hexachlorobutadiene
Concen: 0.12 ug/L
RT: 20.176 min Scan# 3146
Delta R.T. 0.010 min
Lab File: 2d180861.d
Acq: 10 Jan 2019 9:40 am

Tgt Ion:225 Resp: 667

Ion	Ratio	Lower	Upper
225	100		
223	50.4	31.8	91.8
227	47.6	33.7	93.7

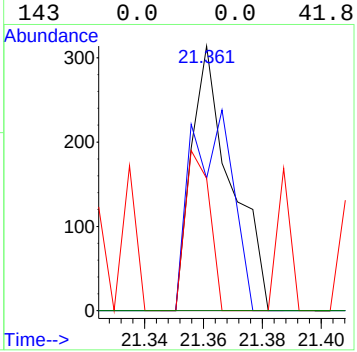




#126
2-methylnaphthalene
Concen: 2.42 ug/L
RT: 21.361 min Scan# 3372
Delta R.T. 0.026 min
Lab File: 2d180861.d
Acq: 10 Jan 2019 9:40 am

Tgt Ion:142 Resp: 293

Ion	Ratio	Lower	Upper
142	100		
141	50.0	65.4	105.4#
115	50.0	0.0	58.6
143	0.0	0.0	41.8



GC Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- GC Identification Summaries (Hits)
- Surrogate Recovery Summaries
- GC Surrogate Retention Time Summaries
- Initial and Continuing Calibration Summaries

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6218-MB2	GH116731.D	1	01/09/19	[redacted]	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	34	ug/l	

CAS No.	Surrogate Recoveries		Limits
111-27-3	Hexanol	80%	56-145%
111-27-3	Hexanol	88%	56-145%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6219-MB1	GH116743.D	1	01/11/19	[redacted]	n/a	n/a	GGH6219

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	34	ug/l	

CAS No.	Surrogate Recoveries		Limits
111-27-3	Hexanol	77%	56-145%
111-27-3	Hexanol	89%	56-145%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6218-MB1	GH116722.D	1	01/09/19	[redacted]	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

GGH6218-BS, JC80750-1MS, JC80750-1MSD

CAS No.	Compound	Result	RL	MDL	Units	Q
64-17-5	Ethanol	ND	100	34	ug/l	

CAS No.	Surrogate Recoveries		Limits
111-27-3	Hexanol	77%	56-145%
111-27-3	Hexanol	82%	56-145%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP17739-MB1	7G30930.D	1	01/10/19	[redacted]	01/10/19	OP17739	G7G1085

The QC reported here applies to the following samples: **Method:** SW846-8011

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
106-93-4	1,2-Dibromoethane	ND	0.020	0.0053	ug/l	

CAS No.	Surrogate Recoveries		Limits
3017-95-6	2-Bromo-1-chloropropane	83%	20-144%
3017-95-6	2-Bromo-1-chloropropane	86%	20-144%

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1617-MB	AA70305.D	1	01/10/19	[redacted]	n/a	n/a	GAA1617

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.11	0.060	ug/l	
74-84-0	Ethane	ND	0.23	0.099	ug/l	
74-85-1	Ethene	ND	0.31	0.072	ug/l	

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5151-MB	WW134881.D	1	01/10/19	[redacted]	n/a	n/a	GWW5151

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Result	RL	MDL	Units	Q
124-38-9	Carbon Dioxide	ND	50	4.4	ug/l	

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5152-MB	WW134901.D	1	01/11/19	[redacted]	n/a	n/a	GWW5152

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
124-38-9	Carbon Dioxide	ND	50	4.4	ug/l	

Method Blank Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1618-MB	AA70332.D	1	01/11/19	[redacted]	n/a	n/a	GAA1618

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.11	0.060	ug/l	
74-84-0	Ethane	ND	0.23	0.099	ug/l	
74-85-1	Ethene	ND	0.31	0.072	ug/l	

Blank Spike Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6218-BS	GH116723.D	1	01/09/19	[redacted]	n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
64-17-5	Ethanol	5000	5290	106	74-123

CAS No.	Surrogate Recoveries	BSP	Limits
111-27-3	Hexanol	103%	56-145%
111-27-3	Hexanol	125%	56-145%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GGH6219-BS	GH116744.D	1	01/11/19	[redacted]	n/a	n/a	GGH6219

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
64-17-5	Ethanol	5000	6030	121	74-123

CAS No.	Surrogate Recoveries	BSP	Limits
111-27-3	Hexanol	91%	56-145%
111-27-3	Hexanol	104%	56-145%

* = Outside of Control Limits.

Blank Spike/Blank Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP17739-BS1	7G30931.D	1	01/10/19	[redacted]	01/10/19	OP17739	G7G1085
OP17739-BSD	7G30932.D	1	01/10/19		01/10/19	OP17739	G7G1085

The QC reported here applies to the following samples: **Method:** SW846-8011

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	BSD ug/l	BSD %	RPD	Limits Rec/RPD
106-93-4	1,2-Dibromoethane	0.5	0.52	104	0.52	104	0	60-140/32

CAS No.	Surrogate Recoveries	BSP	BSD	Limits
3017-95-6	2-Bromo-1-chloropropane	84%	90%	20-144%
3017-95-6	2-Bromo-1-chloropropane	85%	92%	20-144%

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1617-LCS	AA70303.D	1	01/10/19	[redacted]	n/a	n/a	GAA1617

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
74-82-8	Methane	11	11.6	105	59-134
74-84-0	Ethane	23	22.9	100	63-135
74-85-1	Ethene	31	28.1	91	62-133

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5151-LCS	WW134879.D	1	01/10/19	[redacted]	n/a	n/a	GWW5151

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
124-38-9	Carbon Dioxide	164	158	96	66-114

8.4.2

8

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GWW5152-LCS	WW134899.D	1	01/11/19	[redacted]	n/a	n/a	GWW5152

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
124-38-9	Carbon Dioxide	164	160	98	66-114

* = Outside of Control Limits.

Laboratory Control Sample Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GAA1618-LCS	AA70329.D	1	01/11/19	[redacted]	n/a	n/a	GAA1618

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	Spike ug/l	LCS ug/l	LCS %	Limits
74-82-8	Methane	11	13.1	119	59-134
74-84-0	Ethane	23	28.0	122	63-135
74-85-1	Ethene	31	37.3	120	62-133

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80750-1MS	GH116726.D	1	01/09/19	[redacted]	n/a	n/a	GGH6218
JC80750-1MSD	GH116727.D	1	01/09/19		n/a	n/a	GGH6218
JC80750-1	GH116725.D	1	01/09/19		n/a	n/a	GGH6218

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-10, JC80990-11

CAS No.	Compound	JC80750-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
64-17-5	Ethanol	100		5000	4440	87	5000	5000	98	12	58-145/27

CAS No.	Surrogate Recoveries	MS	MSD	JC80750-1	Limits
111-27-3	Hexanol	109%	132%	145%	56-145%
111-27-3	Hexanol	100%	89%	105%	56-145%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7MS	GH116746.D	1	01/11/19	[redacted]	n/a	n/a	GGH6219
JC80990-7MSD	GH116747.D	1	01/11/19		n/a	n/a	GGH6219
JC80990-7	GH116745.D	1	01/11/19		n/a	n/a	GGH6219

The QC reported here applies to the following samples: **Method:** SW846-8015D (DAI)

JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
64-17-5	Ethanol	100	U	5000	4510	90	5000	5180	104	14	58-145/27

CAS No.	Surrogate Recoveries	MS	MSD	JC80990-7	Limits
111-27-3	Hexanol	96%	98%	90%	56-145%
111-27-3	Hexanol	79%	84%	80%	56-145%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP17739-MS	7G30946.D	1	01/10/19	[redacted]	01/10/19	OP17739	G7G1085
OP17739-MSD	7G30947.D	1	01/10/19		01/10/19	OP17739	G7G1085
JC80990-7	7G30941.D	1	01/10/19		01/10/19	OP17739	G7G1085

The QC reported here applies to the following samples: **Method:** SW846-8011

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11

CAS No.	Compound	JC80990-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
106-93-4	1,2-Dibromoethane	0.020	U	0.5	0.35	70	0.499	0.49	98	33	60-140/43

CAS No.	Surrogate Recoveries	MS	MSD	JC80990-7	Limits
3017-95-6	2-Bromo-1-chloropropane	85%	87%	93%	20-144%
3017-95-6	2-Bromo-1-chloropropane	77%	87%	90%	20-144%

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7DUP [a]	WW134892.D	1	01/10/19	[redacted]	n/a	n/a	GWW5151
JC80990-7 [b]	WW134891.D	1	01/10/19	[redacted]	n/a	n/a	GWW5151

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	DUP ug/l	Q	RPD	Limits
124-38-9	Carbon Dioxide	7160		7250		1	20

(a) (pH = 7(Sample is not acid preserved. Sample analyzed within 7 days
(b) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC80990-7DUP	AA70321.D	1	01/10/19	[redacted]	n/a	n/a	GAA1617
JC80990-7	AA70320.D	1	01/10/19	[redacted]	n/a	n/a	GAA1617
JC80990-7	AA70322.D	100	01/10/19	[redacted]	n/a	n/a	GAA1617

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9

CAS No.	Compound	JC80990-7 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	5130 [a]		3630	E	1	20
74-84-0	Ethane	0.23 U		ND		nc	20
74-85-1	Ethene	0.31 U		ND		nc	20

(a) Result is from Run #2.

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC81068-1DUP [a]	WW134906.D	20	01/11/19	[redacted]	n/a	n/a	GWW5152
JC81068-1 [a]	WW134905.D	20	01/11/19	[redacted]	n/a	n/a	GWW5152

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	JC81068-1 ug/l	Q	DUP ug/l	Q	RPD	Limits
124-38-9	Carbon Dioxide	157000		150000		5	20

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

* = Outside of Control Limits.

Duplicate Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC81071-2DUP	AA70338.D	1	01/11/19	[redacted]	n/a	n/a	GAA1618
JC81071-2	AA70337.D	1	01/11/19	[redacted]	n/a	n/a	GAA1618

The QC reported here applies to the following samples: **Method:** RSK-175

JC80990-10, JC80990-11

CAS No.	Compound	JC81071-2 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	4.8		4.6		4	20
74-84-0	Ethane	ND		ND		nc	20
74-85-1	Ethene	ND		ND		nc	20

* = Outside of Control Limits.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	GGH6218-BS	**Injection Date:**	01/09/19
Lab File ID:	GH116723.D	**Injection Time:**	08:36
Client ID:	Blank Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.64	0.64	7020		ug/l	28.1
Ethanol	2 [a]	1.56	1.56	5290		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	GGH6219-BS	**Injection Date:**	01/11/19
Lab File ID:	GH116744.D	**Injection Time:**	06:54
Client ID:	Blank Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.66	0.65	8090		ug/l	29.2
Ethanol	2 [a]	1.59	1.59	6030		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80750-1MS	**Injection Date:**	01/09/19
Lab File ID:	GH116726.D	**Injection Time:**	09:32
Client ID:	Matrix Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.64	0.64	6830		ug/l	42.4
Ethanol	2 [a]	1.56	1.56	4440		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80990-7MS	**Injection Date:**	01/11/19
Lab File ID:	GH116746.D	**Injection Time:**	07:31
Client ID:	Matrix Spike		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.65	0.65	6460		ug/l	35.6
Ethanol	2 [a]	1.59	1.59	4510		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80750-1MSD	**Injection Date:**	01/09/19
Lab File ID:	GH116727.D	**Injection Time:**	09:50
Client ID:	Matrix Spike Duplicate		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.64	0.64	6140		ug/l	20.5
Ethanol	2 [a]	1.56	1.56	5000		ug/l	

(a) QC results reported from this column.

GC Identification Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

Sample ID:	JC80990-7MSD	**Injection Date:**	01/11/19
Lab File ID:	GH116747.D	**Injection Time:**	07:50
Client ID:	Matrix Spike Duplicate		

Compound	Column	RT	StdRT	Conc	Q	Units	RPD Conc
Ethanol	1	0.65	0.65	6520		ug/l	22.9
Ethanol	2 [a]	1.59	1.59	5180		ug/l	

(a) QC results reported from this column.

8.7.6

8

Surrogate Recovery Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846-8015D (DAI) **Matrix:** AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 [a]	S1 [b]
JC80990-1	GH116732.D	105	73
JC80990-2	GH116733.D	111	80
JC80990-3	GH116734.D	120	85
JC80990-4	GH116735.D	110	86
JC80990-5	GH116736.D	108	92
JC80990-6	GH116737.D	97	102
JC80990-7	GH116745.D	90	80
JC80990-8	GH116748.D	109	121
JC80990-9	GH116749.D	98	85
JC80990-10	GH116739.D	113	85
JC80990-11	GH116738.D	107	81
GGH6218-BS	GH116723.D	103	125
GGH6218-MB2	GH116731.D	80	88
GGH6219-BS	GH116744.D	91	104
GGH6219-MB1	GH116743.D	77	89
JC80750-1MS	GH116726.D	109	100
JC80750-1MSD	GH116727.D	132	89
JC80990-7MS	GH116746.D	96	79
JC80990-7MSD	GH116747.D	98	84
GGH6218-MB1	GH116722.D	77	82

Surrogate Compounds	Recovery Limits
S1 = Hexanol	56-145%

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

Surrogate Recovery Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846-8011 **Matrix:** AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1 [a]	S1 [b]
JC80990-1	7G30933.D	77	81
JC80990-2	7G30934.D	79	86
JC80990-3	7G30935.D	77	81
JC80990-4	7G30936.D	78	82
JC80990-5	7G30937.D	68	73
JC80990-6	7G30940.D	75	72
JC80990-7	7G30941.D	93	90
JC80990-8	7G30942.D	68	90
JC80990-9	7G30943.D	66	72
JC80990-10	7G30944.D	89	88
JC80990-11	7G30945.D	86	84
OP17739-BS1	7G30931.D	84	85
OP17739-BSD	7G30932.D	90	92
OP17739-MB1	7G30930.D	83	86
OP17739-MS	7G30946.D	85	77
OP17739-MSD	7G30947.D	87	87

Surrogate Compounds	Recovery Limits
S1 = 2-Bromo-1-chloropropane	20-144%

(a) Recovery from GC signal #2
(b) Recovery from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116721.D	**Injection Time:**	07:59
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

	S1 [a] RT	S1 [b] RT
Check Std	6.14	5.02

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
GGH6218-MB1	GH116722.D	01/09/19	08:18	6.14	5.02
GGH6218-BS	GH116723.D	01/09/19	08:36	6.14	5.01
ZZZZZZ	GH116724.D	01/09/19	08:55	6.14	5.01
JC80750-1	GH116725.D	01/09/19	09:13	6.14	5.01
JC80750-1MS	GH116726.D	01/09/19	09:32	6.14	5.01
JC80750-1MSD	GH116727.D	01/09/19	09:50	6.14	5.01
ZZZZZZ	GH116728.D	01/09/19	10:09	6.15	5.01
ZZZZZZ	GH116729.D	01/09/19	10:27	6.14	5.02

Surrogate Compounds

S1 = Hexanol

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6218-CC5519	**Injection Date:**	01/09/19
Lab File ID:	GH116730.D	**Injection Time:**	10:46
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

	S1 [a] RT	S1 [b] RT
Check Std	6.14	5.01

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
GGH6218-MB2	GH116731.D	01/09/19	11:04	6.14	5.01
JC80990-1	GH116732.D	01/09/19	11:23	6.14	5.02
JC80990-2	GH116733.D	01/09/19	11:41	6.14	5.01
JC80990-3	GH116734.D	01/09/19	12:00	6.14	5.01
JC80990-4	GH116735.D	01/09/19	12:18	6.14	5.01
JC80990-5	GH116736.D	01/09/19	12:37	6.14	5.01
JC80990-6	GH116737.D	01/09/19	12:55	6.14	5.01
JC80990-11	GH116738.D	01/09/19	13:13	6.14	5.01
JC80990-10	GH116739.D	01/09/19	13:32	6.15	5.01

Surrogate Compounds

S1 = Hexanol

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	GGH6219-CC5519	**Injection Date:**	01/11/19
Lab File ID:	GH116742.D	**Injection Time:**	06:17
Instrument ID:	GCGH	**Method:**	SW846-8015D (DAI)

	S1 [a] RT	S1 [b] RT
Check Std	6.17	5.03

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
GGH6219-MB1	GH116743.D	01/11/19	06:35	6.17	5.03
GGH6219-BS	GH116744.D	01/11/19	06:54	6.16	5.03
JC80990-7	GH116745.D	01/11/19	07:13	6.16	5.04
JC80990-7MS	GH116746.D	01/11/19	07:31	6.17	5.03
JC80990-7MSD	GH116747.D	01/11/19	07:50	6.17	5.03
JC80990-8	GH116748.D	01/11/19	08:08	6.17	5.03
JC80990-9	GH116749.D	01/11/19	08:27	6.17	5.03
ZZZZZZ	GH116750.D	01/11/19	08:45	6.17	5.03
ZZZZZZ	GH116751.D	01/11/19	09:04	6.17	5.03

Surrogate Compounds

S1 = Hexanol

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	G7G1085-CC999	**Injection Date:**	01/10/19
Lab File ID:	7G30928.D	**Injection Time:**	16:54
Instrument ID:	GC7G	**Method:**	SW846-8011

	S1 [a] RT	S1 [b] RT
Check Std	2.93	2.51

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
OP17739-MB1	7G30930.D	01/10/19	17:32	2.92	2.51
OP17739-BS1	7G30931.D	01/10/19	17:51	2.93	2.51
OP17739-BSD	7G30932.D	01/10/19	18:09	2.93	2.51
JC80990-1	7G30933.D	01/10/19	18:28	2.92	2.51
JC80990-2	7G30934.D	01/10/19	18:47	2.93	2.52
JC80990-3	7G30935.D	01/10/19	19:06	2.93	2.51
JC80990-4	7G30936.D	01/10/19	19:24	2.93	2.51
JC80990-5	7G30937.D	01/10/19	19:43	2.92	2.51

Surrogate Compounds

S1 = 2-Bromo-1-chloropropane

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

GC Surrogate Retention Time Summary

Job Number: JC80990
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	G7G1085-CC999	**Injection Date:**	01/10/19
Lab File ID:	7G30938.D	**Injection Time:**	20:02
Instrument ID:	GC7G	**Method:**	SW846-8011

	S1 [a] RT	S1 [b] RT
Check Std	2.93	2.51

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	S1 [a] RT	S1 [b] RT
JC80990-6	7G30940.D	01/10/19	20:39	2.92	2.51
JC80990-7	7G30941.D	01/10/19	20:58	2.93	2.51
JC80990-8	7G30942.D	01/10/19	21:17	2.92	2.51
JC80990-9	7G30943.D	01/10/19	21:36	2.92	2.51
JC80990-10	7G30944.D	01/10/19	21:54	2.93	2.51
JC80990-11	7G30945.D	01/10/19	22:13	2.93	2.51
OP17739-MS	7G30946.D	01/10/19	22:32	2.93	2.51
OP17739-MSD	7G30947.D	01/10/19	22:51	2.93	2.51

Surrogate Compounds

S1 = 2-Bromo-1-chloropropane

(a) Retention time from GC signal #2
(b) Retention time from GC signal #1

Initial Calibration Summary

Job Number: JC80990 **Sample:** G7G999-ICC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G29210.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report HP G1530A

Method : [redacted]7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Wed Aug 08 12:07:45 2018
Response via : Initial Calibration

Calibration Files
2 =7g29209.D 1 =7g29210.D 0.5 =7g29211.D 0.2 =7g29212.D
0.1 =7g29213.D 0.02 =7g29214.D

	Compound	2	1	0.5	0.2	0.1	0.02	Avg	%RSD
1) S	2-Bromo-1-Chloropro	1.255	1.306	1.355	1.454	1.444		1.363 E6	6.33
2)	1,2-Dibromoethane	7.227	7.499	7.436	7.386	6.188	6.729	7.077 E6	7.31
3)	1,2,3-Trichloroprop	8.559	8.958	8.911	8.812	8.182	9.793	8.869 E5	6.04
4)	1,2-Dibromo-3-Chlor	1.639	1.636	1.625	1.631	1.526	1.540	1.599 E7	3.24

Signal #2

1) S	2-Bromo-1-Chloropro	1.539	1.645	1.729	1.895	1.860		1.734 E6	8.54
2)	1,2-Dibromoethane	0.855	0.908	0.947	1.022	1.028	0.917	0.946 E7	7.18
3)	1,2,3-Trichloroprop	0.998	1.035	1.058	1.134	1.048	1.114	1.064 E6	4.77
4)	1,2-Dibromo-3-Chlor	1.762	1.755	1.734	1.786	1.658	1.966	1.777 E7	5.77

(#) = Out of Range

7G504M999.M Wed Aug 08 12:13:07 2018

Initial Calibration Verification

Job Number: JC80990 **Sample:** G7G999-ICV999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G29215.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : [redacted]DATA\7g999\7g29215.D\ECD1A.CH Vial: 8
Signal #2 : [redacted]DATA\7g999\7g29215.D\ECD2B.CH
Acq On : 08 Aug 2018 10:57 am Operator: vinced
Sample : icv999-0.5 Inst : HP G1530A
Misc : op13958,g7g999,34.2,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : [redacted]7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Wed Aug 08 12:07:45 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	2.767 E6	-1.5	106	0.00	2.44- 2.50
2	1,2-Dibromoethane	7.077	7.946 E6	-12.3	107	0.00	2.61- 2.67
3	1,2,3-Trichloropropane	886.925	968.637 E3	-9.2	109	0.00	4.05- 4.11
4	1,2-Dibromo-3-Chloropr	15.994	16.759 E6	-4.8	103	0.00	5.69- 5.75

***** Signal #2 *****

1 S	2-Bromo-1-Chloropropan	1.734	3.429 E6	1.1	104	0.00	2.85- 2.91
2	1,2-Dibromoethane	9.464	10.379 E6	-9.7	110	0.00	3.28- 3.34
3	1,2,3-Trichloropropane	1064.368	1147.036 E3	-7.8	108	0.00	4.79- 4.85
4	1,2-Dibromo-3-Chloropr	17.770	18.647 E6	-4.9	108	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29211.D 7G504M999.M Wed Aug 08 12:13:28 2018

8.10.2 8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** G7G1085-CC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G30928.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : [redacted]DATA\7g1085\7g30928.D\ECD1A.CH Vial: 3
Signal #2 : [redacted]DATA\7g1085\7g30928.D\ECD2B.CH
Acq On : 10 Jan 2019 4:54 pm Operator: vinced
Sample : cc999-1.0 Inst : HP G1530A
Misc : op17739,g7g1085,35.0,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : [redacted]7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Tue Dec 11 11:14:35 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	1.283 E6	5.9	98	0.00	2.48- 2.54
2	1,2-Dibromoethane	7.077	7.386 E6	-4.4	98	0.00	2.65- 2.71
3	1,2,3-Trichloropropane	886.925	875.199 E3	1.3	98	0.00	4.07- 4.13
4	1,2-Dibromo-3-Chloropr	15.994	15.745 E6	1.6	96	0.00	5.69- 5.75

***** Signal #2 *****

1 S	2-Bromo-1-Chloropropan	1.734	1.619 E6	6.6	98	0.00	2.90- 2.96
2	1,2-Dibromoethane	9.464	9.223 E6	2.5	102	0.00	3.32- 3.38
3	1,2,3-Trichloropropane	1064.368	1211.879 E3	-13.9	117	0.00	4.81- 4.87
4	1,2-Dibromo-3-Chloropr	17.770	17.879 E6	-0.6	102	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29210.D 7G504M999.M Fri Jan 11 11:44:44 2019

8.10.3

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** G7G1085-CC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G30938.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : [redacted]DATA\7g1085\7g30938.D\ECD1A.CH Vial: 2
Signal #2 : [redacted]DATA\7g1085\7g30938.D\ECD2B.CH
Acq On : 10 Jan 2019 8:02 pm Operator: vinced
Sample : cc999-0.5 Inst : HP G1530A
Misc : op17739,g7g1085,35.3,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : [redacted]7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Tue Dec 11 11:14:35 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	1.282 E6	5.9	95	0.00	2.48- 2.54
2	1,2-Dibromoethane	7.077	7.066 E6	0.2	95	0.00	2.65- 2.71
3	1,2,3-Trichloropropane	886.925	873.381 E3	1.5	98	0.00	4.07- 4.13
4	1,2-Dibromo-3-Chloropr	15.994	14.704 E6	8.1	90	0.00	5.69- 5.75

***** Signal #2 *****

1 S	2-Bromo-1-Chloropropan	1.734	1.646 E6	5.1	95	0.00	2.90- 2.96
2	1,2-Dibromoethane	9.464	9.529 E6	-0.7	101	0.00	3.32- 3.38
3	1,2,3-Trichloropropane	1064.368	1271.006 E3	-19.4	120	0.00	4.81- 4.87
4	1,2-Dibromo-3-Chloropr	17.770	17.106 E6	3.7	99	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29211.D 7G504M999.M Fri Jan 11 11:44:58 2019

8.10.4

Continuing Calibration Summary

Job Number: JC80990 **Sample:** G7G1085-CC999
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 7G30948.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Signal #1 : [redacted]DATA\7g1085\7g30948.D\ECD1A.CH Vial: 3
Signal #2 : [redacted]DATA\7g1085\7g30948.D\ECD2B.CH
Acq On : 10 Jan 2019 11:10 pm Operator: vinced
Sample : cc999-1.0 Inst : HP G1530A
Misc : op17739,g7g1085,35.1,,,2,1 Multiplr: 1.00
IntFile Signal #1: autoint1.e IntFile Signal #2: autoint2.e

Method : [redacted]7G504M999.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Tue Dec 11 11:14:35 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1 S	2-Bromo-1-Chloropropan	1.363	1.245 E6	8.7	95	0.00	2.48- 2.54
2	1,2-Dibromoethane	7.077	7.039 E6	0.5	94	0.00	2.65- 2.71
3	1,2,3-Trichloropropane	886.925	874.899 E3	1.4	98	0.00	4.07- 4.13
4	1,2-Dibromo-3-Chloropr	15.994	15.598 E6	2.5	95	0.00	5.69- 5.75

***** Signal #2 *****

1 S	2-Bromo-1-Chloropropan	1.734	1.546 E6	10.8	94	0.00	2.89- 2.95
2	1,2-Dibromoethane	9.464	8.726 E6	7.8	96	0.00	3.32- 3.38
3	1,2,3-Trichloropropane	1064.368	1154.714 E3	-8.5	112	0.00	4.81- 4.87
4	1,2-Dibromo-3-Chloropr	17.770	17.640 E6	0.7	101	0.00	6.55- 6.61

(#) = Out of Range SPCC's out = 0 CCC's out = 0
7g29210.D 7G504M999.M Fri Jan 11 11:44:46 2019

8.10.5 8

Initial Calibration Summary

Job Number: JC80990 **Sample:** GAA611-ICC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA44604.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report GCAA

Method : [redacted]MAA611.M (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Feb 04 12:42:31 2015
Response via : Initial Calibration

Calibration Files
200 =AA44605.D 100 =AA44604.D 20 =AA44603.D 10 =AA44602.D
2 =AA44601.D 1 =AA44608.D 500 =AA44606.D 1000=AA44607.D
2000=AA38039.D = = =

Compound	200	100	20	10	2	1	500	1000	2000	Avg	%RSD
1) Methane	3.495	2.972	2.227	3.034	2.500	1.220	2.833	2.689		2.621 E4	25.95
2) Ethane	6.678	5.691	4.213	4.974	4.212	2.201	5.484	5.197		4.831 E4	27.56
3) Ethene	6.666	5.675	4.188	4.964	4.177	2.494	5.473	5.191		4.853 E4	25.76
4) Propane	9.771	8.352	6.261	7.405	6.062	2.808	8.032	7.596		7.036 E4	29.46
5) Propylene										0.000	-1.00
6) Isobutane										0.000	-1.00
7) n-Butane	1.333	1.138	0.891	1.078	0.825	0.361	1.098	1.037		0.970 E5	29.93
8) Acetylene										0.000	-1.00
9) n-Pentane	1.628	1.355	1.158	1.454	1.011	0.481	1.331	1.258		1.210 E5	28.73
10) Hexane	1.898	1.462	1.503	1.959	1.335	0.900	1.542	1.454		1.506 E5	21.88

(#) = Out of Range ### Number of calibration levels exceeded format ###

MAA611.M Wed Feb 04 14:15:12 2015 S

8.10.6

Initial Calibration Verification

Job Number: JC80990 **Sample:** GAA611-ICV611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA44609.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : AA44609.D
Signal(s) : FID1A.ch
Acq On : 4 Feb 2015 12:59 pm
Operator : THOMASH
Sample : ICV611-100
Misc : GC45339,GAA611,,,,,1
ALS Vial : 12 Sample Multiplier: 1

Integration File: autoint1.e
Quant Time: Feb 04 14:15:20 2015
Quant Method : [redacted]MAA611.M
Quant Title : METHOD V8015 DG by GC-FID
QLast Update : Wed Feb 04 12:42:31 2015
Response via : Initial Calibration
Integrator: ChemStation

Volume Inj. : 0.5 ml
Signal Phase : Rt-Alumina BOND/Na2SO4
Signal Info : 50m x 0.53 mm ID x 10um df

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
1	Methane	26.211	28.583 E3	-9.0	96	0.00
2	Ethane	48.315	54.762 E3	-13.3	96	0.00
3	Ethene	48.534	54.783 E3	-12.9	97	0.00
4	Propane	70.357	80.260 E3	-14.1	96	0.00
7	n-Butane	97.009	107.063 E3	-10.4	94	0.00
9	n-Pentane	120.954	120.719 E3	0.2	89	-0.02
10	Hexane	150.637	131.911 E3	12.4	90	-0.03

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MAA611.M Wed Feb 04 14:16:18 2015 S

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1617-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70302.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : [redacted]data\AA70302.d Vial: 1
Acq On : 10 Jan 2019 8:15 am Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53780,GAA1617,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : [redacted]maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	27.568 E3	-5.2	93	0.01	0.84- 1.84
2	Ethane	48.315	53.176 E3	-10.1	93	0.00	1.26- 2.26
3	Ethene	48.534	53.010 E3	-9.2	93	-0.02	1.96- 2.96
4	Propane	70.357	80.102 E3	-13.9	96	-0.03	2.41- 3.41
5	n-Butane	97.009	104.718 E3	-7.9	92	-0.04	3.64- 4.64
6	n-Pentane	120.954	116.543 E3	3.6	86	-0.03	4.70- 5.70
7	Hexane	150.637	128.556 E3	14.7	88	-0.06	5.91- 6.91

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Fri Jan 11 16:48:03 2019 GCAA

8.10.8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1617-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70318.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : [redacted]data\AA70318.d Vial: 17
Acq On : 10 Jan 2019 1:43 pm Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53789,GAA1617,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : [redacted]maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	25.711 E3	1.9	87	0.00	0.84- 1.84
2	Ethane	48.315	50.262 E3	-4.0	88	0.00	1.26- 2.26
3	Ethene	48.534	50.012 E3	-3.0	88	-0.02	1.96- 2.96
4	Propane	70.357	76.885 E3	-9.3	92	-0.03	2.41- 3.41
5	n-Butane	97.009	103.613 E3	-6.8	91	-0.04	3.64- 4.64
6	n-Pentane	120.954	121.540 E3	-0.5	90	-0.06	4.68- 5.68
7	Hexane	150.637	137.833 E3	8.5	94	-0.09	5.87- 6.87

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Fri Jan 11 16:32:13 2019 GCAA

8.10.9

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1617-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70327.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : [redacted]data\AA70327.d Vial: 26
Acq On : 10 Jan 2019 4:18 pm Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53789,GAA1617,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : [redacted]maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	28.162 E3	-7.4	95	0.01	0.84- 1.84
2	Ethane	48.315	54.502 E3	-12.8	96	0.00	1.26- 2.26
3	Ethene	48.534	54.339 E3	-12.0	96	-0.02	1.97- 2.97
4	Propane	70.357	82.499 E3	-17.3#	99	-0.03	2.41- 3.41
5	n-Butane	97.009	109.847 E3	-13.2	97	-0.04	3.64- 4.64
6	n-Pentane	120.954	129.365 E3	-7.0	95	-0.05	4.69- 5.69
7	Hexane	150.637	153.705 E3	-2.0	105	-0.09	5.88- 6.88

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Fri Jan 11 16:32:15 2019 GCAA

8.10.10

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1618-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70328.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : [redacted]data\AA70328.d Vial: 1
Acq On : 11 Jan 2019 8:19 am Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53789,GAA1618,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : [redacted]maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	28.625 E3	-9.2	96	0.02	0.84- 1.84
2	Ethane	48.315	55.041 E3	-13.9	97	0.00	1.27- 2.27
3	Ethene	48.534	54.943 E3	-13.2	97	-0.02	1.97- 2.97
4	Propane	70.357	83.181 E3	-18.2#	100	-0.03	2.41- 3.41
5	n-Butane	97.009	109.073 E3	-12.4	96	-0.04	3.64- 4.64
6	n-Pentane	120.954	121.518 E3	-0.5	90	-0.03	4.70- 5.70
7	Hexane	150.637	139.848 E3	7.2	96	-0.06	5.91- 6.91

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Wed Jan 16 09:52:32 2019 GCAA

8.10.11

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GAA1618-CC611
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** AA70343.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : [redacted]data\AA70343.d Vial: 16
Acq On : 11 Jan 2019 1:30 pm Operator: paulcw
Sample : CC611-100 Inst : GCAA
Misc : GC53792,GAA1618,,,,,1 Multiplr: 1.00
IntFile : autoint1.e

Method : [redacted]maa611.m (ChemStation Integrator)
Title : METHOD V8015 DG by GC-FID
Last Update : Wed Aug 17 09:21:43 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methane	26.211	26.537 E3	-1.2	89	0.01	0.84- 1.84
2	Ethane	48.315	50.810 E3	-5.2	89	0.00	1.27- 2.27
3	Ethene	48.534	50.775 E3	-4.6	89	-0.02	1.97- 2.97
4	Propane	70.357	76.983 E3	-9.4	92	-0.03	2.41- 3.41
5	n-Butane	97.009	103.642 E3	-6.8	91	-0.04	3.64- 4.64
6	n-Pentane	120.954	124.373 E3	-2.8	92	-0.05	4.68- 5.68
7	Hexane	150.637	154.523 E3	-2.6	106	-0.09	5.87- 6.87

(#) = Out of Range SPCC's out = 0 CCC's out = 0
AA44604.D maa611.m Wed Jan 16 09:52:34 2019 GCAA

8.10.12

8

Initial Calibration Summary

Job Number: JC80990 **Sample:** GGH5519-ICC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH106910.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report GCGH

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Tue Oct 11 07:59:30 2016
Response via : Initial Calibration

Calibration Files
0.5 =GH106908.D 1 =GH106909.D 5 =GH106910.D 10 =GH106911.D
50 =GH106912.D 100 =GH106913.D 0.2 =GH106907.D 0.1 =GH106906.D

Compound	0.5	1	5	10	50	100	0.2	0.1	Avg		%RSD
1) Methanol	1.006	1.360	1.085	1.028	0.838	0.897	1.076	1.224	1.064	E1	15.79
2) Ethanol	1.428	1.868	1.575	1.643	1.264	1.240	1.406	1.621	1.505	E1	14.06
3) Tert-Butyl A	2.283	3.019	2.529	2.595	2.099	2.385	2.511	2.811	2.529	E1	11.49
4) 1-Propanol	2.011	3.111	2.902	2.930	1.965	2.481	2.170	3.001	2.571	E1	18.38
5) 2-Propanol	1.486	1.914	1.587	1.666	1.263	1.387	1.541	1.885	1.591	E1	14.24
6) Isobutanol	2.597	3.392	3.330	3.751	2.828	3.143	3.080	2.714	3.104	E1	12.41
7) 1-Butanol	2.449	3.433	3.761	3.340	2.789	3.067	2.951	3.468	3.157	E1	13.43
8) 2-Butanol	2.133	2.972	2.860	3.006	2.413	2.665	2.488	2.602	2.642	E1	11.32
9) Hexanol	8.432	7.939	7.720	8.014	8.162	5.562	5.898		7.389	E1	15.68

Signal #2

1) Methanol	1.300	1.262	1.387	1.205	1.312	1.550	1.387	0.867	1.284	E1	15.40
2) Ethanol	1.841	1.987	1.942	2.090	1.771	2.080	1.699	1.337	1.843	E1	13.44
3) Tert-Butyl A	2.556	2.702	3.217	3.180	2.649	3.094	2.839	3.157	2.924	E1	9.16
4) 1-Propanol	2.888	2.679	2.974	2.929	2.417	2.754	2.987	2.617	2.781	E1	7.24
5) 2-Propanol	1.884	2.126	2.463	2.249	1.835	2.184	1.851	1.602	2.024	E1	13.74
6) Isobutanol	3.537	3.280	3.430	3.462	2.731	3.185	3.170	3.736	3.316	E1	9.12
7) 1-Butanol	2.792	3.210	3.276	3.223	2.603	2.946	3.158	2.910	3.015	E1	7.98
8) 2-Butanol	2.140	2.391	2.902	2.981	2.451	2.800	2.176	1.956	2.475	E1	15.45
9) Hexanol	9.625	8.668	8.851	8.768	8.540	5.996	7.999	6.459	8.113	E1	15.43

(#) = Out of Range ### Number of calibration levels exceeded format ###

MGH5519.M Tue Oct 11 08:00:42 2016 GCGH

8.10.13

8

Initial Calibration Verification

Job Number: JC80990 **Sample:** GGH5519-ICV5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH106914.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH106914.D\FID1A.CH Vial: 10
Acq On : 10 Oct 2016 1:40 pm Operator: XULIU
Sample : ICV5519-5000 Inst : GCGH
Misc : GC49338,GGH5519,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH106914.D\FID2B.CH Vial: 10
Acq On : 10 Oct 2016 1:59 pm Operator: XULIU
Sample : ICV5519-5000 Inst : GCGH
Misc : GC49338,GGH5519,5.0,,,,1 Multiplr: 1.00
IntFile : autoint2.e

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Tue Oct 11 07:59:30 2016
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	10.330	2.9	95	0.00	0.46- 0.52
2	Ethanol	15.055	15.437	-2.5	98	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	25.421	-0.5	101	0.00	0.83- 0.95
4	1-Propanol	25.711	23.160	9.9	80	0.00	1.07- 1.23
5	2-Propanol	15.911	15.757	1.0	99	0.00	0.71- 0.83
6	Isobutanol	31.044	31.539	-1.6	95	0.00	1.81- 1.91
7	1-Butanol	31.573	37.216	-17.9	99	0.00	2.36- 2.48
8	2-Butanol	26.424	25.368	4.0	89	0.00	1.40- 1.54
9 S	Hexanol	73.894	81.187	-9.9	105	0.00	4.98- 5.10
*****	Signal #2 *****						
1	Methanol	12.838	12.989	-1.2	94	0.00	1.13- 1.19
2	Ethanol	18.434	20.455	-11.0	105	0.00	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	32.770	-12.1	102	0.00	2.13- 2.19
4	1-Propanol	27.806	30.220	-8.7	102	0.00	2.76- 2.83
5	2-Propanol	20.243	22.159	-9.5	90	0.00	1.86- 1.92
6	Isobutanol	33.164	34.774	-4.9	101	0.00	3.72- 3.78
7	1-Butanol	30.147	32.938	-9.3	101	0.00	4.29- 4.35
8	2-Butanol	24.747	30.371	-22.7#	105	0.00	3.21- 3.27
9 S	Hexanol	81.132	86.623	-6.8	98	0.00	6.14- 6.20

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH106910.D MGH5519.M Tue Oct 11 08:05:43 2016 GCGH

8.10.14
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6218-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116721.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116721.D\FID1A.CH Vial: 92
Acq On : 9 Jan 2019 7:59 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53784,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116721.D\FID2B.CH Vial: 92
Acq On : 9 Jan 2019 8:18 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53784,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	9.676	9.1	89	0.00	0.46- 0.52
2	Ethanol	15.055	18.066	-20.0	115	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	49.762	-96.8#	197#	0.00	0.83- 0.95
4	1-Propanol	25.711	35.168	-36.8#	121	0.00	1.07- 1.23
5	2-Propanol	15.911	22.539	-41.7#	142	0.00	0.71- 0.83
6	Isobutanol	31.044	25.779	17.0	77	0.00	1.80- 1.90
7	1-Butanol	31.573	16.414	48.0#	44#	0.00	2.36- 2.49
8	2-Butanol	26.424	31.151	-17.9	109	0.00	1.40- 1.54
9 S	Hexanol	73.894	74.776	-1.2	97	-0.01	4.96- 5.08
*****	Signal #2 *****						
1	Methanol	12.838	15.191	-18.3	109	0.00	1.14- 1.20
2	Ethanol	18.434	20.625	-11.9	106	0.00	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	27.898	4.6	87	-0.02	2.12- 2.18
4	1-Propanol	27.806	30.636	-10.2	103	-0.02	2.75- 2.82
5	2-Propanol	20.243	19.997	1.2	81	-0.01	1.86- 1.92
6	Isobutanol	33.164	36.610	-10.4	107	-0.01	3.66- 3.72
7	1-Butanol	30.147	34.938	-15.9	107	0.00	4.22- 4.28
8	2-Butanol	24.747	29.572	-19.5	102	0.00	3.19- 3.25
9 S	Hexanol	81.132	79.776	1.7	90	-0.01	6.11- 6.17

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH113241.D MGH5519.M Wed Jan 09 09:01:26 2019 GCGH

8.10.15
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6218-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116730.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116730.D\FID1A.CH Vial: 95
Acq On : 9 Jan 2019 10:46 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53774,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116730.D\FID2B.CH Vial: 95
Acq On : 9 Jan 2019 11:04 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53774,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	10.699	-0.5	104	0.00	0.47- 0.53
2	Ethanol	15.055	17.434	-15.8	106	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	44.037	-74.1#	170#	0.00	0.82- 0.95
4	1-Propanol	25.711	28.861	-12.3	99	-0.01	1.07- 1.23
5	2-Propanol	15.911	21.721	-36.5#	130	0.00	0.71- 0.83
6	Isobutanol	31.044	25.886	16.6	69	-0.02	1.79- 1.90
7	1-Butanol	31.573	20.253	35.9#	61	-0.01	2.35- 2.47
8	2-Butanol	26.424	27.023	-2.3	90	0.00	1.39- 1.53
9 S	Hexanol	73.894	68.338	7.5	85	-0.02	4.95- 5.07
*****	Signal #2 *****						
1	Methanol	12.838	12.740	0.8	106	0.00	1.13- 1.19
2	Ethanol	18.434	16.958	8.0	81	-0.01	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	23.917	18.2	75	-0.02	2.12- 2.18
4	1-Propanol	27.806	23.028	17.2	79	-0.02	2.75- 2.82
5	2-Propanol	20.243	16.630	17.8	74	-0.02	1.85- 1.91
6	Isobutanol	33.164	29.327	11.6	85	-0.01	3.66- 3.72
7	1-Butanol	30.147	27.612	8.4	86	0.00	4.22- 4.28
8	2-Butanol	24.747	25.445	-2.8	85	-0.01	3.19- 3.25
9 S	Hexanol	81.132	70.930	12.6	81	0.00	6.11- 6.17

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH106911.D MGH5519.M Wed Jan 09 12:06:30 2019 GCGH

8.10.16
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6218-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116740.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116740.D\FID1A.CH Vial: 95
Acq On : 9 Jan 2019 1:50 pm Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116740.D\FID2B.CH Vial: 95
Acq On : 9 Jan 2019 2:09 pm Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	10.546	0.9	97	0.00	0.46- 0.52
2	Ethanol	15.055	18.028	-19.7	114	0.00	0.59- 0.69
3	Tert-Butyl Alcohol	25.288	43.697	-72.8#	173#	0.00	0.82- 0.95
4	1-Propanol	25.711	24.902	3.1	86	-0.01	1.07- 1.23
5	2-Propanol	15.911	22.110	-39.0#	139	0.00	0.71- 0.83
6	Isobutanol	31.044	25.937	16.5	78	-0.01	1.80- 1.90
7	1-Butanol	31.573	18.022	42.9#	48#	0.00	2.35- 2.48
8	2-Butanol	26.424	24.138	8.7	84	0.00	1.39- 1.53
9 S	Hexanol	73.894	77.537	-4.9	100	-0.02	4.95- 5.08
*****	Signal #2 *****						
1	Methanol	12.838	13.653	-6.3	98	0.00	1.14- 1.20
2	Ethanol	18.434	21.079	-14.3	109	0.00	1.53- 1.59
3	Tert-Butyl Alcohol	29.242	30.175	-3.2	94	-0.01	2.13- 2.19
4	1-Propanol	27.806	27.874	-0.2	94	-0.01	2.75- 2.82
5	2-Propanol	20.243	21.965	-8.5	89	-0.01	1.86- 1.92
6	Isobutanol	33.164	35.416	-6.8	103	0.00	3.66- 3.72
7	1-Butanol	30.147	32.045	-6.3	98	0.00	4.22- 4.28
8	2-Butanol	24.747	29.375	-18.7	101	0.00	3.19- 3.25
9 S	Hexanol	81.132	90.565	-11.6	102	0.00	6.12- 6.18

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH113241.D MGH5519.M Wed Jan 09 14:23:39 2019 GCGH

8.10.17
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6219-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116742.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116742.D\FID1A.CH Vial: 92
Acq On : 11 Jan 2019 6:17 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116742.D\FID2B.CH Vial: 92
Acq On : 11 Jan 2019 6:35 am Operator: XULIU
Sample : CC5519-5000 Inst : GCGH
Misc : GC53787,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	14.811	-39.2#	137	0.02	0.48- 0.54
2	Ethanol	15.055	23.057	-53.2#	146	0.01	0.60- 0.71
3	Tert-Butyl Alcohol	25.288	46.036	-82.0#	182#	0.01	0.84- 0.97
4	1-Propanol	25.711	35.356	-37.5#	122	0.01	1.09- 1.25
5	2-Propanol	15.911	25.529	-60.4#	161#	0.02	0.72- 0.85
6	Isobutanol	31.044	30.781	0.8	92	0.02	1.83- 1.94
7	1-Butanol	31.573	25.832	18.2	69	0.03	2.39- 2.51
8	2-Butanol	26.424	33.536	-26.9#	117	0.02	1.42- 1.56
9 S	Hexanol	73.894	76.012	-2.9	98	0.00	4.97- 5.09
*****	Signal #2 *****						
1	Methanol	12.838	15.111	-17.7	109	0.02	1.16- 1.22
2	Ethanol	18.434	20.531	-11.4	106	0.02	1.56- 1.62
3	Tert-Butyl Alcohol	29.242	27.281	6.7	85	0.02	2.16- 2.22
4	1-Propanol	27.806	25.819	7.1	87	0.02	2.79- 2.86
5	2-Propanol	20.243	18.821	7.0	76	0.02	1.89- 1.95
6	Isobutanol	33.164	33.568	-1.2	98	0.03	3.70- 3.76
7	1-Butanol	30.147	32.765	-8.7	100	0.03	4.26- 4.32
8	2-Butanol	24.747	29.855	-20.6#	103	0.03	3.23- 3.29
9 S	Hexanol	81.132	74.708	7.9	84	0.02	6.14- 6.20

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH113241.D MGH5519.M Fri Jan 11 10:09:48 2019 GCGH

8.10.18
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GGH6219-CC5519
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** GH116752.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\HPCHEM\1\DATA\GH116752.D\FID1A.CH Vial: 95
Acq On : 11 Jan 2019 9:23 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53796,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116752.D\FID2B.CH Vial: 95
Acq On : 11 Jan 2019 9:42 am Operator: XULIU
Sample : CC5519-10000 Inst : GCGH
Misc : GC53796,GGH6219,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	RT Window
1	Methanol	10.643	12.200	-14.6	119	0.02	0.48- 0.54
2	Ethanol	15.055	19.479	-29.4#	119	0.02	0.60- 0.71
3	Tert-Butyl Alcohol	25.288	41.879	-65.6#	161#	0.01	0.84- 0.96
4	1-Propanol	25.711	27.908	-8.5	95	0.01	1.09- 1.25
5	2-Propanol	15.911	23.406	-47.1#	141	0.02	0.72- 0.85
6	Isobutanol	31.044	27.435	11.6	73	0.02	1.83- 1.93
7	1-Butanol	31.573	23.324	26.1#	70	0.03	2.39- 2.51
8	2-Butanol	26.424	27.600	-4.5	92	0.02	1.42- 1.56
9 S	Hexanol	73.894	68.913	6.7	86	0.00	4.97- 5.10
*****	Signal #2 *****						
1	Methanol	12.838	12.228	4.8	101	0.02	1.16- 1.22
2	Ethanol	18.434	17.115	7.2	82	0.02	1.56- 1.62
3	Tert-Butyl Alcohol	29.242	24.012	17.9	76	0.02	2.16- 2.22
4	1-Propanol	27.806	22.309	19.8	76	0.03	2.79- 2.86
5	2-Propanol	20.243	16.302	19.5	72	0.03	1.90- 1.96
6	Isobutanol	33.164	28.785	13.2	83	0.03	3.70- 3.76
7	1-Butanol	30.147	27.623	8.4	86	0.03	4.26- 4.32
8	2-Butanol	24.747	25.349	-2.4	85	0.03	3.23- 3.29
9 S	Hexanol	81.132	68.933	15.0	79	0.02	6.14- 6.20

(#) = Out of Range SPCC's out = 0 CCC's out = 0
GH106911.D MGH5519.M Fri Jan 11 10:09:22 2019 GCGH

8.10.19
8

Initial Calibration Summary

Job Number: JC80990 **Sample:** GWW5071-ICC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW133620.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report GCWW

Method : [redacted]MWW5071.M (Chemstation Integrator)
Title : GC/ECD- EDB
Last Update : Fri Jun 22 13:05:24 2018
Response via : Initial Calibration

Calibration Files
20 =ww133619.D 100 =ww133620.D 25^4=ww133624.D 10^4=ww133623.D
1000=ww133622.D 500 =ww133621.D 10 =ww133618.D

	Compound	20	100	25^4	10^4	1000	500	10	Avg		%RSD
1)	Carbon Monoxide								0.000		-1.00
2)	Methane	5.572	4.917	2.495	3.981	4.859	4.044	4.114	4.283	E2	22.90
3)	Carbon Dioxide	7.552	7.662	5.185	5.919	6.940	6.449	7.133	6.691	E2	13.45
4)	Ethylene	6.955	6.846			6.058	5.269	5.732	6.172	E2	11.71
5)	Ethane	7.826	7.511			6.719	5.924	5.618	6.720	E2	14.31

(#) = Out of Range

MWW5071.M Thu Jun 28 12:11:14 2018

8.10.20

8

Initial Calibration Verification

Job Number: JC80990 **Sample:** GWW5071-ICV5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW133627.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : ww133627.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 22 Jun 2018 2:32 pm
Operator : paulcw
Sample : ICV5071-100
Misc : gc52722,gww5071,,,,,1
ALS Vial : 15 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jun 22 14:41:58 2018
Quant Method : [redacted]MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Fri Jun 22 13:05:24 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	514.986	-20.2#	105	0.05
3	Carbon Dioxide	669.145	665.4	-1.0	99	0.08
4	Ethylene	617.173	582.160	5.7	85	0.01
5	Ethane	671.960	649.158	3.4	86	0.02

Evaluate Continuing Calibration Report - Not Founds

1	Carbon Monoxide	0.000	0.000	0.0	0#	-3.58#

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Tue Jul 03 13:49:21 2018

8.10.21

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5151-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134878.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : ww134878.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 10 Jan 2019 8:43 am
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5151,,,,,1
ALS Vial : 2 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 14 16:59:15 2019
Quant Method : [redacted]MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	400.509	6.5	81	0.00
3	Carbon Dioxide	669.145	666.813	0.3	87	0.02
4	Ethylene	617.173	571.877	7.3	84	0.07
5	Ethane	671.960	677.293	-0.8	90	0.09

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 08:46:37 2019

8.10.22
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5151-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134893.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : ww134893.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 10 Jan 2019 2:28 pm
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5151,,,,,1
ALS Vial : 17 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 10 14:38:03 2019
Quant Method : [redacted]MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	529.042	-23.5#	108	0.02
3	Carbon Dioxide	669.145	671.506	-0.4	88	0.04
5	Ethane	671.960	735.799	-9.5	98	0.12

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 08:46:40 2019

8.10.23

8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5151-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134897.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : ww134897.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 10 Jan 2019 4:04 pm
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5151,,,,,1
ALS Vial : 21 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 10 16:14:04 2019
Quant Method : [redacted]MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	426.906	0.3	87	0.01
3	Carbon Dioxide	669.145	690.012	-3.1	90	0.03
4	Ethylene	617.173	621.913	-0.8	91	0.08
5	Ethane	671.960	696.704	-3.7	93	0.10

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 08:46:42 2019

8.10.24
8

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5152-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134898.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : ww134898.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 11 Jan 2019 8:18 am
Operator : paulcw
Sample : CC5071-100
Misc : gc53788,gww5152,,,,,1
ALS Vial : 1 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 11 08:28:04 2019
Quant Method : [redacted]MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	584.128	-36.4#	119	0.02
3	Carbon Dioxide	669.145	725.411	-8.4	95	0.03
4	Ethylene	617.173	656.115	-6.3	96	0.09
5	Ethane	671.960	728.528	-8.4	97	0.11

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 13:29:08 2019

Continuing Calibration Summary

Job Number: JC80990 **Sample:** GWW5152-CC5071
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** WW134912.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data Path : [redacted]DATA\
Data File : ww134912.D
Signal(s) : Signal #1: TCD1B.CH Signal #2: TCD2B.CH
Acq On : 11 Jan 2019 2:12 pm
Operator : paulcw
Sample : CC5071-100
Misc : gc53794,gww5152,,,,,1
ALS Vial : 15 Sample Multiplier: 1

Integration File signal 1: autoint1.e
Integration File signal 2: autoint2.e
Quant Time: Jan 11 14:21:29 2019
Quant Method : [redacted]MWW5071.M
Quant Title : GC/ECD- EDB
QLast Update : Wed Aug 29 10:36:12 2018
Response via : Initial Calibration
Integrator: ChemStation 6890 Scale Mode: Small noise peaks clipped

Volume Inj. : 1UL/COLUMN
Signal #1 Phase : RTXCLP Signal #2 Phase: RTXCLPII
Signal #1 Info : 30mx0.32mmx0.50um Signal #2 Info : 30m x 0.32mm x 0.25um

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 15% Max. Rel. Area : 150%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(Min)
2	Methane	428.307	464.203	-8.4	94	0.02
3	Carbon Dioxide	669.145	721.128	-7.8	94	0.04
5	Ethane	671.960	742.837	-10.5	99	0.11

(#) = Out of Range SPCC's out = 0 CCC's out = 0

MWW5071.M Thu Jan 17 13:29:10 2019

8.10.26

8

GC Volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID1A.CH Vial: 30
Acq On : 9 Jan 2019 11:23 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID2B.CH Vial: 30
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:12 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.02	6.14	271104	424211	3668.798	5228.664 #
Spiked Amount 5000.000			Recovery =		73.38%	104.57%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116732.D MGH5519.M Wed Jan 09 12:12:29 2019 GCGH Page 1

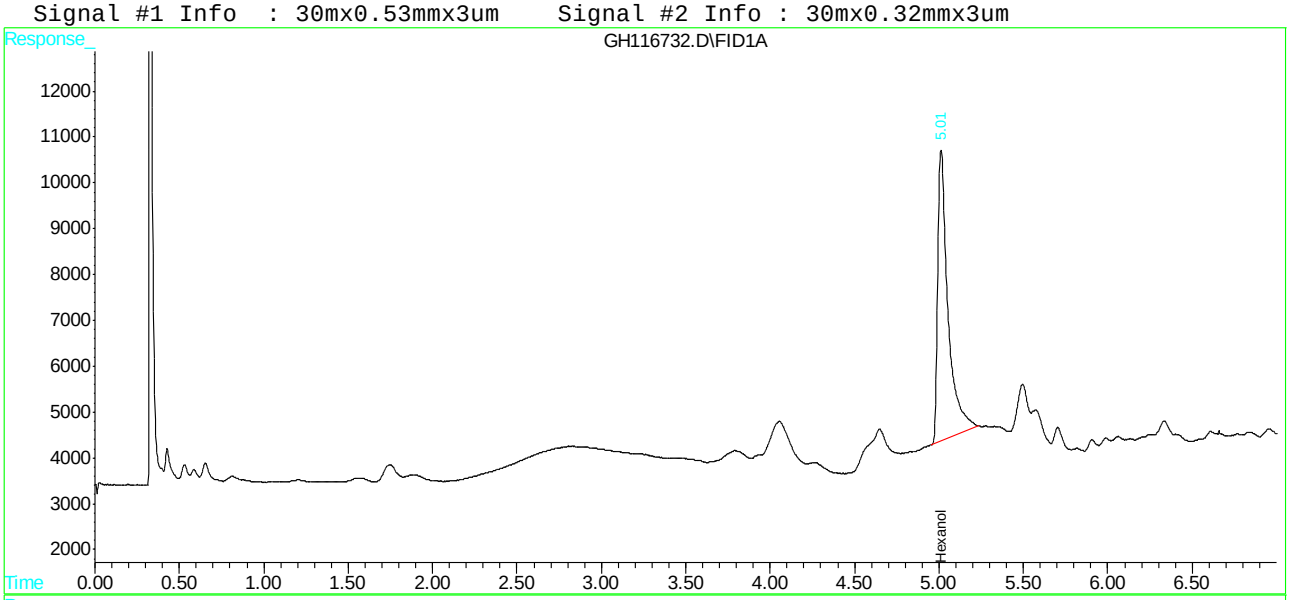
Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID1A.CH Vial: 30
Acq On : 9 Jan 2019 11:23 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116732.D\FID2B.CH Vial: 30
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-1 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:12 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116733.D\FID1A.CH Vial: 31
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116733.D\FID2B.CH Vial: 31
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:13 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	296999	449565	4019.231	5541.167
Spiked Amount 5000.000			Recovery =		80.38%	110.82%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116733.D MGH5519.M Wed Jan 09 12:13:27 2019 GCGH Page 1

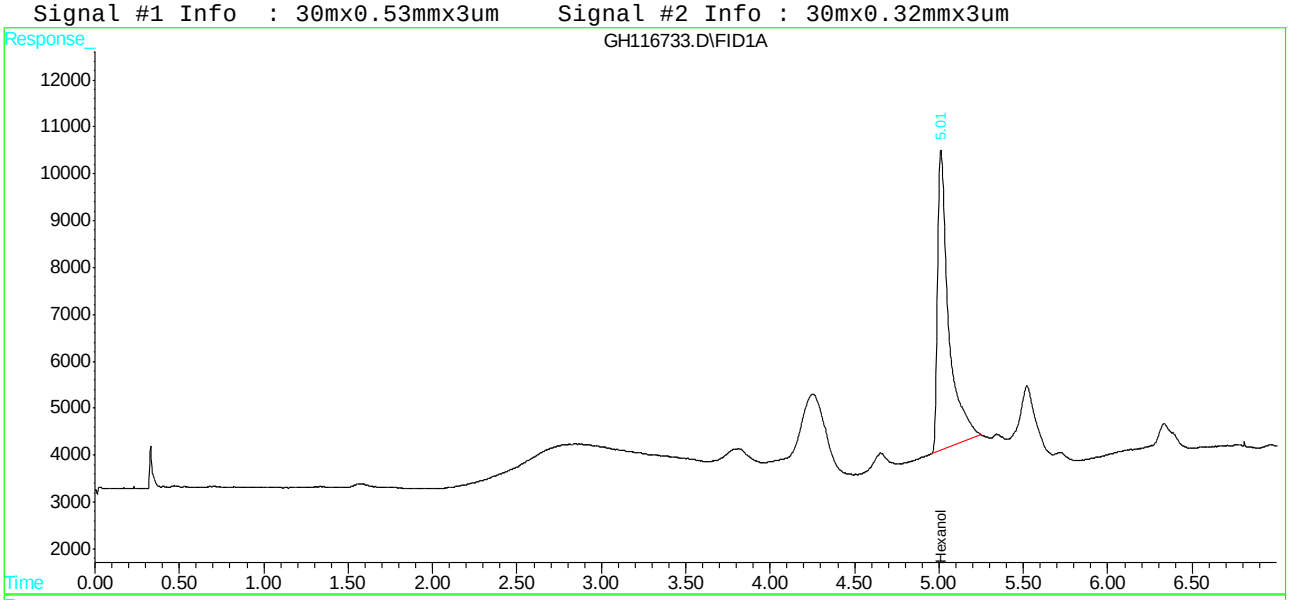
Quantitation Report (QT Reviewed)

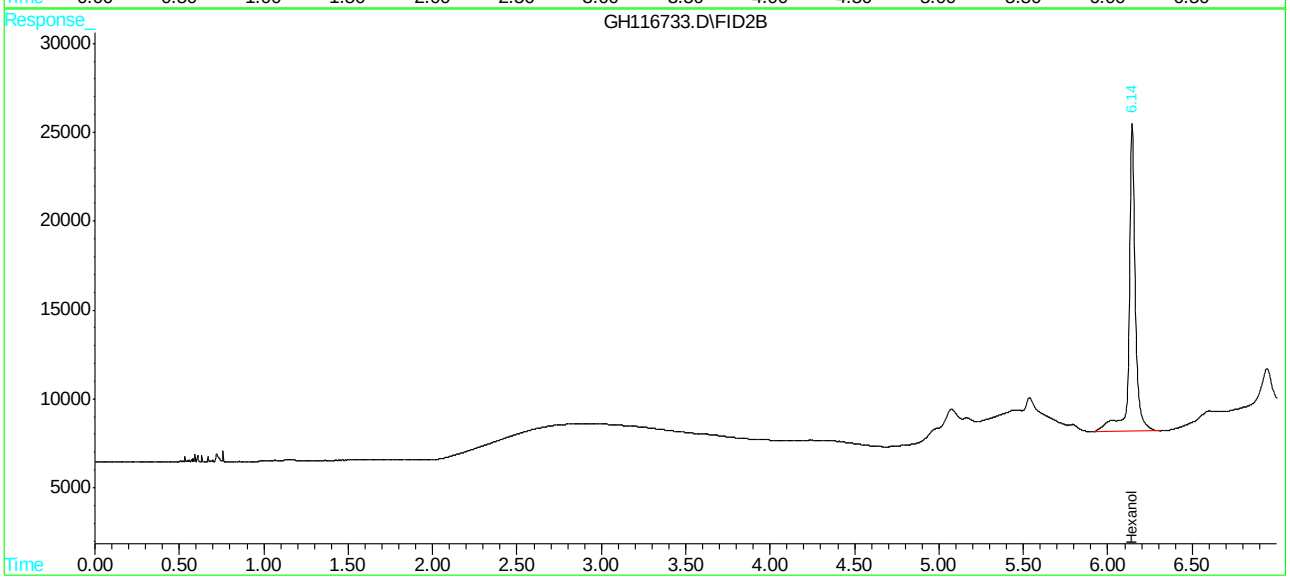
Data File : C:\HPCHEM\1\DATA\GH116733.D\FID1A.CH Vial: 31
Acq On : 9 Jan 2019 11:41 am Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116733.D\FID2B.CH Vial: 31
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-2 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 12:13 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116734.D\FID1A.CH Vial: 32
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116734.D\FID2B.CH Vial: 32
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	312616	486724	4230.584	5999.177 #
Spiked Amount 5000.000			Recovery =		84.61%	119.98%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.

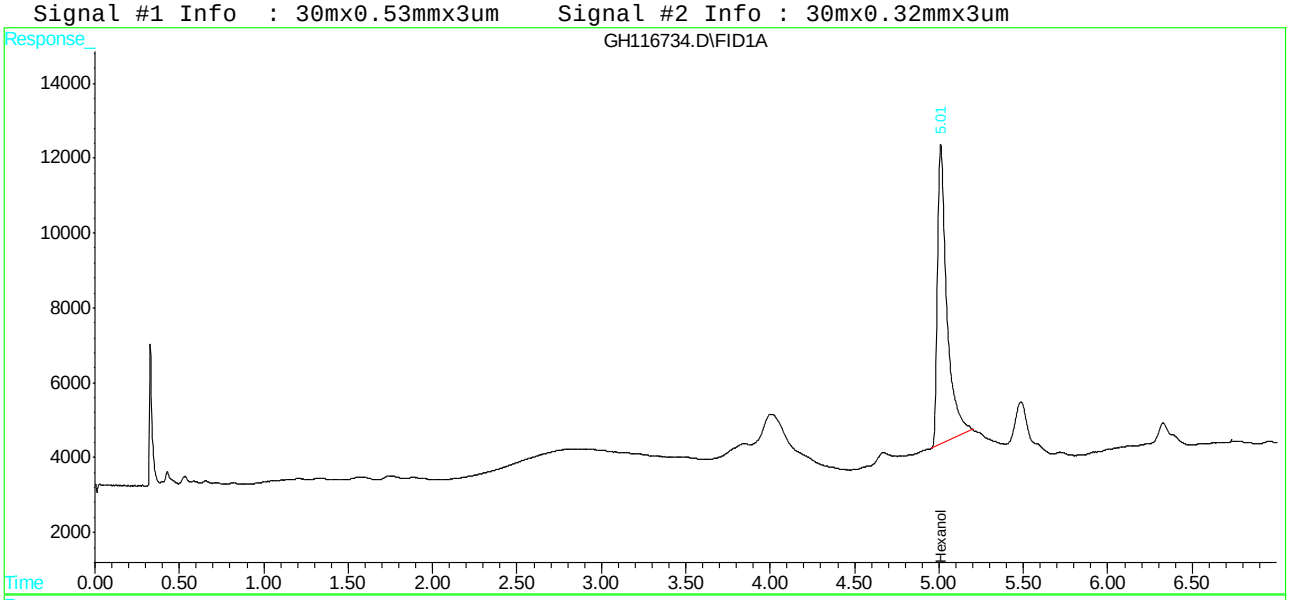
Quantitation Report (QT Reviewed)

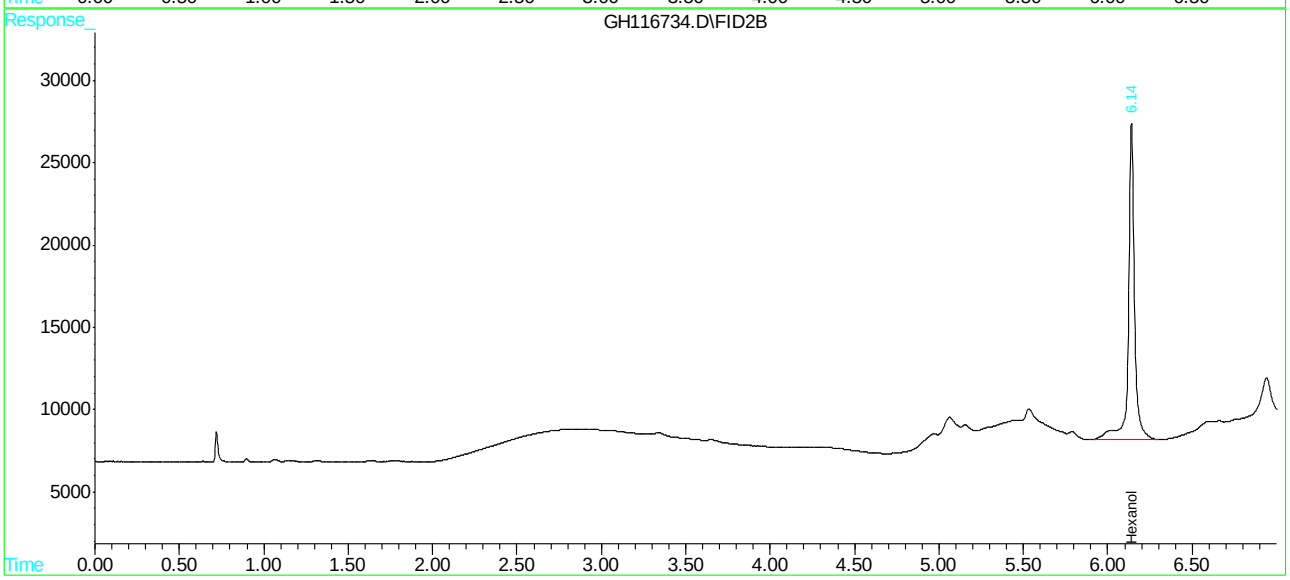
Data File : C:\HPCHEM\1\DATA\GH116734.D\FID1A.CH Vial: 32
Acq On : 9 Jan 2019 12:00 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116734.D\FID2B.CH Vial: 32
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-3 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116735.D\FID1A.CH Vial: 33
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116735.D\FID2B.CH Vial: 33
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	318143	445964	4305.379	5496.789
Spiked Amount 5000.000			Recovery =		86.11%	109.94%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116735.D MGH5519.M Wed Jan 09 14:06:41 2019 GCGH Page 1

Quantitation Report (QT Reviewed)

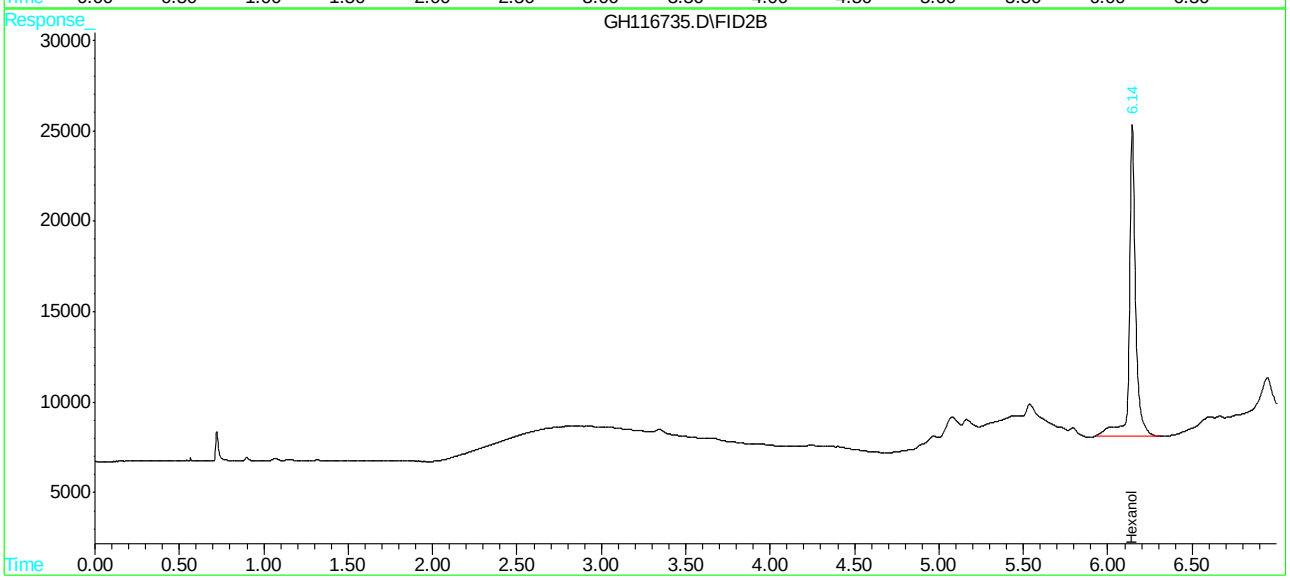
Data File : C:\HPCHEM\1\DATA\GH116735.D\FID1A.CH Vial: 33
Acq On : 9 Jan 2019 12:18 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116735.D\FID2B.CH Vial: 33
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-4 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116736.D\FID1A.CH Vial: 34
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116736.D\FID2B.CH Vial: 34
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	338236	437316	4577.294	5390.189
Spiked Amount 5000.000			Recovery =		91.55%	107.80%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116736.D MGH5519.M Wed Jan 09 14:07:04 2019 GCGH Page 1

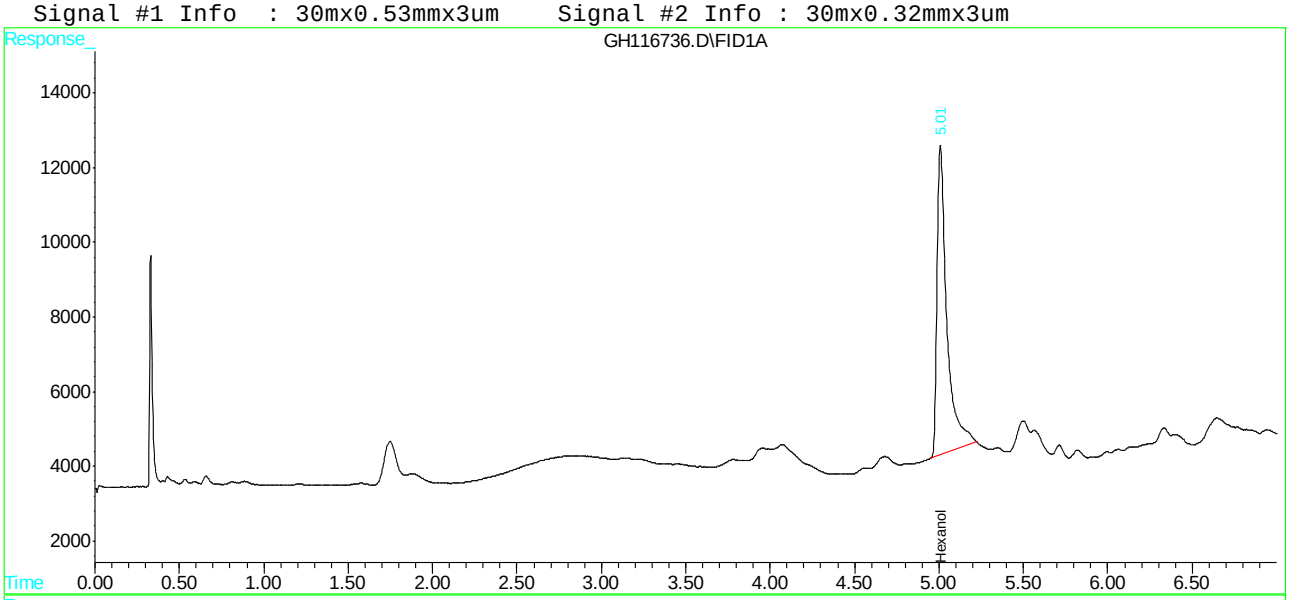
Quantitation Report (QT Reviewed)

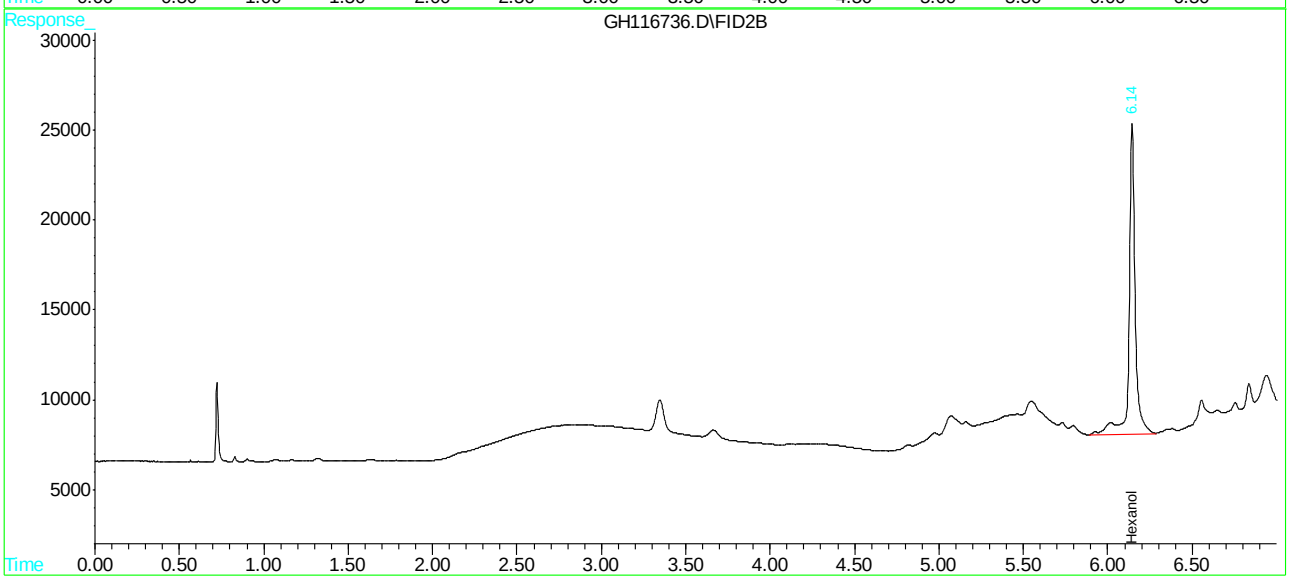
Data File : C:\HPCHEM\1\DATA\GH116736.D\FID1A.CH Vial: 34
Acq On : 9 Jan 2019 12:37 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116736.D\FID2B.CH Vial: 34
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-5 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:06 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





Quantitation Report (QT Reviewed)

Data File : C:\HPCHEM\1\DATA\GH116737.D\FID1A.CH Vial: 35
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116737.D\FID2B.CH Vial: 35
Acq On : 9 Jan 2019 1:13 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:07 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Initial Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um

Compound	RT#1	RT#2	Resp#1	Resp#2	PPB	PPB
System Monitoring Compounds						
9) S Hexanol	5.01f	6.14	375396	391662	5080.164	4827.476
Spiked Amount 5000.000			Recovery =		101.60%	96.55%
Target Compounds						

(f)=RT Delta > 1/2 Window (#)=Amounts differ by > 40% (m)=manual int.
GH116737.D MGH5519.M Wed Jan 09 14:07:34 2019 GCGH Page 1

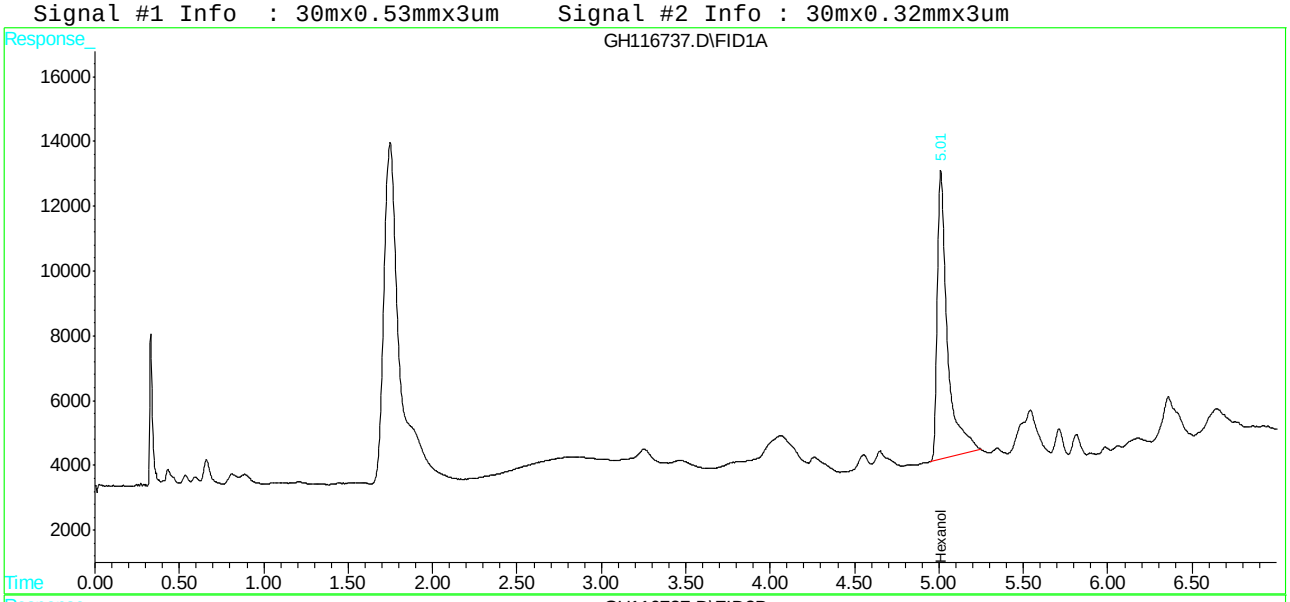
Quantitation Report (QT Reviewed)

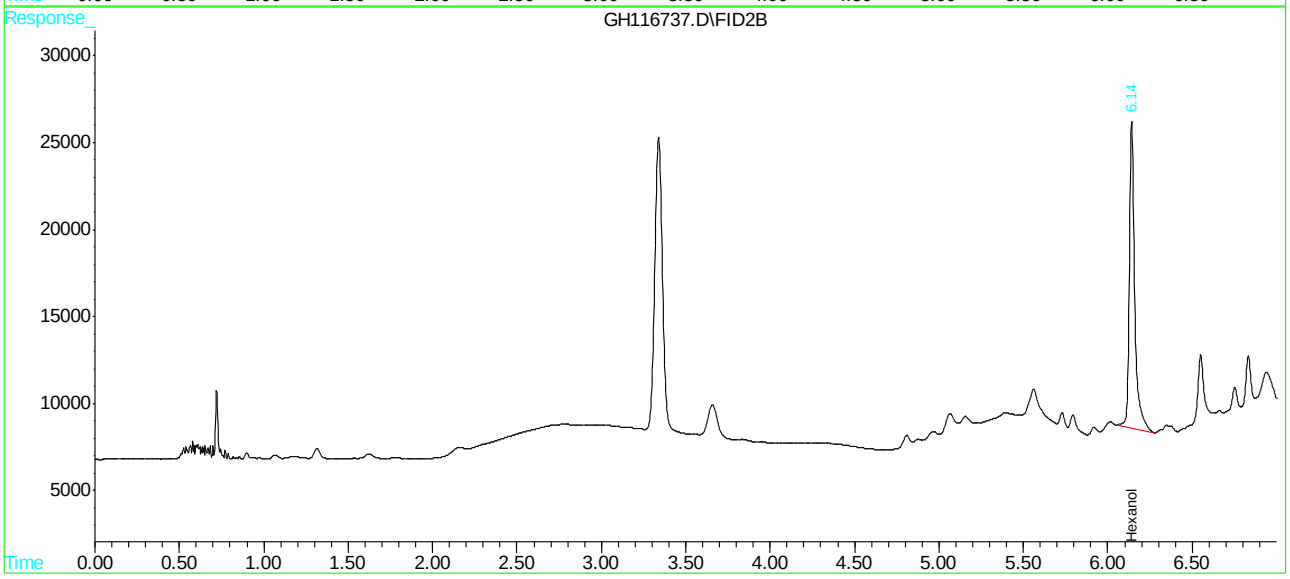
Data File : C:\HPCHEM\1\DATA\GH116737.D\FID1A.CH Vial: 35
Acq On : 9 Jan 2019 12:55 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E

Data File : C:\HPCHEM\1\DATA\GH116737.D\FID2B.CH Vial: 35
Acq On : 9 Jan 2019 1:13 pm Operator: XULIU
Sample : JC80990-6 Inst : GCGH
Misc : GC53787,GGH6218,5.0,,,,1 Multiplr: 1.00
IntFile : AUTOINT1.E
Quant Time: Jan 9 14:07 2019 Quant Results File: MGH5519.RES

Quant Method : C:\HPCHEM\1\METHODS\MGH5519.M (Chemstation Integrator)
Title : METHOD SW846-8015C (DAI)
Last Update : Mon Oct 22 13:56:50 2018
Response via : Multiple Level Calibration
DataAcq Meth : MGH5519.M

Volume Inj. : 2ul
Signal #1 Phase : ZB-624 Signal #2 Phase: RTX-1
Signal #1 Info : 30mx0.53mmx3um Signal #2 Info : 30mx0.32mmx3um





CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011119M1.CSV Date Analyzed: 01/11/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 90 to 110 % Recovery Run ID: MA45972 Units: ug/l

Time:		15:38			16:24			17:26	
Sample ID:	CCVA	CCVA5		CCVA	CCVA6		CCVA	CCVA7	
Metal	True	Results	% Rec	True	Results	% Rec	True	Results	% Rec
Aluminum									
Antimony									
Arsenic	anr								
Barium									
Beryllium									
Boron									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper	anr								
Iron	5000	5150	103.0	5000	5100	102.0	5000	5060	101.2
Lead	anr								
Magnesium									
Manganese	50	50.9	101.8	50	50.3	100.6	50	49.8	99.6
Molybdenum									
Nickel	anr								
Potassium									
Selenium									
Silver									
Sodium									
Strontium									
Thallium	anr								
Tin									
Titanium									
Vanadium									
Zinc	anr								

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011119M1.CSV Date Analyzed: 01/11/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 90 to 110 % Recovery Run ID: MA45972 Units: ug/l

Time:		18:21			19:16			20:11	
Sample ID:	CCVA	CCVA8		CCVA	CCVA9		CCVA	CCVA10	
Metal	True	Results	% Rec	True	Results	% Rec	True	Results	% Rec
Aluminum									
Antimony									
Arsenic	anr								
Barium									
Beryllium									
Boron									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper	anr								
Iron	5000	5060	101.2	5000	5560 (a)	111.2*(a	5000	5080	101.6
Lead	anr								
Magnesium									
Manganese	50	50.1	100.2	50	54.4 (a)	108.8(a)	50	50.0	100.0
Molybdenum									
Nickel	anr								
Potassium									
Selenium									
Silver									
Sodium									
Strontium									
Thallium	anr								
Tin									
Titanium									
Vanadium									
Zinc	anr								

(*) Outside of QC limits
(anr) Analyte not requested
(a) No samples reported for this element in the area bracketed by this QC.

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011119M1.CSV Date Analyzed: 01/11/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 90 to 110 % Recovery Run ID: MA45972 Units: ug/l

Time:		20:56	
Sample ID:	CCVA	CCVA11	
Metal	True	Results	% Rec
Aluminum			
Antimony			
Arsenic	anr		
Barium			
Beryllium			
Boron			
Cadmium			
Calcium			
Chromium			
Cobalt			
Copper	anr		
Iron	5000	5130	102.6
Lead	anr		
Magnesium			
Manganese	50	50.5	101.0
Molybdenum			
Nickel	anr		
Potassium			
Selenium			
Silver			
Sodium			
Strontium			
Thallium	anr		
Tin			
Titanium			
Vanadium			
Zinc	anr		

(*) Outside of QC limits
(anr) Analyte not requested

LOW CALIBRATION CHECK STANDARDS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011119M1.CSV Date Analyzed: 01/11/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 80 to 120 % Recovery Run ID: MA45972 Units: ug/l

Time:			12:24	
Sample ID:	CRI	CRIA	CRI1	
Metal	True	True	Results	% Rec
Aluminum	25	25		
Antimony	2.0	0.25		
Arsenic	0.50	0.50	anr	
Barium	1.0	0.50		
Beryllium	0.50	0.25		
Boron	25	2.5		
Cadmium	0.50	0.25		
Calcium	250	125		
Chromium	1.0	2.0		
Cobalt	0.50	0.25		
Copper	2.0	2.0	anr	
Iron	25	25	24.2	96.8
Lead	0.50	0.25	anr	
Magnesium	250	125		
Manganese	1.0	0.25	1.01	101.0
Molybdenum	1.0	0.50		
Nickel	1.0	2.0	anr	
Potassium	250	125		
Selenium	0.50	0.50		
Silver	0.50	1.0		
Sodium	250	125		
Strontium	5.0	0.50		
Thallium	0.50	0.25	anr	
Tin	5.0	0.50		
Titanium	1.0	0.50		
Vanadium	1.0	2.0		
Zinc	5.0	2.0	anr	

(*) Outside of QC limits
(anr) Analyte not requested

INTERFERING ELEMENT CHECK STANDARDS SUMMARY
Part 1 - ICSA and ICSAB Standards

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011119M1.CSV Date Analyzed: 01/11/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 80 to 120 % Recovery Run ID: MA45972 Units: ug/l

Time: / Sample ID: / Metal	ICSA True	ICSAB True	12:35 ICSA1 Results	% Rec	12:40 ICSAB1 Results	% Rec
Aluminum	100000	100000	89600	89.6	89000	89.0
Antimony			0.0855		0.0761	
Arsenic		20	0.0792		19.0	95.0
Barium			0.155		0.217	
Beryllium			0.000657		0.00409	
Boron		50	0.294		40.2	80.4
Cadmium		20	0.0487		17.8	89.0
Calcium	100000	100000	93000	93.0	94400	94.4
Chromium		20	0.190		19.6	98.0
Cobalt		20	0.0482		18.3	91.5
Copper		20	0.414		17.7	88.5
Iron	100000	100000	85800	85.8	88700	88.7
Lead			0.107		0.118	
Magnesium	100000	100000	87200	87.2	87400	87.4
Manganese		20	0.363		19.8	99.0
Molybdenum	2000	2000	2260	113.0	2290	114.5
Nickel		20	0.379		17.5	87.5
Potassium	100000	100000	94600	94.6	95700	95.7
Selenium		20	0.0630		20.3	101.5
Silver		20	0.0304		21.7	108.5
Sodium	100000	100000	88200	88.2	89000	89.0
Strontium	2000	2000	2260	113.0	2130	106.5
Thallium			0.00795		0.00413	
Tin	2000	2000	2010	100.5	1920	96.0
Titanium	2000	2000	1910	95.5	1950	97.5
Vanadium		20	0.0302		21.5	107.5
Zinc		20	0.449		18.0	90.0

(*) Outside of QC limits
(anr) Analyte not requested

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Dilution Factor	PS Recov	Comments
11:06	MA45980-STD1	1		STDA
11:11	MA45980-STD2	1		STDA
11:16	MA45980-STD3	1		STDA
11:21	MA45980-STD4	1		STDB
11:26	MA45980-STD5	1		STDC
11:31	MA45980-STD6	1		STDC
11:36	MA45980-STD7	1		STDD
11:41	MA45980-STD8	1		STDE
11:46	MA45980-STD9	1		STDF
11:51	MA45980-STD10	1		STDG
11:56	MA45980-STD11	1		STDH
12:01	MA45980-STD12	1		STDI
12:06	MA45980-STD13	1		STDJ
12:11	ZZZZZZ	1		
12:16	ZZZZZZ	1		
12:21	MA45980-ICVA1	1		
12:28	MA45980-ICV1	1		
12:33	MA45980-ICB1	1		
12:38	MA45980-CCVA1	1		
12:43	MA45980-CCB1	1		
12:48	MA45980-CRI1	1		
12:58	MA45980-ICSA1	1		
13:03	MA45980-ICSAB1	1		
13:08	ZZZZZZ	1		
13:13	MA45980-CCVA2	1		
13:18	MA45980-CCB2	1		
13:27	MP11896-MB1	2		
13:32	MP11896-B1	2		
13:37	ZZZZZZ	2		
13:42	MP11895-MB1	5		
13:47	MP11895-B1	5		
13:52	ZZZZZZ	5		
13:57	ZZZZZZ	1		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Dilution Factor	PS Recov	Comments
14:02	MP11897-B1	1		
14:07	MA45980-CCVA3	1		
14:12	MA45980-CCB3	1		
14:17	MP11897-MB1	1		
14:22	JC80990-3	100		
14:27	JC80990-4	100		
14:32	JC80990-5	25		
14:37	ZZZZZZ	2		
14:42	JC80990-6	10		
14:47	JC80990-8	20		
14:52	JC80990-9	10		
14:57	MA45980-CCVA4	1		
15:02	MA45980-CCB4	1		
15:08	JC80990-1F	10		Mn high
15:13	JC80990-1F	100		
15:18	JC80990-2F	20		
15:23	JC80990-3F	100		Result confirmed with the un-digested sample in MA45987
15:28	ZZZZZZ	2		
15:33	JC80990-4F	100		Result confirmed with the un-digested sample in MA45987
15:38	ZZZZZZ	10		
15:43	JC80990-5F	25		
15:48	JC80990-6F	10		
15:53	MA45980-CCVA5	1		
15:59	MA45980-CCB5	1		
16:04	JC80990-8F	10		Mn high
16:09	JC80990-8F	100		
16:14	JC80990-9F	10		
---------->	Last reportable sample/prep for job JC80990			
16:19	ZZZZZZ	25		
16:24	MP12039-S1	5		
16:29	MP12039-S2	5		
16:34	ZZZZZZ	2		
16:39	ZZZZZZ	2		
16:44	ZZZZZZ	2		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Dilution Factor	PS Recov	Comments
16:49	MA45980-CCVA6	1		
16:54	MA45980-CCB6	1		
---------->	Last reportable CCB for job JC80990			
16:59	ZZZZZZ	2		
17:04	MP12071-B1	2		
17:09	MP12071-S1	2		
17:14	MP12071-S2	2		
17:19	JC81275-1	2		(sample used for QC only; not part of login JC80990)
17:24	ZZZZZZ	2		
17:29	MP12071-MB1	2		
17:34	MA45980-CCVA7	1		
17:39	MA45980-CCB7	1		
17:44	MP12071-SD1	10		
17:49	MP12071-PS1	2		
17:54	ZZZZZZ	2		
17:59	ZZZZZZ	1		
18:04	MA45980-CCVA8	1		
18:09	MA45980-CCB8	1		
18:16	ZZZZZZ	1		
18:21	ZZZZZZ	1		

Refer to raw data for calibration curve and standards.

REPORTED ELEMENTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Element: Dilution	Fe	Mn
12:11	ZZZZZZ	1		
12:16	ZZZZZZ	1		
12:21	MA45980-ICVA1	1	X	X
12:28	MA45980-ICV1	1		
12:33	MA45980-ICB1	1	X	X
12:38	MA45980-CCVA1	1	X	X
12:43	MA45980-CCB1	1	X	X
12:48	MA45980-CRI1	1	X	X
12:58	MA45980-ICSA1	1	X	X
13:03	MA45980-ICSAB1	1	X	X
13:08	ZZZZZZ	1		
13:13	MA45980-CCVA2	1	X	X
13:18	MA45980-CCB2	1	X	X
13:27	MP11896-MB1	2	X	X
13:32	MP11896-B1	2	X	X
13:37	ZZZZZZ	2		
13:42	MP11895-MB1	5	X	X
13:47	MP11895-B1	5	X	X
13:52	ZZZZZZ	5		
13:57	ZZZZZZ	1		
14:02	MP11897-B1	1	X	X
14:07	MA45980-CCVA3	1	X	X
14:12	MA45980-CCB3	1	X	X
14:17	MP11897-MB1	1	X	X
14:22	JC80990-3	100		X
14:27	JC80990-4	100		X
14:32	JC80990-5	25	X	X
14:37	ZZZZZZ	2		
14:42	JC80990-6	10	X	X
14:47	JC80990-8	20		X
14:52	JC80990-9	10		X
14:57	MA45980-CCVA4	1	X	X
15:02	MA45980-CCB4	1	X	X
		Element:	Fe	Mn

REPORTED ELEMENTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Element: Dilution	Fe	Mn	
15:08	JC80990-1F	10	X		
15:13	JC80990-1F	100		X	
15:18	JC80990-2F	20		X	
15:23	JC80990-3F	100		X	
15:28	ZZZZZZ	2			
15:33	JC80990-4F	100		X	
15:38	ZZZZZZ	10			
15:43	JC80990-5F	25	X	X	
15:48	JC80990-6F	10	X	X	
15:53	MA45980-CCVA5	1	X	X	
15:59	MA45980-CCB5	1	X	X	
16:04	JC80990-8F	10	X		
16:09	JC80990-8F	100		X	
16:14	JC80990-9F	10		X	
16:19	ZZZZZZ	25			
16:24	MP12039-S1	5		X	
16:29	MP12039-S2	5		X	
16:34	ZZZZZZ	2			
16:39	ZZZZZZ	2			
16:44	ZZZZZZ	2			
16:49	MA45980-CCVA6	1	X	X	
16:54	MA45980-CCB6	1	X	X	
16:59	ZZZZZZ	2			
17:04	MP12071-B1	2			
17:09	MP12071-S1	2			
17:14	MP12071-S2	2			
17:19	JC81275-1	2			(a)
17:24	ZZZZZZ	2			
17:29	MP12071-MB1	2			
17:34	MA45980-CCVA7	1	X	X	
17:39	MA45980-CCB7	1	X	X	
17:44	MP12071-SD1	10			
17:49	MP12071-PS1	2			
		Element:	Fe	Mn	

REPORTED ELEMENTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Element: Dilution	F e	M n
17:54	ZZZZZZ	2		
17:59	ZZZZZZ	1		
18:04	MA45980-CCVA8	1	X	X
18:09	MA45980-CCB8	1	X	X
18:16	ZZZZZZ	1		
18:21	ZZZZZZ	1		

(a) Sample used for QC only; not part of login JC80990.

Element:	F e	M n

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#1	Istd#2	Istd#3	Istd#4	Istd#5	Istd#6	Istd#7	Istd#8
11:06	MA45980-STD1	100	100	100	100	100	100	100	100
11:11	MA45980-STD2	100	100	100	100	100	100	100	100
11:16	MA45980-STD3	100	100	100	100	100	100	100	100
11:21	MA45980-STD4	100.715	100.187	100.083	100.566	100.934	102.042	100.791	100.413
11:26	MA45980-STD5	102.355	105.13	102.219	100.446	103.859	102.831	101.368	104.116
11:31	MA45980-STD6	99.818	101.325	102.878	102.034	102.312	105.032	102.026	102.264
11:36	MA45980-STD7	100.943	101.456	102.114	100.673	102.46	103.619	101.1	102.668
11:41	MA45980-STD8	100.042	100.026	102.532	101.269	102.079	103.112	100.825	102.168
11:46	MA45980-STD9	100.793	98.954	100.391	99.947	100.885	101.323	99.114	101.031
11:51	MA45980-STD10	98.143	98.671	99.943	99.015	99.502	101.336	99.632	100.094
11:56	MA45980-STD11	101.053	99.331	101.579	99.572	99.856	102.227	100.106	101.885
12:01	MA45980-STD12	99.737	100.399	100.869	98.593	115.909	102.355	97.515	115.878
12:06	MA45980-STD13	98.725	99.505	102.182	97.777	97.321	99.774	94.945	96.502
12:11	ZZZZZZ	No results reported for the elements associated with this internal standard.							
12:16	ZZZZZZ	No results reported for the elements associated with this internal standard.							
12:21	MA45980-ICVA1	99.963	102.139	103.211	99.085	101.71	102.308	97.318	102.171
12:28	MA45980-ICV1	105.405	104.2	106.429	104.24	103.887	108.394	104.529	104.669
12:33	MA45980-ICB1	104.22	106.093	107.124	104.659	105.005	107.959	104.201	104.689
12:38	MA45980-CCVA1	103.286	103.205	104.47	100.5	102.285	103.461	98.764	102.781
12:43	MA45980-CCB1	103.945	105.353	106.921	104.709	105.005	108.25	104.948	104.502
12:48	MA45980-CRI1	105.934	106.468	107.065	105.278	106.605	108.85	105.019	106.704
12:58	MA45980-ICSA1	83.292	90.652	94.856	85.103	90.606	91.109	79.42	82.175
13:03	MA45980-ICSAB1	80.102	89.022	91.859	86.157	89.362	87.927	79.108	81.373
13:08	ZZZZZZ	No results reported for the elements associated with this internal standard.							
13:13	MA45980-CCVA2	80.328	87.54	88.8	93.401	92.063	94.128	93.116	92.926
13:18	MA45980-CCB2	84.02	91.304	91.392	98.743	95.533	97.758	99.684	95.986
13:27	MP11896-MB1	88.128	92.098	93.639	104.467	95.1	96.084	101.101	94.881
13:32	MP11896-B1	88.302	93.448	95.019	105.345	97.009	96.626	101.493	97.453
13:37	ZZZZZZ	91.806	97.247	96.635	110.308	98.872	99.649	105.332	98.963
13:42	MP11895-MB1	96.78	105.431	103.465	112.83	106.861	108.242	111.235	107.262
13:47	MP11895-B1	97.115	104.895	101.984	111.471	105.896	105.971	108.165	106.366
13:52	ZZZZZZ	97.888	105.734	104.51	113.615	107.67	108.74	112.593	107.85
13:57	ZZZZZZ	102.508	109.204	109.181	118.811	110.588	112.501	115.481	111.241

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#1	Istd#2	Istd#3	Istd#4	Istd#5	Istd#6	Istd#7	Istd#8
14:02	MP11897-B1	100.4	108.713	108.117	114.87	110.746	110.812	111.472	111.393
14:07	MA45980-CCVA3	99.539	107.6	104.536	110.614	107.5	107.581	108.188	108.036
14:12	MA45980-CCB3	102.427	107.823	106.059	115.281	109.657	110.643	113.817	109.567
14:17	MP11897-MB1	106.809	111.851	108.911	119.003	111.623	112.43	116.582	111.99
14:22	JC80990-3	105.555	111.792	108.014	116.74	111.516	111.956	115.648	111.679
14:27	JC80990-4	106.86	111.55	108.19	118.369	112.06	112.547	115.554	112.295
14:32	JC80990-5	104.727	111.589	108.485	116.816	109.852	110.342	113.247	110.222
14:37	ZZZZZZ	100.801	106.334	101.478	115.563	105.08	103.72	111.803	104.716
14:42	JC80990-6	103.554	114.127	105.651	113.136	109.477	106.515	107.563	109.1
14:47	JC80990-8	106.371	114.45	110.425	118.816	112.621	112.223	116.363	111.746
14:52	JC80990-9	105.885	112.457	108.334	117.283	108.077	109.102	112.989	108.638
14:57	MA45980-CCVA4	104.991	114.45	111.995	116.659	112.2	113.406	112.147	112.785
15:02	MA45980-CCB4	107.663	114.545	111.508	119.572	113.268	115.472	117.355	113.781
15:08	JC80990-1F	106.159	114.322	109.994	116.243	110.703	111.6	111.149	109.775
15:13	JC80990-1F	107.27	115.068	112.568	119.667	114.601	114.738	117.26	114.143
15:18	JC80990-2F	106.301	114.44	110.553	118.803	112.128	112.226	114.488	112.114
15:23	JC80990-3F	105.805	115.166	111.528	118.895	113.458	114.657	116.484	112.932
15:28	ZZZZZZ	104.752	110.43	106.576	119.951	107.11	105.666	111.701	107.06
15:33	JC80990-4F	108.796	116.701	111.847	119.043	114.313	114.329	116.829	113.94
15:38	ZZZZZZ	107.55	113.408	110	119.637	110.281	111.343	114.567	110.083
15:43	JC80990-5F	110.246	115.91	112.946	119.395	113.333	113.773	114.916	113.043
15:48	JC80990-6F	105.706	112.596	107.595	113.635	107.28	106.09	107.23	106.626
15:53	MA45980-CCVA5	107.166	113.398	109.894	114.984	110.981	110.407	110.08	112.056
15:59	MA45980-CCB5	109.71	115.169	113.195	119.521	113.509	114.86	115.379	113.361
16:04	JC80990-8F	106.922	111.708	107.46	114.245	105.976	105.804	107.344	105.918
16:09	JC80990-8F	107.849	114.219	111.033	117.449	111.69	112.381	114.344	111.446
16:14	JC80990-9F	106.606	113.341	109.785	117.429	108.285	109.604	112.264	107.952
16:19	ZZZZZZ	98.958	104.147	111.146	115.591	101.616	114.294	112.481	101.201
16:24	MP12039-S1	108.368	115.259	111.829	119.441	120.002	120.276	122.547	119.992
16:29	MP12039-S2	109.48	117.94	111.279	120.021	120.414	120.048	121.921	121.123
16:34	ZZZZZZ	107.176	113.953	109.117	121.42	109.784	107.444	114.792	109.415
16:39	ZZZZZZ	109.042	114.095	109.74	121.857	110.764	107.835	114.708	109.579
16:44	ZZZZZZ	106.631	113.337	108.754	120.213	108.352	105.724	112.971	108.936

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#1	Istd#2	Istd#3	Istd#4	Istd#5	Istd#6	Istd#7	Istd#8
16:49	MA45980-CCVA6	110.002	118.545	113.763	116.524	114.133	113.404	112.221	114.271
16:54	MA45980-CCB6	110.488	116.644	113.083	118.912	114.011	114.543	116.044	113.988
16:59	ZZZZZZ	110.438	115.132	113.907	113.314	115.851	118.447	113.837	115.518
17:04	MP12071-B1	108.034	113.31	109.362	117.082	108.666	106.518	110.271	109.005
17:09	MP12071-S1	102.696	111.372	106.393	114.56	103.518	103.149	138.569	!a104.017
17:14	MP12071-S2	102.443	111.09	104.58	112.884	103.449	101.087	104.03	103.712
17:19	JC81275-1	99.804	109.717	102.67	112.355	101.954	99.844	104.297	101.39
17:24	ZZZZZZ	102.6	109.376	104.841	114.31	106.449	103.985	109.24	105.322
17:29	MP12071-MB1	105.663	110.378	105.747	116.054	107.018	105.03	109.757	106.463
17:34	MA45980-CCVA7	106.269	110.2	108.439	111.722	108.473	108.673	107.519	109.276
17:39	MA45980-CCB7	106.542	111.494	109.008	113.268	109.643	110.853	111.046	109.177
17:44	MP12071-SD1	105.499	111.233	108.017	112.772	107.745	109.969	109.836	108.072
17:49	MP12071-PS1	102.813	107.145	103.756	110.518	100.759	100.163	102.757	101.771
17:54	ZZZZZZ	103.273	109.012	105.151	114.02	104.01	101.682	106.748	104.688
17:59	ZZZZZZ	No results reported for the elements associated with this internal standard.							
18:04	MA45980-CCVA8	103.127	109.354	107.306	109.151	106.605	106.036	105.017	106.605
18:09	MA45980-CCB8	102.724	109.231	105.978	110.842	107.541	107.955	107.754	107.457
18:16	ZZZZZZ	No results reported for the elements associated with this internal standard.							
18:21	ZZZZZZ	No results reported for the elements associated with this internal standard.							

! = Outside limits.

LEGEND:			CCV/CCB
Istd#	Parameter	Limits	Limits
Istd#1	Lithium	60-125 %	60-125 %
Istd#2	Scandium (45-1)	60-125 %	60-125 %
Istd#3	Scandium (45-2)	60-125 %	60-125 %
Istd#4	Scandium (45-3)	60-125 %	60-125 %
Istd#5	Germanium (72-1)	60-125 %	60-125 %
Istd#6	Germanium (72-2)	60-125 %	60-125 %
Istd#7	Germanium (72-3)	60-125 %	60-125 %
Istd#8	Germanium (74-1)	60-125 %	60-125 %

(a) No samples reported for the elements associated with this internal standard.

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#9	Istd#10	Istd#11	Istd#12	Istd#13	Istd#14	Istd#15	Istd#16
11:06	MA45980-STD1	100	100	100	100	100	100	100	100
11:11	MA45980-STD2	100	100	100	100	100	100	100	100
11:16	MA45980-STD3	100	100	100	100	100	100	100	100
11:21	MA45980-STD4	101.562	100.305	100.855	100.248	99.941	100.452	100.609	99.729
11:26	MA45980-STD5	102.784	100.658	105.386	100.847	100.405	105.335	101.575	103
11:31	MA45980-STD6	104.28	102.111	102.075	102.288	101.537	102.203	102.801	100.744
11:36	MA45980-STD7	103.797	100.791	101.109	101.414	100.513	101.103	101.785	99.632
11:41	MA45980-STD8	103.501	101.202	101.436	101.592	100.132	100.627	101.693	100.506
11:46	MA45980-STD9	101.86	98.877	99.765	99.678	98.458	99.744	100.314	99.862
11:51	MA45980-STD10	101.068	99.886	99.446	99.119	98.884	100.164	100.587	100.151
11:56	MA45980-STD11	102.682	101.034	99.125	99.54	98.768	100.257	101.041	101.798
12:01	MA45980-STD12	102.296	96.437	96.424	96.33	94.33	98.067	98.843	98.803
12:06	MA45980-STD13	100.041	93.752	93.913	94.828	91.16	96.474	98.469	98.882
12:11	ZZZZZZ	No results reported for the elements associated with this internal standard.							
12:16	ZZZZZZ	No results reported for the elements associated with this internal standard.							
12:21	MA45980-ICVA1	102.954	97.233	99.8	97.556	94.168	101.281	101.18	101.652
12:28	MA45980-ICV1	106.726	103.289	105.45	105.59	103.522	106.918	107.602	103.634
12:33	MA45980-ICB1	108.063	104.441	105.577	106.227	104.113	106.882	107.531	104.107
12:38	MA45980-CCVA1	103.024	98.463	100.725	98.786	95.332	101.055	101.82	102.091
12:43	MA45980-CCB1	107.651	104.329	106.07	105.865	104.325	107.027	107.204	103.6
12:48	MA45980-CRI1	108.238	105.195	107.439	105.516	104.054	107.389	107.691	105.281
12:58	MA45980-ICSA1	87.867	76.412	78.227	76.32	68.181 !a	83.58	87.616	87.559
13:03	MA45980-ICSAB1	85.463	75.982	79.155	75.296	68.173 !a	85.61	85.369	90.861
13:08	ZZZZZZ	No results reported for the elements associated with this internal standard.							
13:13	MA45980-CCVA2	94.662	93.328	95.01	92.472	91.285	99.15	95.367	104.197
13:18	MA45980-CCB2	98.578	99.65	101.237	99.761	100.695	106.031	100.039	107.405
13:27	MP11896-MB1	97.056	100.76	103.007	100.049	103.07	107.079	99.041	110.62
13:32	MP11896-B1	97.55	101.676	102.032	98.541	101.41	106.891	98.119	114.007
13:37	ZZZZZZ	99.658	105.759	105.497	102.64	107.342	110.814	100.315	115.1
13:42	MP11895-MB1	109.328	111.657	111.295	107.755	110.619	114.442	105.688	115.269
13:47	MP11895-B1	105.59	107.756	107.287	103.439	105.23	112.591	102.561	114.254
13:52	ZZZZZZ	109.05	111.082	111.21	106.737	108.633	114.967	105.364	115.068
13:57	ZZZZZZ	112.539	114.742	114.524	110.978	113.743	118.321	109.295	118.011

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#9	Istd#10	Istd#11	Istd#12	Istd#13	Istd#14	Istd#15	Istd#16
14:02	MP11897-B1	111.059	111.604	111.636	108.148	106.956	114.221	105.904	114.23
14:07	MA45980-CCVA3	107.747	107.677	106.66	102.349	102.032	110.996	102.608	111.536
14:12	MA45980-CCB3	110.487	113.442	112.439	108.462	110.747	114.491	106.053	114.815
14:17	MP11897-MB1	112.968	115.899	115.97	110.566	113.39	117.631	108.51	116.171
14:22	JC80990-3	112.018	114.226	113.357	108.412	110.317	115.559	106.665	115.563
14:27	JC80990-4	111.877	114.823	114.387	108.708	111.675	117.754	106.901	116.532
14:32	JC80990-5	110.27	112.23	111.086	106.578	108.491	114.796	105.248	115.549
14:37	ZZZZZZ	103.473	110.739	109.713	103.723	109.335	114.605	99.64	114.728
14:42	JC80990-6	106.124	105.658	109.539	100.298	100.289	113.186	100.648	116.421
14:47	JC80990-8	113.015	115.562	112.854	108.724	109.882	115.978	106.513	115.411
14:52	JC80990-9	109.043	112.045	108.37	103.933	105.838	113.29	103.677	114.802
14:57	MA45980-CCVA4	113.898	112.387	111.121	105.932	104.823	114.197	106.198	113.238
15:02	MA45980-CCB4	115.179	116.548	116.685	111.227	112.623	118.791	108.479	115.992
15:08	JC80990-1F	109.958	110.419	111.139	105.242	105.262	113.492	104.369	115.507
15:13	JC80990-1F	115.296	116.334	116.482	110.498	111.173	117.096	108.925	116.264
15:18	JC80990-2F	111.701	114.459	114.2	107.872	109.751	117.558	106.012	115.341
15:23	JC80990-3F	114.37	115.685	113.599	109.631	111.698	117.075	107.41	114.95
15:28	ZZZZZZ	105.291	111.651	109.512	104.406	107.862	114.708	101.757	117.088
15:33	JC80990-4F	114.154	115.917	116.39	109.823	111.654	119.938	107.872	116.152
15:38	ZZZZZZ	110.437	114.464	112.249	106.917	109.887	116.377	105.369	115.158
15:43	JC80990-5F	112.621	114.296	114.288	108.042	109.303	116.78	106.696	117.201
15:48	JC80990-6F	106.338	105.66	106.746	100.56	100.281	110.74	100.639	112.836
15:53	MA45980-CCVA5	110.229	110.303	110.839	103.275	103.302	113.674	103.489	111.165
15:59	MA45980-CCB5	114.995	114.779	116.282	110.707	111.287	119.605	108.624	114.661
16:04	JC80990-8F	106.303	106.754	107.271	100.801	101.308	111.875	100.617	112.156
16:09	JC80990-8F	112.244	113.79	112.901	107.233	109.075	115.114	106.543	113.587
16:14	JC80990-9F	109.888	110.935	109.719	103.762	105.345	114.766	104.262	113.347
16:19	ZZZZZZ	109.681	107.721	96.749	100.389	99.118	101.468	102.361	103.098
16:24	MP12039-S1	119.114	122.093	110.462	104.448	105.525	114.059	104.855	116.248
16:29	MP12039-S2	119.995	121.618	112.123	104.891	105.793	116.347	105.807	116.692
16:34	ZZZZZZ	107.567	114.185	114.962	108.407	112.976	118.549	103.941	119.384
16:39	ZZZZZZ	108.244	113.865	115.446	108.724	113.157	118.11	104.877	120.403
16:44	ZZZZZZ	105.673	111.375	112.197	104.813	108.627	116.196	102.327	117.451

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#9	Istd#10	Istd#11	Istd#12	Istd#13	Istd#14	Istd#15	Istd#16
16:49	MA45980-CCVA6	113.11	111.92	111.428	105.545	103.992	116.244	105.377	113.303
16:54	MA45980-CCB6	114.502	115.179	116.556	110.161	111.451	118.37	108.63	114.699
16:59	ZZZZZZ	118.019	112.8	116.444	110.218	107.584	116.735	111.39	111.169
17:04	MP12071-B1	105.765	109.351	112.263	104.824	105.775	116.047	102.693	115.98
17:09	MP12071-S1	103.053	137.348	!a105.018	98.766	99.315	111.024	99.34	114.527
17:14	MP12071-S2	101.363	104.301	104.528	97.277	98.717	111.089	98.678	114.347
17:19	JC81275-1	100.564	103.311	105.48	97.59	99.746	110.513	98.419	113.447
17:24	ZZZZZZ	103.768	108.048	112.197	104.713	107.97	116.464	101.429	116.394
17:29	MP12071-MB1	103.995	108.858	112.012	105.142	108.713	115.008	102.061	115.889
17:34	MA45980-CCVA7	108.335	107.053	107.757	101.908	100.698	111.824	102.5	110.505
17:39	MA45980-CCB7	110.693	110.03	111.808	107.083	107.544	115.608	105.793	112.79
17:44	MP12071-SD1	109.665	109.066	110.83	103.554	104.107	113.907	104.36	110.471
17:49	MP12071-PS1	99.847	102.124	102.146	96.472	97.504	108.621	97.206	111.278
17:54	ZZZZZZ	101.391	106.021	109.049	102.141	104.244	114.598	100.654	115.45
17:59	ZZZZZZ	No results reported for the elements associated with this internal standard.							
18:04	MA45980-CCVA8	106.627	104.561	106.375	100.415	98.161	110.335	101.488	108.31
18:09	MA45980-CCB8	107.919	107.112	112.323	104.85	104.724	114.73	103.973	110.464
18:16	ZZZZZZ	No results reported for the elements associated with this internal standard.							
18:21	ZZZZZZ	No results reported for the elements associated with this internal standard.							

! = Outside limits.

LEGEND:			CCV/CCB
Istd#	Parameter	Limits	Limits
Istd#9	Germanium (74-2)	60-125 %	60-125 %
Istd#10	Germanium (74-3)	60-125 %	60-125 %
Istd#11	Rhodium (103-1)	60-125 %	60-125 %
Istd#12	Rhodium (103-2)	60-125 %	60-125 %
Istd#13	Rhodium (103-3)	60-125 %	60-125 %
Istd#14	Indium (115-1)	60-125 %	60-125 %
Istd#15	Indium (115-2)	60-125 %	60-125 %
Istd#16	Terbium (159-1)	60-125 %	60-125 %

(a) No samples reported for the elements associated with this internal standard.

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#17	Istd#18	Istd#19	Istd#20	Istd#21	Istd#22
11:06	MA45980-STD1	100	100	100	100	100	100
11:11	MA45980-STD2	100	100	100	100	100	100
11:16	MA45980-STD3	100	100	100	100	100	100
11:21	MA45980-STD4	100.126	99.374	99.489	100.902	100.429	99.841
11:26	MA45980-STD5	100.941	99.909	103.977	101.45	103.572	100.69
11:31	MA45980-STD6	102.251	100.774	100.974	102.681	100.784	101.866
11:36	MA45980-STD7	101.801	99.517	101.67	101.738	101.01	101.245
11:41	MA45980-STD8	101.493	99.651	101.379	102.003	101.375	101.182
11:46	MA45980-STD9	100.486	98.164	101.463	100.672	100.702	100.092
11:51	MA45980-STD10	100.449	99.398	100.041	100.686	99.553	99.752
11:56	MA45980-STD11	100.694	99.537	100.741	101.347	99.349	99.482
12:01	MA45980-STD12	100.15	97.195	98.576	100.881	95.558	95.337
12:06	MA45980-STD13	100.184	94.842	97.799	100.861	92.595	92.535
12:11	ZZZZZZ	No results reported for the elements associated with this internal standard.					
12:16	ZZZZZZ	No results reported for the elements associated with this internal standard.					
12:21	MA45980-ICVA1	101.494	96.801	100.972	102.04	96.111	96.157
12:28	MA45980-ICV1	105.507	102.063	103.327	105.971	103.506	104.296
12:33	MA45980-ICB1	105.878	102.206	102.632	105.636	103.09	104.354
12:38	MA45980-CCVA1	102.79	97.109	101.914	102.968	96.73	96.676
12:43	MA45980-CCB1	105.361	102.405	102.579	105.829	104.54	104.236
12:48	MA45980-CRI1	104.982	102.505	104.448	105.638	106.034	104.005
12:58	MA45980-ICSA1	88.896	75.945	86.922	90.255	72.576	74.236
13:03	MA45980-ICSAB1	88.003	76.42	89.962	89.445	74.925	73.362
13:08	ZZZZZZ	No results reported for the elements associated with this internal standard.					
13:13	MA45980-CCVA2	99.517	96.087	104.628	100.775	101.58	95.663
13:18	MA45980-CCB2	101.759	101.816	106.286	103.232	108.285	102.46
13:27	MP11896-MB1	103.592	105.65	110.536	104.615	111.297	101.939
13:32	MP11896-B1	103.111	105.384	113.349	104.577	108.1	97.79
13:37	ZZZZZZ	105.028	109.664	114.086	106.784	111.652	101.012
13:42	MP11895-MB1	106.545	109.054	113.038	107.8	114.468	106.629
13:47	MP11895-B1	104.364	106.172	113.341	105.947	109.542	100.661
13:52	ZZZZZZ	105.555	107.63	113.74	106.976	113.518	104.468
13:57	ZZZZZZ	108.981	112.096	115.919	110.278	115.109	106.917

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#17	Istd#18	Istd#19	Istd#20	Istd#21	Istd#22
14:02	MP11897-B1	108.089	105.962	112.831	107.849	110.39	103.284
14:07	MA45980-CCVA3	103.348	102.861	110.969	104.851	105.773	98.536
14:12	MA45980-CCB3	105.6	107.651	112.14	106.98	114.643	105.259
14:17	MP11897-MB1	107.363	109.497	114.33	108.185	116.491	107.677
14:22	JC80990-3	105.912	107.772	113.133	107.397	113.94	104.859
14:27	JC80990-4	105.68	108.661	113.455	107.041	114.098	105.077
14:32	JC80990-5	105.366	107.357	113.328	107.076	112.284	101.819
14:37	ZZZZZZ	101.948	108.621	111.035	103.781	112.638	99.931
14:42	JC80990-6	101.991	101.724	113.4	103.705	105.318	93.499
14:47	JC80990-8	105.631	107.238	113.088	107.059	111.656	102.924
14:52	JC80990-9	104.11	106.608	112.75	106.346	108.145	98.342
14:57	MA45980-CCVA4	105.052	103.493	111.637	106.43	107.656	99.579
15:02	MA45980-CCB4	106.743	107.885	112.457	107.861	115.033	105.306
15:08	JC80990-1F	105.061	105.011	112.132	106.732	107.181	98.149
15:13	JC80990-1F	106.283	107.503	112.013	107.938	113.364	104.578
15:18	JC80990-2F	105.016	106.91	111.199	106.362	111.884	102.351
15:23	JC80990-3F	105.351	107.234	111.633	106.485	112.541	104.051
15:28	ZZZZZZ	105.217	108.908	115.478	106.439	110.036	97.793
15:33	JC80990-4F	105.316	107.735	112.335	107.902	114.241	104.978
15:38	ZZZZZZ	105.121	107.773	112.316	106.52	110.951	101.509
15:43	JC80990-5F	105.412	106.301	112.399	107.101	111.388	101.422
15:48	JC80990-6F	101.796	101.642	110.063	103.465	103.162	93.285
15:53	MA45980-CCVA5	102.469	102.126	110.904	103.837	106.717	97.236
15:59	MA45980-CCB5	106.074	106.32	111.75	107.353	112.966	104.908
16:04	JC80990-8F	102.312	102.748	108.664	102.843	104.373	93.747
16:09	JC80990-8F	104.486	105.374	109.978	105.869	110.86	101.885
16:14	JC80990-9F	103.797	104.983	110.587	105.54	106.276	97.736
16:19	ZZZZZZ	104.162	102.445	119.656	123.551	92.999	92.97
16:24	MP12039-S1	104.915	105.577	112.769	106.786	107.675	97.085
16:29	MP12039-S2	105.345	105.802	113.456	106.464	108.087	97.518
16:34	ZZZZZZ	106.239	111.226	115.761	107.419	114.026	101.193
16:39	ZZZZZZ	106.793	111.017	117.082	108.102	113.604	100.875
16:44	ZZZZZZ	104.936	108.447	115.252	106.062	110.186	97.045

INTERNAL STANDARD SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
Analyst: ZC Run ID: MA45980
Parameters: Fe,Mn

Time	Sample Description	Istd#17	Istd#18	Istd#19	Istd#20	Istd#21	Istd#22
16:49	MA45980-CCVA6	104.556	102.279	111.015	105.841	106.913	98.232
16:54	MA45980-CCB6	105.22	105.809	110.777	106.527	112.751	103.792
16:59	ZZZZZZ	104.897	101.756	106.243	105.696	109.164	104.475
17:04	MP12071-B1	104.747	105.653	113.641	106.045	110.264	97.899
17:09	MP12071-S1	101.746	102.166	110.418	103.068	102.228	91.08
17:14	MP12071-S2	101.464	101.6	111.411	102.7	103.203	90.598
17:19	JC81275-1	100.971	102.868	110.596	102.431	104.939	91.624
17:24	ZZZZZZ	104.136	107.26	112.732	104.895	113.128	98.997
17:29	MP12071-MB1	103.797	106.99	112.247	104.597	111.967	98.907
17:34	MA45980-CCVA7	101.448	99.762	106.248	102.537	105.182	95.81
17:39	MA45980-CCB7	103.631	102.915	106.952	104.312	110.715	102.244
17:44	MP12071-SD1	101.898	101.62	106.245	103.286	108.699	99.62
17:49	MP12071-PS1	99.692	99.992	107.424	101.186	101.036	90.123
17:54	ZZZZZZ	103.616	105.297	112.708	104.725	108.511	95.661
17:59	ZZZZZZ	No results reported for the elements associated with this internal standard.					
18:04	MA45980-CCVA8	100.462	97.491	104.91	101.818	102.593	95.13
18:09	MA45980-CCB8	101.267	101.102	105.96	102.416	110.011	100.225
18:16	ZZZZZZ	No results reported for the elements associated with this internal standard.					
18:21	ZZZZZZ	No results reported for the elements associated with this internal standard.					

! = Outside limits.

LEGEND:			CCV/CCB
Istd#	Parameter	Limits	Limits
Istd#17	Terbium (159-2)	60-125 %	60-125 %
Istd#18	Terbium (159-3)	60-125 %	60-125 %
Istd#19	Holmium (165-1)	60-125 %	60-125 %
Istd#20	Holmium (165-2)	60-125 %	60-125 %
Istd#21	Bismuth (209-1)	60-125 %	60-125 %
Istd#22	Bismuth (209-2)	60-125 %	60-125 %

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: result < 1/2 RL Run ID: MA45980 Units: ug/l

Time: / Sample ID:				12:33 ICB1		12:43 CCB1		13:18 CCB2	
Metal	RL	IDL	LOD	raw	final	raw	final	raw	final
Aluminum	25	1.1	20						
Antimony	2.0	.27	1.5						
Arsenic	0.50	.017	1.0						
Barium	1.0	.011	0.50						
Beryllium	0.50	.002	0.25						
Boron	25	1.5	20						
Cadmium	0.50	.004	2.0						
Calcium	250	21	50						
Chromium	1.0	.009	3.0						
Cobalt	0.50	.002	0.25						
Copper	2.0	.012	4.0						
Iron	25	.87	13	0.280	<25	0.701	<25	1.89	<25
Lead	0.50	.004	1.0						
Magnesium	250	1.9	130						
Manganese	1.0	.02	1.0	0.00171	<2.0	0.00423	<2.0	0.00651	<2.0
Molybdenum	1.0	.018	0.50						
Nickel	1.0	.02	3.0						
Potassium	250	3.3	50						
Selenium	0.50	.025	0.50						
Silver	0.50	.005	0.50						
Sodium	250	3.6	100						
Strontium	5.0	.039	5.0						
Thallium	0.50	.003	0.50						
Tin	5.0	.038	2.5						
Titanium	1.0	.042	1.0						
Vanadium	1.0	.006	1.0						
Zinc	5.0	2.2	7.5						

(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: result < 1/2 RL Run ID: MA45980 Units: ug/l

Time: / Sample ID:				14:12 CCB3		15:02 CCB4		15:59 CCB5	
Metal	RL	IDL	LOD	raw	final	raw	final	raw	final
Aluminum	25	1.1	20						
Antimony	2.0	.27	1.5						
Arsenic	0.50	.017	1.0						
Barium	1.0	.011	0.50						
Beryllium	0.50	.002	0.25						
Boron	25	1.5	20						
Cadmium	0.50	.004	2.0						
Calcium	250	21	50						
Chromium	1.0	.009	3.0						
Cobalt	0.50	.002	0.25						
Copper	2.0	.012	4.0						
Iron	25	.87	13	0.983	<50	1.04	<25	4.49	<25
Lead	0.50	.004	1.0						
Magnesium	250	1.9	130						
Manganese	1.0	.02	1.0	0.00597	<1.0	0.00663	<2.0	0.0599	<2.0
Molybdenum	1.0	.018	0.50						
Nickel	1.0	.02	3.0						
Potassium	250	3.3	50						
Selenium	0.50	.025	0.50						
Silver	0.50	.005	0.50						
Sodium	250	3.6	100						
Strontium	5.0	.039	5.0						
Thallium	0.50	.003	0.50						
Tin	5.0	.038	2.5						
Titanium	1.0	.042	1.0						
Vanadium	1.0	.006	1.0						
Zinc	5.0	2.2	7.5						

(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 1 - Initial and Continuing Calibration Blanks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: result < 1/2 RL Run ID: MA45980 Units: ug/l

Time: / Sample ID:				16:54 CCB6	
Metal	RL	IDL	LOD	raw	final
Aluminum	25	1.1	20		
Antimony	2.0	.27	1.5		
Arsenic	0.50	.017	1.0		
Barium	1.0	.011	0.50		
Beryllium	0.50	.002	0.25		
Boron	25	1.5	20		
Cadmium	0.50	.004	2.0		
Calcium	250	21	50		
Chromium	1.0	.009	3.0		
Cobalt	0.50	.002	0.25		
Copper	2.0	.012	4.0		
Iron	25	.87	13	1.94	<25
Lead	0.50	.004	1.0		
Magnesium	250	1.9	130		
Manganese	1.0	.02	1.0	0.0277	<1.0
Molybdenum	1.0	.018	0.50		
Nickel	1.0	.02	3.0		
Potassium	250	3.3	50		
Selenium	0.50	.025	0.50		
Silver	0.50	.005	0.50		
Sodium	250	3.6	100		
Strontium	5.0	.039	5.0		
Thallium	0.50	.003	0.50		
Tin	5.0	.038	2.5		
Titanium	1.0	.042	1.0		
Vanadium	1.0	.006	1.0		
Zinc	5.0	2.2	7.5		

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 90 to 110 % Recovery Run ID: MA45980 Units: ug/l

Time: / Sample ID: / Metal	ICVA True	12:21 ICVA1 Results	% Rec	ICV True	12:28 ICV1 Results	% Rec	CCVA True	12:38 CCVA1 Results	% Rec
Aluminum	anr								
Antimony	anr								
Arsenic	anr								
Barium	anr								
Beryllium	anr								
Boron									
Cadmium	anr								
Calcium	anr								
Chromium	anr								
Cobalt	anr								
Copper	anr								
Iron	5500	5490	99.8				5000	5300	106.0
Lead	anr								
Magnesium	anr								
Manganese	60	61.5	102.5				50	52.7	105.4
Molybdenum									
Nickel	anr								
Potassium	anr								
Selenium	anr								
Silver	anr								
Sodium	anr								
Strontium									
Thallium	anr								
Tin									
Titanium									
Vanadium	anr								
Zinc	anr								

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 90 to 110 % Recovery Run ID: MA45980 Units: ug/l

Time:		13:13			14:07			14:57	
Sample ID:	CCVA	CCVA2		CCVA	CCVA3		CCVA	CCVA4	
Metal	True	Results	% Rec	True	Results	% Rec	True	Results	% Rec
Aluminum	anr								
Antimony	anr								
Arsenic	anr								
Barium	anr								
Beryllium	anr								
Boron									
Cadmium	anr								
Calcium	anr								
Chromium	anr								
Cobalt	anr								
Copper	anr								
Iron	5000	5220	104.4	5000	5090	101.8	5000	5090	101.8
Lead	anr								
Magnesium	anr								
Manganese	50	51.1	102.2	50	49.4	98.8	50	49.1	98.2
Molybdenum									
Nickel	anr								
Potassium	anr								
Selenium	anr								
Silver	anr								
Sodium	anr								
Strontium									
Thallium	anr								
Tin									
Titanium									
Vanadium	anr								
Zinc	anr								

(*) Outside of QC limits
(anr) Analyte not requested

CALIBRATION CHECK STANDARDS SUMMARY
Initial and Continuing Calibration Checks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 90 to 110 % Recovery Run ID: MA45980 Units: ug/l

Time:		15:53			16:49	
Sample ID:	CCVA	CCVA5		CCVA	CCVA6	
Metal	True	Results	% Rec	True	Results	% Rec
Aluminum	anr					
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium	anr					
Boron						
Cadmium	anr					
Calcium	anr					
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron	5000	5130	102.6	5000	5120	102.4
Lead	anr					
Magnesium	anr					
Manganese	50	49.1	98.2	50	49.1	98.2
Molybdenum						
Nickel	anr					
Potassium	anr					
Selenium	anr					
Silver	anr					
Sodium	anr					
Strontium						
Thallium	anr					
Tin						
Titanium						
Vanadium	anr					
Zinc	anr					

(*) Outside of QC limits
(anr) Analyte not requested

10.3.4 10

LOW CALIBRATION CHECK STANDARDS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 80 to 120 % Recovery Run ID: MA45980 Units: ug/l

Time: / Sample ID: / Metal	CRI True	CRIA True	12:48 CRI1 Results	% Rec
Aluminum	25	25	anr	
Antimony	2.0	0.25	anr	
Arsenic	0.50	0.50	anr	
Barium	1.0	0.50	anr	
Beryllium	0.50	0.25	anr	
Boron	25	2.5		
Cadmium	0.50	0.25	anr	
Calcium	250	125	anr	
Chromium	1.0	2.0	anr	
Cobalt	0.50	0.25	anr	
Copper	2.0	2.0	anr	
Iron	25	25	25.3	101.2
Lead	0.50	0.25	anr	
Magnesium	250	125	anr	
Manganese	1.0	0.25	1.00	100.0
Molybdenum	1.0	0.50		
Nickel	1.0	2.0	anr	
Potassium	250	125	anr	
Selenium	0.50	0.50	anr	
Silver	0.50	1.0	anr	
Sodium	250	125	anr	
Strontium	5.0	0.50		
Thallium	0.50	0.25	anr	
Tin	5.0	0.50		
Titanium	1.0	0.50		
Vanadium	1.0	2.0	anr	
Zinc	5.0	2.0	anr	

(*) Outside of QC limits
(anr) Analyte not requested

INTERFERING ELEMENT CHECK STANDARDS SUMMARY
Part 1 - ICSA and ICSAB Standards

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: XA011419M1L.CSV Date Analyzed: 01/14/19 Methods: EPA 200.8, SW846 6020B
QC Limits: 80 to 120 % Recovery Run ID: MA45980 Units: ug/l

Time: / Sample ID: / Metal	ICSA True	ICSAB True	12:58 ICSA1 Results	% Rec	13:03 ICSAB1 Results	% Rec
Aluminum	100000	100000	91300	91.3	93000	93.0
Antimony			0.101		0.0987	
Arsenic		20	0.0789		19.6	98.0
Barium			0.145		0.169	
Beryllium			0.000435		0.00212	
Boron		50	0.525		44.0	88.0
Cadmium		20	-0.0638		18.0	90.0
Calcium	100000	100000	93300	93.3	95900	95.9
Chromium		20	0.149		19.8	99.0
Cobalt		20	0.0548		18.2	91.0
Copper		20	0.366		17.2	86.0
Iron	100000	100000	86200	86.2	89100	89.1
Lead			0.102		0.102	
Magnesium	100000	100000	86700	86.7	87900	87.9
Manganese		20	0.356		19.7	98.5
Molybdenum	2000	2000	2260	113.0	2320	116.0
Nickel		20	0.406		17.3	86.5
Potassium	100000	100000	95900	95.9	97500	97.5
Selenium		20	0.0950		20.6	103.0
Silver		20	0.0366		22.2	111.0
Sodium	100000	100000	87300	87.3	89700	89.7
Strontium	2000	2000	2200	110.0	2130	106.5
Thallium			0.00841		0.00511	
Tin	2000	2000	2050	102.5	1990	99.5
Titanium	2000	2000	1920	96.0	1970	98.5
Vanadium		20	0.0255		21.7	108.5
Zinc		20	0.345		17.1	85.5

(*) Outside of QC limits
(anr) Analyte not requested

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	RL	IDL	MDL	MB raw	final
Aluminum	50	1	32		
Antimony	4.0	.026	1.7		
Arsenic	3.0	.016	.94	0.073	<3.0
Barium	2.0	.012	.73		
Beryllium	1.0	.004	.15		
Boron	50	1.4	14		
Cadmium	6.0	.008	.17		
Calcium	500	1.6	64		
Chromium	8.0	.022	.62		
Cobalt	1.0	.006	.17		
Copper	10	.024	1.9		
Iron	50	.76	19	1.6	<50
Lead	3.0	.006	.52	0.0024	<3.0
Magnesium	500	.81	46		
Manganese	4.0	.01	.63	0.041	<4.0
Molybdenum	2.0	.046	.45		
Nickel	8.0	.014	.95		
Potassium	500	2.3	68		
Selenium	2.0	.12	.55		
Silver	2.0	.004	.16		
Sodium	500	1.7	140		
Strontium	20	.02	2.4		
Thallium	2.0	.012	.17		
Tin	10	.05	2.6		
Titanium	4.0	.084	1.6		
Vanadium	3.0	.036	1.8		
Zinc	20	.12	5.4		

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	JC80990-7 Original	MS	Spikelot MP6020AQ3%	Rec	QC Limits
Aluminum					
Antimony					
Arsenic	1.6	78.6	80	96.3	75-125
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron	6560	10500	4000	98.5	75-125
Lead	4.9	86.4	80	101.9	75-125
Magnesium					
Manganese	582	650	80	85.0	75-125
Molybdenum					
Nickel					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	JC80990-7 Original	MSD	Spikelot MP6020AQ3	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	1.6	81.1	80	99.4	3.1	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron	6560	10500	4000	98.5	0.0	20
Lead	4.9	89.2	80	105.4	3.2	20
Magnesium						
Manganese	582	653	80	88.8	0.5	20
Molybdenum						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	JC80990-7F Original	MS	Spikelot MP6020AQ3	% Rec	QC Limits
Aluminum					
Antimony					
Arsenic	1.3	79.4	80	97.6	75-125
Barium					
Beryllium					
Boron					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper					
Iron	4580	8360	4000	94.5	75-125
Lead	0.15	82.3	80	102.7	75-125
Magnesium					
Manganese	554	633	80	98.8	75-125
Molybdenum					
Nickel					
Potassium					
Selenium					
Silver					
Sodium					
Strontium					
Thallium					
Tin					
Titanium					
Vanadium					
Zinc					

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	JC80990-7F Original	MSD	Spikelot MP6020AQ3	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	1.3	80.5	80	99.0	1.4	20
Barium						
Beryllium						
Boron						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron	4580	8400	4000	95.5	0.5	20
Lead	0.15	83.0	80	103.6	0.8	20
Magnesium						
Manganese	554	613	80	73.8 (a)	3.2	20
Molybdenum						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	BSP Result	Spikelot MP6020AQ3	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	78.5	80	98.1	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron	3850	4000	96.3	80-120
Lead	80.0	80	100.0	80-120
Magnesium				
Manganese	78.0	80	97.5	80-120
Molybdenum				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SERIAL DILUTION RESULTS SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date:			01/09/19				01/09/19	
Metal	JC80990-7 Original	SDL 2:10	%DIF	QC Limits	JC80990-7F Original	SDL 2:10	%DIF	QC Limits
Aluminum								
Antimony								
Arsenic	1.63	1.66	1.5	0-10	1.26	1.32	4.8	0-10
Barium								
Beryllium								
Boron								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron	6560	6720	2.4	0-10	4580	4590	0.2	0-10
Lead	4.94	4.89	1.0	0-10	0.154	0.193	25.5 (a)	0-10
Magnesium								
Manganese	582	589	1.2	0-10	554	577	4.3	0-10
Molybdenum								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Strontium								
Thallium								
Tin								
Titanium								
Vanadium								
Zinc								

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

POST DIGESTATE SPIKE SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	Sample ml	Final ml	JC80990-7 Raw	Corr.**	PS ug/l	Spike ml	Spike ug/ml	Spike ug/l	% Rec	QC Limits
Aluminum										
Antimony										
Arsenic	9.14	10		1.49158	81.65773	0.2	4	80	100.2	75-125
Barium										
Beryllium										
Boron										
Cadmium										
Calcium										
Chromium										
Cobalt										
Copper										
Iron	9.14	10	6558.393	5994.371	9785.341	0.1	400	4000	94.8	75-125
Lead	9.14	10	4.943849	4.518678	90.28002	0.2	4	80	107.2	75-125
Magnesium										
Manganese	9.14	10	582.3073	532.2288	596.5798	0.2	4	80	80.4	75-125
Molybdenum										
Nickel										
Potassium										
Selenium										
Silver										
Sodium										
Strontium										
Thallium										
Tin										
Titanium										
Vanadium										
Zinc										

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(**) Corr. sample result = Raw * (sample volume / final volume)
(anr) Analyte not requested

POST DIGESTATE SPIKE SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12001
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	Sample ml	Final ml	JC80990-7F Raw	JC80990-7F Corr.**	PS ug/l	Spike ml	Spike ug/ml	Spike ug/l	% Rec	QC Limits
Aluminum										
Antimony										
Arsenic	9.14	10		1.14741	86.18089	0.2	4	80	106.3	75-125
Barium										
Beryllium										
Boron										
Cadmium										
Calcium										
Chromium										
Cobalt										
Copper										
Iron	9.14	10	4580.699	4186.758	8330.086	0.1	400	4000	103.6	75-125
Lead	9.14	10	.1540267	.1407804	88.57118	0.2	4	80	110.5	75-125
Magnesium										
Manganese	9.14	10	553.675	506.059	617.4901	0.2	4	80	139.3*(a	75-125
Molybdenum										
Nickel										
Potassium										
Selenium										
Silver										
Sodium										
Strontium										
Thallium										
Tin										
Titanium										
Vanadium										
Zinc										

Associated samples MP12001: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-1F, JC80990-2F, JC80990-3F, JC80990-4F, JC80990-5F, JC80990-6F, JC80990-7F, JC80990-8F, JC80990-9F, JC80990-10F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(**) Corr. sample result = Raw * (sample volume / final volume)
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12002
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	RL	IDL	MDL	MB raw	final
Aluminum	50	1	32		
Antimony	4.0	.026	1.7		
Arsenic	3.0	.016	.94	0.073	<3.0
Barium	2.0	.012	.73		
Beryllium	1.0	.004	.15		
Boron	50	1.4	14		
Cadmium	6.0	.008	.17		
Calcium	500	1.6	64		
Chromium	8.0	.022	.62		
Cobalt	1.0	.006	.17		
Copper	10	.024	1.9		
Iron	50	.76	19	1.6	<50
Lead	3.0	.006	.52	0.047	<3.0
Magnesium	500	.81	46		
Manganese	4.0	.01	.63	0.067	<4.0
Molybdenum	2.0	.046	.45		
Nickel	8.0	.014	.95		
Potassium	500	2.3	68		
Selenium	2.0	.12	.55		
Silver	2.0	.004	.16		
Sodium	500	1.7	140		
Strontium	20	.02	2.4		
Thallium	2.0	.012	.17		
Tin	10	.05	2.6		
Titanium	4.0	.084	1.6		
Vanadium	3.0	.036	1.8		
Zinc	20	.12	5.4		

Associated samples MP12002: JC80990-11, JC80990-11F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

QC Batch ID: MP12002
Matrix Type: AQUEOUS

Methods: SW846 6020B
Units: ug/l

Prep Date: 01/09/19

Metal	BSP Result	Spikelot MP6020AQ3%	Rec	QC Limits
Aluminum				
Antimony				
Arsenic	76.9	80	96.1	80-120
Barium				
Beryllium				
Boron				
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron	3850	4000	96.3	80-120
Lead	81.1	80	101.4	80-120
Magnesium				
Manganese	78.4	80	98.0	80-120
Molybdenum				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP12002: JC80990-11, JC80990-11F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries
- Instrument Runlogs/QC

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Nitrogen, Nitrate + Nitrite	GP18786/GN90791	0.10	0.0	mg/l	2	1.90	95.0	90-110%
Nitrogen, Nitrite	GN90373	0.010	0.0	mg/l	0.04	0.040	100.0	90-110%
Sulfate	GP18594/GN90452	2.0	0.0	mg/l	80	82.5	103.1	90-110%
Sulfide	GN90519			mg/l	10.04	9.9	98.6	80-120%
Sulfide	GN90519	2.0	0.0	mg/l	5.02	4.9	97.6	80-120%

Associated Samples:
Batch GN90373: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GN90519: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GP18594: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GP18786: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Nitrogen, Nitrate + Nitrite	GP18786/GN90838	JC80990-7	mg/l	0.090 U	0.0	0.0	0-33%
Nitrogen, Nitrite	GN90373	JC80990-7	mg/l	0.0030 U	0.0	0.0	0-11%
Sulfate	GP18594/GN90452	JC80990-7	mg/l	5.1	5.0	2.0	0-20%
Sulfide	GN90519	JC80990-7	mg/l	0.57	0.65	13.1(a)	0-12%

Associated Samples:
Batch GN90373: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GN90519: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GP18594: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GP18786: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
(*) Outside of QC limits
(a) RPD acceptable due to low duplicate and sample concentrations.

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Nitrogen, Nitrate + Nitrite	GP18786/GN90791	JC80990-7	mg/l	0.090 U	1	1.1	110.0	90-110%
Nitrogen, Nitrate + Nitrite	GP18786/GN90791	JC80990-9	mg/l	0.090 U	1	1.1	110.0	90-110%
Nitrogen, Nitrite	GN90373	JC80990-7	mg/l	0.0030 U	0.04	0.038	95.0	22-140%
Sulfate	GP18594/GN90452	JC80990-7	mg/l	5.1	80	83.5	98.0	80-120%
Sulfide	GN90519	JC80990-7	mg/l	0.57	3.59	3.7	87.2	37-135%

Associated Samples:
Batch GN90373: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GN90519: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GP18594: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
Batch GP18786: JC80990-1, JC80990-2, JC80990-3, JC80990-4, JC80990-5, JC80990-6, JC80990-7, JC80990-8, JC80990-9, JC80990-10, JC80990-11
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: 319011001.TXT Date Analyzed: 01/10/19 Methods: EPA 300/SW846 9056A
Analyst: NV Run ID: GN90452
Parameters: Sulfate

Time	Sample Description	Dilution Factor	PS Recov	Comments
10:54	GN90452-STD1	1		Manually integrated chrom. peaks reviewed and verified to comply with criteria of Accutest SOP EQA044.
11:18	GN90452-STD2	1		RT: F=3.018 min Chl=4.579 min So4=7.069 min Bro=8.376 min
11:55	GN90452-STD3	1		STDC
12:19	GN90452-STD4	1		STDCD
13:54	GN90452-STD6	1		STDDE
14:18	GN90452-STD7	1		STDE
14:42	GN90452-STD8	1		STDF
15:06	GN90452-STD9	1		STDG
15:33	GN90452-STD5	1		STDD
10:29	GN90452-ICV1	1		
10:53	GN90452-CCV1	1		
11:17	GN90452-CCB1	1		
11:41	GP18519-MB3	1		
12:05	GP18519-B5	1		
12:31	GP18519-S1	1		
12:54	GP18519-S2	1		
13:18	GP18567-MB2	1		
13:18	GP18594-MB1	1		
13:42	GP18567-B2	1		
13:42	GP18594-B1	1		
14:06	ZZZZZZ	2		
14:34	ZZZZZZ	3		
14:57	ZZZZZZ	3		
15:21	ZZZZZZ	3		
15:45	GN90452-CCV2	1		
16:09	GN90452-CCB2	1		
16:33	ZZZZZZ	3		
16:57	ZZZZZZ	40		
17:21	GP18594-S2	1		
17:45	JC80969-2	1		(sample used for QC only; not part of login JC80990)
18:08	ZZZZZZ	1		
18:32	JC80990-1	1		
18:56	JC80990-2	1		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: 319011001.TXT Date Analyzed: 01/10/19 Methods: EPA 300/SW846 9056A
Analyst: NV Run ID: GN90452
Parameters: Sulfate

Time	Sample Description	Dilution Factor	PS Recov	Comments
19:20	JC80990-3	1		
19:44	JC80990-4	1		
20:08	JC80990-5	1		
20:32	GN90452-CCV3	1		
20:56	GN90452-CCB3	1		
21:20	JC80990-6	1		
21:44	GP18594-S1	1		
22:08	GP18594-D1	1		
22:32	JC80990-7	1		
22:56	JC80990-8	1		
23:19	JC80990-9	1		
23:43	JC80990-10	1		
00:07	JC80990-11	1		
00:31	GN90452-CCV4	1		
00:55	GN90452-CCB4	1		
01:19	GP18595-MB1	1		
01:43	GP18595-B1	1		
02:07	ZZZZZZ	1		
02:31	GP18595-S1	1		report for CHL/SO4
02:55	GP18595-D1	1		report for CHL/SO4
03:19	JC80970-1	1		(sample used for QC only; not part of login JC80990)
03:43	ZZZZZZ	1		
04:07	ZZZZZZ	1		
04:31	ZZZZZZ	1		
04:54	ZZZZZZ	1		
05:18	GN90452-CCV5	1		
05:42	GN90452-CCB5	1		
06:06	ZZZZZZ	1		
06:30	GP18595-BA	1		
06:54	GP18595-BB	1		
07:18	GP18595-BC	1		
07:42	GP18595-BD	1		
08:06	GN90452-CCV6	1		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: 319011001.TXT Date Analyzed: 01/10/19 Methods: EPA 300/SW846 9056A
Analyst: NV Run ID: GN90452
Parameters: Sulfate

Time	Sample Description	Dilution Factor	PS Recov	Comments
08:30	GN90452-CCB6	1		

Refer to raw data for calibration curve and standards.

Instrument QC Summary
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: 319011001.TXT Date Analyzed: 01/10/19 Methods: EPA 300/SW846 9056A
Run ID: GN90452 Units: mg/l

Sample Number	Parameter	Result	RL	IDL/MDL	True Value	% Recov.	QC Limits
GN90452-ICV1	Sulfate	104	2.0	0.38	100	104.0	90-110
GN90452-CCV1	Sulfate	203	2.0	0.38	200	101.5	90-110
GN90452-CCB1	Sulfate	0.38 U	2.0	0.38			
GN90452-CCV2	Sulfate	203	2.0	0.38	200	101.5	90-110
GN90452-CCB2	Sulfate	0.38 U	2.0	0.38			
GN90452-CCV3	Sulfate	204	2.0	0.38	200	102.0	90-110
GN90452-CCB3	Sulfate	0.38 U	2.0	0.38			
GN90452-CCV4	Sulfate	203	2.0	0.38	200	101.5	90-110
GN90452-CCB4	Sulfate	0.38 U	2.0	0.38			
GN90452-CCV5	Sulfate	203	2.0	0.38	200	101.5	90-110
GN90452-CCB5	Sulfate	0.38 U	2.0	0.38			
GN90452-CCV6	Sulfate	203	2.0	0.38	200	101.5	90-110
GN90452-CCB6	Sulfate	0.38 U	2.0	0.38			

(!) Outside of QC limits

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011719W1.NO32 Date Analyzed: 01/17/19 Methods: EPA 353.2 M/LACHAT, EPA 353.2/LACHAT
Analyst: KI Run ID: GN90791
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
15:42	GN90791-STD1	1		STDA
15:43	GN90791-STD2	1		STDB
15:44	GN90791-STD3	1		STDC
15:46	GN90791-STD4	1		STDD
15:47	GN90791-STD5	1		STDE
15:48	GN90791-STD6	1		STDF
15:49	GN90791-STD7	1		STDG
15:51	GN90791-ICV1	1		
15:52	GN90791-ICB1	1		
15:53	GN90791-CCV1	1		
15:55	GN90791-CCB1	1		
15:56	GP18786-MB1	1		
15:57	GP18786-B1	1		
15:58	GP18786-S1	1		
15:59	GP18786-S2	1		
16:00	GP18786-D1	1		
16:01	ZZZZZZ	1		
16:02	ZZZZZZ	1		
16:04	ZZZZZZ	1		
16:05	ZZZZZZ	1		
16:06	ZZZZZZ	1		
16:07	GN90791-CCV2	1		
16:08	GN90791-CCB2	1		
16:09	JC80990-1	1		
16:10	JC80990-2	1		
16:11	JC80990-3	1		
16:13	JC80990-4	1		
16:14	JC80990-5	1		
16:15	JC80990-6	1		
16:16	JC80990-7	1		
16:17	JC80990-8	1		
16:18	JC80990-9	1		
16:19	JC80990-10	1		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011719W1.NO32 Date Analyzed: 01/17/19 Methods: EPA 353.2 M/LACHAT, EPA 353.2/LACHAT
Analyst: KI Run ID: GN90791
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
16:20	GN90791-CCV3	1		
16:22	GN90791-CCB3	1		
16:23	JC80990-11	1		
16:24	ZZZZZZ	1		
16:25	ZZZZZZ	1		
16:26	ZZZZZZ	1		
16:27	GP18790-MB1	1		
16:28	GP18790-B1	1		
16:29	GP18790-S1	1		
16:30	GP18790-S2	1		
16:32	GP18790-D1	1		
16:33	ZZZZZZ	1		
16:34	GN90791-CCV4	1		
16:35	GN90791-CCB4	1		
16:36	ZZZZZZ	1		
16:37	ZZZZZZ	1		
16:38	JC81271-2	1		(sample used for QC only; not part of login JC80990)
16:40	ZZZZZZ	1		
16:41	ZZZZZZ	1		
16:42	ZZZZZZ	1		
16:43	ZZZZZZ	1		
16:44	ZZZZZZ	1		
16:45	ZZZZZZ	1		
16:46	JC81304-1	1		(sample used for QC only; not part of login JC80990)
16:47	GN90791-CCV5	1		
16:48	GN90791-CCB5	1		
16:50	ZZZZZZ	1		
16:51	ZZZZZZ	1		
16:52	ZZZZZZ	1		
16:53	ZZZZZZ	1		
16:54	ZZZZZZ	1		
16:55	ZZZZZZ	1		
16:56	ZZZZZZ	1		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011719W1.NO32 Date Analyzed: 01/17/19 Methods: EPA 353.2 M/LACHAT, EPA 353.2/LACHAT
Analyst: KI Run ID: GN90791
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
16:57	ZZZZZZ	1		
16:59	ZZZZZZ	1		
17:00	GP18745-MB1	1		
17:01	GN90791-CCV6	1		
17:02	GN90791-CCB6	1		
17:03	GP18745-B1	1		
17:04	GP18745-S1	1		
17:05	GP18745-D1	1		
17:06	JC81197-1	1		(sample used for QC only; not part of login JC80990)
17:08	ZZZZZZ	1		
17:09	ZZZZZZ	1		
17:10	ZZZZZZ	1		
17:11	ZZZZZZ	1		
17:12	GP18746-MB1	1		
17:13	ZZZZZZ	1		
17:16	GN90791-CCV7	1		
17:17	GN90791-CCB7	1		

Refer to raw data for calibration curve and standards.

Instrument QC Summary
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011719W1.NO32 Date Analyzed: 01/17/19 Methods: EPA 353.2 M/LACHAT, EPA 353.2/LACHAT
Run ID: GN90791 Units: mg/l

Sample Number	Parameter	Result	RL	IDL/MDL	True Value	% Recov.	QC Limits
GN90791-ICV1	Nitrogen, Nitrate + Nitrite	1.91	0.10	0.090	2	95.5	90-110
GN90791-ICB1	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV1	Nitrogen, Nitrate + Nitrite	2.61	0.10	0.090	2.5	104.4	90-110
GN90791-CCB1	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV2	Nitrogen, Nitrate + Nitrite	2.64	0.10	0.090	2.5	105.6	90-110
GN90791-CCB2	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV3	Nitrogen, Nitrate + Nitrite	2.64	0.10	0.090	2.5	105.6	90-110
GN90791-CCB3	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV4	Nitrogen, Nitrate + Nitrite	2.64	0.10	0.090	2.5	105.6	90-110
GN90791-CCB4	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV5	Nitrogen, Nitrate + Nitrite	2.64	0.10	0.090	2.5	105.6	90-110
GN90791-CCB5	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV6	Nitrogen, Nitrate + Nitrite	2.63	0.10	0.090	2.5	105.2	90-110
GN90791-CCB6	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90791-CCV7	Nitrogen, Nitrate + Nitrite	2.60	0.10	0.090	2.5	104.0	90-110
GN90791-CCB7	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			

(!) Outside of QC limits

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011819W1.NO32 Date Analyzed: 01/18/19 Methods: EPA 353.2/LACHAT
Analyst: BM Run ID: GN90838
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
14:39	GN90838-STD1	1		STDA
14:40	GN90838-STD2	1		STDB
14:41	GN90838-STD3	1		STDC
14:43	GN90838-STD4	1		STDD
14:44	GN90838-STD5	1		STDE
14:45	GN90838-STD6	1		STDF
14:46	GN90838-STD7	1		STDG
14:48	GN90838-ICV1	1		
14:49	GN90838-ICB1	1		
14:50	GN90838-CCV1	1		
14:52	GN90838-CCB1	1		
14:53	GP18808-MB1	1		
14:54	GP18808-B1	1		
14:55	GP18808-S1	1		
14:56	GP18808-S2	1		
14:57	GP18808-D1	1		
14:58	ZZZZZZ	1		
14:59	ZZZZZZ	1		
15:01	ZZZZZZ	1		
15:02	ZZZZZZ	1		
15:03	ZZZZZZ	1		
15:04	GN90838-CCV2	1		
15:05	GN90838-CCB2	1		
15:06	ZZZZZZ	1		
15:07	ZZZZZZ	1		
15:08	ZZZZZZ	1		
15:10	ZZZZZZ	1		
15:11	ZZZZZZ	1		
15:12	ZZZZZZ	1		
15:13	JC81358-7	1		(sample used for QC only; not part of login JC80990)
15:14	ZZZZZZ	1		
15:15	ZZZZZZ	1		
15:16	JC81378-3	1		(sample used for QC only; not part of login JC80990)

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011819W1.NO32 Date Analyzed: 01/18/19 Methods: EPA 353.2/LACHAT
Analyst: BM Run ID: GN90838
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
15:17	GN90838-CCV3	1		
15:19	GN90838-CCB3	1		
15:20	ZZZZZZ	1		
15:21	ZZZZZZ	1		
15:22	GP18809-MB1	1		
15:23	GP18809-B1	1		
15:24	GP18809-S1	1		
15:25	GP18809-S2	1		
15:26	GP18809-D1	1		
15:28	ZZZZZZ	1		
15:29	ZZZZZZ	1		
15:30	JC81071-2	1		(sample used for QC only; not part of login JC80990)
15:31	GN90838-CCV4	1		
15:32	GN90838-CCB4	1		
15:33	ZZZZZZ	1		
15:34	ZZZZZZ	1		
15:35	ZZZZZZ	1		
15:37	ZZZZZZ	1		
15:38	ZZZZZZ	1		
15:39	ZZZZZZ	1		
15:40	ZZZZZZ	1		
15:41	ZZZZZZ	1		
15:42	ZZZZZZ	1		
15:43	ZZZZZZ	1		
15:44	GN90838-CCV5	1		
15:46	GN90838-CCB5	1		
15:47	JC81071-13	1		(sample used for QC only; not part of login JC80990)
15:48	ZZZZZZ	1		
15:49	ZZZZZZ	1		
15:50	ZZZZZZ	1		
15:51	ZZZZZZ	1		
15:52	GP18810-MB1	1		BSP failed, back to need.
15:53	GP18810-B1	1		BSP failed, back to need.

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011819W1.NO32 Date Analyzed: 01/18/19 Methods: EPA 353.2/LACHAT
Analyst: BM Run ID: GN90838
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
15:54	GP18810-S1	1		BSP failed, back to need.
15:56	GP18810-D1	1		BSP failed, back to need.
15:57	ZZZZZZ	1		
15:58	GN90838-CCV6	1		
15:59	GN90838-CCB6	1		
16:00	JC81388-1	1		(sample used for QC only; not part of login JC80990)
16:01	ZZZZZZ	1		
16:02	ZZZZZZ	1		
16:03	ZZZZZZ	1		
16:05	ZZZZZZ	1		
16:06	ZZZZZZ	1		
16:07	ZZZZZZ	1		
16:08	ZZZZZZ	1		
16:09	ZZZZZZ	1		
16:10	GP18786-MB2	1		
16:11	GN90838-CCV7	1		
16:12	GN90838-CCB7	1		
16:14	GP18786-B2	1		
16:15	GP18786-D1	1		
16:16	ZZZZZZ	2		
16:17	ZZZZZZ	2		
16:18	ZZZZZZ	3		
16:19	ZZZZZZ	6		
16:20	ZZZZZZ	20		
16:21	ZZZZZZ	20		
16:23	ZZZZZZ	10		
16:24	ZZZZZZ	20		
16:25	GN90838-CCV8	1		
16:26	GN90838-CCB8	1		
16:27	ZZZZZZ	10		
16:28	ZZZZZZ	2		
16:29	ZZZZZZ	2		
16:30	ZZZZZZ	2		

SGS Instrument Runlog
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011819W1.NO32 Date Analyzed: 01/18/19 Methods: EPA 353.2/LACHAT
Analyst: BM Run ID: GN90838
Parameters: Nitrogen, Nitrate + Nitrite

Time	Sample Description	Dilution Factor	PS Recov	Comments
16:32	ZZZZZZ	2		
16:33	ZZZZZZ	2		
16:36	GN90838-CCV9	1		
16:37	GN90838-CCB9	1		

Refer to raw data for calibration curve and standards.

Instrument QC Summary
Inorganics Analyses

Login Number: JC80990
Account: USACEPAP - USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

File ID: E011819W1.NO32 Date Analyzed: 01/18/19 Methods: EPA 353.2/LACHAT
Run ID: GN90838 Units: mg/l

Sample Number	Parameter	Result	RL	IDL/MDL	True Value	% Recov.	QC Limits
GN90838-ICV1	Nitrogen, Nitrate + Nitrite	2.08	0.10	0.090	2	104.0	90-110
GN90838-ICB1	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV1	Nitrogen, Nitrate + Nitrite	2.65	0.10	0.090	2.5	106.0	90-110
GN90838-CCB1	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV2	Nitrogen, Nitrate + Nitrite	2.62	0.10	0.090	2.5	104.8	90-110
GN90838-CCB2	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV3	Nitrogen, Nitrate + Nitrite	2.64	0.10	0.090	2.5	105.6	90-110
GN90838-CCB3	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV4	Nitrogen, Nitrate + Nitrite	2.64	0.10	0.090	2.5	105.6	90-110
GN90838-CCB4	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV5	Nitrogen, Nitrate + Nitrite	2.65	0.10	0.090	2.5	106.0	90-110
GN90838-CCB5	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV6	Nitrogen, Nitrate + Nitrite	2.65	0.10	0.090	2.5	106.0	90-110
GN90838-CCB6	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV7	Nitrogen, Nitrate + Nitrite	2.65	0.10	0.090	2.5	106.0	90-110
GN90838-CCB7	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV8	Nitrogen, Nitrate + Nitrite	2.62	0.10	0.090	2.5	104.8	90-110
GN90838-CCB8	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			
GN90838-CCV9	Nitrogen, Nitrate + Nitrite	2.61	0.10	0.090	2.5	104.4	90-110
GN90838-CCB9	Nitrogen, Nitrate + Nitrite	0.090 U	0.10	0.090			

(!) Outside of QC limits

The results set forth herein are provided by SGS North America Inc.

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Automated Report

Technical Report for

USACE-Philadelphia District

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

CONTRACT#W912BU18D0003/TO#W912BU19F0011

SGS Job Number: JC88209

Sampling Date: 05/14/19



Report to:

USACE-Philadelphia District
100 Penn Square East
Philadelphia, PA 19107
[redacted]
ATTN: [redacted]

Total number of pages in report: 679

[redacted]
General Manager

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Client Service contact: [redacted]

Certifications: NJ([redacted], NY([redacted], CA, CT, FL, IL, IN, KS, KY, LA, MA, MD, ME, MN, NC, OH VAP ([redacted]), AK (UST[redacted]), AZ ([redacted]), PA, RI, SC, TX, UT, VA, WV, DoD ELAP ([redacted])

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Table of Contents

Sections: 1 2 3 4 5 6 7 8 9 10 11

Section 1: Sample Summary 4
Section 2: Case Narrative/Conformance Summary 7
Section 3: Summary of Hits 12
Section 4: Sample Results 18
4.1: JC88209-1: PH-PH-2(05142019) 19
4.2: JC88209-1F: PH-PH-2(05142019) 25
4.3: JC88209-2: PH-RW-B2(05142019) 26
4.4: JC88209-2F: PH-RW-B2(05142019) 32
4.5: JC88209-3: PH-RW-B(05142019) 33
4.6: JC88209-3F: PH-RW-B(05142019) 39
4.7: JC88209-4: PH-MW-67(05142019) 40
4.8: JC88209-4F: PH-MW-67(05142019) 46
4.9: JC88209-5: DUP-05142019 47
4.10: JC88209-5F: DUP-05142019 53
4.11: JC88209-6: PH-RW-A2(05142019) 54
4.12: JC88209-6F: PH-RW-A2(05142019) 60
4.13: JC88209-7: PH-RW-A(05142019) 61
4.14: JC88209-7F: PH-RW-A(05142019) 67
4.15: JC88209-8: PH-MW-66(05142019) 68
4.16: JC88209-8F: PH-MW-66(05142019) 74
4.17: JC88209-9: PH-PH-21(05172019) 75
4.18: JC88209-9F: PH-PH-21(05172019) 81
4.19: JC88209-10: FB-05142019 82
4.20: JC88209-10F: FB-05142019 88
4.21: JC88209-11: EB-05142019 89
4.22: JC88209-11F: EB-05142019 95
4.23: JC88209-12: TRIP BLANK 96
Section 5: Misc. Forms 97
5.1: Certification Exceptions 98
5.2: Chain of Custody 99
5.3: Sample Tracking Chronicle 102
5.4: Internal Chain of Custody 109
5.5: QC Evaluation: DOD QSM5 Limits 131
Section 6: MS Volatiles - QC Data Summaries 139
6.1: Method Blank Summary 140
6.2: Blank Spike Summary 143
6.3: Matrix Spike/Matrix Spike Duplicate Summary 146
6.4: Instrument Performance Checks (BFB) 149
6.5: Internal Standard Area Summaries 154
6.6: Surrogate Recovery Summaries 157
6.7: Initial and Continuing Calibration Summaries 159
Section 7: MS Volatiles - Raw Data 196

Sections: 1 2 3 4 5 6 7 8 9 10 11

Table of Contents

7.1: Samples 197
7.2: Method Blanks 355
Section 8: GC Volatiles - QC Data Summaries 369
8.1: Method Blank Summary 370
8.2: Blank Spike Summary 376
8.3: Blank Spike/Blank Spike Duplicate Summary 377
8.4: Laboratory Control Sample Summary 379
8.5: Matrix Spike/Matrix Spike Duplicate Summary 381
8.6: Duplicate Summary 384
8.7: GC Identification Summaries (Hits) 388
8.8: Surrogate Recovery Summaries 391
8.9: GC Surrogate Retention Time Summaries 393
8.10: Initial and Continuing Calibration Summaries 400
Section 9: GC Volatiles - Raw Data 426
9.1: Samples 427
9.2: Method Blanks 566
Section 10: Metals Analysis - QC Data Summaries 580
10.1: Inst QC MA46767: As,Fe,Pb,Mn 581
10.2: Inst QC MA46776: As,Fe,Pb,Mn 598
10.3: Inst QC MA46795: Fe,Mn 627
10.4: Prep QC MP15198: As,Fe,Pb,Mn 653
10.5: Prep QC MP15216: As,Fe,Pb,Mn 662
Section 11: General Chemistry - QC Data Summaries 668
11.1: Method Blank and Spike Results Summary 669
11.2: Duplicate Results Summary 670
11.3: Matrix Spike Results Summary 671
11.4: Inst QC GN95746: Sulfate 672
11.5: Inst QC GN95831: Nitrogen, Nitrate + Nitrite 675

SGS North America Inc.

Sample Summary

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
JC88209-1	05/14/19	09:25	CO	05/15/19	AQ	Ground Water	PH-PH-2(05142019)
JC88209-1F	05/14/19	09:25	CO	05/15/19	AQ	Groundwater Filtered	PH-PH-2(05142019)
JC88209-2	05/14/19	10:50	CO	05/15/19	AQ	Ground Water	PH-RW-B2(05142019)
JC88209-2F	05/14/19	10:50	CO	05/15/19	AQ	Groundwater Filtered	PH-RW-B2(05142019)
JC88209-3	05/14/19	12:45	CO	05/15/19	AQ	Ground Water	PH-RW-B(05142019)
JC88209-3F	05/14/19	12:45	CO	05/15/19	AQ	Groundwater Filtered	PH-RW-B(05142019)
JC88209-4	05/14/19	14:40	CO	05/15/19	AQ	Ground Water	PH-MW-67(05142019)
JC88209-4F	05/14/19	14:40	CO	05/15/19	AQ	Groundwater Filtered	PH-MW-67(05142019)
JC88209-5	05/14/19	12:00	CO	05/15/19	AQ	Ground Water	DUP-05142019
JC88209-5F	05/14/19	12:00	CO	05/15/19	AQ	Groundwater Filtered	DUP-05142019
JC88209-6	05/14/19	16:09	CO	05/15/19	AQ	Ground Water	PH-RW-A2(05142019)
JC88209-6F	05/14/19	16:09	CO	05/15/19	AQ	Groundwater Filtered	PH-RW-A2(05142019)
JC88209-7	05/14/19	09:28	CO	05/15/19	AQ	Ground Water	PH-RW-A(05142019)

Sample Summary
(continued)

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
JC88209-7F	05/14/19	09:28	CO	05/15/19	AQ	Groundwater Filtered	PH-RW-A(05142019)
JC88209-8	05/14/19	14:52	CO	05/15/19	AQ	Ground Water	PH-MW-66(05142019)
JC88209-8F	05/14/19	14:52	CO	05/15/19	AQ	Groundwater Filtered	PH-MW-66(05142019)
JC88209-9	05/14/19	11:43	CO	05/15/19	AQ	Ground Water	PH-PH-21(05172019)
JC88209-9D	05/14/19	11:43	CO	05/15/19	AQ	Water Dup/MSD	PH-PH-21(05172019)MSD)
JC88209-9F	05/14/19	11:43	CO	05/15/19	AQ	Groundwater Filtered	PH-PH-21(05172019)
JC88209-9FD	05/14/19	11:43	CO	05/15/19	AQ	Water Dup/MSD	PH-PH-21(05172019)MSD)
JC88209-9FS	05/14/19	11:43	CO	05/15/19	AQ	Water Matrix Spike	PH-PH-21(05172019)MS)
JC88209-9S	05/14/19	11:43	CO	05/15/19	AQ	Water Matrix Spike	PH-PH-21(05172019)MS)
JC88209-10	05/14/19	16:00	CO	05/15/19	AQ	Field Blank Water	FB-05142019
JC88209-10F	05/14/19	16:00	CO	05/15/19	AQ	Field Blank Filtered	FB-05142019
JC88209-11	05/14/19	15:55	CO	05/15/19	AQ	Equipment Blank	EB-05142019
JC88209-11F	05/14/19	15:55	CO	05/15/19	AQ	Equip Blank Filtered	EB-05142019

SGS North America Inc.

Sample Summary
(continued)

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
JC88209-12	05/14/19	16:00	CO	05/15/19	AQ	Trip Blank Water	TRIP BLANK

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: USACE-Philadelphia District **Job No** JC88209

Site: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphi **Report Date** 6/3/2019 9:23:12 AM

On 05/15/2019, 19 Sample(s), 1 Trip Blank(s) and 3 Field Blank(s) were received at SGS North America Inc. at a maximum corrected temperature of 1.4 C. Samples were intact and chemically preserved, unless noted below. A SGS North America Inc. Job Number of JC88209 was assigned to the project. Laboratory sample ID, client sample ID and dates of sample collection are detailed in the report's Results Summary Section. Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Please refer to certification exceptions summary for additional certification information.

Compounds qualified as out of range in the continuing calibration summary report are acceptable as per method requirements when there is a high bias but the sample result is non-detect.

MS Volatiles By Method SW846 8260C

Matrix: AQ **Batch ID:** V4B3854

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC88209-9MS, JC88209-9MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike Recovery(s) for 1,2-Dichloroethane are outside control limits. Outside control limits due to matrix interference.
- Matrix Spike / Matrix Spike Duplicate Recovery(s) for Benzene are outside control limits. Outside control limits due to high level in sample relative to spike amount.

Matrix: AQ **Batch ID:** V4B3857

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC88209-7MS, JC88209-7MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike / Matrix Spike Duplicate Recovery(s) for Benzene are outside control limits. Outside control limits due to high level in sample relative to spike amount.
- JC88209-6: Confirmation run for internal standard areas.
- JC88209-6: Diluted due to high concentration of target compound.
- JC88209-7: Diluted due to high concentration of target compound.

Matrix: AQ **Batch ID:** VX7769

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC88209-1MS, JC88209-1MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- Matrix Spike / Matrix Spike Duplicate Recovery(s) for Benzene are outside control limits. Outside control limits due to high level in sample relative to spike amount.
- JC88209-1: Diluted due to high concentration of target compound.
- JC88209-4: Diluted due to high concentration of target compound.
- JC88209-8: Diluted due to high concentration of target compound.

GC Volatiles By Method RSK-175

Matrix: AQ **Batch ID:** GAA1722

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9DUP, JC88209-1DUP were used as the QC samples indicated.
- RPD(s) for Duplicate for Methane, Ethene are outside control limits for sample JC88209-1DUP, JC88209-9DUP. RPD acceptable due to low DUP and sample concentrations.

Matrix: AQ **Batch ID:** GWW5201

- All samples were analyzed within the recommended method holding time.
- Sample(s) JC88209-1DUP, JC88209-9DUP were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- JC88209-5: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-9: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-8: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-6: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-1: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-10: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-11: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-2: (pH=5)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-9DUP: (pH=7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-4: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-7: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
- JC88209-3: (pH=6)Sample is not acid preserved. Sample analyzed within 7 days holding time.

GC Volatiles By Method SW846-8011

Matrix: AQ **Batch ID:** OP20555

- All samples were extracted within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9MS, JC88209-9MSD were used as the QC samples indicated.
- JC88209-8: Confirmation run.
- JC88209-8 for 2-Bromo-1-chloropropane: Outside the QC limits.

Matrix: AQ **Batch ID:** OP20629

- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88574-21MS, JC88574-21MSD were used as the QC samples indicated.
- JC88209-8: Sample originally extracted within the holding time. Re-extracted due to missing surrogate.

GC Volatiles By Method SW846-8015D (DAI)

Matrix: AQ **Batch ID:** GGH6303

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9MS, JC88209-9MSD were used as the QC samples indicated.

Metals Analysis By Method SW846 6020B

Matrix: AQ **Batch ID:** MP15198

- All samples were digested within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9FMS, JC88209-9FMSD, JC88209-9FSDL, JC88209-9MS, JC88209-9MSD, JC88209-9PS, JC88209-9SDL, JC88209-9FPS were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Lead, Arsenic, Lead are outside control limits for sample MP15198-SD1, MP15198-SD2. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
- MP15198-PS2 for Manganese: Spike recovery indicates possible matrix interference.

Matrix: AQ **Batch ID:** MP15216

- All samples were digested within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC87015-48MS, JC87015-48MSD, JC87015-48PS, JC87015-48SDL were used as the QC samples for metals.
- RPD(s) for Serial Dilution for Arsenic, Iron, Lead are outside control limits for sample MP15216-SD1. Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

General Chemistry By Method EPA 300/SW846 9056A

Matrix: AQ **Batch ID:** GP21461

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9DUP, JC88209-9MS were used as the QC samples for Sulfate.

General Chemistry By Method EPA 353.2/LACHAT

Matrix: AQ **Batch ID:** GP21493

- All samples were prepared within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9DUP, JC88209-9MS were used as the QC samples for Nitrogen, Nitrate + Nitrite.

General Chemistry By Method EPA353.2/SM4500NO2B

Matrix: AQ **Batch ID:** R178616

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-1 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178617

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-2 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178618

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-3 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178619

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-4 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178620

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-5 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178621

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-6 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178622

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-7 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178623

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-8 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178624

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-9 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178625

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-10 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

Matrix: AQ **Batch ID:** R178626

- The data for EPA353.2/SM4500NO2B meets quality control requirements.
- JC88209-11 for Nitrogen, Nitrate: Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

General Chemistry By Method SM4500NO2 B-11

Matrix: AQ **Batch ID:** GN95389

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9DUP, JC88209-9MS were used as the QC samples for Nitrogen, Nitrite.

General Chemistry By Method SM4500S2- F-11

Matrix: AQ **Batch ID:** GN95536

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) JC88209-9DUP, JC88209-9MS were used as the QC samples for Sulfide.

SGS North America Inc. certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting the Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

SGS North America Inc. is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. Data release is authorized by SGS North America Inc indicated via signature on the report cover

Summary of Hits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
JC88209-1	**PH-PH-2(05142019)**					
Benzene		11000	250	230	ug/l	SW846 8260C
Toluene [a]		314	20	15	ug/l	SW846 8260C
Ethylbenzene [a]		368	20	15	ug/l	SW846 8260C
Xylene (total) [a]		375	20	15	ug/l	SW846 8260C
Naphthalene [a]		54.3 J	100	40	ug/l	SW846 8260C
Isopropylbenzene [a]		29.3	20	15	ug/l	SW846 8260C
Tert Butyl Alcohol [a]		262	200	150	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [a]		48.9	40	30	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [a]		97.6	40	30	ug/l	SW846 8260C
Methane		1670	5.5	4.0	ug/l	RSK-175
Ethane		0.40	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [b]		10200	50	10	ug/l	RSK-175
Arsenic		9.0	3.0	2.0	ug/l	SW846 6020B
Iron		55000	250	130	ug/l	SW846 6020B
Lead		7.5	3.0	2.0	ug/l	SW846 6020B
Manganese		479	20	10	ug/l	SW846 6020B
Nitrogen, Nitrate + Nitrite		0.12	0.10	0.095	mg/l	EPA 353.2/LACHAT
Nitrogen, Nitrite		0.13	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		21.1	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-1F	**PH-PH-2(05142019)**					
Arsenic		6.1	3.0	2.0	ug/l	SW846 6020B
Iron		59800	250	130	ug/l	SW846 6020B
Manganese		498	20	10	ug/l	SW846 6020B
JC88209-2	**PH-RW-B2(05142019)**					
Benzene		362	5.0	4.5	ug/l	SW846 8260C
Toluene		23.5	1.0	0.75	ug/l	SW846 8260C
Ethylbenzene		85.1	1.0	0.75	ug/l	SW846 8260C
Xylene (total)		162	1.0	0.75	ug/l	SW846 8260C
Naphthalene		22.4	5.0	2.0	ug/l	SW846 8260C
Isopropylbenzene		3.7	1.0	0.75	ug/l	SW846 8260C
Tert Butyl Alcohol		29.3	10	7.5	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		119	2.0	1.5	ug/l	SW846 8260C
1,3,5-Trimethylbenzene		39.3	2.0	1.5	ug/l	SW846 8260C
Methane		958	1.1	0.80	ug/l	RSK-175
Carbon Dioxide [c]		3700	50	10	ug/l	RSK-175
Arsenic		2.3 J	3.0	2.0	ug/l	SW846 6020B
Iron		3540	50	25	ug/l	SW846 6020B
Lead		0.54 J	3.0	2.0	ug/l	SW846 6020B
Manganese		10200	300	150	ug/l	SW846 6020B

Summary of Hits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Sulfate		76.5	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-2F	**PH-RW-B2(05142019)**					
Arsenic		1.4 J	3.0	2.0	ug/l	SW846 6020B
Iron		2310	50	25	ug/l	SW846 6020B
Manganese		10500	300	150	ug/l	SW846 6020B
JC88209-3	**PH-RW-B(05142019)**					
2,2,4-Trimethylpentane		1.7 J	5.0	2.5	ug/l	SW846 8260C
Methane		5.4	0.11	0.080	ug/l	RSK-175
Carbon Dioxide [b]		2500	50	10	ug/l	RSK-175
Arsenic		0.97 J	3.0	2.0	ug/l	SW846 6020B
Iron		859	50	25	ug/l	SW846 6020B
Manganese		159	4.0	2.0	ug/l	SW846 6020B
Nitrogen, Nitrate [d]		3.6	0.11	0.10	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite		3.6	0.10	0.095	mg/l	EPA 353.2/LACHAT
Nitrogen, Nitrite		0.029	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		79.6	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-3F	**PH-RW-B(05142019)**					
Iron		70.5	50	25	ug/l	SW846 6020B
Manganese		162	4.0	2.0	ug/l	SW846 6020B
JC88209-4	**PH-MW-67(05142019)**					
Benzene		11700	250	230	ug/l	SW846 8260C
Toluene [a]		2730	20	15	ug/l	SW846 8260C
Ethylbenzene [a]		873	20	15	ug/l	SW846 8260C
Xylene (total) [a]		8490	20	15	ug/l	SW846 8260C
Naphthalene [a]		365	100	40	ug/l	SW846 8260C
Isopropylbenzene [a]		65.3	20	15	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [a]		1760	40	30	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [a]		606	40	30	ug/l	SW846 8260C
Methane		1050	1.1	0.80	ug/l	RSK-175
Ethane		0.75	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [b]		4420	50	10	ug/l	RSK-175
Arsenic		11.9	3.0	2.0	ug/l	SW846 6020B
Iron		33900	130	63	ug/l	SW846 6020B
Lead		1.9 J	3.0	2.0	ug/l	SW846 6020B
Manganese		4700	200	100	ug/l	SW846 6020B
Nitrogen, Nitrate [d]		0.17	0.11	0.10	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite		0.18	0.10	0.095	mg/l	EPA 353.2/LACHAT

Summary of Hits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Nitrogen, Nitrite		0.0089 J	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		10.1	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-4F	**PH-MW-67(05142019)**					
Arsenic		11.4	3.0	2.0	ug/l	SW846 6020B
Iron		31800	130	63	ug/l	SW846 6020B
Manganese		4630	200	100	ug/l	SW846 6020B
JC88209-5	**DUP-05142019**					
2,2,4-Trimethylpentane		1.8 J	5.0	2.5	ug/l	SW846 8260C
Methane		7.4	0.11	0.080	ug/l	RSK-175
Carbon Dioxide [b]		2910	50	10	ug/l	RSK-175
Arsenic		0.99 J	3.0	2.0	ug/l	SW846 6020B
Iron		916	50	25	ug/l	SW846 6020B
Lead		0.60 J	3.0	2.0	ug/l	SW846 6020B
Manganese		153	4.0	2.0	ug/l	SW846 6020B
Nitrogen, Nitrate [d]		3.4	0.11	0.10	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite		3.4	0.10	0.095	mg/l	EPA 353.2/LACHAT
Nitrogen, Nitrite		0.031	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		77.9	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-5F	**DUP-05142019**					
Iron		68.3	50	25	ug/l	SW846 6020B
Manganese		163	4.0	2.0	ug/l	SW846 6020B
JC88209-6	**PH-RW-A2(05142019)**					
Benzene [a]		685	2.5	2.3	ug/l	SW846 8260C
Toluene [a]		67.9	5.0	3.8	ug/l	SW846 8260C
Ethylbenzene [a]		323	5.0	3.8	ug/l	SW846 8260C
Xylene (total) [a]		467	5.0	3.8	ug/l	SW846 8260C
Naphthalene [a]		187	25	10	ug/l	SW846 8260C
Isopropylbenzene [a]		20.4	5.0	3.8	ug/l	SW846 8260C
Tert Butyl Alcohol [a]		68.1	50	38	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [a]		445	10	7.5	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [a]		170	10	7.5	ug/l	SW846 8260C
2,2,4-Trimethylpentane [a]		12.7 J	25	13	ug/l	SW846 8260C
Methane		7960	11	8.0	ug/l	RSK-175
Ethane		0.73	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [b]		25400	500	100	ug/l	RSK-175
Arsenic		24.3	3.0	2.0	ug/l	SW846 6020B
Iron		54200	250	130	ug/l	SW846 6020B

Summary of Hits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Lead		1.6 J	3.0	2.0	ug/l	SW846 6020B
Manganese		8810	200	100	ug/l	SW846 6020B
Nitrogen, Nitrite		0.0069 J	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		15.3	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-6F	**PH-RW-A2(05142019)**					
Arsenic		22.3	3.0	2.0	ug/l	SW846 6020B
Iron		52200	250	130	ug/l	SW846 6020B
Manganese		9090	200	100	ug/l	SW846 6020B
JC88209-7	**PH-RW-A(05142019)**					
Benzene		4090	100	90	ug/l	SW846 8260C
Toluene [a]		119	20	15	ug/l	SW846 8260C
Ethylbenzene [a]		451	20	15	ug/l	SW846 8260C
Xylene (total) [a]		282	20	15	ug/l	SW846 8260C
Naphthalene [a]		344	100	40	ug/l	SW846 8260C
Isopropylbenzene [a]		51.8	20	15	ug/l	SW846 8260C
Tert Butyl Alcohol [a]		527	200	150	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [a]		74.7	40	30	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [a]		182	40	30	ug/l	SW846 8260C
2,2,4-Trimethylpentane [a]		58.9 J	100	50	ug/l	SW846 8260C
Methane		9430	22	16	ug/l	RSK-175
Ethane		1.5	0.23	0.12	ug/l	RSK-175
Carbon Dioxide [b]		38300	500	100	ug/l	RSK-175
Arsenic		25.5	3.0	2.0	ug/l	SW846 6020B
Iron		37700	500	250	ug/l	SW846 6020B
Lead		0.95 J	3.0	2.0	ug/l	SW846 6020B
Manganese		1520	40	20	ug/l	SW846 6020B
Sulfate		7.0	2.0	1.0	mg/l	EPA 300/SW846 9056A
Sulfide		0.62 J	2.0	1.0	mg/l	SM4500S2- F-11
JC88209-7F	**PH-RW-A(05142019)**					
Arsenic		21.1	3.0	2.0	ug/l	SW846 6020B
Iron		33200	500	250	ug/l	SW846 6020B
Manganese		1410	40	20	ug/l	SW846 6020B
JC88209-8	**PH-MW-66(05142019)**					
Benzene		24900	500	450	ug/l	SW846 8260C
Toluene [a]		2060	50	38	ug/l	SW846 8260C
Ethylbenzene [a]		1350	50	38	ug/l	SW846 8260C
Xylene (total) [a]		5780	50	38	ug/l	SW846 8260C

Summary of Hits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Naphthalene [a]		285	250	100	ug/l	SW846 8260C
Isopropylbenzene [a]		37.2 J	50	38	ug/l	SW846 8260C
1,2,4-Trimethylbenzene [a]		945	100	75	ug/l	SW846 8260C
1,3,5-Trimethylbenzene [a]		278	100	75	ug/l	SW846 8260C
Methane		5780	22	16	ug/l	RSK-175
Ethane		2.7	0.23	0.12	ug/l	RSK-175
Ethene		0.82	0.31	0.16	ug/l	RSK-175
Carbon Dioxide [b]		18600	500	100	ug/l	RSK-175
Arsenic		5.2	3.0	2.0	ug/l	SW846 6020B
Iron		40900	250	130	ug/l	SW846 6020B
Lead		0.58 J	3.0	2.0	ug/l	SW846 6020B
Manganese		946	20	10	ug/l	SW846 6020B
Nitrogen, Nitrite		0.0083 J	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		9.6	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-8F	**PH-MW-66(05142019)**					
Arsenic		5.2	3.0	2.0	ug/l	SW846 6020B
Iron		38400	250	130	ug/l	SW846 6020B
Manganese		909	20	10	ug/l	SW846 6020B
JC88209-9	**PH-PH-21(05172019)**					
Benzene		851	10	9.0	ug/l	SW846 8260C
Toluene		26.8	1.0	0.75	ug/l	SW846 8260C
Ethylbenzene		10.0	1.0	0.75	ug/l	SW846 8260C
Xylene (total)		78.7	1.0	0.75	ug/l	SW846 8260C
Isopropylbenzene		5.6	1.0	0.75	ug/l	SW846 8260C
Tert Butyl Alcohol		13.6	10	7.5	ug/l	SW846 8260C
1,2,4-Trimethylbenzene		6.7	2.0	1.5	ug/l	SW846 8260C
1,3,5-Trimethylbenzene		1.2 J	2.0	1.5	ug/l	SW846 8260C
Methane		4830	11	8.0	ug/l	RSK-175
Ethane		0.82	0.23	0.12	ug/l	RSK-175
Ethene		0.32	0.31	0.16	ug/l	RSK-175
Carbon Dioxide [e]		25100	500	100	ug/l	RSK-175
Arsenic		1.3 J	3.0	2.0	ug/l	SW846 6020B
Iron		11200	50	25	ug/l	SW846 6020B
Manganese		2010	50	25	ug/l	SW846 6020B
Nitrogen, Nitrite		0.0086 J	0.010	0.0050	mg/l	SM4500NO2 B-11
Sulfate		9.3	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-9F	**PH-PH-21(05172019)**					
Arsenic		1.2 J	3.0	2.0	ug/l	SW846 6020B
Iron		10700	50	25	ug/l	SW846 6020B

Summary of Hits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Manganese		2000	50	25	ug/l	SW846 6020B
JC88209-10	**FB-05142019**					
Methane		1.9	0.11	0.080	ug/l	RSK-175
Manganese		8.3	4.0	2.0	ug/l	SW846 6020B
JC88209-10F	**FB-05142019**					
Manganese		8.4	4.0	2.0	ug/l	SW846 6020B
JC88209-11	**EB-05142019**					
Methane		1.7	0.11	0.080	ug/l	RSK-175
Manganese		5.3	4.0	2.0	ug/l	SW846 6020B
Nitrogen, Nitrate [d]		0.15	0.11	0.10	mg/l	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite		0.15	0.10	0.095	mg/l	EPA 353.2/LACHAT
Sulfate		1.1 J	2.0	1.0	mg/l	EPA 300/SW846 9056A
JC88209-11F	**EB-05142019**					
Manganese		7.8	4.0	2.0	ug/l	SW846 6020B
JC88209-12	**TRIP BLANK**					

No hits reported in this sample.

(a) Diluted due to high concentration of target compound.
(b) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(c) (pH = 5)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(d) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)
(e) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.

Sample Results

Report of Analysis

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	X181602.D	20	05/28/19 11:25	JP	n/a	n/a	VX7769
Run #2	4B91019.D	50	05/24/19 17:54	CSF	n/a	n/a	V4B3857
Run #3	4B91020.D	500	05/24/19 18:22	CSF	n/a	n/a	V4B3857

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml
Run #3	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	11000 [b]	250	230	210	ug/l	
108-88-3	Toluene	314	20	15	11	ug/l	
100-41-4	Ethylbenzene	368	20	15	12	ug/l	
1330-20-7	Xylene (total)	375	20	15	12	ug/l	
91-20-3	Naphthalene	54.3	100	40	20	ug/l	J
107-06-2	1,2-Dichloroethane	15 U	20	15	12	ug/l	
98-82-8	Isopropylbenzene	29.3	20	15	13	ug/l	
1634-04-4	Methyl Tert Butyl Ether	15 U	20	15	10	ug/l	
75-65-0	Tert Butyl Alcohol	262	200	150	120	ug/l	
95-63-6	1,2,4-Trimethylbenzene	48.9	40	30	20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	97.6	40	30	20	ug/l	
540-84-1	2,2,4-Trimethylpentane	50 U	100	50	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
1868-53-7	Dibromofluoromethane	104%	103%	103%	80-120%
17060-07-0	1,2-Dichloroethane-D4	97%	109%	110%	81-124%
2037-26-5	Toluene-D8	102%	98%	97%	80-120%
460-00-4	4-Bromofluorobenzene	96%	103%	104%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Result is from Run# 3

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118148.D	1	05/20/19 07:59	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	77%		56-145%
111-27-3	Hexanol	82%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32564.D	1	05/23/19 11:14	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0098 U	0.020	0.0098	0.0052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	84%		20-144%
3017-95-6	2-Bromo-1-chloropropane	94%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73098.D	1	05/24/19 08:38	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135644.D	1	05/17/19 12:41	GP	n/a	n/a	GWW5201
Run #3	AA73102.D	50	05/24/19 09:32	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1670 [b]	5.5	4.0	3.0	ug/l	
74-84-0	Ethane	0.40	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	10200 [c]	50	10	4.4	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	9.0	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	55000	250	130	93	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]
Lead	7.5	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	479	20	10	3.2	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:09	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.12	0.10	0.095	0.090	mg/l	1	05/28/19 19:09	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.13	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	21.1	2.0	1.0	0.38	mg/l	1	05/24/19 15:01	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-2(05142019)		
Lab Sample ID:	JC88209-1F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	6.1	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	59800	250	130	93	ug/l	10	05/20/19	05/24/19	GT	SW846 6020B [2]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	498	20	10	3.2	ug/l	10	05/20/19	05/24/19	GT	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46795
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90974.D	1	05/23/19 17:27	JP	n/a	n/a	V4B3854
Run #2	X181601.D	10	05/28/19 10:56	JP	n/a	n/a	VX7769

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	362 [a]	5.0	4.5	4.3	ug/l	
108-88-3	Toluene	23.5	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	85.1	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	162	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	22.4	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	3.7	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	29.3	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	119	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	39.3	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	106%	80-120%
17060-07-0	1,2-Dichloroethane-D4	110%	98%	81-124%
2037-26-5	Toluene-D8	101%	101%	80-120%
460-00-4	4-Bromofluorobenzene	107%	97%	80-120%

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118149.D	1	05/20/19 08:18	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	85%		56-145%
111-27-3	Hexanol	84%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32565.D	1	05/23/19 11:33	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0098 U	0.020	0.0098	0.0052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	95%		20-144%
3017-95-6	2-Bromo-1-chloropropane	89%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73104.D	1	05/24/19 10:11	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135646.D	1	05/17/19 13:22	GP	n/a	n/a	GWW5201
Run #3	AA73105.D	10	05/24/19 10:41	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	958 [b]	1.1	0.80	0.60	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	3700 [c]	50	10	4.4	ug/l	

(a) (pH = 5)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.3 J	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	3540	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Lead	0.54 J	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	10200	300	150	47	ug/l	150	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:10	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.095 U	0.10	0.095	0.090	mg/l	1	05/28/19 19:10	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	76.5	2.0	1.0	0.38	mg/l	1	05/24/19 15:27	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B2(05142019)		
Lab Sample ID:	JC88209-2F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	1.4 J	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	2310	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	10500	300	150	47	ug/l	150	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90972.D	1	05/23/19 16:30	JP	n/a	n/a	V4B3854
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	1.7	5.0	2.5	1.0	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-120%
17060-07-0	1,2-Dichloroethane-D4	112%		81-124%
2037-26-5	Toluene-D8	98%		80-120%
460-00-4	4-Bromofluorobenzene	106%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118150.D	1	05/20/19 08:36	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	91%		56-145%
111-27-3	Hexanol	79%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32568.D	1	05/23/19 12:30	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.020	0.010	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	100%		20-144%
3017-95-6	2-Bromo-1-chloropropane	103%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73106.D	1	05/24/19 10:56	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135647.D	1	05/17/19 13:53	GP	n/a	n/a	GWW5201

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	5.4	0.11	0.080	0.060	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	2500 [b]	50	10	4.4	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	0.97 J	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	859	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	159	4.0	2.0	0.63	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46767
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	3.6	0.11	0.10	0.093	mg/l	1	05/28/19 19:11	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	3.6	0.10	0.095	0.090	mg/l	1	05/28/19 19:11	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.029	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	79.6	2.0	1.0	0.38	mg/l	1	05/24/19 16:47	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-B(05142019)		
Lab Sample ID:	JC88209-3F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	70.5	50	25	19	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	162	4.0	2.0	0.63	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67(05142019)		
Lab Sample ID:	JC88209-4	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	X181604.D	20	05/28/19 12:25	JP	n/a	n/a	VX7769
Run #2	4B91021.D	50	05/24/19 18:50	CSF	n/a	n/a	V4B3857
Run #3	4B91022.D	500	05/24/19 19:18	CSF	n/a	n/a	V4B3857

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml
Run #3	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	11700 [b]	250	230	210	ug/l	
108-88-3	Toluene	2730	20	15	11	ug/l	
100-41-4	Ethylbenzene	873	20	15	12	ug/l	
1330-20-7	Xylene (total)	8490	20	15	12	ug/l	
91-20-3	Naphthalene	365	100	40	20	ug/l	
107-06-2	1,2-Dichloroethane	15 U	20	15	12	ug/l	
98-82-8	Isopropylbenzene	65.3	20	15	13	ug/l	
1634-04-4	Methyl Tert Butyl Ether	15 U	20	15	10	ug/l	
75-65-0	Tert Butyl Alcohol	150 U	200	150	120	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1760	40	30	20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	606	40	30	20	ug/l	
540-84-1	2,2,4-Trimethylpentane	50 U	100	50	20	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
1868-53-7	Dibromofluoromethane	102%	102%	103%	80-120%
17060-07-0	1,2-Dichloroethane-D4	97%	110%	108%	81-124%
2037-26-5	Toluene-D8	104%	101%	99%	80-120%
460-00-4	4-Bromofluorobenzene	103%	107%	103%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Result is from Run# 3

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67(05142019)		
Lab Sample ID:	JC88209-4	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118151.D	1	05/20/19 08:54	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	96%		56-145%
111-27-3	Hexanol	101%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67(05142019)		
Lab Sample ID:	JC88209-4	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32569.D	1	05/23/19 12:48	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	34 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.021	0.010	0.0055	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	75%		20-144%
3017-95-6	2-Bromo-1-chloropropane	77%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-67(05142019)		
Lab Sample ID:	JC88209-4	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73107.D	1	05/24/19 11:09	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135648.D	1	05/17/19 14:12	GP	n/a	n/a	GWW5201
Run #3	AA73108.D	10	05/24/19 11:23	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1050 [b]	1.1	0.80	0.60	ug/l	
74-84-0	Ethane	0.75	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	4420 [c]	50	10	4.4	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: PH-MW-67(05142019)
Lab Sample ID: JC88209-4 **Date Sampled:** 05/14/19
Matrix: AQ - Ground Water **Date Received:** 05/15/19
Percent Solids: n/a
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	11.9	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [4]
Iron	33900	130	63	47	ug/l	5	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [4]
Lead	1.9 J	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [4]
Manganese	4700	200	100	32	ug/l	100	05/20/19	05/24/19	GT	SW846 6020B [3]	SW846 3010A [4]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Instrument QC Batch: MA46795
(4) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-67(05142019)		
Lab Sample ID:	JC88209-4	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.17	0.11	0.10	0.093	mg/l	1	05/28/19 19:13	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.18	0.10	0.095	0.090	mg/l	1	05/28/19 19:13	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0089 J	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	10.1	2.0	1.0	0.38	mg/l	1	05/24/19 17:13	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-67(05142019)		
Lab Sample ID:	JC88209-4F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	11.4	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	31800	130	63	47	ug/l	5	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	4630	200	100	32	ug/l	100	05/20/19	05/24/19	GT	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46776
(2) Instrument QC Batch: MA46795
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	DUP-05142019		
Lab Sample ID:	JC88209-5	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90973.D	1	05/23/19 16:59	JP	n/a	n/a	V4B3854
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	1.8	5.0	2.5	1.0	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	108%		80-120%
17060-07-0	1,2-Dichloroethane-D4	111%		81-124%
2037-26-5	Toluene-D8	99%		80-120%
460-00-4	4-Bromofluorobenzene	107%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	DUP-05142019		
Lab Sample ID:	JC88209-5	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118154.D	1	05/20/19 10:09	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	94%		56-145%
111-27-3	Hexanol	86%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID: DUP-05142019
Lab Sample ID: JC88209-5 **Date Sampled:** 05/14/19
Matrix: AQ - Ground Water **Date Received:** 05/15/19
Method: SW846-8011 SW846 8011 **Percent Solids:** n/a
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32570.D	1	05/23/19 13:07	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	96%		20-144%
3017-95-6	2-Bromo-1-chloropropane	96%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	DUP-05142019		
Lab Sample ID:	JC88209-5	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73109.D	1	05/24/19 11:36	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135649.D	1	05/17/19 14:39	GP	n/a	n/a	GWW5201

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	7.4	0.11	0.080	0.060	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	2910 [b]	50	10	4.4	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	DUP-05142019		
Lab Sample ID:	JC88209-5	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	0.99 J	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	916	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	0.60 J	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	153	4.0	2.0	0.63	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46767
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	DUP-05142019		
Lab Sample ID:	JC88209-5	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	3.4	0.11	0.10	0.093	mg/l	1	05/28/19 19:14	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	3.4	0.10	0.095	0.090	mg/l	1	05/28/19 19:14	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.031	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	77.9	2.0	1.0	0.38	mg/l	1	05/24/19 17:40	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	DUP-05142019		
Lab Sample ID:	JC88209-5F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	68.3	50	25	19	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	163	4.0	2.0	0.63	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	4B91010.D	5	05/24/19 13:05	CSF	n/a	n/a	V4B3857
Run #2 [b]	4B91018.D	10	05/24/19 17:26	CSF	n/a	n/a	V4B3857

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	685	2.5	2.3	2.1	ug/l	
108-88-3	Toluene	67.9	5.0	3.8	2.7	ug/l	
100-41-4	Ethylbenzene	323	5.0	3.8	3.0	ug/l	
1330-20-7	Xylene (total)	467	5.0	3.8	3.0	ug/l	
91-20-3	Naphthalene	187	25	10	4.9	ug/l	
107-06-2	1,2-Dichloroethane	3.8 U	5.0	3.8	3.0	ug/l	
98-82-8	Isopropylbenzene	20.4	5.0	3.8	3.2	ug/l	
1634-04-4	Methyl Tert Butyl Ether	3.8 U	5.0	3.8	2.5	ug/l	
75-65-0	Tert Butyl Alcohol	68.1	50	38	29	ug/l	
95-63-6	1,2,4-Trimethylbenzene	445	10	7.5	5.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	170	10	7.5	5.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	12.7	25	13	5.0	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	95%	102%	80-120%
17060-07-0	1,2-Dichloroethane-D4	105%	109%	81-124%
2037-26-5	Toluene-D8	104%	99%	80-120%
460-00-4	4-Bromofluorobenzene	114%	106%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Confirmation run for internal standard areas.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118155.D	1	05/20/19 10:27	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	91%		56-145%
111-27-3	Hexanol	96%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32571.D	1	05/23/19 13:26	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0097 U	0.019	0.0097	0.0051	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	89%		20-144%
3017-95-6	2-Bromo-1-chloropropane	81%		20-144%

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73110.D	1	05/24/19 11:49	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135652.D	10	05/17/19 15:28	GP	n/a	n/a	GWW5201
Run #3	AA73111.D	100	05/24/19 12:02	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	7960 [b]	11	8.0	6.0	ug/l	
74-84-0	Ethane	0.73	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	25400 [c]	500	100	44	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	24.3	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	54200	250	130	93	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]
Lead	1.6 J	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	8810	200	100	32	ug/l	100	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:15	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.095 U	0.10	0.095	0.090	mg/l	1	05/28/19 19:15	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0069 J	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	15.3	2.0	1.0	0.38	mg/l	1	05/24/19 18:07	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A2(05142019)		
Lab Sample ID:	JC88209-6F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	22.3	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	52200	250	130	93	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	9090	200	100	32	ug/l	100	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	4B91012.D	20	05/24/19 14:17	CSF	n/a	n/a	V4B3857
Run #2	4B91017.D	200	05/24/19 16:58	CSF	n/a	n/a	V4B3857

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	4090 [b]	100	90	85	ug/l	
108-88-3	Toluene	119	20	15	11	ug/l	
100-41-4	Ethylbenzene	451	20	15	12	ug/l	
1330-20-7	Xylene (total)	282	20	15	12	ug/l	
91-20-3	Naphthalene	344	100	40	20	ug/l	
107-06-2	1,2-Dichloroethane	15 U	20	15	12	ug/l	
98-82-8	Isopropylbenzene	51.8	20	15	13	ug/l	
1634-04-4	Methyl Tert Butyl Ether	15 U	20	15	10	ug/l	
75-65-0	Tert Butyl Alcohol	527	200	150	120	ug/l	
95-63-6	1,2,4-Trimethylbenzene	74.7	40	30	20	ug/l	
108-67-8	1,3,5-Trimethylbenzene	182	40	30	20	ug/l	
540-84-1	2,2,4-Trimethylpentane	58.9	100	50	20	ug/l	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	104%	102%	80-120%
17060-07-0	1,2-Dichloroethane-D4	112%	108%	81-124%
2037-26-5	Toluene-D8	98%	97%	80-120%
460-00-4	4-Bromofluorobenzene	105%	102%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118156.D	1	05/20/19 10:46	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	94%		56-145%
111-27-3	Hexanol	75%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32572.D	1	05/23/19 13:45	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0097 U	0.019	0.0097	0.0051	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	84%		20-144%
3017-95-6	2-Bromo-1-chloropropane	75%		20-144%

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73112.D	1	05/24/19 12:14	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135655.D	10	05/17/19 16:52	GP	n/a	n/a	GWW5201
Run #3	AA73113.D	200	05/24/19 12:27	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	9430 [b]	22	16	12	ug/l	
74-84-0	Ethane	1.5	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	38300 [c]	500	100	44	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	25.5	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	37700	500	250	190	ug/l	20	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]
Lead	0.95 J	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	1520	40	20	6.3	ug/l	20	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:16	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.095 U	0.10	0.095	0.090	mg/l	1	05/28/19 19:16	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	7.0	2.0	1.0	0.38	mg/l	1	05/24/19 18:33	NV	EPA 300/SW846 9056A
Sulfide	0.62 J	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-RW-A(05142019)		
Lab Sample ID:	JC88209-7F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	21.1	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	33200	500	250	190	ug/l	20	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	1410	40	20	6.3	ug/l	20	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	X181603.D	50	05/28/19 11:53	JP	n/a	n/a	VX7769
Run #2	4B91023.D	100	05/24/19 19:46	CSF	n/a	n/a	V4B3857
Run #3	4B91024.D	1000	05/24/19 20:14	CSF	n/a	n/a	V4B3857

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml
Run #3	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	24900 [b]	500	450	430	ug/l	
108-88-3	Toluene	2060	50	38	27	ug/l	
100-41-4	Ethylbenzene	1350	50	38	30	ug/l	
1330-20-7	Xylene (total)	5780	50	38	30	ug/l	
91-20-3	Naphthalene	285	250	100	49	ug/l	
107-06-2	1,2-Dichloroethane	38 U	50	38	30	ug/l	
98-82-8	Isopropylbenzene	37.2	50	38	32	ug/l	J
1634-04-4	Methyl Tert Butyl Ether	38 U	50	38	25	ug/l	
75-65-0	Tert Butyl Alcohol	380 U	500	380	290	ug/l	
95-63-6	1,2,4-Trimethylbenzene	945	100	75	50	ug/l	
108-67-8	1,3,5-Trimethylbenzene	278	100	75	50	ug/l	
540-84-1	2,2,4-Trimethylpentane	130 U	250	130	50	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Run# 3	Limits
1868-53-7	Dibromofluoromethane	107%	103%	102%	80-120%
17060-07-0	1,2-Dichloroethane-D4	100%	111%	110%	81-124%
2037-26-5	Toluene-D8	101%	97%	97%	80-120%
460-00-4	4-Bromofluorobenzene	98%	103%	103%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Result is from Run# 3

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118157.D	1	05/20/19 11:04	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	81%		56-145%
111-27-3	Hexanol	75%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	7G32677.D	1	05/30/19 04:04	VDT	05/29/19 13:00	OP20629	G7G1154
Run #2 [b]	7G32573.D	1	05/23/19 14:05	VDT	05/22/19 11:45	OP20555	G7G1150

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2	34 ml	2.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.010 U	0.020	0.010	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	109%	0% [c]	20-144%
3017-95-6	2-Bromo-1-chloropropane	113%	0% [c]	20-144%

(a) Sample originally extracted within the holding time. Re-extracted due to missing surrogate.
(b) Confirmation run.
(c) Outside the QC limits.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73114.D	1	05/24/19 12:42	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135656.D	10	05/17/19 17:09	GP	n/a	n/a	GWW5201
Run #3	AA73116.D	200	05/24/19 13:15	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	5780 [b]	22	16	12	ug/l	
74-84-0	Ethane	2.7	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.82	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	18600 [c]	500	100	44	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	5.2	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	40900	250	130	93	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]
Lead	0.58 J	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	946	20	10	3.2	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:17	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.095 U	0.10	0.095	0.090	mg/l	1	05/28/19 19:17	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0083 J	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	9.6	2.0	1.0	0.38	mg/l	1	05/24/19 19:00	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-MW-66(05142019)		
Lab Sample ID:	JC88209-8F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	5.2	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	38400	250	130	93	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	909	20	10	3.2	ug/l	10	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90963.D	1	05/23/19 12:17	JP	n/a	n/a	V4B3854
Run #2	4B90964.D	20	05/23/19 12:45	JP	n/a	n/a	V4B3854

	Purge Volume
Run #1	5.0 ml
Run #2	5.0 ml

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	851 [a]	10	9.0	8.5	ug/l	
108-88-3	Toluene	26.8	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	10.0	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	78.7	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	5.6	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	13.6	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	6.7	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.2	2.0	1.5	1.0	ug/l	J
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	107%	109%	80-120%
17060-07-0	1,2-Dichloroethane-D4	111%	111%	81-124%
2037-26-5	Toluene-D8	100%	98%	80-120%
460-00-4	4-Bromofluorobenzene	105%	103%	80-120%

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118145.D	1	05/20/19 07:04	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	72%		56-145%
111-27-3	Hexanol	62%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32561.D	1	05/23/19 10:17	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	35 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0053	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	93%		20-144%
3017-95-6	2-Bromo-1-chloropropane	89%		20-144%

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73117.D	1	05/24/19 13:28	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135662.D	10	05/17/19 19:17	GP	n/a	n/a	GWW5201
Run #3	AA73119.D	100	05/24/19 15:01	GP	n/a	n/a	GAA1722

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	4830 [b]	11	8.0	6.0	ug/l	
74-84-0	Ethane	0.82	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.32	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	25100 [c]	500	100	44	ug/l	

(a) (pH = 7)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 3
(c) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	1.3 J	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	11200	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	2010	50	25	7.9	ug/l	25	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9	**Date Sampled:**	05/14/19
Matrix:	AQ - Ground Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:18	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.095 U	0.10	0.095	0.090	mg/l	1	05/28/19 19:18	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0086 J	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	9.3	2.0	1.0	0.38	mg/l	1	05/24/19 20:20	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	PH-PH-21(05172019)		
Lab Sample ID:	JC88209-9F	**Date Sampled:**	05/14/19
Matrix:	AQ - Groundwater Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	1.2 J	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Iron	10700	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [3]
Manganese	2000	50	25	7.9	ug/l	25	05/20/19	05/22/19	SN	SW846 6020B [2]	SW846 3010A [3]

(1) Instrument QC Batch: MA46767
(2) Instrument QC Batch: MA46776
(3) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90969.D	1	05/23/19 15:06	JP	n/a	n/a	V4B3854
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-120%
17060-07-0	1,2-Dichloroethane-D4	112%		81-124%
2037-26-5	Toluene-D8	99%		80-120%
460-00-4	4-Bromofluorobenzene	104%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Water	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118158.D	1	05/20/19 11:22	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	85%		56-145%
111-27-3	Hexanol	82%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Water	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32574.D	1	05/23/19 14:24	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	102%		20-144%
3017-95-6	2-Bromo-1-chloropropane	95%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Water	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73120.D	1	05/24/19 15:14	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135658.D	1	05/17/19 17:51	GP	n/a	n/a	GWW5201

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1.9	0.11	0.080	0.060	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	10 U [b]	50	10	4.4	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	8.3	4.0	2.0	0.63	ug/l	2	05/20/19	05/21/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46767
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Water	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.10 U	0.11	0.10	0.093	mg/l	1	05/28/19 19:21	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.095 U	0.10	0.095	0.090	mg/l	1	05/28/19 19:21	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	1.0 U	2.0	1.0	0.38	mg/l	1	05/24/19 20:47	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	FB-05142019		
Lab Sample ID:	JC88209-10F	**Date Sampled:**	05/14/19
Matrix:	AQ - Field Blank Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	8.4	4.0	2.0	0.63	ug/l	2	05/20/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15198

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11	**Date Sampled:**	05/14/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90970.D	1	05/23/19 15:34	JP	n/a	n/a	V4B3854
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	109%		80-120%
17060-07-0	1,2-Dichloroethane-D4	112%		81-124%
2037-26-5	Toluene-D8	97%		80-120%
460-00-4	4-Bromofluorobenzene	104%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11	**Date Sampled:**	05/14/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/15/19
Method:	SW846-8015D (DAI)	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	GH118159.D	1	05/20/19 11:41	XPL	n/a	n/a	GGH6303
Run #2							

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
64-17-5	Ethanol	50 U	100	50	34	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
111-27-3	Hexanol	86%		56-145%
111-27-3	Hexanol	88%		56-145%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11	**Date Sampled:**	05/14/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/15/19
Method:	SW846-8011 SW846 8011	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	7G32575.D	1	05/23/19 14:43	VDT	05/22/19 11:45	OP20555	G7G1150
Run #2							

	Initial Volume	Final Volume
Run #1	36 ml	2.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
106-93-4	1,2-Dibromoethane	0.0099 U	0.020	0.0099	0.0052	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
3017-95-6	2-Bromo-1-chloropropane	99%		20-144%
3017-95-6	2-Bromo-1-chloropropane	92%		20-144%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11	**Date Sampled:**	05/14/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/15/19
Method:	RSK-175	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA73121.D	1	05/24/19 15:27	GP	n/a	n/a	GAA1722
Run #2 [a]	WW135659.D	1	05/17/19 18:21	GP	n/a	n/a	GWW5201

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
74-82-8	Methane	1.7	0.11	0.080	0.060	ug/l	
74-84-0	Ethane	0.12 U	0.23	0.12	0.099	ug/l	
74-85-1	Ethene	0.16 U	0.31	0.16	0.072	ug/l	
124-38-9	Carbon Dioxide	10 U [b]	50	10	4.4	ug/l	

(a) (pH = 6)Sample is not acid preserved. Sample analyzed within 7 days holding time.
(b) Result is from Run# 2

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11	**Date Sampled:**	05/14/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Total Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	5.3	4.0	2.0	0.63	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15216

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11	**Date Sampled:**	05/14/19
Matrix:	AQ - Equipment Blank	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

General Chemistry

Analyte	Result	LOQ	LOD	DL	Units	DF	Analyzed	By	Method
Nitrogen, Nitrate [a]	0.15	0.11	0.10	0.093	mg/l	1	05/28/19 19:23	KI	EPA353.2/SM4500NO2B
Nitrogen, Nitrate + Nitrite	0.15	0.10	0.095	0.090	mg/l	1	05/28/19 19:23	KI	EPA 353.2/LACHAT
Nitrogen, Nitrite	0.0050 U	0.010	0.0050	0.0030	mg/l	1	05/15/19 00:04	MO	SM4500NO2 B-11
Sulfate	1.1 J	2.0	1.0	0.38	mg/l	1	05/24/19 22:06	NV	EPA 300/SW846 9056A
Sulfide	1.0 U	2.0	1.0	0.48	mg/l	1	05/20/19 11:37	MP	SM4500S2- F-11

(a) Calculated as: (Nitrogen, Nitrate + Nitrite) - (Nitrogen, Nitrite)

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

Report of Analysis

Client Sample ID:	EB-05142019		
Lab Sample ID:	JC88209-11F	**Date Sampled:**	05/14/19
Matrix:	AQ - Equip Blank Filtered	**Date Received:**	05/15/19
		Percent Solids:	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

Dissolved Metals Analysis

Analyte	Result	LOQ	LOD	DL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	2.0 U	3.0	2.0	0.94	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Iron	25 U	50	25	19	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Lead	2.0 U	3.0	2.0	0.52	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]
Manganese	7.8	4.0	2.0	0.63	ug/l	2	05/21/19	05/22/19	SN	SW846 6020B [1]	SW846 3010A [2]

(1) Instrument QC Batch: MA46776
(2) Prep QC Batch: MP15216

LOQ = Limit of Quantitation DL = Detection Limit U = Indicates a result < LOD
LOD = Limit of Detection B = Analyte found in associated blank J = Indicates a result > = DL (MDL) but < LOQ

SGS North America Inc.

Report of Analysis

Client Sample ID:	TRIP BLANK		
Lab Sample ID:	JC88209-12	**Date Sampled:**	05/14/19
Matrix:	AQ - Trip Blank Water	**Date Received:**	05/15/19
Method:	SW846 8260C	**Percent Solids:**	n/a
Project:	Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	4B90971.D	1	05/23/19 16:02	JP	n/a	n/a	V4B3854
Run #2							

	Purge Volume
Run #1	5.0 ml
Run #2	

PA Leaded Gasoline and Aviation Gas List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
71-43-2	Benzene	0.45 U	0.50	0.45	0.43	ug/l	
108-88-3	Toluene	0.75 U	1.0	0.75	0.53	ug/l	
100-41-4	Ethylbenzene	0.75 U	1.0	0.75	0.60	ug/l	
1330-20-7	Xylene (total)	0.75 U	1.0	0.75	0.59	ug/l	
91-20-3	Naphthalene	2.0 U	5.0	2.0	0.98	ug/l	
107-06-2	1,2-Dichloroethane	0.75 U	1.0	0.75	0.60	ug/l	
98-82-8	Isopropylbenzene	0.75 U	1.0	0.75	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	0.75 U	1.0	0.75	0.51	ug/l	
75-65-0	Tert Butyl Alcohol	7.5 U	10	7.5	5.8	ug/l	
95-63-6	1,2,4-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	1.5 U	2.0	1.5	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	2.5 U	5.0	2.5	1.0	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1868-53-7	Dibromofluoromethane	110%		80-120%
17060-07-0	1,2-Dichloroethane-D4	112%		81-124%
2037-26-5	Toluene-D8	99%		80-120%
460-00-4	4-Bromofluorobenzene	104%		80-120%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody
- Sample Tracking Chronicle
- Internal Chain of Custody
- QC Evaluation: DOD QSM5 Limits

Parameter Certification Exceptions

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

The following parameters included in this report are exceptions to NELAC certification.
The certification status of each is indicated below.

Parameter	CAS#	Method	Mat	Certification Status
2,2,4-Trimethylpentane	540-84-1	SW846 8260C	AQ	SGS is not certified for this parameter.[a]

(a) Lab cert for analyte not supported by NJDEP, OQA. Only methods/analytes required for reporting by the State of NJ can be certified in NJ. Use of this analyte for compliance must be verified through the appropriate regulatory office.

Certification exceptions shown are based on the New Jersey DEP certifications. Applicability in other states may vary. Please contact your laboratory representative if additional information is required for a specific regulatory program.

GW FB EB WTB

CHAIN OF CUSTODY

SGS North America Inc. - Dayton
2235 Route 130, Dayton, NJ 08810
TEL. 732-329-0200 FAX: 732-329-3499/3480
www.sgs.com/ehsusa

Page 1 of 1

E / PN

FED-EX Tracking #: | Bottle Order Control #:
SGS Quote #: | SGS Job #: JC88209

Client / Reporting Information

Company Name: USACE
Street Address: 100 PENN SQ EAST
City: PHILA State: PA Zip: 19107
Project Contact: JOE LOEPER E-mail:
Phone #: 215-656-6545
Sampler(s) Name(s): ARNOLD / PARS Phone #:

Project Information

Project Name: DSCP
Street: 2990 B. S 20th St
City: PHILA State: PA
Project #:
Client Purchase Order #:
Project Manager: JOE LOEPER

Billing Information (if different from Report to)

Company Name:
Street Address:
City: State: Zip:
Attention:

Requested Analysis

SGS Sample #	Field ID / Point of Collection	MEOH/DI Vial #	Collection Date	Collection Time	Sampled by	Grab (G) Comp (C)	Matrix	# of bottles	Number of preserved Bottles: HCl	NaOH	HNO3	H2SO4	NONE	DI Water	MEOH	ENCORE	VOCs PAL 6TMB VMS+224 TOAP	SOIL EDB	SOIL CTHL	DISS METALS (As, Pb, Mn, Fe)	VPSK 1150 DGMCE	VPSK 1150 CO2	XN030	SO4	S	TOAL METALS (As, Pb, Mn, Fe)	LAB USE ONLY
1F	PH-PH-2(05142019)		5-14-19	0925	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	A26
2F	PH-RW-B2(05142019)			1050	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	M9
3F	PH-RW-B(05142019)			1245	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	V1173
4F	PH-MW-67(05142019)			1440	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	V1174
5F	DUP-05142019			1200	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	V1175
6F	PH-RW-A2(05142019)			1609	DH	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	V1172
7F	PH-RW-A(05142019)			0928	DH	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	
8F	PH-MW-66(05142019)			1452	DH	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	
9F	PH-PH-21(05142019)	MS/MSD		1143	DH	G	GW	60	33	6	6	3	12				X	X	X	X	X	X	X	X	X	X	
10F	FB-05142019			1600	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	
11F	EB-05142019			1555	CO	G	GW	20	11	2	2	1	4				X	X	X	X	X	X	X	X	X	X	
12	TRIP BLANK		-	-	-	-	-	3	3								X										

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
SED-Sediment
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe
FB - Field Blank
EB-Equipment Blank
RB - Rinse Blank
TB - Trip Blank

Turn Around Time (Business Days)

Approved By (SGS PM): / Date:

- [X] 10 Business Days
- [ ] 5 Business Days
- [ ] 3 Business Days*
- [ ] 2 Business Days*
- [ ] 1 Business Day*
- [ ] Other

All data available via Lablink | * Approval needed for 1-3 Business Day TAT

Deliverable

- [ ] Commercial "A" (Level 1)
- [ ] Commercial "B" (Level 2)
- [X] NJ Reduced (Level 3)
- [ ] Full Tier I (Level 4)
- [ ] Commercial "C"
- [ ] NJ DKQP
- [ ] NYASP Category A
- [ ] NYASP Category B
- [ ] MA MCP Criteria
- [ ] CT RCP Criteria
- [ ] State Forms
- [ ] EDD Format
- [ ] DOD-QSM5

Commercial "A" = Results only; Commercial "B" = Results + QC Summary
Commercial "C" = Results + QC Summary + Partial Raw data

Comments / Special Instructions

NJDEP DATA PACKAGE ONLY

http://www.sgs.com/en/terms-and-conditions

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished By:	Date / Time:	Received By:
1	[signature]	5/15/19 1030	[signature]
2	[signature]	5/16/19 1430	[signature]
3	[signature]	5/16/19 1445	[signature]
4			
5			

Custody Seal #: [ ] Intact [ ] Not Intact | Preserved where applicable [ ] Absent | Therm ID: | On Ice: [ ] | Cooler Temp: 1.5, 1.1, 2.4, 2.0 COC

INITIAL ASESSMENT BB 5/17

LABEL VERIFICATION

EHSA-QAC-0023-02-FORM-Dayton - Standard COC.xlsx

SGS Sample Receipt Summary

Job Number: JC88209 **Client:** USACE-PHILADELPHIA DISTRICT **Project:** DEFENSE SUPPLY CENTER (DSCP), 2990 SOU

Date / Time Received: 5/15/2019 7:45:00 PM **Delivery Method:** Accutest Courier **Airbill #'s:**

Cooler Temps (Raw Measured) °C: #Deleted

Cooler Temps (Corrected) °C: #Deleted

Cooler Security	Y	N		Y	N
1. Custody Seals Present:	☑	☐	3. COC Present:	☑	☐
2. Custody Seals Intact:	☑	☐	4. Smpl Dates/Time OK	☑	☐

Cooler Temperature	Y	N
1. Temp criteria achieved:	☑	☐
2. Cooler temp verification:	IR Gun	
3. Cooler media:	Ice (Bag)	
4. No. Coolers:	4	

Quality Control Preservation	Y	N	N/A
1. Trip Blank present / cooler:	☑	☐	☐
2. Trip Blank listed on COC:	☑	☐	☐
3. Samples preserved properly:	☑	☐	
4. VOCs headspace free:	☑	☐	☐

Sample Integrity - Documentation	Y	N
1. Sample labels present on bottles:	☑	☐
2. Container labeling complete:	☑	☐
3. Sample container label / COC agree:	☑	☐

Sample Integrity - Condition	Y	N
1. Sample recvd within HT:	☑	☐
2. All containers accounted for:	☑	☐
3. Condition of sample:	Intact	

Sample Integrity - Instructions	Y	N	N/A
1. Analysis requested is clear:	☑	☐	
2. Bottles received for unspecified tests	☐	☑	
3. Sufficient volume recvd for analysis:	☑	☐	
4. Compositing instructions clear:	☐	☐	☑
5. Filtering instructions clear:	☐	☐	☑

Test Strip Lot #s: pH 1-12: 206717 pH 12+: 208717 Other: (Specify)

Comments #Deleted

SM089-02 Rev. Date 12/1/16

Responded to by:

Response Date:

JC88209: Chain of Custody
Page 3 of 3

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-1	Collected: 14-MAY-19 09:25 By: CO			Received: 15-MAY-19 By: AS		
PH-PH-2(05142019)						
JC88209-1	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-1	RSK-175	17-MAY-19 12:41	GP			VRSK175CO2
JC88209-1	SW846-8015D (DAI)	20-MAY-19 07:59	XPL			D8015ETHL
JC88209-1	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-1	SW846 6020B	21-MAY-19 13:34	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-1	SW846 6020B	22-MAY-19 15:17	SN	20-MAY-19	MR	FEMS,MNMS
JC88209-1	SW846-8011	23-MAY-19 11:14	VDT	22-MAY-19	NT	V8011EDB
JC88209-1	RSK-175	24-MAY-19 08:38	GP			VRSK175DGMEE
JC88209-1	RSK-175	24-MAY-19 09:32	GP			VRSK175DGMEE
JC88209-1	EPA 300/SW846 9056A	24-MAY-19 15:01	NV	24-MAY-19	NV	SO4
JC88209-1	SW846 8260C	24-MAY-19 17:54	CSF			V8260PALGTMB
JC88209-1	SW846 8260C	24-MAY-19 18:22	CSF			V8260PALGTMB
JC88209-1	SW846 8260C	28-MAY-19 11:25	JP			V8260PALGTMB
JC88209-1	EPA353.2/SM4500NO2B	28-MAY-19 19:09	KI			NO3O
JC88209-1	EPA 353.2/LACHAT	28-MAY-19 19:09	KI	28-MAY-19	KI	NO32
JC88209-2	Collected: 14-MAY-19 10:50 By: CO			Received: 15-MAY-19 By: AS		
PH-RW-B2(05142019)						
JC88209-2	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-2	RSK-175	17-MAY-19 13:22	GP			VRSK175CO2
JC88209-2	SW846-8015D (DAI)	20-MAY-19 08:18	XPL			D8015ETHL
JC88209-2	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-2	SW846 6020B	21-MAY-19 13:39	SN	20-MAY-19	MR	ASMS,FEMS,PBMS
JC88209-2	SW846 6020B	22-MAY-19 15:21	SN	20-MAY-19	MR	MNMS
JC88209-2	SW846-8011	23-MAY-19 11:33	VDT	22-MAY-19	NT	V8011EDB
JC88209-2	SW846 8260C	23-MAY-19 17:27	JP			V8260PALGTMB
JC88209-2	RSK-175	24-MAY-19 10:11	GP			VRSK175DGMEE
JC88209-2	RSK-175	24-MAY-19 10:41	GP			VRSK175DGMEE
JC88209-2	EPA 300/SW846 9056A	24-MAY-19 15:27	NV	24-MAY-19	NV	SO4
JC88209-2	SW846 8260C	28-MAY-19 10:56	JP			V8260PALGTMB
JC88209-2	EPA353.2/SM4500NO2B	28-MAY-19 19:10	KI			NO3O
JC88209-2	EPA 353.2/LACHAT	28-MAY-19 19:10	KI	28-MAY-19	KI	NO32
JC88209-3	Collected: 14-MAY-19 12:45 By: CO			Received: 15-MAY-19 By: AS		
PH-RW-B(05142019)						

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-3	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-3	RSK-175	17-MAY-19 13:53	GP			VRSK175CO2
JC88209-3	SW846-8015D (DAI)	20-MAY-19 08:36	XPL			D8015ETHL
JC88209-3	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-3	SW846 6020B	21-MAY-19 13:44	SN	20-MAY-19	MR	ASMS,FEMS,MNMS,PBMS
JC88209-3	SW846-8011	23-MAY-19 12:30	VDT	22-MAY-19	NT	V8011EDB
JC88209-3	SW846 8260C	23-MAY-19 16:30	JP			V8260PALGTMB
JC88209-3	RSK-175	24-MAY-19 10:56	GP			VRSK175DGMEE
JC88209-3	EPA 300/SW846 9056A	24-MAY-19 16:47	NV	24-MAY-19	NV	SO4
JC88209-3	EPA353.2/SM4500NO2B	28-MAY-19 19:11	KI			NO3O
JC88209-3	EPA 353.2/LACHAT	28-MAY-19 19:11	KI	28-MAY-19	KI	NO32
JC88209-4	Collected: 14-MAY-19 14:40 By: CO			Received: 15-MAY-19 By: AS		
PH-MW-67(05142019)						
JC88209-4	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-4	RSK-175	17-MAY-19 14:12	GP			VRSK175CO2
JC88209-4	SW846-8015D (DAI)	20-MAY-19 08:54	XPL			D8015ETHL
JC88209-4	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-4	SW846 6020B	21-MAY-19 13:59	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-4	SW846 6020B	22-MAY-19 15:37	SN	20-MAY-19	MR	FEMS
JC88209-4	SW846-8011	23-MAY-19 12:48	VDT	22-MAY-19	NT	V8011EDB
JC88209-4	RSK-175	24-MAY-19 11:09	GP			VRSK175DGMEE
JC88209-4	RSK-175	24-MAY-19 11:23	GP			VRSK175DGMEE
JC88209-4	SW846 6020B	24-MAY-19 13:19	GT	20-MAY-19	MR	MNMS
JC88209-4	EPA 300/SW846 9056A	24-MAY-19 17:13	NV	24-MAY-19	NV	SO4
JC88209-4	SW846 8260C	24-MAY-19 18:50	CSF			V8260PALGTMB
JC88209-4	SW846 8260C	24-MAY-19 19:18	CSF			V8260PALGTMB
JC88209-4	SW846 8260C	28-MAY-19 12:25	JP			V8260PALGTMB
JC88209-4	EPA353.2/SM4500NO2B	28-MAY-19 19:13	KI			NO3O
JC88209-4	EPA 353.2/LACHAT	28-MAY-19 19:13	KI	28-MAY-19	KI	NO32
JC88209-5	Collected: 14-MAY-19 12:00 By: CO			Received: 15-MAY-19 By: AS		
DUP-05142019						
JC88209-5	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-5	RSK-175	17-MAY-19 14:39	GP			VRSK175CO2
JC88209-5	SW846-8015D (DAI)	20-MAY-19 10:09	XPL			D8015ETHL
JC88209-5	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-5	SW846 6020B	21-MAY-19 14:03	SN	20-MAY-19	MR	ASMS,FEMS,MNMS,PBMS

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-5	SW846-8011	23-MAY-19 13:07	VDT	22-MAY-19	NT	V8011EDB
JC88209-5	SW846 8260C	23-MAY-19 16:59	JP			V8260PALGTMB
JC88209-5	RSK-175	24-MAY-19 11:36	GP			VRSK175DGMEE
JC88209-5	EPA 300/SW846 9056A	24-MAY-19 17:40	NV	24-MAY-19	NV	SO4
JC88209-5	EPA353.2/SM4500NO2B	28-MAY-19 19:14	KI			NO3O
JC88209-5	EPA 353.2/LACHAT	28-MAY-19 19:14	KI	28-MAY-19	KI	NO32
JC88209-6	Collected: 14-MAY-19 16:09 By: CO			Received: 15-MAY-19 By: AS		
PH-RW-A2(05142019)						
JC88209-6	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-6	RSK-175	17-MAY-19 15:28	GP			VRSK175CO2
JC88209-6	SW846-8015D (DAI)	20-MAY-19 10:27	XPL			D8015ETHL
JC88209-6	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-6	SW846 6020B	21-MAY-19 14:09	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-6	SW846 6020B	22-MAY-19 15:47	SN	20-MAY-19	MR	FEMS
JC88209-6	SW846 6020B	22-MAY-19 15:52	SN	20-MAY-19	MR	MNMS
JC88209-6	SW846-8011	23-MAY-19 13:26	VDT	22-MAY-19	NT	V8011EDB
JC88209-6	RSK-175	24-MAY-19 11:49	GP			VRSK175DGMEE
JC88209-6	RSK-175	24-MAY-19 12:02	GP			VRSK175DGMEE
JC88209-6	SW846 8260C	24-MAY-19 13:05	CSF			V8260PALGTMB
JC88209-6	SW846 8260C	24-MAY-19 17:26	CSF			V8260PALGTMB
JC88209-6	EPA 300/SW846 9056A	24-MAY-19 18:07	NV	24-MAY-19	NV	SO4
JC88209-6	EPA353.2/SM4500NO2B	28-MAY-19 19:15	KI			NO3O
JC88209-6	EPA 353.2/LACHAT	28-MAY-19 19:15	KI	28-MAY-19	KI	NO32
JC88209-7	Collected: 14-MAY-19 09:28 By: CO			Received: 15-MAY-19 By: AS		
PH-RW-A(05142019)						
JC88209-7	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-7	RSK-175	17-MAY-19 16:52	GP			VRSK175CO2
JC88209-7	SW846-8015D (DAI)	20-MAY-19 10:46	XPL			D8015ETHL
JC88209-7	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-7	SW846 6020B	21-MAY-19 14:13	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-7	SW846 6020B	22-MAY-19 15:57	SN	20-MAY-19	MR	FEMS,MNMS
JC88209-7	SW846-8011	23-MAY-19 13:45	VDT	22-MAY-19	NT	V8011EDB
JC88209-7	RSK-175	24-MAY-19 12:14	GP			VRSK175DGMEE
JC88209-7	RSK-175	24-MAY-19 12:27	GP			VRSK175DGMEE
JC88209-7	SW846 8260C	24-MAY-19 14:17	CSF			V8260PALGTMB
JC88209-7	SW846 8260C	24-MAY-19 16:58	CSF			V8260PALGTMB

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-7	EPA 300/SW846 9056A	24-MAY-19 18:33	NV	24-MAY-19	NV	SO4
JC88209-7	EPA353.2/SM4500NO2B	28-MAY-19 19:16	KI			NO3O
JC88209-7	EPA 353.2/LACHAT	28-MAY-19 19:16	KI	28-MAY-19	KI	NO32
JC88209-8	Collected: 14-MAY-19 14:52 By: CO			Received: 15-MAY-19 By: AS		
PH-MW-66(05142019)						
JC88209-8	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-8	RSK-175	17-MAY-19 17:09	GP			VRSK175CO2
JC88209-8	SW846-8015D (DAI)	20-MAY-19 11:04	XPL			D8015ETHL
JC88209-8	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-8	SW846 6020B	21-MAY-19 14:18	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-8	SW846 6020B	22-MAY-19 16:02	SN	20-MAY-19	MR	FEMS,MNMS
JC88209-8	SW846-8011	23-MAY-19 14:05	VDT	22-MAY-19		
JC88209-8	RSK-175	24-MAY-19 12:42	GP			VRSK175DGMEE
JC88209-8	RSK-175	24-MAY-19 13:15	GP			VRSK175DGMEE
JC88209-8	EPA 300/SW846 9056A	24-MAY-19 19:00	NV	24-MAY-19	NV	SO4
JC88209-8	SW846 8260C	24-MAY-19 19:46	CSF			V8260PALGTMB
JC88209-8	SW846 8260C	24-MAY-19 20:14	CSF			V8260PALGTMB
JC88209-8	SW846 8260C	28-MAY-19 11:53	JP			V8260PALGTMB
JC88209-8	EPA353.2/SM4500NO2B	28-MAY-19 19:17	KI			NO3O
JC88209-8	EPA 353.2/LACHAT	28-MAY-19 19:17	KI	28-MAY-19	KI	NO32
JC88209-8	SW846-8011	30-MAY-19 04:04	VDT	29-MAY-19	CC	V8011EDB
JC88209-9	Collected: 14-MAY-19 11:43 By: CO			Received: 15-MAY-19 By: AS		
PH-PH-21(05172019)						
JC88209-9	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-9	RSK-175	17-MAY-19 19:17	GP			VRSK175CO2
JC88209-9	SW846-8015D (DAI)	20-MAY-19 07:04	XPL			D8015ETHL
JC88209-9	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-9	SW846 6020B	21-MAY-19 12:44	SN	20-MAY-19	MR	ASMS,FEMS,PBMS
JC88209-9	SW846 6020B	22-MAY-19 14:26	SN	20-MAY-19	MR	MNMS
JC88209-9	SW846-8011	23-MAY-19 10:17	VDT	22-MAY-19	NT	V8011EDB
JC88209-9	SW846 8260C	23-MAY-19 12:17	JP			V8260PALGTMB
JC88209-9	SW846 8260C	23-MAY-19 12:45	JP			V8260PALGTMB
JC88209-9	RSK-175	24-MAY-19 13:28	GP			VRSK175DGMEE
JC88209-9	RSK-175	24-MAY-19 15:01	GP			VRSK175DGMEE
JC88209-9	EPA 300/SW846 9056A	24-MAY-19 20:20	NV	24-MAY-19	NV	SO4
JC88209-9	EPA353.2/SM4500NO2B	28-MAY-19 19:18	KI			NO3O

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-9	EPA 353.2/LACHAT	28-MAY-19 19:18	KI	28-MAY-19	KI	NO32
JC88209-10	Collected: 14-MAY-19 16:00 By: CO		Received: 15-MAY-19 By: AS			
FB-05142019						
JC88209-10	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-10	RSK-175	17-MAY-19 17:51	GP			VRSK175CO2
JC88209-10	SW846-8015D (DAI)	20-MAY-19 11:22	XPL			D8015ETHL
JC88209-10	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-10	SW846 6020B	21-MAY-19 14:23	SN	20-MAY-19	MR	ASMS,FEMS,MNMS,PBMS
JC88209-10	SW846-8011	23-MAY-19 14:24	VDT	22-MAY-19	NT	V8011EDB
JC88209-10	SW846 8260C	23-MAY-19 15:06	JP			V8260PALGTMB
JC88209-10	RSK-175	24-MAY-19 15:14	GP			VRSK175DGMEE
JC88209-10	EPA 300/SW846 9056A	24-MAY-19 20:47	NV	24-MAY-19	NV	SO4
JC88209-10	EPA353.2/SM4500NO2B	28-MAY-19 19:21	KI			NO3O
JC88209-10	EPA 353.2/LACHAT	28-MAY-19 19:21	KI	28-MAY-19	KI	NO32
JC88209-11	Collected: 14-MAY-19 15:55 By: CO		Received: 15-MAY-19 By: AS			
EB-05142019						
JC88209-11	SM4500NO2 B-11	15-MAY-19 00:04	MO			NO2
JC88209-11	RSK-175	17-MAY-19 18:21	GP			VRSK175CO2
JC88209-11	SM4500S2- F-11	20-MAY-19 11:37	MP			S
JC88209-11	SW846-8015D (DAI)	20-MAY-19 11:41	XPL			D8015ETHL
JC88209-11	SW846 6020B	22-MAY-19 18:58	SN	21-MAY-19	TG	ASMS,FEMS,MNMS,PBMS
JC88209-11	SW846-8011	23-MAY-19 14:43	VDT	22-MAY-19	NT	V8011EDB
JC88209-11	SW846 8260C	23-MAY-19 15:34	JP			V8260PALGTMB
JC88209-11	RSK-175	24-MAY-19 15:27	GP			VRSK175DGMEE
JC88209-11	EPA 300/SW846 9056A	24-MAY-19 22:06	NV	24-MAY-19	NV	SO4
JC88209-11	EPA353.2/SM4500NO2B	28-MAY-19 19:23	KI			NO3O
JC88209-11	EPA 353.2/LACHAT	28-MAY-19 19:23	KI	28-MAY-19	KI	NO32
JC88209-12	Collected: 14-MAY-19 16:00 By: CO		Received: 15-MAY-19 By: AS			
TRIP BLANK						
JC88209-12	SW846 8260C	23-MAY-19 16:02	JP			V8260PALGTMB
JC88209-1F	Collected: 14-MAY-19 09:25 By: CO		Received: 15-MAY-19 By: AS			
PH-PH-2(05142019)						

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-1F	SW846 6020B	21-MAY-19 14:28	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-1F	SW846 6020B	24-MAY-19 13:24	GT	20-MAY-19	MR	FEMS,MNMS
JC88209-2F Collected: 14-MAY-19 10:50 By: CO Received: 15-MAY-19 By: AS PH-RW-B2(05142019)						
JC88209-2F	SW846 6020B	21-MAY-19 14:33	SN	20-MAY-19	MR	ASMS,FEMS,PBMS
JC88209-2F	SW846 6020B	22-MAY-19 16:12	SN	20-MAY-19	MR	MNMS
JC88209-3F Collected: 14-MAY-19 12:45 By: CO Received: 15-MAY-19 By: AS PH-RW-B(05142019)						
JC88209-3F	SW846 6020B	22-MAY-19 12:42	SN	20-MAY-19	MR	ASMS,FEMS,MNMS,PBMS
JC88209-4F Collected: 14-MAY-19 14:40 By: CO Received: 15-MAY-19 By: AS PH-MW-67(05142019)						
JC88209-4F	SW846 6020B	22-MAY-19 12:47	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-4F	SW846 6020B	22-MAY-19 16:27	SN	20-MAY-19	MR	FEMS
JC88209-4F	SW846 6020B	24-MAY-19 13:29	GT	20-MAY-19	MR	MNMS
JC88209-5F Collected: 14-MAY-19 12:00 By: CO Received: 15-MAY-19 By: AS DUP-05142019						
JC88209-5F	SW846 6020B	22-MAY-19 12:52	SN	20-MAY-19	MR	ASMS,FEMS,MNMS,PBMS
JC88209-6F Collected: 14-MAY-19 16:09 By: CO Received: 15-MAY-19 By: AS PH-RW-A2(05142019)						
JC88209-6F	SW846 6020B	22-MAY-19 12:57	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-6F	SW846 6020B	22-MAY-19 16:37	SN	20-MAY-19	MR	FEMS
JC88209-6F	SW846 6020B	22-MAY-19 16:42	SN	20-MAY-19	MR	MNMS
JC88209-7F Collected: 14-MAY-19 09:28 By: CO Received: 15-MAY-19 By: AS PH-RW-A(05142019)						
JC88209-7F	SW846 6020B	22-MAY-19 13:02	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-7F	SW846 6020B	22-MAY-19 16:47	SN	20-MAY-19	MR	FEMS,MNMS

Internal Sample Tracking Chronicle

USACE-Philadelphia District

Job No: JC88209

Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Project No: CONTRACT#W912BU18D0003/TO#W912BU19F0011

Sample Number	Method	Analyzed	By	Prepped	By	Test Codes
JC88209-8F	Collected: 14-MAY-19 14:52 By: CO			Received: 15-MAY-19 By: AS		
PH-MW-66(05142019)						
JC88209-8F	SW846 6020B	22-MAY-19 13:07	SN	20-MAY-19	MR	ASMS,PBMS
JC88209-8F	SW846 6020B	22-MAY-19 16:52	SN	20-MAY-19	MR	FEMS,MNMS
JC88209-9F	Collected: 14-MAY-19 11:43 By: CO			Received: 15-MAY-19 By: AS		
PH-PH-21(05172019)						
JC88209-9F	SW846 6020B	21-MAY-19 13:19	SN	20-MAY-19	MR	ASMS,FEMS,PBMS
JC88209-9F	SW846 6020B	22-MAY-19 15:01	SN	20-MAY-19	MR	MNMS
JC88209-10F	Collected: 14-MAY-19 16:00 By: CO			Received: 15-MAY-19 By: AS		
FB-05142019						
JC88209-10F	SW846 6020B	22-MAY-19 14:03	SN	20-MAY-19	MR	ASMS,FEMS,MNMS,PBMS
JC88209-11F	Collected: 14-MAY-19 15:55 By: CO			Received: 15-MAY-19 By: AS		
EB-05142019						
JC88209-11F	SW846 6020B	22-MAY-19 19:03	SN	21-MAY-19	TG	ASMS,FEMS,MNMS,PBMS

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-1.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-1.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-1.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-1.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-1.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-1.1
JC88209-1.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-1.1
JC88209-1.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-1.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-1.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-1.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-1.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-1.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-1.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-1.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-1.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-1.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-1.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-1.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-1.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-1.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-1.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-1.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-1.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-1.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-1.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-1.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-1.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-1.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-1.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-1.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-1.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-1.8	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-1.8	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-1.8	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-1.8	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-1.11	Secured Storage	Gabriella Pericone	05/23/19 16:59	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-1.11	Gabriella Pericone	VOA Prep Storage	05/23/19 17:04	Return to Storage
JC88209-1.11	VOA Prep Storage	Gabriella Pericone	05/24/19 10:14	Retrieve from Storage
JC88209-1.11	Gabriella Pericone		05/24/19 16:07	Disposed
JC88209-1.12	Secured Storage	Jessica Potts	05/28/19 10:42	Retrieve from Storage
JC88209-1.12	Jessica Potts	GCMSX	05/28/19 10:42	Load on Instrument
JC88209-1.12	GCMSX	Jessica Potts	05/29/19 08:50	Unload from Instrument
JC88209-1.12	Jessica Potts	Secured Storage	05/29/19 08:50	Return to Storage
JC88209-1.13	Secured Storage	Chelsea San Filippo	05/24/19 16:02	Retrieve from Storage
JC88209-1.13	Chelsea San Filippo	GCMS4B	05/24/19 16:02	Load on Instrument
JC88209-1.13	GCMS4B	Chelsea San Filippo	05/28/19 10:51	Unload from Instrument
JC88209-1.13	Chelsea San Filippo	Secured Storage	05/28/19 10:51	Return to Storage
JC88209-1.14	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-1.14	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-1.14	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-1.14	Natasha Torres		05/22/19 14:38	Depleted
JC88209-1.14.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-1.14
JC88209-1.14.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-1.14
JC88209-1.14.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-1.14.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-1.14.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-1.14.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-1.14.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-1.17	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-1.17	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-1F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-1F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-1F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-1F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-1F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-1F.2
JC88209-1F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-1F.2
JC88209-1F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-2.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-2.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-2.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-2.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-2.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-2.1
JC88209-2.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-2.1
JC88209-2.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-2.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-2.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-2.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-2.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-2.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-2.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-2.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-2.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-2.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-2.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-2.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-2.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-2.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-2.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-2.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-2.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-2.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-2.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-2.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-2.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-2.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-2.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-2.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-2.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-2.8	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-2.8	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-2.8	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-2.8	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-2.10	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-2.10	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-2.10	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-2.10	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-2.11	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-2.11	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-2.11	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-2.11	Natasha Torres		05/22/19 14:38	Depleted
JC88209-2.11.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-2.11
JC88209-2.11.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-2.11
JC88209-2.11.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-2.11.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-2.11.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-2.11.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-2.11.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-2.14	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-2.14	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-2.16	Secured Storage	Gabriella Pericone	05/23/19 16:59	Retrieve from Storage
JC88209-2.16	Gabriella Pericone	VOA Prep Storage	05/23/19 17:04	Return to Storage
JC88209-2.16	VOA Prep Storage	Gabriella Pericone	05/24/19 16:08	Retrieve from Storage
JC88209-2.16	Gabriella Pericone		05/24/19 16:08	Disposed
JC88209-2.17	Secured Storage	Jessica Potts	05/28/19 10:42	Retrieve from Storage
JC88209-2.17	Jessica Potts	GCMSX	05/28/19 10:42	Load on Instrument
JC88209-2.17	GCMSX	Jessica Potts	05/29/19 08:50	Unload from Instrument
JC88209-2.17	Jessica Potts	Secured Storage	05/29/19 08:50	Return to Storage
JC88209-2F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-2F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-2F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-2F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-2F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-2F.2
JC88209-2F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-2F.2
JC88209-2F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-3.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-3.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-3.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-3.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-3.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-3.1
JC88209-3.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-3.1
JC88209-3.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-3.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-3.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-3.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-3.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-3.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-3.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-3.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-3.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-3.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-3.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-3.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-3.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-3.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-3.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-3.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-3.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-3.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-3.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-3.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-3.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-3.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-3.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-3.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-3.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-3.8	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-3.8	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-3.8	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-3.8	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-3.14	Secured Storage	Gabriella Pericone	05/23/19 16:59	Retrieve from Storage
JC88209-3.14	Gabriella Pericone	VOA Prep Storage	05/23/19 17:04	Return to Storage
JC88209-3.14	VOA Prep Storage	Gabriella Pericone	05/24/19 16:08	Retrieve from Storage
JC88209-3.14	Gabriella Pericone		05/24/19 16:08	Disposed
JC88209-3.16	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-3.16	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-3.18	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-3.18	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-3.18	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-3.18	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-3.19	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-3.19	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-3.19	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-3.19	Natasha Torres		05/22/19 14:38	Depleted
JC88209-3.19.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-3.19
JC88209-3.19.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-3.19
JC88209-3.19.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-3.19.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-3.19.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-3.19.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-3.19.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-3F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-3F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-3F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-3F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-3F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-3F.2
JC88209-3F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-3F.2
JC88209-3F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-4.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-4.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-4.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-4.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-4.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-4.1
JC88209-4.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-4.1
JC88209-4.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-4.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-4.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-4.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-4.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-4.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-4.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-4.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-4.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-4.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-4.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-4.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-4.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-4.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-4.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-4.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-4.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-4.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-4.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-4.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-4.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-4.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-4.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-4.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-4.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-4.8	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-4.8	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-4.8	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-4.8	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-4.11	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-4.11	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-4.11	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-4.11	Natasha Torres		05/22/19 14:38	Depleted
JC88209-4.11.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-4.11
JC88209-4.11.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-4.11
JC88209-4.11.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-4.11.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-4.11.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-4.11.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-4.11.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-4.12	Secured Storage	Chelsea San Filippo	05/24/19 16:02	Retrieve from Storage
JC88209-4.12	Chelsea San Filippo	GCMS4B	05/24/19 16:02	Load on Instrument
JC88209-4.12	GCMS4B	Chelsea San Filippo	05/28/19 10:51	Unload from Instrument
JC88209-4.12	Chelsea San Filippo	Secured Storage	05/28/19 10:51	Return to Storage
JC88209-4.13	Secured Storage	Gabriella Pericone	05/23/19 16:59	Retrieve from Storage
JC88209-4.13	Gabriella Pericone	VOA Prep Storage	05/23/19 17:04	Return to Storage
JC88209-4.13	VOA Prep Storage	Gabriella Pericone	05/24/19 16:08	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-4.13	Gabriella Pericone		05/24/19 16:08	Disposed
JC88209-4.16	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-4.16	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-4.17	Secured Storage	Jessica Potts	05/28/19 12:11	Retrieve from Storage
JC88209-4.17	Jessica Potts	GCMSX	05/28/19 12:11	Load on Instrument
JC88209-4.17	GCMSX	Jessica Potts	05/29/19 08:50	Unload from Instrument
JC88209-4.17	Jessica Potts	Secured Storage	05/29/19 08:50	Return to Storage
JC88209-4F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-4F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-4F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-4F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-4F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-4F.2
JC88209-4F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-4F.2
JC88209-4F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-5.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-5.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-5.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-5.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-5.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-5.1
JC88209-5.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-5.1
JC88209-5.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-5.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-5.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-5.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-5.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-5.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-5.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-5.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-5.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-5.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-5.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-5.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-5.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-5.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-5.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-5.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-5.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-5.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-5.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-5.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-5.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-5.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-5.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-5.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-5.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-5.8	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-5.8	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-5.8	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-5.8	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-5.10	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-5.10	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-5.11	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-5.11	Gabriella Pericone		05/24/19 16:07	Disposed
JC88209-5.13	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-5.13	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-5.13	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-5.13	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-5.19	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-5.19	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-5.19	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-5.19	Natasha Torres		05/22/19 14:38	Depleted
JC88209-5.19.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-5.19
JC88209-5.19.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-5.19
JC88209-5.19.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-5.19.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-5.19.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-5.19.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-5.19.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-5F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-5F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-5F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-5F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-5F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-5F.2
JC88209-5F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-5F.2
JC88209-5F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-6.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-6.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-6.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-6.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-6.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-6.1
JC88209-6.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-6.1
JC88209-6.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-6.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-6.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-6.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-6.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-6.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-6.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-6.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-6.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-6.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-6.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-6.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-6.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-6.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-6.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-6.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-6.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-6.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-6.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-6.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-6.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-6.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-6.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-6.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-6.7	Mahendra Patel		05/20/19 12:05	Depleted

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-6.9	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-6.9	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-6.9	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-6.9	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-6.13	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-6.13	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-6.13	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-6.13	Natasha Torres		05/22/19 14:38	Depleted
JC88209-6.13.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-6.13
JC88209-6.13.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-6.13
JC88209-6.13.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-6.13.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-6.13.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-6.13.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-6.13.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-6.14	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-6.14	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-6.15	Secured Storage	Chelsea San Filippo	05/24/19 16:02	Retrieve from Storage
JC88209-6.15	Chelsea San Filippo	GCMS4B	05/24/19 16:02	Load on Instrument
JC88209-6.15	GCMS4B	Chelsea San Filippo	05/28/19 10:51	Unload from Instrument
JC88209-6.15	Chelsea San Filippo	Secured Storage	05/28/19 10:51	Return to Storage
JC88209-6.19	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-6.19	Gabriella Pericone		05/24/19 16:07	Disposed
JC88209-6F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-6F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-6F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-6F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-6F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-6F.2
JC88209-6F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-6F.2
JC88209-6F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-7.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-7.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-7.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-7.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-7.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-7.1
JC88209-7.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-7.1
JC88209-7.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-7.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-7.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-7.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-7.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-7.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-7.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-7.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-7.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-7.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-7.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-7.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-7.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-7.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-7.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-7.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-7.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-7.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-7.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-7.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-7.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-7.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-7.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-7.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-7.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-7.9	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-7.9	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-7.9	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-7.9	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-7.11	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-7.11	Gabriella Pericone		05/24/19 16:07	Disposed
JC88209-7.12	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-7.12	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-7.16	Secured Storage	Chelsea San Filippo	05/24/19 16:02	Retrieve from Storage
JC88209-7.16	Chelsea San Filippo	GCMS4B	05/24/19 16:02	Load on Instrument
JC88209-7.16	GCMS4B	Chelsea San Filippo	05/28/19 10:51	Unload from Instrument
JC88209-7.16	Chelsea San Filippo	Secured Storage	05/28/19 10:51	Return to Storage
JC88209-7.17	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-7.17	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-7.17	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-7.17	Natasha Torres		05/22/19 14:38	Depleted
JC88209-7.17.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-7.17
JC88209-7.17.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-7.17
JC88209-7.17.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-7.17.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-7.17.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-7.17.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-7.17.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-7F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-7F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-7F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-7F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-7F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-7F.2
JC88209-7F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-7F.2
JC88209-7F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-8.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-8.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-8.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-8.1	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-8.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-8.1
JC88209-8.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-8.1
JC88209-8.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-8.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-8.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-8.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-8.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-8.4	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-8.4	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-8.4	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-8.4	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-8.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-8.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-8.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-8.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-8.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-8.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-8.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-8.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-8.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-8.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-8.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-8.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-8.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-8.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-8.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-8.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-8.9	Secured Storage	Gabriella Pericone	05/17/19 09:15	Retrieve from Storage
JC88209-8.9	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-8.9	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-8.9	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-8.10	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-8.10	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-8.10	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-8.10	Natasha Torres		05/22/19 14:38	Depleted
JC88209-8.10.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-8.10
JC88209-8.10.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-8.10
JC88209-8.10.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-8.10.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-8.10.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-8.10.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-8.10.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-8.11	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-8.11	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-8.12	Secured Storage	Chelsea San Filippo	05/24/19 16:02	Retrieve from Storage
JC88209-8.12	Chelsea San Filippo	GCMS4B	05/24/19 16:02	Load on Instrument

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-8.12	GCMS4B	Chelsea San Filippo	05/28/19 10:51	Unload from Instrument
JC88209-8.12	Chelsea San Filippo	Secured Storage	05/28/19 10:51	Return to Storage
JC88209-8.14	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-8.14	Gabriella Pericone	VOA Prep Storage	05/24/19 16:34	Return to Storage
JC88209-8.14	VOA Prep Storage	Gabriella Pericone	05/25/19 07:08	Retrieve from Storage
JC88209-8.14	Gabriella Pericone		05/25/19 12:18	Disposed
JC88209-8.15	Secured Storage	Dave Hunkele	05/29/19 06:49	Retrieve from Storage
JC88209-8.15	Dave Hunkele	Secured Staging Area	05/29/19 06:49	Return to Storage
JC88209-8.15	Secured Staging Area	Natasha Torres	05/29/19 07:10	Retrieve from Storage
JC88209-8.15	Natasha Torres	Secured Storage	05/29/19 16:17	Return to Storage
JC88209-8.15.1	Natasha Torres	Organics Prep	05/29/19 07:12	Extract from JC88209-8.15
JC88209-8.15.1	Organics Prep	Chatiyah Canaday	05/29/19 16:19	Extract from JC88209-8.15
JC88209-8.15.1	Chatiyah Canaday	Extract Storage	05/29/19 16:19	Return to Storage
JC88209-8.15.1	Extract Storage	Vincent Drago	05/29/19 17:26	Retrieve from Storage
JC88209-8.15.1	Vincent Drago	GC7G	05/29/19 17:26	Load on Instrument
JC88209-8.15.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-8.15.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-8.19	Secured Storage	Jessica Potts	05/28/19 11:33	Retrieve from Storage
JC88209-8.19	Jessica Potts	GCMSX	05/28/19 11:33	Load on Instrument
JC88209-8.19	GCMSX	Jessica Potts	05/29/19 08:50	Unload from Instrument
JC88209-8.19	Jessica Potts	Secured Storage	05/29/19 08:50	Return to Storage
JC88209-8F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-8F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-8F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-8F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-8F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-8F.2
JC88209-8F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-8F.2
JC88209-8F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-9.3	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-9.3	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-9.3	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-9.3	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-9.3.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-9.3
JC88209-9.3.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-9.3
JC88209-9.3.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-9.9	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-9.9	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-9.9	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-9.9	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-9.10	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-9.10	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-9.10	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-9.10	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-9.13	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-9.13	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-9.13	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-9.13	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-9.13	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-9.13	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-9.13	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-9.13	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-9.14	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-9.14	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-9.14	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-9.14	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-9.14	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-9.14	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-9.14	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-9.14	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-9.15	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-9.15	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-9.15	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-9.15	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-9.15	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-9.15	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-9.15	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-9.15	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-9.16	Secured Storage	Dwayne Johnson	05/20/19 10:10	Retrieve from Storage
JC88209-9.16	Dwayne Johnson	Secured Staging Area	05/20/19 10:10	Return to Storage
JC88209-9.16	Secured Staging Area	Mahendra Patel	05/20/19 10:48	Retrieve from Storage
JC88209-9.16	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-9.19	Secured Storage	Dwayne Johnson	05/20/19 10:10	Retrieve from Storage
JC88209-9.19	Dwayne Johnson	Secured Staging Area	05/20/19 10:10	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-9.19	Secured Staging Area	Mahendra Patel	05/20/19 10:48	Retrieve from Storage
JC88209-9.19	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-9.20	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-9.20	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-9.20	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-9.20	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-9.21	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-9.21	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-9.21	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-9.21	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-9.23	Secured Storage	Gabriella Pericone	05/17/19 15:22	Retrieve from Storage
JC88209-9.23	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-9.23	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-9.23	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-9.27	Secured Storage	Gabriella Pericone	05/17/19 15:22	Retrieve from Storage
JC88209-9.27	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-9.27	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-9.27	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-9.28	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-9.28	Gabriella Pericone	VOA Prep Storage	05/24/19 16:34	Return to Storage
JC88209-9.28	VOA Prep Storage	Gabriella Pericone	05/25/19 07:08	Retrieve from Storage
JC88209-9.28	Gabriella Pericone		05/25/19 12:18	Disposed
JC88209-9.35	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-9.35	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-9.35	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-9.35	Natasha Torres		05/22/19 14:38	Depleted
JC88209-9.35.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-9.35
JC88209-9.35.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-9.35
JC88209-9.35.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-9.35.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-9.35.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-9.35.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-9.35.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-9.36	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-9.36	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-9.36	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-9.36	Natasha Torres		05/22/19 14:38	Depleted
JC88209-9.36.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-9.36
JC88209-9.36.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-9.36
JC88209-9.36.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-9.36.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-9.36.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-9.36.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-9.36.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-9.42	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-9.42	Gabriella Pericone	VOA Prep Storage	05/24/19 16:34	Return to Storage
JC88209-9.42	VOA Prep Storage	Gabriella Pericone	05/25/19 07:08	Retrieve from Storage
JC88209-9.42	Gabriella Pericone		05/25/19 12:18	Disposed
JC88209-9.49	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-9.49	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-9.49	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-9.49	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-9.52	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-9.52	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-9.53	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-9.53	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-9.53	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-9.53	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-9.57	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-9.57	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-9.57	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-9.57	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-9.59	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-9.59	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-9.59	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-9.59	Natasha Torres		05/22/19 14:38	Depleted
JC88209-9.59.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-9.59
JC88209-9.59.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-9.59
JC88209-9.59.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-9.59.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-9.59.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-9.59.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-9.59.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-9F.6	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-9F.6	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-9F.6	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-9F.6	Moustafa Ramadan	Secured Storage	05/20/19 17:20	Return to Storage
JC88209-9F.6.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-9F.6
JC88209-9F.6.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-9F.6
JC88209-9F.6.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-10.1	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-10.1	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-10.1	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-10.1	Moustafa Ramadan	Secured Storage	05/20/19 17:21	Return to Storage
JC88209-10.1.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-10.1
JC88209-10.1.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-10.1
JC88209-10.1.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage
JC88209-10.3	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-10.3	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-10.3	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-10.3	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-10.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-10.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-10.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-10.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-10.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-10.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-10.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-10.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-10.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-10.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-10.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-10.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-10.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-10.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-10.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-10.6	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-10.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-10.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-10.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-10.7	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-10.9	Secured Storage	Gabriella Pericone	05/17/19 15:22	Retrieve from Storage
JC88209-10.9	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-10.9	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-10.9	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-10.13	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-10.13	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-10.13	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-10.13	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-10.15	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-10.15	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-10.16	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-10.16	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-10.16	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-10.16	Natasha Torres		05/22/19 14:38	Depleted
JC88209-10.16.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-10.16
JC88209-10.16.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-10.16
JC88209-10.16.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-10.16.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-10.16.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-10.16.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-10.16.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-10.19	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-10.19	Gabriella Pericone	VOA Prep Storage	05/24/19 16:34	Return to Storage
JC88209-10.19	VOA Prep Storage	Gabriella Pericone	05/25/19 07:08	Retrieve from Storage
JC88209-10.19	Gabriella Pericone		05/25/19 12:18	Disposed
JC88209-10F.2	Secured Storage	Todd Shoemaker	05/20/19 13:41	Retrieve from Storage
JC88209-10F.2	Todd Shoemaker	Secured Staging Area	05/20/19 13:42	Return to Storage
JC88209-10F.2	Secured Staging Area	Moustafa Ramadan	05/20/19 17:17	Retrieve from Storage
JC88209-10F.2	Moustafa Ramadan	Secured Storage	05/20/19 17:21	Return to Storage
JC88209-10F.2.1	Moustafa Ramadan	Metals Digestion	05/20/19 17:20	Digestate from JC88209-10F.2
JC88209-10F.2.1	Metals Digestion	Moustafa Ramadan	05/20/19 17:20	Digestate from JC88209-10F.2
JC88209-10F.2.1	Moustafa Ramadan	Metals Digestate Storage	05/20/19 17:20	Return to Storage

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-11.1	Secured Storage	Taylor Gorman	05/21/19 09:00	Retrieve from Storage
JC88209-11.1	Taylor Gorman	Secured Storage	05/21/19 10:23	Return to Storage
JC88209-11.1.1	Taylor Gorman	Metals Digestion	05/21/19 09:38	Digestate from JC88209-11.1
JC88209-11.1.1	Metals Digestion	Taylor Gorman	05/21/19 09:38	Digestate from JC88209-11.1
JC88209-11.1.1	Taylor Gorman	Metals Digestate Storage	05/21/19 09:38	Return to Storage
JC88209-11.3	Secured Storage	Sahara Feliciano	05/15/19 22:02	Retrieve from Storage
JC88209-11.3	Sahara Feliciano	Secured Staging Area	05/15/19 22:02	Return to Storage
JC88209-11.3	Secured Staging Area	Michael Olcott	05/15/19 22:13	Retrieve from Storage
JC88209-11.3	Michael Olcott	Secured Storage	05/15/19 23:35	Return to Storage
JC88209-11.3	Secured Storage	Sahara Feliciano	05/22/19 22:05	Retrieve from Storage
JC88209-11.3	Sahara Feliciano	Secured Staging Area	05/22/19 22:05	Return to Storage
JC88209-11.3	Secured Staging Area	Natasha Verma	05/23/19 13:29	Retrieve from Storage
JC88209-11.3	Natasha Verma	Secured Storage	05/23/19 16:46	Return to Storage
JC88209-11.5	Secured Storage	Todd Shoemaker	05/23/19 14:59	Retrieve from Storage
JC88209-11.5	Todd Shoemaker	Secured Staging Area	05/23/19 14:59	Return to Storage
JC88209-11.5	Secured Staging Area	Todd Shoemaker	05/24/19 09:32	Retrieve from Storage
JC88209-11.5	Todd Shoemaker	Secured Storage	05/24/19 09:32	Return to Storage
JC88209-11.5	Secured Storage	Todd Shoemaker	05/24/19 10:14	Retrieve from Storage
JC88209-11.5	Todd Shoemaker	Secured Staging Area	05/24/19 10:14	Return to Storage
JC88209-11.5	Secured Staging Area	Dominic Guerriero	05/27/19 08:14	Retrieve from Storage
JC88209-11.5	Dominic Guerriero	Secured Storage	05/27/19 08:18	Return to Storage
JC88209-11.6	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-11.6	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-11.6	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-11.6	Mahendra Patel		05/20/19 12:05	Depleted
JC88209-11.7	Secured Storage	Sahara Feliciano	05/19/19 11:30	Retrieve from Storage
JC88209-11.7	Sahara Feliciano	Secured Staging Area	05/19/19 11:30	Return to Storage
JC88209-11.7	Secured Staging Area	Mahendra Patel	05/20/19 08:07	Retrieve from Storage
JC88209-11.7	Mahendra Patel	Secured Storage	05/20/19 15:20	Return to Storage
JC88209-11.9	Secured Storage	Gabriella Pericone	05/17/19 15:22	Retrieve from Storage
JC88209-11.9	Gabriella Pericone	VOA Prep Storage	05/17/19 18:54	Return to Storage
JC88209-11.9	VOA Prep Storage	Gabriella Pericone	05/22/19 11:49	Retrieve from Storage
JC88209-11.9	Gabriella Pericone		05/22/19 11:50	Disposed
JC88209-11.12	Secured Storage	Gabriella Pericone	05/24/19 08:34	Retrieve from Storage
JC88209-11.12	Gabriella Pericone	VOA Prep Storage	05/24/19 16:34	Return to Storage
JC88209-11.12	VOA Prep Storage	Gabriella Pericone	05/25/19 07:08	Retrieve from Storage
JC88209-11.12	Gabriella Pericone		05/25/19 12:18	Disposed

SGS Internal Chain of Custody

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Received: 05/15/19

Sample.Bottle Number	Transfer FROM	Transfer TO	Date/Time	Reason
JC88209-11.14	Secured Storage	Todd Shoemaker	05/22/19 09:08	Retrieve from Storage
JC88209-11.14	Todd Shoemaker	Secured Staging Area	05/22/19 09:08	Return to Storage
JC88209-11.14	Secured Staging Area	Natasha Torres	05/22/19 09:47	Retrieve from Storage
JC88209-11.14	Natasha Torres		05/22/19 14:38	Depleted
JC88209-11.14.1	Natasha Torres	Organics Prep	05/22/19 09:47	Extract from JC88209-11.14
JC88209-11.14.1	Organics Prep	Natasha Torres	05/22/19 14:38	Extract from JC88209-11.14
JC88209-11.14.1	Natasha Torres	Extract Storage	05/22/19 14:38	Return to Storage
JC88209-11.14.1	Extract Storage	Vincent Drago	05/23/19 08:58	Retrieve from Storage
JC88209-11.14.1	Vincent Drago	GC7G	05/23/19 08:58	Load on Instrument
JC88209-11.14.1	GC7G	Vincent Drago	05/31/19 16:01	Unload from Instrument
JC88209-11.14.1	Vincent Drago	Extract Freezer	05/31/19 16:01	Return to Storage
JC88209-11.15	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-11.15	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-11.15	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-11.15	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage
JC88209-11.16	Secured Storage	Xu Liu	05/20/19 06:06	Retrieve from Storage
JC88209-11.16	Xu Liu	Secured Storage	05/20/19 13:57	Return to Storage
JC88209-11F.2	Secured Storage	Taylor Gorman	05/21/19 09:00	Retrieve from Storage
JC88209-11F.2	Taylor Gorman	Secured Storage	05/21/19 10:23	Return to Storage
JC88209-11F.2.1	Taylor Gorman	Metals Digestion	05/21/19 09:38	Digestate from JC88209-11F.2
JC88209-11F.2.1	Metals Digestion	Taylor Gorman	05/21/19 09:38	Digestate from JC88209-11F.2
JC88209-11F.2.1	Taylor Gorman	Metals Digestate Storage	05/21/19 09:38	Return to Storage
JC88209-12.2	Secured Storage	Chelsea San Filippo	05/23/19 12:07	Retrieve from Storage
JC88209-12.2	Chelsea San Filippo	GCMS4B	05/23/19 12:07	Load on Instrument
JC88209-12.2	GCMS4B	Chelsea San Filippo	05/24/19 15:27	Unload from Instrument
JC88209-12.2	Chelsea San Filippo	Secured Storage	05/24/19 15:27	Return to Storage

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
V4B3854	SW846 8260C						
V4B3854-BS	71-43-2	Benzene	BSP	REC	98	%	79-120
V4B3854-BS	107-06-2	1,2-Dichloroethane	BSP	REC	104	%	73-128
V4B3854-BS	100-41-4	Ethylbenzene	BSP	REC	98	%	79-121
V4B3854-BS	98-82-8	Isopropylbenzene	BSP	REC	98	%	72-131
V4B3854-BS	1634-04-4	Methyl Tert Butyl Ether	BSP	REC	102	%	71-124
V4B3854-BS	91-20-3	Naphthalene	BSP	REC	104	%	61-128
V4B3854-BS	75-65-0	Tert Butyl Alcohol	BSP	REC	98	%	68-129
V4B3854-BS	108-88-3	Toluene	BSP	REC	97	%	80-121
V4B3854-BS	95-63-6	1,2,4-Trimethylbenzene	BSP	REC	102	%	76-124
V4B3854-BS	108-67-8	1,3,5-Trimethylbenzene	BSP	REC	102	%	75-124
V4B3854-BS	540-84-1	2,2,4-Trimethylpentane	BSP	REC	104	%	58-132
V4B3854-BS	1330-20-7	Xylene (total)	BSP	REC	97	%	79-121
V4B3854-BS	1868-53-7	Dibromofluoromethane	BSP	SURR	109	%	80-119
V4B3854-BS	17060-07-0	1,2-Dichloroethane-D4	BSP	SURR	108	%	81-118
V4B3854-BS	2037-26-5	Toluene-D8	BSP	SURR	99	%	89-112
V4B3854-BS	460-00-4	4-Bromofluorobenzene	BSP	SURR	103	%	85-114
JC88209-9MS	71-43-2	Benzene	MS	REC	-120 [a]	%	79-120
JC88209-9MS	107-06-2	1,2-Dichloroethane	MS	REC	132 [b]	%	73-128
JC88209-9MS	100-41-4	Ethylbenzene	MS	REC	95	%	79-121
JC88209-9MS	98-82-8	Isopropylbenzene	MS	REC	95	%	72-131
JC88209-9MS	1634-04-4	Methyl Tert Butyl Ether	MS	REC	88	%	71-124
JC88209-9MS	91-20-3	Naphthalene	MS	REC	99	%	61-128
JC88209-9MS	75-65-0	Tert Butyl Alcohol	MS	REC	73	%	68-129
JC88209-9MS	108-88-3	Toluene	MS	REC	94	%	80-121
JC88209-9MS	95-63-6	1,2,4-Trimethylbenzene	MS	REC	99	%	76-124
JC88209-9MS	108-67-8	1,3,5-Trimethylbenzene	MS	REC	97	%	75-124
JC88209-9MS	540-84-1	2,2,4-Trimethylpentane	MS	REC	122	%	58-132
JC88209-9MS	1330-20-7	Xylene (total)	MS	REC	94	%	79-121
JC88209-9MS	1868-53-7	Dibromofluoromethane	MS	SURR	105	%	80-119
JC88209-9MS	17060-07-0	1,2-Dichloroethane-D4	MS	SURR	106	%	81-118
JC88209-9MS	2037-26-5	Toluene-D8	MS	SURR	101	%	89-112
JC88209-9MS	460-00-4	4-Bromofluorobenzene	MS	SURR	106	%	85-114
JC88209-9MSD	71-43-2	Benzene	MSD	REC	-184 [a]	%	79-120
JC88209-9MSD	71-43-2	Benzene	MSD	RPD	4	%	20
JC88209-9MSD	107-06-2	1,2-Dichloroethane	MSD	REC	128	%	73-128
JC88209-9MSD	107-06-2	1,2-Dichloroethane	MSD	RPD	3	%	20
JC88209-9MSD	100-41-4	Ethylbenzene	MSD	REC	93	%	79-121
JC88209-9MSD	100-41-4	Ethylbenzene	MSD	RPD	2	%	20
JC88209-9MSD	98-82-8	Isopropylbenzene	MSD	REC	92	%	72-131
JC88209-9MSD	98-82-8	Isopropylbenzene	MSD	RPD	3	%	20
JC88209-9MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	REC	87	%	71-124
JC88209-9MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	RPD	2	%	20

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC88209-9MSD	91-20-3	Naphthalene	MSD	REC	102	%	61-128
JC88209-9MSD	91-20-3	Naphthalene	MSD	RPD	3	%	20
JC88209-9MSD	75-65-0	Tert Butyl Alcohol	MSD	REC	76	%	68-129
JC88209-9MSD	75-65-0	Tert Butyl Alcohol	MSD	RPD	4	%	20
JC88209-9MSD	108-88-3	Toluene	MSD	REC	93	%	80-121
JC88209-9MSD	108-88-3	Toluene	MSD	RPD	1	%	20
JC88209-9MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	REC	97	%	76-124
JC88209-9MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	RPD	2	%	20
JC88209-9MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	REC	96	%	75-124
JC88209-9MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	RPD	1	%	20
JC88209-9MSD	540-84-1	2,2,4-Trimethylpentane	MSD	REC	121	%	58-132
JC88209-9MSD	540-84-1	2,2,4-Trimethylpentane	MSD	RPD	1	%	20
JC88209-9MSD	1330-20-7	Xylene (total)	MSD	REC	90	%	79-121
JC88209-9MSD	1330-20-7	Xylene (total)	MSD	RPD	3	%	20
JC88209-9MSD	1868-53-7	Dibromofluoromethane	MSD	SURR	105	%	80-119
JC88209-9MSD	17060-07-0	1,2-Dichloroethane-D4	MSD	SURR	106	%	81-118
JC88209-9MSD	2037-26-5	Toluene-D8	MSD	SURR	101	%	89-112
JC88209-9MSD	460-00-4	4-Bromofluorobenzene	MSD	SURR	106	%	85-114
V4B3854-MB	1868-53-7	Dibromofluoromethane	MB	SURR	109	%	80-119
V4B3854-MB	17060-07-0	1,2-Dichloroethane-D4	MB	SURR	112	%	81-118
V4B3854-MB	2037-26-5	Toluene-D8	MB	SURR	99	%	89-112
V4B3854-MB	460-00-4	4-Bromofluorobenzene	MB	SURR	103	%	85-114
JC88209-2	1868-53-7	Dibromofluoromethane	SAMP	SURR	107	%	80-119
JC88209-2	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	110	%	81-118
JC88209-2	2037-26-5	Toluene-D8	SAMP	SURR	101	%	89-112
JC88209-2	460-00-4	4-Bromofluorobenzene	SAMP	SURR	107	%	85-114
JC88209-3	1868-53-7	Dibromofluoromethane	SAMP	SURR	108	%	80-119
JC88209-3	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	112	%	81-118
JC88209-3	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC88209-3	460-00-4	4-Bromofluorobenzene	SAMP	SURR	106	%	85-114
JC88209-5	1868-53-7	Dibromofluoromethane	SAMP	SURR	108	%	80-119
JC88209-5	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	111	%	81-118
JC88209-5	2037-26-5	Toluene-D8	SAMP	SURR	99	%	89-112
JC88209-5	460-00-4	4-Bromofluorobenzene	SAMP	SURR	107	%	85-114
JC88209-9	1868-53-7	Dibromofluoromethane	SAMP	SURR	109	%	80-119
JC88209-9	1868-53-7	Dibromofluoromethane	SAMP	SURR	107	%	80-119
JC88209-9	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	111	%	81-118
JC88209-9	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	111	%	81-118
JC88209-9	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC88209-9	2037-26-5	Toluene-D8	SAMP	SURR	100	%	89-112
JC88209-9	460-00-4	4-Bromofluorobenzene	SAMP	SURR	105	%	85-114
JC88209-9	460-00-4	4-Bromofluorobenzene	SAMP	SURR	103	%	85-114
JC88209-10	1868-53-7	Dibromofluoromethane	SAMP	SURR	109	%	80-119
JC88209-10	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	112	%	81-118
JC88209-10	2037-26-5	Toluene-D8	SAMP	SURR	99	%	89-112

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC88209-10	460-00-4	4-Bromofluorobenzene	SAMP	SURR	104	%	85-114
JC88209-11	1868-53-7	Dibromofluoromethane	SAMP	SURR	109	%	80-119
JC88209-11	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	112	%	81-118
JC88209-11	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC88209-11	460-00-4	4-Bromofluorobenzene	SAMP	SURR	104	%	85-114
JC88209-12	1868-53-7	Dibromofluoromethane	SAMP	SURR	110	%	80-119
JC88209-12	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	112	%	81-118
JC88209-12	2037-26-5	Toluene-D8	SAMP	SURR	99	%	89-112
JC88209-12	460-00-4	4-Bromofluorobenzene	SAMP	SURR	104	%	85-114
V4B3857	SW846 8260C						
V4B3857-BS	71-43-2	Benzene	BSP	REC	94	%	79-120
V4B3857-BS	107-06-2	1,2-Dichloroethane	BSP	REC	107	%	73-128
V4B3857-BS	100-41-4	Ethylbenzene	BSP	REC	94	%	79-121
V4B3857-BS	98-82-8	Isopropylbenzene	BSP	REC	93	%	72-131
V4B3857-BS	1634-04-4	Methyl Tert Butyl Ether	BSP	REC	97	%	71-124
V4B3857-BS	91-20-3	Naphthalene	BSP	REC	97	%	61-128
V4B3857-BS	75-65-0	Tert Butyl Alcohol	BSP	REC	104	%	68-129
V4B3857-BS	108-88-3	Toluene	BSP	REC	96	%	80-121
V4B3857-BS	95-63-6	1,2,4-Trimethylbenzene	BSP	REC	95	%	76-124
V4B3857-BS	108-67-8	1,3,5-Trimethylbenzene	BSP	REC	95	%	75-124
V4B3857-BS	540-84-1	2,2,4-Trimethylpentane	BSP	REC	69	%	58-132
V4B3857-BS	1330-20-7	Xylene (total)	BSP	REC	94	%	79-121
V4B3857-BS	1868-53-7	Dibromofluoromethane	BSP	SURR	101	%	80-119
V4B3857-BS	17060-07-0	1,2-Dichloroethane-D4	BSP	SURR	107	%	81-118
V4B3857-BS	2037-26-5	Toluene-D8	BSP	SURR	100	%	89-112
V4B3857-BS	460-00-4	4-Bromofluorobenzene	BSP	SURR	103	%	85-114
JC88209-7MS	71-43-2	Benzene	MS	REC	22 [a]	%	79-120
JC88209-7MS	107-06-2	1,2-Dichloroethane	MS	REC	109	%	73-128
JC88209-7MS	100-41-4	Ethylbenzene	MS	REC	84	%	79-121
JC88209-7MS	98-82-8	Isopropylbenzene	MS	REC	93	%	72-131
JC88209-7MS	1634-04-4	Methyl Tert Butyl Ether	MS	REC	99	%	71-124
JC88209-7MS	91-20-3	Naphthalene	MS	REC	93	%	61-128
JC88209-7MS	75-65-0	Tert Butyl Alcohol	MS	REC	92	%	68-129
JC88209-7MS	108-88-3	Toluene	MS	REC	94	%	80-121
JC88209-7MS	95-63-6	1,2,4-Trimethylbenzene	MS	REC	92	%	76-124
JC88209-7MS	108-67-8	1,3,5-Trimethylbenzene	MS	REC	90	%	75-124
JC88209-7MS	540-84-1	2,2,4-Trimethylpentane	MS	REC	92	%	58-132
JC88209-7MS	1330-20-7	Xylene (total)	MS	REC	92	%	79-121
JC88209-7MS	1868-53-7	Dibromofluoromethane	MS	SURR	101	%	80-119
JC88209-7MS	17060-07-0	1,2-Dichloroethane-D4	MS	SURR	105	%	81-118
JC88209-7MS	2037-26-5	Toluene-D8	MS	SURR	99	%	89-112
JC88209-7MS	460-00-4	4-Bromofluorobenzene	MS	SURR	101	%	85-114
JC88209-7MSD	71-43-2	Benzene	MSD	REC	11 [a]	%	79-120

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC88209-7MSD	71-43-2	Benzene	MSD	RPD	3	%	20
JC88209-7MSD	107-06-2	1,2-Dichloroethane	MSD	REC	108	%	73-128
JC88209-7MSD	107-06-2	1,2-Dichloroethane	MSD	RPD	1	%	20
JC88209-7MSD	100-41-4	Ethylbenzene	MSD	REC	82	%	79-121
JC88209-7MSD	100-41-4	Ethylbenzene	MSD	RPD	2	%	20
JC88209-7MSD	98-82-8	Isopropylbenzene	MSD	REC	91	%	72-131
JC88209-7MSD	98-82-8	Isopropylbenzene	MSD	RPD	2	%	20
JC88209-7MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	REC	95	%	71-124
JC88209-7MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	RPD	3	%	20
JC88209-7MSD	91-20-3	Naphthalene	MSD	REC	92	%	61-128
JC88209-7MSD	91-20-3	Naphthalene	MSD	RPD	1	%	20
JC88209-7MSD	75-65-0	Tert Butyl Alcohol	MSD	REC	89	%	68-129
JC88209-7MSD	75-65-0	Tert Butyl Alcohol	MSD	RPD	2	%	20
JC88209-7MSD	108-88-3	Toluene	MSD	REC	92	%	80-121
JC88209-7MSD	108-88-3	Toluene	MSD	RPD	2	%	20
JC88209-7MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	REC	89	%	76-124
JC88209-7MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	RPD	3	%	20
JC88209-7MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	REC	88	%	75-124
JC88209-7MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	RPD	2	%	20
JC88209-7MSD	540-84-1	2,2,4-Trimethylpentane	MSD	REC	89	%	58-132
JC88209-7MSD	540-84-1	2,2,4-Trimethylpentane	MSD	RPD	3	%	20
JC88209-7MSD	1330-20-7	Xylene (total)	MSD	REC	92	%	79-121
JC88209-7MSD	1330-20-7	Xylene (total)	MSD	RPD	1	%	20
JC88209-7MSD	1868-53-7	Dibromofluoromethane	MSD	SURR	101	%	80-119
JC88209-7MSD	17060-07-0	1,2-Dichloroethane-D4	MSD	SURR	105	%	81-118
JC88209-7MSD	2037-26-5	Toluene-D8	MSD	SURR	100	%	89-112
JC88209-7MSD	460-00-4	4-Bromofluorobenzene	MSD	SURR	101	%	85-114
V4B3857-MB	1868-53-7	Dibromofluoromethane	MB	SURR	105	%	80-119
V4B3857-MB	17060-07-0	1,2-Dichloroethane-D4	MB	SURR	110	%	81-118
V4B3857-MB	2037-26-5	Toluene-D8	MB	SURR	97	%	89-112
V4B3857-MB	460-00-4	4-Bromofluorobenzene	MB	SURR	103	%	85-114
JC88209-1	1868-53-7	Dibromofluoromethane	SAMP	SURR	103	%	80-119
JC88209-1	1868-53-7	Dibromofluoromethane	SAMP	SURR	103	%	80-119
JC88209-1	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	110	%	81-118
JC88209-1	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	109	%	81-118
JC88209-1	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC88209-1	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC88209-1	460-00-4	4-Bromofluorobenzene	SAMP	SURR	104	%	85-114
JC88209-1	460-00-4	4-Bromofluorobenzene	SAMP	SURR	103	%	85-114
JC88209-4	1868-53-7	Dibromofluoromethane	SAMP	SURR	102	%	80-119
JC88209-4	1868-53-7	Dibromofluoromethane	SAMP	SURR	103	%	80-119
JC88209-4	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	108	%	81-118
JC88209-4	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	110	%	81-118
JC88209-4	2037-26-5	Toluene-D8	SAMP	SURR	99	%	89-112
JC88209-4	2037-26-5	Toluene-D8	SAMP	SURR	101	%	89-112

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC88209-4	460-00-4	4-Bromofluorobenzene	SAMP	SURR	107	%	85-114
JC88209-4	460-00-4	4-Bromofluorobenzene	SAMP	SURR	103	%	85-114
JC88209-6	1868-53-7	Dibromofluoromethane	SAMP	SURR	95	%	80-119
JC88209-6	1868-53-7	Dibromofluoromethane	SAMP	SURR	102	%	80-119
JC88209-6	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	105	%	81-118
JC88209-6	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	109	%	81-118
JC88209-6	2037-26-5	Toluene-D8	SAMP	SURR	104	%	89-112
JC88209-6	2037-26-5	Toluene-D8	SAMP	SURR	99	%	89-112
JC88209-6	460-00-4	4-Bromofluorobenzene	SAMP	SURR	114	%	85-114
JC88209-6	460-00-4	4-Bromofluorobenzene	SAMP	SURR	106	%	85-114
JC88209-7	1868-53-7	Dibromofluoromethane	SAMP	SURR	104	%	80-119
JC88209-7	1868-53-7	Dibromofluoromethane	SAMP	SURR	102	%	80-119
JC88209-7	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	108	%	81-118
JC88209-7	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	112	%	81-118
JC88209-7	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC88209-7	2037-26-5	Toluene-D8	SAMP	SURR	98	%	89-112
JC88209-7	460-00-4	4-Bromofluorobenzene	SAMP	SURR	102	%	85-114
JC88209-7	460-00-4	4-Bromofluorobenzene	SAMP	SURR	105	%	85-114
JC88209-8	1868-53-7	Dibromofluoromethane	SAMP	SURR	102	%	80-119
JC88209-8	1868-53-7	Dibromofluoromethane	SAMP	SURR	103	%	80-119
JC88209-8	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	111	%	81-118
JC88209-8	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	110	%	81-118
JC88209-8	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC88209-8	2037-26-5	Toluene-D8	SAMP	SURR	97	%	89-112
JC88209-8	460-00-4	4-Bromofluorobenzene	SAMP	SURR	103	%	85-114
JC88209-8	460-00-4	4-Bromofluorobenzene	SAMP	SURR	103	%	85-114
VX7769	SW846 8260C						
VX7769-BS	71-43-2	Benzene	BSP	REC	97	%	79-120
VX7769-BS	107-06-2	1,2-Dichloroethane	BSP	REC	88	%	73-128
VX7769-BS	100-41-4	Ethylbenzene	BSP	REC	89	%	79-121
VX7769-BS	98-82-8	Isopropylbenzene	BSP	REC	92	%	72-131
VX7769-BS	1634-04-4	Methyl Tert Butyl Ether	BSP	REC	106	%	71-124
VX7769-BS	91-20-3	Naphthalene	BSP	REC	113	%	61-128
VX7769-BS	75-65-0	Tert Butyl Alcohol	BSP	REC	105	%	68-129
VX7769-BS	108-88-3	Toluene	BSP	REC	92	%	80-121
VX7769-BS	95-63-6	1,2,4-Trimethylbenzene	BSP	REC	95	%	76-124
VX7769-BS	108-67-8	1,3,5-Trimethylbenzene	BSP	REC	96	%	75-124
VX7769-BS	540-84-1	2,2,4-Trimethylpentane	BSP	REC	111	%	58-132
VX7769-BS	1330-20-7	Xylene (total)	BSP	REC	91	%	79-121
VX7769-BS	1868-53-7	Dibromofluoromethane	BSP	SURR	111	%	80-119
VX7769-BS	17060-07-0	1,2-Dichloroethane-D4	BSP	SURR	91	%	81-118
VX7769-BS	2037-26-5	Toluene-D8	BSP	SURR	94	%	89-112
VX7769-BS	460-00-4	4-Bromofluorobenzene	BSP	SURR	103	%	85-114

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
JC88209-1MS	71-43-2	Benzene	MS	REC	-59 [a]	%	79-120
JC88209-1MS	107-06-2	1,2-Dichloroethane	MS	REC	87	%	73-128
JC88209-1MS	100-41-4	Ethylbenzene	MS	REC	83	%	79-121
JC88209-1MS	98-82-8	Isopropylbenzene	MS	REC	94	%	72-131
JC88209-1MS	1634-04-4	Methyl Tert Butyl Ether	MS	REC	94	%	71-124
JC88209-1MS	91-20-3	Naphthalene	MS	REC	111	%	61-128
JC88209-1MS	75-65-0	Tert Butyl Alcohol	MS	REC	97	%	68-129
JC88209-1MS	108-88-3	Toluene	MS	REC	90	%	80-121
JC88209-1MS	95-63-6	1,2,4-Trimethylbenzene	MS	REC	97	%	76-124
JC88209-1MS	108-67-8	1,3,5-Trimethylbenzene	MS	REC	99	%	75-124
JC88209-1MS	540-84-1	2,2,4-Trimethylpentane	MS	REC	92	%	58-132
JC88209-1MS	1330-20-7	Xylene (total)	MS	REC	91	%	79-121
JC88209-1MS	1868-53-7	Dibromofluoromethane	MS	SURR	105	%	80-119
JC88209-1MS	17060-07-0	1,2-Dichloroethane-D4	MS	SURR	89	%	81-118
JC88209-1MS	2037-26-5	Toluene-D8	MS	SURR	97	%	89-112
JC88209-1MS	460-00-4	4-Bromofluorobenzene	MS	SURR	106	%	85-114
JC88209-1MSD	71-43-2	Benzene	MSD	REC	-36 [a]	%	79-120
JC88209-1MSD	71-43-2	Benzene	MSD	RPD	3	%	20
JC88209-1MSD	107-06-2	1,2-Dichloroethane	MSD	REC	87	%	73-128
JC88209-1MSD	107-06-2	1,2-Dichloroethane	MSD	RPD	1	%	20
JC88209-1MSD	100-41-4	Ethylbenzene	MSD	REC	85	%	79-121
JC88209-1MSD	100-41-4	Ethylbenzene	MSD	RPD	2	%	20
JC88209-1MSD	98-82-8	Isopropylbenzene	MSD	REC	96	%	72-131
JC88209-1MSD	98-82-8	Isopropylbenzene	MSD	RPD	2	%	20
JC88209-1MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	REC	96	%	71-124
JC88209-1MSD	1634-04-4	Methyl Tert Butyl Ether	MSD	RPD	2	%	20
JC88209-1MSD	91-20-3	Naphthalene	MSD	REC	113	%	61-128
JC88209-1MSD	91-20-3	Naphthalene	MSD	RPD	2	%	20
JC88209-1MSD	75-65-0	Tert Butyl Alcohol	MSD	REC	98	%	68-129
JC88209-1MSD	75-65-0	Tert Butyl Alcohol	MSD	RPD	1	%	20
JC88209-1MSD	108-88-3	Toluene	MSD	REC	93	%	80-121
JC88209-1MSD	108-88-3	Toluene	MSD	RPD	2	%	20
JC88209-1MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	REC	102	%	76-124
JC88209-1MSD	95-63-6	1,2,4-Trimethylbenzene	MSD	RPD	5	%	20
JC88209-1MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	REC	104	%	75-124
JC88209-1MSD	108-67-8	1,3,5-Trimethylbenzene	MSD	RPD	4	%	20
JC88209-1MSD	540-84-1	2,2,4-Trimethylpentane	MSD	REC	98	%	58-132
JC88209-1MSD	540-84-1	2,2,4-Trimethylpentane	MSD	RPD	6	%	20
JC88209-1MSD	1330-20-7	Xylene (total)	MSD	REC	92	%	79-121
JC88209-1MSD	1330-20-7	Xylene (total)	MSD	RPD	2	%	20
JC88209-1MSD	1868-53-7	Dibromofluoromethane	MSD	SURR	105	%	80-119
JC88209-1MSD	17060-07-0	1,2-Dichloroethane-D4	MSD	SURR	89	%	81-118
JC88209-1MSD	2037-26-5	Toluene-D8	MSD	SURR	96	%	89-112
JC88209-1MSD	460-00-4	4-Bromofluorobenzene	MSD	SURR	108	%	85-114
VX7769-MB	1868-53-7	Dibromofluoromethane	MB	SURR	104	%	80-119

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
VX7769-MB	17060-07-0	1,2-Dichloroethane-D4	MB	SURR	99	%	81-118
VX7769-MB	2037-26-5	Toluene-D8	MB	SURR	100	%	89-112
VX7769-MB	460-00-4	4-Bromofluorobenzene	MB	SURR	95	%	85-114
JC88209-1	1868-53-7	Dibromofluoromethane	SAMP	SURR	104	%	80-119
JC88209-1	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	97	%	81-118
JC88209-1	2037-26-5	Toluene-D8	SAMP	SURR	102	%	89-112
JC88209-1	460-00-4	4-Bromofluorobenzene	SAMP	SURR	96	%	85-114
JC88209-2	1868-53-7	Dibromofluoromethane	SAMP	SURR	106	%	80-119
JC88209-2	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	98	%	81-118
JC88209-2	2037-26-5	Toluene-D8	SAMP	SURR	101	%	89-112
JC88209-2	460-00-4	4-Bromofluorobenzene	SAMP	SURR	97	%	85-114
JC88209-4	1868-53-7	Dibromofluoromethane	SAMP	SURR	102	%	80-119
JC88209-4	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	97	%	81-118
JC88209-4	2037-26-5	Toluene-D8	SAMP	SURR	104	%	89-112
JC88209-4	460-00-4	4-Bromofluorobenzene	SAMP	SURR	103	%	85-114
JC88209-8	1868-53-7	Dibromofluoromethane	SAMP	SURR	107	%	80-119
JC88209-8	17060-07-0	1,2-Dichloroethane-D4	SAMP	SURR	100	%	81-118
JC88209-8	2037-26-5	Toluene-D8	SAMP	SURR	101	%	89-112
JC88209-8	460-00-4	4-Bromofluorobenzene	SAMP	SURR	98	%	85-114
MP15198	SW846 6020B						
MP15198-B1	7440-38-2	Arsenic	BSP	REC	84	%	84-116
MP15198-B1	7439-89-6	Iron	BSP	REC	95	%	87-118
MP15198-B1	7439-92-1	Lead	BSP	REC	90.4	%	88-115
MP15198-B1	7439-96-5	Manganese	BSP	REC	90.8	%	87-115
MP15198-S1	7440-38-2	Arsenic	MS	REC	83.5	%	84-116
MP15198-S1	7439-89-6	Iron	MS	REC	97.5	%	87-118
MP15198-S1	7439-92-1	Lead	MS	REC	93.7	%	88-115
MP15198-S1	7439-96-5	Manganese	MS	REC	125	%	87-115
MP15198-S3	7440-38-2	Arsenic	MS	REC	84.5	%	84-116
MP15198-S3	7439-89-6	Iron	MS	REC	100	%	87-118
MP15198-S3	7439-92-1	Lead	MS	REC	93.9	%	88-115
MP15198-S3	7439-96-5	Manganese	MS	REC	100	%	87-115
MP15198-S2	7440-38-2	Arsenic	MSD	REC	83.5	%	84-116
MP15198-S2	7440-38-2	Arsenic	MSD	RPD	0	%	20
MP15198-S2	7439-89-6	Iron	MSD	REC	92.5	%	87-118
MP15198-S2	7439-89-6	Iron	MSD	RPD	1.3	%	20
MP15198-S2	7439-92-1	Lead	MSD	REC	94.8	%	88-115
MP15198-S2	7439-92-1	Lead	MSD	RPD	1.2	%	20
MP15198-S2	7439-96-5	Manganese	MSD	REC	50 [c]	%	87-115
MP15198-S2	7439-96-5	Manganese	MSD	RPD	2.9	%	20
MP15198-S4	7440-38-2	Arsenic	MSD	REC	83.5	%	84-116
MP15198-S4	7440-38-2	Arsenic	MSD	RPD	1.2	%	20
MP15198-S4	7439-89-6	Iron	MSD	REC	87.5	%	87-118

* Sample used for QC is not from job JC88209

QC Evaluation: DOD QSM5 Limits

Job Number: JC88209
Account: USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA
Collected: 05/14/19

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
MP15198-S4	7439-89-6	Iron	MSD	RPD	3.5	%	20
MP15198-S4	7439-92-1	Lead	MSD	REC	94.8	%	88-115
MP15198-S4	7439-92-1	Lead	MSD	RPD	.9	%	20
MP15198-S4	7439-96-5	Manganese	MSD	REC	75	%	87-115
MP15198-S4	7439-96-5	Manganese	MSD	RPD	1	%	20
MP15216	SW846 6020B						
MP15216-B2	7440-38-2	Arsenic	BSP	REC	86	%	84-116
MP15216-B2	7439-89-6	Iron	BSP	REC	99.5	%	87-118
MP15216-B2	7439-92-1	Lead	BSP	REC	98.3	%	88-115
MP15216-B2	7439-96-5	Manganese	BSP	REC	97.5	%	87-115
MP15216-S3*	7440-38-2	Arsenic	MS	REC	85.3	%	84-116
MP15216-S3*	7439-89-6	Iron	MS	REC	98.5	%	87-118
MP15216-S3*	7439-92-1	Lead	MS	REC	98.8	%	88-115
MP15216-S3*	7439-96-5	Manganese	MS	REC	97.1	%	87-115
MP15216-S4*	7440-38-2	Arsenic	MSD	REC	85.8	%	84-116
MP15216-S4*	7440-38-2	Arsenic	MSD	RPD	.6	%	20
MP15216-S4*	7439-89-6	Iron	MSD	REC	97.7	%	87-118
MP15216-S4*	7439-89-6	Iron	MSD	RPD	.8	%	20
MP15216-S4*	7439-92-1	Lead	MSD	REC	99.3	%	88-115
MP15216-S4*	7439-92-1	Lead	MSD	RPD	.5	%	20
MP15216-S4*	7439-96-5	Manganese	MSD	REC	94.9	%	87-115
MP15216-S4*	7439-96-5	Manganese	MSD	RPD	2.3	%	20
GP21461	EPA 300/SW846 9056A						
GP21461-B1	14808-79-8	Sulfate	BSP	REC	96.8	%	87-112
GP21461-S1	14808-79-8	Sulfate	MS	REC	91.3	%	87-112
GP21461-D1	14808-79-8	Sulfate	DUP	RPD	4.4	%	15

(a) Outside control limits due to high level in sample relative to spike amount.
(b) Outside control limits due to matrix interference.
(c) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

* Sample used for QC is not from job JC88209

MS Volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries
- Instrument Performance Checks (BFB)
- Internal Standard Area Summaries
- Surrogate Recovery Summaries
- Initial and Continuing Calibration Summaries

Method Blank Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V4B3854-MB	4B90956.D	1	05/23/19	JP	n/a	n/a	V4B3854

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-2, JC88209-3, JC88209-5, JC88209-9, JC88209-10, JC88209-11, JC88209-12

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.50	0.43	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.60	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.51	ug/l	
91-20-3	Naphthalene	ND	5.0	0.98	ug/l	
75-65-0	Tert Butyl Alcohol	ND	10	5.8	ug/l	
108-88-3	Toluene	ND	1.0	0.53	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	ND	5.0	1.0	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.59	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	109%	80-120%
17060-07-0	1,2-Dichloroethane-D4	112%	81-124%
2037-26-5	Toluene-D8	99%	80-120%
460-00-4	4-Bromofluorobenzene	103%	80-120%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/l	

Method Blank Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V4B3857-MB	4B91009.D	1	05/24/19	CSF	n/a	n/a	V4B3857

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-1, JC88209-4, JC88209-6, JC88209-7, JC88209-8

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.50	0.43	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.60	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.51	ug/l	
91-20-3	Naphthalene	ND	5.0	0.98	ug/l	
75-65-0	Tert Butyl Alcohol	ND	10	5.8	ug/l	
108-88-3	Toluene	ND	1.0	0.53	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	ND	5.0	1.0	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.59	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	105%	80-120%
17060-07-0	1,2-Dichloroethane-D4	110%	81-124%
2037-26-5	Toluene-D8	97%	80-120%
460-00-4	4-Bromofluorobenzene	103%	80-120%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/l	

Method Blank Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VX7769-MB	X181600.D	1	05/28/19	JP	n/a	n/a	VX7769

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-1, JC88209-2, JC88209-4, JC88209-8

CAS No.	Compound	Result	RL	MDL	Units	Q
71-43-2	Benzene	ND	0.50	0.43	ug/l	
107-06-2	1,2-Dichloroethane	ND	1.0	0.60	ug/l	
100-41-4	Ethylbenzene	ND	1.0	0.60	ug/l	
98-82-8	Isopropylbenzene	ND	1.0	0.65	ug/l	
1634-04-4	Methyl Tert Butyl Ether	ND	1.0	0.51	ug/l	
91-20-3	Naphthalene	ND	5.0	0.98	ug/l	
75-65-0	Tert Butyl Alcohol	ND	10	5.8	ug/l	
108-88-3	Toluene	ND	1.0	0.53	ug/l	
95-63-6	1,2,4-Trimethylbenzene	ND	2.0	1.0	ug/l	
108-67-8	1,3,5-Trimethylbenzene	ND	2.0	1.0	ug/l	
540-84-1	2,2,4-Trimethylpentane	ND	5.0	1.0	ug/l	
1330-20-7	Xylene (total)	ND	1.0	0.59	ug/l	

CAS No.	Surrogate Recoveries		Limits
1868-53-7	Dibromofluoromethane	104%	80-120%
17060-07-0	1,2-Dichloroethane-D4	99%	81-124%
2037-26-5	Toluene-D8	100%	80-120%
460-00-4	4-Bromofluorobenzene	95%	80-120%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Volatile		0	ug/l	

Blank Spike Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V4B3854-BS	4B90954.D	1	05/23/19	JP	n/a	n/a	V4B3854

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-2, JC88209-3, JC88209-5, JC88209-9, JC88209-10, JC88209-11, JC88209-12

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	48.9	98	80-120
107-06-2	1,2-Dichloroethane	50	51.9	104	78-126
100-41-4	Ethylbenzene	50	48.8	98	80-120
98-82-8	Isopropylbenzene	50	49.1	98	83-120
1634-04-4	Methyl Tert Butyl Ether	50	51.0	102	80-119
91-20-3	Naphthalene	50	52.0	104	73-131
75-65-0	Tert Butyl Alcohol	250	246	98	78-126
108-88-3	Toluene	50	48.4	97	80-120
95-63-6	1,2,4-Trimethylbenzene	50	50.8	102	84-120
108-67-8	1,3,5-Trimethylbenzene	50	50.8	102	83-119
540-84-1	2,2,4-Trimethylpentane	50	51.8	104	57-154
1330-20-7	Xylene (total)	150	146	97	80-120

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	109%	80-120%
17060-07-0	1,2-Dichloroethane-D4	108%	81-124%
2037-26-5	Toluene-D8	99%	80-120%
460-00-4	4-Bromofluorobenzene	103%	80-120%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
V4B3857-BS	4B91007.D	1	05/24/19	CSF	n/a	n/a	V4B3857

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-1, JC88209-4, JC88209-6, JC88209-7, JC88209-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	47.1	94	80-120
107-06-2	1,2-Dichloroethane	50	53.6	107	78-126
100-41-4	Ethylbenzene	50	47.2	94	80-120
98-82-8	Isopropylbenzene	50	46.5	93	83-120
1634-04-4	Methyl Tert Butyl Ether	50	48.4	97	80-119
91-20-3	Naphthalene	50	48.4	97	73-131
75-65-0	Tert Butyl Alcohol	250	261	104	78-126
108-88-3	Toluene	50	48.2	96	80-120
95-63-6	1,2,4-Trimethylbenzene	50	47.7	95	84-120
108-67-8	1,3,5-Trimethylbenzene	50	47.6	95	83-119
540-84-1	2,2,4-Trimethylpentane	50	34.3	69	57-154
1330-20-7	Xylene (total)	150	141	94	80-120

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	101%	80-120%
17060-07-0	1,2-Dichloroethane-D4	107%	81-124%
2037-26-5	Toluene-D8	100%	80-120%
460-00-4	4-Bromofluorobenzene	103%	80-120%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
VX7769-BS	X181598.D	1	05/28/19	JP	n/a	n/a	VX7769

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-1, JC88209-2, JC88209-4, JC88209-8

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
71-43-2	Benzene	50	48.5	97	80-120
107-06-2	1,2-Dichloroethane	50	43.8	88	78-126
100-41-4	Ethylbenzene	50	44.3	89	80-120
98-82-8	Isopropylbenzene	50	46.0	92	83-120
1634-04-4	Methyl Tert Butyl Ether	50	53.2	106	80-119
91-20-3	Naphthalene	50	56.6	113	73-131
75-65-0	Tert Butyl Alcohol	250	263	105	78-126
108-88-3	Toluene	50	45.8	92	80-120
95-63-6	1,2,4-Trimethylbenzene	50	47.7	95	84-120
108-67-8	1,3,5-Trimethylbenzene	50	48.1	96	83-119
540-84-1	2,2,4-Trimethylpentane	50	55.4	111	57-154
1330-20-7	Xylene (total)	150	137	91	80-120

CAS No.	Surrogate Recoveries	BSP	Limits
1868-53-7	Dibromofluoromethane	111%	80-120%
17060-07-0	1,2-Dichloroethane-D4	91%	81-124%
2037-26-5	Toluene-D8	94%	80-120%
460-00-4	4-Bromofluorobenzene	103%	80-120%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC88209-9MS	4B90965.D	1	05/23/19	JP	n/a	n/a	V4B3854
JC88209-9MSD	4B90966.D	1	05/23/19	JP	n/a	n/a	V4B3854
JC88209-9	4B90963.D	1	05/23/19	JP	n/a	n/a	V4B3854
JC88209-9	4B90964.D	20	05/23/19	JP	n/a	n/a	V4B3854

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-2, JC88209-3, JC88209-5, JC88209-9, JC88209-10, JC88209-11, JC88209-12

CAS No.	Compound	JC88209-9 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	851 [b]		50	791	-120* [a]	50	759	-184* [a]	4	54-136/10
107-06-2	1,2-Dichloroethane	1.0 U		50	66.0	132* [c]	50	64.0	128	3	72-131/11
100-41-4	Ethylbenzene	10.0		50	57.5	95	50	56.4	93	2	51-140/20
98-82-8	Isopropylbenzene	5.6		50	53.3	95	50	51.8	92	3	75-129/11
1634-04-4	Methyl Tert Butyl Ether	1.0 U		50	44.2	88	50	43.4	87	2	72-123/11
91-20-3	Naphthalene	5.0 U		50	49.7	99	50	51.1	102	3	62-141/13
75-65-0	Tert Butyl Alcohol	13.6		250	196	73	250	204	76	4	73-134/13
108-88-3	Toluene	26.8		50	73.8	94	50	73.4	93	1	60-135/10
95-63-6	1,2,4-Trimethylbenzene	6.7		50	56.4	99	50	55.1	97	2	54-143/10
108-67-8	1,3,5-Trimethylbenzene	1.2	J	50	49.9	97	50	49.3	96	1	67-133/11
540-84-1	2,2,4-Trimethylpentane	5.0 U		50	61.2	122	50	60.4	121	1	47-173/19
1330-20-7	Xylene (total)	78.7		150	220	94	150	214	90	3	56-139/20

CAS No.	Surrogate Recoveries	MS	MSD	JC88209-9	JC88209-9	Limits
1868-53-7	Dibromofluoromethane	105%	105%	107%	109%	80-120%
17060-07-0	1,2-Dichloroethane-D4	106%	106%	111%	111%	81-124%
2037-26-5	Toluene-D8	101%	101%	100%	98%	80-120%
460-00-4	4-Bromofluorobenzene	106%	106%	105%	103%	80-120%

(a) Outside control limits due to high level in sample relative to spike amount.
(b) Result is from Run #2.
(c) Outside control limits due to matrix interference.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC88209-7MS	4B91015.D	20	05/24/19	CSF	n/a	n/a	V4B3857
JC88209-7MSD	4B91016.D	20	05/24/19	CSF	n/a	n/a	V4B3857
JC88209-7 [a]	4B91012.D	20	05/24/19	CSF	n/a	n/a	V4B3857
JC88209-7	4B91017.D	200	05/24/19	CSF	n/a	n/a	V4B3857

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-1, JC88209-4, JC88209-6, JC88209-7, JC88209-8

CAS No.	Compound	JC88209-7 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	4090 [c]		1000	4310	22* [b]	1000	4200	11* [b]	3	54-136/10
107-06-2	1,2-Dichloroethane	20 U		1000	1090	109	1000	1080	108	1	72-131/11
100-41-4	Ethylbenzene	451		1000	1290	84	1000	1270	82	2	51-140/20
98-82-8	Isopropylbenzene	51.8		1000	986	93	1000	966	91	2	75-129/11
1634-04-4	Methyl Tert Butyl Ether	20 U		1000	985	99	1000	954	95	3	72-123/11
91-20-3	Naphthalene	344		1000	1270	93	1000	1260	92	1	62-141/13
75-65-0	Tert Butyl Alcohol	527		5000	5110	92	5000	4990	89	2	73-134/13
108-88-3	Toluene	119		1000	1060	94	1000	1040	92	2	60-135/10
95-63-6	1,2,4-Trimethylbenzene	74.7		1000	991	92	1000	961	89	3	54-143/10
108-67-8	1,3,5-Trimethylbenzene	182		1000	1080	90	1000	1060	88	2	67-133/11
540-84-1	2,2,4-Trimethylpentane	58.9	J	1000	974	92	1000	945	89	3	47-173/19
1330-20-7	Xylene (total)	282		3000	3050	92	3000	3030	92	1	56-139/20

CAS No.	Surrogate Recoveries	MS	MSD	JC88209-7	JC88209-7	Limits
1868-53-7	Dibromofluoromethane	101%	101%	104%	102%	80-120%
17060-07-0	1,2-Dichloroethane-D4	105%	105%	112%	108%	81-124%
2037-26-5	Toluene-D8	99%	100%	98%	97%	80-120%
460-00-4	4-Bromofluorobenzene	101%	101%	105%	102%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Outside control limits due to high level in sample relative to spike amount.
(c) Result is from Run #2.

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
JC88209-1MS	X181605.D	20	05/28/19	JP	n/a	n/a	VX7769
JC88209-1MSD	X181606.D	20	05/28/19	JP	n/a	n/a	VX7769
JC88209-1 [a]	X181602.D	20	05/28/19	JP	n/a	n/a	VX7769

The QC reported here applies to the following samples: **Method:** SW846 8260C

JC88209-1, JC88209-2, JC88209-4, JC88209-8

CAS No.	Compound	JC88209-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
71-43-2	Benzene	8940	E	1000	8350	-59* [b]	1000	8580	-36* [b]	3	54-136/10
107-06-2	1,2-Dichloroethane	20 U		1000	868	87	1000	873	87	1	72-131/11
100-41-4	Ethylbenzene	368		1000	1200	83	1000	1220	85	2	51-140/20
98-82-8	Isopropylbenzene	29.3		1000	967	94	1000	991	96	2	75-129/11
1634-04-4	Methyl Tert Butyl Ether	20 U		1000	940	94	1000	962	96	2	72-123/11
91-20-3	Naphthalene	54.3	J	1000	1160	111	1000	1180	113	2	62-141/13
75-65-0	Tert Butyl Alcohol	262		5000	5110	97	5000	5150	98	1	73-134/13
108-88-3	Toluene	314		1000	1210	90	1000	1240	93	2	60-135/10
95-63-6	1,2,4-Trimethylbenzene	48.9		1000	1020	97	1000	1070	102	5	54-143/10
108-67-8	1,3,5-Trimethylbenzene	97.6		1000	1090	99	1000	1140	104	4	67-133/11
540-84-1	2,2,4-Trimethylpentane	100 U		1000	923	92	1000	982	98	6	47-173/19
1330-20-7	Xylene (total)	375		3000	3090	91	3000	3140	92	2	56-139/20

CAS No.	Surrogate Recoveries	MS	MSD	JC88209-1	Limits
1868-53-7	Dibromofluoromethane	105%	105%	104%	80-120%
17060-07-0	1,2-Dichloroethane-D4	89%	89%	97%	81-124%
2037-26-5	Toluene-D8	97%	96%	102%	80-120%
460-00-4	4-Bromofluorobenzene	106%	108%	96%	80-120%

(a) Diluted due to high concentration of target compound.
(b) Outside control limits due to high level in sample relative to spike amount.

* = Outside of Control Limits.

Instrument Performance Check (BFB)

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	V4B3793-BFB	**Injection Date:**	04/06/19
Lab File ID:	4B89751.D	**Injection Time:**	17:47
Instrument ID:	GCMS4B		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	16461	16.6		Pass
75	30.0 - 60.0% of mass 95	43936	44.2		Pass
95	Base peak, 100% relative abundance	99336	100.0		Pass
96	5.0 - 9.0% of mass 95	6566	6.61		Pass
173	Less than 2.0% of mass 174	0	0.00	(0.00) [a]	Pass
174	50.0 - 150.0% of mass 95	91778	92.4		Pass
175	5.0 - 9.0% of mass 174	7111	7.16	(7.75) [a]	Pass
176	95.0 - 101.0% of mass 174	88976	89.6	(96.9) [a]	Pass
177	5.0 - 9.0% of mass 176	6193	6.23	(6.96) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V4B3793-IC3793	4B89752.D	04/06/19	18:21	00:34	Initial cal 0.2
V4B3793-IC3793	4B89753.D	04/06/19	18:50	01:03	Initial cal 0.5
V4B3793-IC3793	4B89754.D	04/06/19	19:17	01:30	Initial cal 1
V4B3793-IC3793	4B89755.D	04/06/19	19:45	01:58	Initial cal 2
V4B3793-IC3793	4B89756.D	04/06/19	20:13	02:26	Initial cal 4
V4B3793-IC3793	4B89757.D	04/06/19	20:41	02:54	Initial cal 8
V4B3793-IC3793	4B89758.D	04/06/19	21:09	03:22	Initial cal 20
V4B3793-ICC3793	4B89759.D	04/06/19	21:37	03:50	Initial cal 50
V4B3793-IC3793	4B89760.D	04/06/19	22:05	04:18	Initial cal 100
V4B3793-IC3793	4B89761.D	04/06/19	22:33	04:46	Initial cal 200
V4B3793-ICV3793	4B89764.D	04/06/19	23:57	06:10	Initial cal verification 50

Instrument Performance Check (BFB)

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	V4B3854-BFB	**Injection Date:**	05/23/19
Lab File ID:	4B90953.D	**Injection Time:**	06:57
Instrument ID:	GCMS4B		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	15466	17.4		Pass
75	30.0 - 60.0% of mass 95	39821	44.9		Pass
95	Base peak, 100% relative abundance	88659	100.0		Pass
96	5.0 - 9.0% of mass 95	5820	6.56		Pass
173	Less than 2.0% of mass 174	0	0.00	(0.00) [a]	Pass
174	50.0 - 150.0% of mass 95	81091	91.5		Pass
175	5.0 - 9.0% of mass 174	6169	6.96	(7.61) [a]	Pass
176	95.0 - 101.0% of mass 174	79397	89.6	(97.9) [a]	Pass
177	5.0 - 9.0% of mass 176	5029	5.67	(6.33) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V4B3854-CC3793	4B90953.D	05/23/19	06:57	00:00	Continuing cal 20
V4B3854-BS	4B90954.D	05/23/19	07:35	00:38	Blank Spike
V4B3854-MB	4B90956.D	05/23/19	08:48	01:51	Method Blank
ZZZZZZ	4B90959.D	05/23/19	10:25	03:28	(unrelated sample)
ZZZZZZ	4B90960.D	05/23/19	10:53	03:56	(unrelated sample)
ZZZZZZ	4B90961.D	05/23/19	11:21	04:24	(unrelated sample)
ZZZZZZ	4B90962.D	05/23/19	11:49	04:52	(unrelated sample)
JC88209-9	4B90963.D	05/23/19	12:17	05:20	PH-PH-21(05172019)
JC88209-9	4B90964.D	05/23/19	12:45	05:48	PH-PH-21(05172019)
JC88209-9MS	4B90965.D	05/23/19	13:13	06:16	Matrix Spike
JC88209-9MSD	4B90966.D	05/23/19	13:42	06:45	Matrix Spike Duplicate
ZZZZZZ	4B90967.D	05/23/19	14:10	07:13	(unrelated sample)
ZZZZZZ	4B90968.D	05/23/19	14:38	07:41	(unrelated sample)
JC88209-10	4B90969.D	05/23/19	15:06	08:09	FB-05142019
JC88209-11	4B90970.D	05/23/19	15:34	08:37	EB-05142019
JC88209-12	4B90971.D	05/23/19	16:02	09:05	TRIP BLANK
JC88209-3	4B90972.D	05/23/19	16:30	09:33	PH-RW-B(05142019)
JC88209-5	4B90973.D	05/23/19	16:59	10:02	DUP-05142019
JC88209-2	4B90974.D	05/23/19	17:27	10:30	PH-RW-B2(05142019)
V4B3854-ECC3793	4B90975.D	05/23/19	17:55	10:58	Ending cal 50

Instrument Performance Check (BFB)

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	V4B3857-BFB	**Injection Date:**	05/24/19
Lab File ID:	4B91006.D	**Injection Time:**	10:46
Instrument ID:	GCMS4B		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	14466	16.7		Pass
75	30.0 - 60.0% of mass 95	39048	45.2		Pass
95	Base peak, 100% relative abundance	86397	100.0		Pass
96	5.0 - 9.0% of mass 95	5909	6.84		Pass
173	Less than 2.0% of mass 174	0	0.00	(0.00) [a]	Pass
174	50.0 - 150.0% of mass 95	78896	91.3		Pass
175	5.0 - 9.0% of mass 174	5799	6.71	(7.35) [a]	Pass
176	95.0 - 101.0% of mass 174	77893	90.2	(98.7) [a]	Pass
177	5.0 - 9.0% of mass 176	5182	6.00	(6.65) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
V4B3857-CC3793	4B91006.D	05/24/19	10:46	00:00	Continuing cal 20
V4B3857-BS	4B91007.D	05/24/19	11:24	00:38	Blank Spike
V4B3857-MB	4B91009.D	05/24/19	12:20	01:34	Method Blank
JC88209-6	4B91010.D	05/24/19	13:05	02:19	PH-RW-A2(05142019)
JC88209-7	4B91012.D	05/24/19	14:17	03:31	PH-RW-A(05142019)
JC88209-7MS	4B91015.D	05/24/19	16:01	05:15	Matrix Spike
JC88209-7MSD	4B91016.D	05/24/19	16:29	05:43	Matrix Spike Duplicate
JC88209-7	4B91017.D	05/24/19	16:58	06:12	PH-RW-A(05142019)
JC88209-6	4B91018.D	05/24/19	17:26	06:40	PH-RW-A2(05142019)
JC88209-1	4B91019.D	05/24/19	17:54	07:08	PH-PH-2(05142019)
JC88209-1	4B91020.D	05/24/19	18:22	07:36	PH-PH-2(05142019)
JC88209-4	4B91021.D	05/24/19	18:50	08:04	PH-MW-67(05142019)
JC88209-4	4B91022.D	05/24/19	19:18	08:32	PH-MW-67(05142019)
JC88209-8	4B91023.D	05/24/19	19:46	09:00	PH-MW-66(05142019)
JC88209-8	4B91024.D	05/24/19	20:14	09:28	PH-MW-66(05142019)
V4B3857-ECC3793	4B91025.D	05/24/19	20:42	09:56	Ending cal 50

Instrument Performance Check (BFB)

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	VX7749-BFB	**Injection Date:**	05/02/19
Lab File ID:	X181279.D	**Injection Time:**	16:28
Instrument ID:	GCMSX		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	14769	17.6		Pass
75	30.0 - 60.0% of mass 95	38133	45.6		Pass
95	Base peak, 100% relative abundance	83690	100.0		Pass
96	5.0 - 9.0% of mass 95	5531	6.61		Pass
173	Less than 2.0% of mass 174	0	0.00	(0.00) [a]	Pass
174	50.0 - 120.0% of mass 95	80445	96.1		Pass
175	5.0 - 9.0% of mass 174	6070	7.25	(7.55) [a]	Pass
176	95.0 - 101.0% of mass 174	79192	94.6	(98.4) [a]	Pass
177	5.0 - 9.0% of mass 176	5418	6.47	(6.84) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
VX7749-IC7749	X181280.D	05/02/19	17:02	00:34	Initial cal 0.2
VX7749-IC7749	X181281.D	05/02/19	17:31	01:03	Initial cal 0.5
VX7749-IC7749	X181282.D	05/02/19	17:59	01:31	Initial cal 1
VX7749-IC7749	X181283.D	05/02/19	18:28	02:00	Initial cal 2
VX7749-IC7749	X181284.D	05/02/19	18:56	02:28	Initial cal 4
VX7749-IC7749	X181285.D	05/02/19	19:25	02:57	Initial cal 8
VX7749-IC7749	X181286.D	05/02/19	19:54	03:26	Initial cal 20
VX7749-ICC7749	X181287.D	05/02/19	20:22	03:54	Initial cal 50
VX7749-IC7749	X181288.D	05/02/19	20:51	04:23	Initial cal 100
VX7749-IC7749	X181289.D	05/02/19	21:19	04:51	Initial cal 200
VX7749-ICV7749	X181292.D	05/02/19	22:45	06:17	Initial cal verification 50
VX7749-ICV7749	X181293.D	05/02/19	23:14	06:46	Initial cal verification 50

Instrument Performance Check (BFB)

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Sample:	VX7769-BFB	**Injection Date:**	05/28/19
Lab File ID:	X181595.D	**Injection Time:**	07:07
Instrument ID:	GCMSX		

m/e	Ion Abundance Criteria	Raw Abundance	% Relative Abundance		Pass/Fail
50	15.0 - 40.0% of mass 95	14936	15.1		Pass
75	30.0 - 60.0% of mass 95	42093	42.5		Pass
95	Base peak, 100% relative abundance	99011	100.0		Pass
96	5.0 - 9.0% of mass 95	6692	6.76		Pass
173	Less than 2.0% of mass 174	0	0.00	(0.00) [a]	Pass
174	50.0 - 120.0% of mass 95	94864	95.8		Pass
175	5.0 - 9.0% of mass 174	7166	7.24	(7.55) [a]	Pass
176	95.0 - 101.0% of mass 174	92755	93.7	(97.8) [a]	Pass
177	5.0 - 9.0% of mass 176	6033	6.09	(6.50) [b]	Pass

(a) Value is % of mass 174
(b) Value is % of mass 176

This check applies to the following Samples, MS, MSD, Blanks, and Standards:

Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed	Hours Lapsed	Client Sample ID
VX7769-CC7749	X181595.D	05/28/19	07:07	00:00	Continuing cal 20
VX7769-BS	X181598.D	05/28/19	09:07	02:00	Blank Spike
VX7769-MB	X181600.D	05/28/19	10:15	03:08	Method Blank
JC88209-2	X181601.D	05/28/19	10:56	03:49	PH-RW-B2(05142019)
JC88209-1	X181602.D	05/28/19	11:25	04:18	PH-PH-2(05142019)
JC88209-8	X181603.D	05/28/19	11:53	04:46	PH-MW-66(05142019)
JC88209-4	X181604.D	05/28/19	12:25	05:18	PH-MW-67(05142019)
JC88209-1MS	X181605.D	05/28/19	12:53	05:46	Matrix Spike
JC88209-1MSD	X181606.D	05/28/19	13:21	06:14	Matrix Spike Duplicate
ZZZZZZ	X181608.D	05/28/19	14:18	07:11	(unrelated sample)
ZZZZZZ	X181609.D	05/28/19	14:48	07:41	(unrelated sample)
ZZZZZZ	X181610.D	05/28/19	15:17	08:10	(unrelated sample)
ZZZZZZ	X181611.D	05/28/19	15:46	08:39	(unrelated sample)
ZZZZZZ	X181613.D	05/28/19	16:43	09:36	(unrelated sample)
ZZZZZZ	X181614.D	05/28/19	17:13	10:06	(unrelated sample)
VX7769-ECC7749	X181615.D	05/28/19	17:42	10:35	Ending cal 50

Internal Standard Area Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	V4B3854-CC3793	**Injection Date:**	05/23/19
Lab File ID:	4B90953.D	**Injection Time:**	06:57
Instrument ID:	GCMS4B	**Method:**	SW846 8260C

	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
Check Std	130046	6.73	229441	8.76	317119	9.63	302578	12.81	180128	15.38
Upper Limit [a]	260092	7.23	458882	9.26	634238	10.13	605156	13.31	360256	15.88
Lower Limit [b]	65023	6.23	114721	8.26	158560	9.13	151289	12.31	90064	14.88

Lab Sample ID	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
V4B3854-BS	123983	6.74	231762	8.76	320837	9.63	298697	12.81	177433	15.38
V4B3854-MB	120791	6.73	247593	8.76	343143	9.63	314110	12.81	186687	15.38
ZZZZZZ	108383	6.74	233438	8.76	321951	9.63	304843	12.81	181615	15.38
ZZZZZZ	113485	6.74	239096	8.76	331124	9.63	307929	12.81	183403	15.38
ZZZZZZ	107906	6.74	229083	8.75	319259	9.63	302773	12.81	180570	15.38
ZZZZZZ	105889	6.74	242480	8.76	336378	9.63	311079	12.81	184305	15.38
JC88209-9	134390	6.73	236988	8.76	323541	9.63	307320	12.81	183185	15.38
JC88209-9	112472	6.73	246764	8.76	341660	9.63	312879	12.81	185432	15.38
JC88209-9MS	152823	6.74	245454	8.76	339822	9.63	310622	12.81	179738	15.38
JC88209-9MSD	161988	6.75	249427	8.76	345049	9.63	313362	12.81	181729	15.38
ZZZZZZ	124788	6.74	252209	8.76	341128	9.63	312095	12.81	188883	15.38
ZZZZZZ	122274	6.74	240854	8.76	328028	9.63	308708	12.81	188351	15.38
JC88209-10	120430	6.74	249450	8.76	344482	9.63	313362	12.81	188719	15.38
JC88209-11	122061	6.74	250925	8.76	344658	9.63	319015	12.81	187952	15.38
JC88209-12	120833	6.74	244336	8.76	335675	9.63	309462	12.81	185258	15.38
JC88209-3	118618	6.74	244188	8.76	334005	9.63	310301	12.81	184053	15.38
JC88209-5	123764	6.74	247378	8.76	343287	9.63	311406	12.81	184037	15.38
JC88209-2	168313	6.75	243258	8.76	332226	9.63	309330	12.81	182087	15.38
V4B3854-ECC3793	126577	6.75	247121	8.76	340607	9.63	312612	12.81	179644	15.38

IS 1 = Tert Butyl Alcohol-D9
IS 2 = Pentafluorobenzene
IS 3 = 1,4-Difluorobenzene
IS 4 = Chlorobenzene-D5
IS 5 = 1,4-Dichlorobenzene-d4

(a) Upper Limit = +100% of check standard area; Retention time +0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.

Internal Standard Area Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	V4B3857-CC3793	**Injection Date:**	05/24/19
Lab File ID:	4B91006.D	**Injection Time:**	10:46
Instrument ID:	GCMS4B	**Method:**	SW846 8260C

	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
Check Std	136201	6.75	236289	8.76	314322	9.63	288475	12.81	173637	15.38
Upper Limit [a]	272402	7.25	472578	9.26	628644	10.13	576950	13.31	347274	15.88
Lower Limit [b]	68101	6.25	118145	8.26	157161	9.13	144238	12.31	86819	14.88
Lab Sample ID	**IS 1 AREA**	**RT**	**IS 2 AREA**	**RT**	**IS 3 AREA**	**RT**	**IS 4 AREA**	**RT**	**IS 5 AREA**	**RT**
V4B3857-BS	134361	6.75	253124	8.76	340200	9.63	306899	12.81	183518	15.38
V4B3857-MB	139604	6.75	249176	8.76	333110	9.63	305367	12.81	186124	15.38
JC88209-6 [c]	277450[d]	6.75	459576	8.76	586531	9.63	494411	12.81	264634	15.38
JC88209-7 [c]	138258	6.75	236290	8.75	310352	9.63	294978	12.81	184015	15.38
JC88209-7MS	141474	6.75	242335	8.76	323252	9.63	299895	12.81	182804	15.38
JC88209-7MSD	145350	6.76	250610	8.76	333349	9.63	302303	12.81	185279	15.38
JC88209-7	127215	6.75	258133	8.76	343105	9.63	317021	12.81	192694	15.38
JC88209-6 [e]	141121	6.75	251389	8.76	332881	9.63	307896	12.81	187084	15.38
JC88209-1	141002	6.75	256743	8.76	339180	9.63	313930	12.81	194705	15.38
JC88209-1	133871	6.75	255814	8.76	337878	9.63	316393	12.81	194628	15.38
JC88209-4	146812	6.74	252135	8.76	330949	9.63	310432	12.81	188901	15.38
JC88209-4	135981	6.75	256794	8.76	341435	9.63	312000	12.81	190617	15.38
JC88209-8	144897	6.75	246874	8.76	324967	9.63	311435	12.81	190394	15.38
JC88209-8	140701	6.74	252912	8.76	332667	9.63	313384	12.81	192234	15.38
V4B3857-ECC3793	132532	6.75	251844	8.76	340622	9.63	305843	12.81	184801	15.38

IS 1 = Tert Butyl Alcohol-D9
IS 2 = Pentafluorobenzene
IS 3 = 1,4-Difluorobenzene
IS 4 = Chlorobenzene-D5
IS 5 = 1,4-Dichlorobenzene-d4

(a) Upper Limit = +100% of check standard area; Retention time +0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.
(c) Diluted due to high concentration of target compound.
(d) Outside control limits due to matrix interference.
(e) Confirmation run for internal standard areas.

Internal Standard Area Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Check Std:	VX7769-CC7749	**Injection Date:**	05/28/19
Lab File ID:	X181595.D	**Injection Time:**	07:07
Instrument ID:	GCMSX	**Method:**	SW846 8260C

	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
Check Std	181958	7.41	280399	10.21	387620	11.40	387359	15.62	206279	18.40
Upper Limit [a]	363916	7.91	560798	10.71	775240	11.90	774718	16.12	412558	18.90
Lower Limit [b]	90979	6.91	140200	9.71	193810	10.90	193680	15.12	103140	17.90

Lab Sample ID	IS 1 AREA	RT	IS 2 AREA	RT	IS 3 AREA	RT	IS 4 AREA	RT	IS 5 AREA	RT
VX7769-BS	194628	7.42	244826	10.21	348740	11.40	356724	15.62	195136	18.40
VX7769-MB	216735	7.41	278382	10.21	379480	11.40	373320	15.62	245760	18.40
JC88209-2	209285	7.42	270736	10.21	370130	11.41	368435	15.62	225533	18.40
JC88209-1 [c]	210539	7.42	274364	10.21	367958	11.40	369671	15.62	229449	18.40
JC88209-8 [c]	195997	7.42	258625	10.21	350558	11.40	356407	15.62	218748	18.40
JC88209-4 [c]	197904	7.42	275910	10.21	369095	11.40	370496	15.62	209298	18.41
JC88209-1MS	191879	7.42	252366	10.21	354585	11.41	355189	15.62	186139	18.41
JC88209-1MSD	182159	7.42	251147	10.21	354201	11.41	356028	15.62	182738	18.41
ZZZZZZ	215831	7.43	270813	10.22	370587	11.41	362676	15.62	243618	18.41
ZZZZZZ	187921	7.42	244966	10.22	340192	11.41	345978	15.62	207781	18.41
ZZZZZZ	189373	7.42	243123	10.22	328846	11.41	345441	15.62	204772	18.41
ZZZZZZ	201080	7.42	234850	10.22	320728	11.41	338922	15.62	203517	18.41
ZZZZZZ	189844	7.43	256677	10.22	360328	11.42	358142	15.63	233854	18.41
ZZZZZZ	213097	7.42	256972	10.22	359581	11.42	356853	15.63	236423	18.41
VX7769-ECC7749	166343	7.43	226010	10.22	327754	11.42	334611	15.63	175309	18.41

IS 1 = Tert Butyl Alcohol-D9
IS 2 = Pentafluorobenzene
IS 3 = 1,4-Difluorobenzene
IS 4 = Chlorobenzene-D5
IS 5 = 1,4-Dichlorobenzene-d4

(a) Upper Limit = +100% of check standard area; Retention time +0.5 minutes.
(b) Lower Limit = -50% of check standard area; Retention time -0.5 minutes.
(c) Diluted due to high concentration of target compound.

Surrogate Recovery Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846 8260C **Matrix:** AQ

Samples and QC shown here apply to the above method

Lab Sample ID	Lab File ID	S1	S2	S3	S4
JC88209-1	4B91019.D	103	109	98	103
JC88209-1	X181602.D	104	97	102	96
JC88209-1	4B91020.D	103	110	97	104
JC88209-2	4B90974.D	107	110	101	107
JC88209-2	X181601.D	106	98	101	97
JC88209-3	4B90972.D	108	112	98	106
JC88209-4	4B91021.D	102	110	101	107
JC88209-4	X181604.D	102	97	104	103
JC88209-4	4B91022.D	103	108	99	103
JC88209-5	4B90973.D	108	111	99	107
JC88209-6	4B91018.D	102	109	99	106
JC88209-6	4B91010.D	95	105	104	114
JC88209-7	4B91017.D	102	108	97	102
JC88209-7	4B91012.D	104	112	98	105
JC88209-8	4B91024.D	102	110	97	103
JC88209-8	X181603.D	107	100	101	98
JC88209-8	4B91023.D	103	111	97	103
JC88209-9	4B90964.D	109	111	98	103
JC88209-9	4B90963.D	107	111	100	105
JC88209-10	4B90969.D	109	112	99	104
JC88209-11	4B90970.D	109	112	97	104
JC88209-12	4B90971.D	110	112	99	104
JC88209-1MS	X181605.D	105	89	97	106
JC88209-1MSD	X181606.D	105	89	96	108
JC88209-7MS	4B91015.D	101	105	99	101
JC88209-7MSD	4B91016.D	101	105	100	101
JC88209-9MS	4B90965.D	105	106	101	106
JC88209-9MSD	4B90966.D	105	106	101	106
V4B3854-BS	4B90954.D	109	108	99	103
V4B3854-MB	4B90956.D	109	112	99	103
V4B3857-BS	4B91007.D	101	107	100	103
V4B3857-MB	4B91009.D	105	110	97	103
VX7769-BS	X181598.D	111	91	94	103
VX7769-MB	X181600.D	104	99	100	95

Surrogate Compounds	Recovery Limits
S1 = Dibromofluoromethane	80-120%
S2 = 1,2-Dichloroethane-D4	81-124%

Surrogate Recovery Summary

Job Number: JC88209
Account: USACEPAP USACE-Philadelphia District
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Method: SW846 8260C	**Matrix:** AQ

Samples and QC shown here apply to the above method

Surrogate Compounds	Recovery Limits
S3 = Toluene-D8	80-120%
S4 = 4-Bromofluorobenzene	80-120%

Initial Calibration Summary

Job Number: JC88209 **Sample:** V4B3793-ICC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89759.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report MS4B

Method : C:\MSDCHEM\1\METHODS\M4B3793.M (RTE Integrator)
Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
Last Update : Mon Apr 08 11:56:42 2019
Response via : Initial Calibration

Calibration Files
1 =4B89754.D 4 =4B89756.D 100 =4B89760.D 50 =4B89759.D
20 =4B89758.D 200 =4B89761.D 8 =4B89757.D 0.5 =4B89753.D
2 =4B89755.D 0.2 =4B89752.D = =

Compound	1	4	100	50	20	200	8	0.5	2	0.2	Avg	%RSD
1) I tert butyl alcohol-d9	----------ISTD----------											
2) ethanol											0.000	-1.00
3) tertiary butyl alcohol	0.121	0.145	0.147	0.140	0.139	0.143	0.146		0.152		0.141	6.51
4) 1,4-dioxane		0.010	0.012	0.011	0.010	0.012	0.010		0.009		0.011	9.88
5) I pentafluorobenzene	----------ISTD----------											
6) chlorodifluoromethane	0.988	1.042	1.033	0.987	0.985	0.996	1.027		1.158		1.027	5.63
7) dichlorodifluoromethane	0.894	0.813	1.124	1.061	1.063	1.072	1.002		0.994		1.003	10.30
8) chloromethane	1.209	0.949	1.184	1.114	1.126	1.115	1.160	1.322	1.191		1.152	8.64
9) vinyl chloride	0.983	0.808	1.100	1.036	1.038	1.013	1.034	0.948	1.022		0.998	8.27
10) 1,3-butadiene	0.757	0.776	0.762	0.733	0.738	0.709	0.766		0.813		0.757	4.15
11) bromomethane		0.580	0.698	0.680	0.689	0.604	0.703		0.744		0.671	8.64
12) chloroethane	0.587	0.425	0.514	0.501	0.519	0.451	0.530		0.551		0.510	10.18
13) trichlorofluoromethane	0.914	0.779	1.064	0.996	1.024	0.979	0.982		0.992		0.966	8.97
14) vinyl bromide	0.547	0.425	0.569	0.531	0.541	0.520	0.538	0.512	0.526		0.523	7.69
15) ethyl ether	0.279	0.303	0.307	0.296	0.300	0.288	0.309		0.333		0.302	5.34
16) 2-chloropropane	1.327	1.183	1.059	1.024	1.043	0.983	1.073		1.320		1.127	11.92
17) acrolein		0.113	0.118	0.113	0.118	0.110	0.116				0.115	2.71
18) freon 113	0.521	0.542	0.563	0.535	0.543	0.541	0.535		0.599		0.547	4.33
19) 1,1-dichloroethene	1.009	1.043	1.026	0.982	1.005	0.964	1.033	1.085	1.125		1.030	4.84
20) acetone	0.044	0.050	0.054	0.053	0.051	0.049	0.053		0.055		0.051	6.63
21) acetonitrile		0.090	0.082	0.081	0.081	0.076	0.090				0.083	6.62
22) iodomethane	1.029	1.098	1.111	1.061	1.065	1.072	1.093	1.141	1.206	0.959	1.084	6.05
23) carbon disulfide												

Job Number: JC88209 **Sample:** V4B3793-ICC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89759.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

2.085 2.175 2.130 2.034 2.065 2.039 2.142 2.259 2.386 2.658 2.197 8.86
24) methylene chloride
0.710 0.723 0.705 0.679 0.689 0.673 0.705 0.786 0.796 0.718 6.14
25) methyl acetate
0.464 0.432 0.441 0.420 0.408 0.474 0.440 5.81
26) methyl tert butyl ether
1.651 1.683 1.581 1.556 1.567 1.473 1.673 1.858 1.829 1.652 7.68
27) trans-1,2-dichloroethene
0.862 0.926 0.886 0.844 0.868 0.836 0.885 0.914 0.982 0.843 0.885 5.13
28) hexane
0.460 0.490 0.466 0.441 0.460 0.446 0.456 0.517 0.509 0.472 5.82
29) di-isopropyl ether
2.165 2.218 2.070 2.050 2.084 1.935 2.179 2.493 2.427 2.376 2.200 8.20
30) 2-butanone
0.054 0.063 0.060 0.059 0.061 0.060 0.062 0.060 4.71
31) 1,1-dichloroethane
1.066 1.118 1.075 1.037 1.069 1.013 1.095 1.136 1.199 1.081 1.089 4.83
32) chloroprene
0.781 0.856 0.852 0.808 0.826 0.807 0.852 0.887 0.931 0.789 0.839 5.53
33) acrylonitrile
0.223 0.233 0.223 0.224 0.218 0.233 0.239 0.228 3.25
34) vinyl acetate
0.080 0.097 0.090 0.089 0.095 0.087 0.081 0.088 7.43
35) ethyl tert-butyl ether
1.841 1.961 1.852 1.826 1.839 1.730 1.971 2.199 2.166 1.955 1.934 7.78
36) ethyl acetate
0.076 0.082 0.078 0.081 0.078 0.083 0.087 0.081 4.82
37) 2,2-dichloropropane
0.890 0.861 0.797 0.774 0.787 0.757 0.843 0.956 0.980 0.886 0.853 8.91
38) cis-1,2-dichloroethene
0.679 0.677 0.658 0.632 0.631 0.627 0.653 0.691 0.725 0.626 0.660 5.00
39) propionitrile
0.081 0.091 0.087 0.084 0.087 0.081 0.091 0.081 0.100 0.087 7.05
40) methyl acrylate
0.070 0.082 0.077 0.079 0.080 0.074 0.065 0.075 8.01
41) methacrylonitrile
0.179 0.202 0.222 0.212 0.214 0.218 0.212 0.220 0.210 6.69
42) bromochloromethane
0.289 0.318 0.323 0.308 0.313 0.313 0.324 0.311 0.345 0.316 4.70
43) tetrahydrofuran
0.073 0.077 0.074 0.072 0.073 0.073 0.085 0.075 5.91
44) chloroform
1.056 1.044 1.009 0.965 0.985 0.967 1.006 1.157 1.152 1.038 7.02
45) tert-butyl formate
0.398 0.465 0.459 0.449 0.438 0.436 0.465 0.450 0.505 0.452 6.36
46) dibromofluoromethane (s)
0.453 0.450 0.452 0.454 0.450 0.453 0.455 0.450 0.454 0.451 0.452 0.44
47) 1,1,1-trichloroethane
0.866 0.930 0.936 0.883 0.887 0.915 0.921 0.951 1.008 0.893 0.919 4.46
48) cyclohexane
0.972 0.755 0.986 0.919 1.068 0.924 0.930 0.954 0.950 0.855 0.931 8.87
49) isobutyl alcohol
0.000 -1.00
50) 1,1-dichloropropene
0.730 0.757 0.747 0.698 0.724 0.720 0.729 0.790 0.801 0.662 0.736 5.56
51) carbon tetrachloride
0.725 0.781 0.804 0.751 0.751 0.783 0.768 0.756 0.858 0.706 0.768 5.52
52) tert-amyl alcohol
0.041 0.040 0.036 0.036 0.037 0.035 0.040 0.042 0.038 7.05
53) isopropyl acetate

Job Number: JC88209 **Sample:** V4B3793-ICC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89759.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

0.098 0.113 0.104 0.105 0.110 0.101 0.100 0.104 5.21

54) I 1,4-difluorobenzene ----------ISTD----------
55) 1,2-dichloroethane-d4 (s)
0.331 0.332 0.316 0.322 0.332 0.316 0.335 0.336 0.340 0.337 0.330 2.61
56) n-butyl alcohol
0.009 0.011 0.009 0.010 0.010 0.009 0.011 0.011 0.012 0.010 10.45
57) 2,2,4-trimethylpentane
1.762 1.830 1.750 1.688 1.779 1.623 1.734 1.883 1.930 1.737 1.772 5.08
58) benzene
1.654 1.718 1.653 1.583 1.639 1.587 1.660 1.854 1.867 1.763 1.698 5.96
59) tert-amyl methyl ether
1.400 1.429 1.276 1.290 1.316 1.154 1.422 1.561 1.611 1.457 1.392 9.85
60) heptane
0.293 0.328 0.319 0.301 0.315 0.302 0.301 0.336 0.344 0.240 0.308 9.46
61) 1,2-dichloroethane
0.534 0.520 0.480 0.463 0.482 0.456 0.491 0.582 0.501 8.38
62) ethyl acrylate
0.414 0.440 0.456 0.436 0.445 0.437 0.453 0.429 0.488 0.444 4.63
63) trichloroethene
0.392 0.411 0.415 0.390 0.399 0.400 0.400 0.454 0.436 0.367 0.406 6.02
64) 2-chloroethyl vinyl ether
0.211 0.225 0.236 0.228 0.227 0.222 0.231 0.245 0.228 4.34
65) methyl methacrylate
0.084 0.097 0.095 0.091 0.096 0.087 0.082 0.090 6.71
66) methylcyclohexane
0.830 0.887 0.845 0.818 0.850 0.797 0.853 0.954 0.941 0.815 0.859 6.15
67) 1,2-dichloropropane
0.409 0.445 0.425 0.408 0.414 0.403 0.433 0.467 0.465 0.357 0.423 7.68
68) dibromomethane
0.243 0.246 0.249 0.238 0.241 0.238 0.248 0.229 0.275 0.245 5.21
69) bromodichloromethane
0.494 0.507 0.539 0.505 0.508 0.526 0.511 0.534 0.548 0.473 0.515 4.40
70) 2-nitropropane *This compound fails Initial Calibration criteria*
0.082 0.071 0.066 0.115 0.066 0.080 25.57
----- Linear regression ----- Coefficient = 0.9663
Response Ratio = -0.01159 + 0.10440 *A

71) epichlorohydrin
0.033 0.041 0.040 0.039 0.040 0.038 0.040 0.043 0.039 7.93
72) cis-1,3-dichloropropene
0.572 0.604 0.633 0.597 0.606 0.610 0.604 0.638 0.661 0.534 0.606 5.81
73) 4-methyl-2-pentanone
0.158 0.165 0.158 0.156 0.161 0.146 0.168 0.169 0.181 0.163 5.91
74) isoamyl alcohol
0.011 0.014 0.012 0.013 0.014 0.011 0.014 0.014 0.013 10.10

75) I chlorobenzene-d5 ----------ISTD----------
76) toluene-d8 (s)
1.275 1.254 1.259 1.242 1.267 1.270 1.255 1.248 1.262 1.251 1.258 0.82
77) toluene
0.971 1.050 1.075 0.995 1.035 1.040 1.030 1.082 1.136 1.008 1.042 4.54
78) ethyl methacrylate
0.468 0.508 0.528 0.504 0.511 0.503 0.515 0.475 0.552 0.507 4.98
79) trans-1,3-dichloropropene
0.555 0.574 0.589 0.554 0.567 0.565 0.566 0.539 0.625 0.509 0.564 5.35
80) 1,1,2-trichloroethane
0.314 0.315 0.327 0.306 0.316 0.317 0.313 0.297 0.357 0.282 0.314 6.19
81) tetrachloroethene
0.384 0.397 0.402 0.371 0.382 0.387 0.383 0.439 0.408 0.352 0.391 6.00

Job Number: JC88209 **Sample:** V4B3793-ICC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89759.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

82) 2-hexanone
0.161 0.174 0.160 0.157 0.165 0.146 0.169 0.152 0.196 0.164 8.72
83) 1,3-dichloropropane
0.571 0.587 0.586 0.558 0.570 0.561 0.583 0.622 0.658 0.544 0.584 5.74
84) butyl acetate
0.268 0.295 0.275 0.271 0.287 0.262 0.303 0.277 0.338 0.286 8.20
85) dibromochloromethane
0.392 0.408 0.453 0.416 0.412 0.446 0.403 0.399 0.438 0.344 0.411 7.61
86) 1,2-dibromoethane
0.477 0.469 0.517 0.484 0.491 0.499 0.492 0.512 0.520 0.460 0.492 4.09
87) n-butyl ether
1.906 1.964 1.853 1.783 1.843 1.758 1.905 2.049 2.128 1.868 1.906 6.03
88) chlorobenzene
1.160 1.161 1.184 1.108 1.141 1.141 1.150 1.237 1.255 1.143 1.168 3.90
89) 1,1,1,2-tetrachloroethane
0.435 0.465 0.492 0.461 0.462 0.477 0.461 0.528 0.515 0.383 0.468 8.71
90) ethylbenzene
1.945 2.089 2.037 1.928 1.997 1.937 2.010 2.239 2.231 2.044 2.046 5.48
91) m,p-xylene
0.759 0.784 0.779 0.740 0.762 0.740 0.769 0.821 0.837 0.777 4.31
92) o-xylene
1.677 1.756 1.725 1.646 1.697 1.649 1.719 1.865 1.899 1.705 1.734 4.92
93) styrene
1.199 1.284 1.309 1.243 1.272 1.244 1.273 1.301 1.350 1.175 1.265 4.11
94) butyl acrylate
0.902 0.957 0.899 0.877 0.914 0.855 0.946 0.990 1.013 0.814 0.917 6.66
95) isopropylbenzene
2.086 2.206 2.239 2.100 2.161 2.162 2.180 2.356 2.428 2.047 2.197 5.41
96) bromoform
0.269 0.286 0.333 0.301 0.288 0.331 0.289 0.254 0.315 0.296 8.99
97) cis-1,4-dichloro-2-butene
0.137 0.151 0.165 0.154 0.155 0.163 0.157 0.132 0.164 0.153 7.72

98) I 1,4-dichlorobenzene-d ----------ISTD----------
99) 4-bromofluorobenzene (s)
0.819 0.822 0.827 0.822 0.822 0.817 0.823 0.832 0.817 0.830 0.823 0.64
100) 1,1,2,2-tetrachloroethane
0.895 0.972 0.995 0.932 0.927 0.939 0.944 0.967 1.037 0.955 0.956 4.12
101) trans-1,4-dichloro-2-butene
0.179 0.199 0.208 0.195 0.192 0.200 0.192 0.153 0.205 0.192 8.80
102) 1,2,3-trichloropropane
0.205 0.239 0.240 0.226 0.230 0.224 0.228 0.206 0.245 0.227 6.20
103) bromobenzene
0.900 0.963 1.013 0.935 0.932 0.974 0.933 0.983 1.016 0.792 0.944 6.89
104) n-propylbenzene
3.870 4.102 4.294 4.016 4.057 4.061 4.041 4.351 4.344 3.945 4.108 4.06
105) 2-chlorotoluene
0.823 0.877 0.920 0.856 0.859 0.879 0.854 0.891 0.926 0.728 0.861 6.53
106) 4-chlorotoluene
2.338 2.445 2.477 2.317 2.358 2.367 2.369 2.535 2.572 2.329 2.411 3.76
107) 1,3,5-trimethylbenzene
2.869 3.115 3.301 3.040 3.072 3.125 3.046 3.156 3.294 2.863 3.088 4.79
108) tert-butylbenzene
2.433 2.580 2.933 2.638 2.642 2.846 2.527 2.626 2.710 2.462 2.640 5.98
109) 1,2,4-trimethylbenzene
2.886 3.136 3.267 3.040 3.054 3.115 3.058 3.155 3.343 2.894 3.095 4.66
110) sec-butylbenzene
3.695 3.970 4.381 4.012 4.019 4.168 3.951 4.059 4.214 3.674 4.014 5.41
111) p-isopropyltoluene
3.153 3.441 3.706 3.413 3.385 3.525 3.377 3.504 3.587 3.076 3.417 5.52

Job Number: JC88209 **Sample:** V4B3793-ICC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89759.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

```
112)  1,3-dichlorobenzene
       1.697 1.838 1.881 1.743 1.770 1.808 1.792 1.833 1.955 1.764  1.808    4.07
113)  1,4-dichlorobenzene
       1.747 1.832 1.905 1.774 1.781 1.847 1.773 1.929 1.945 1.626  1.816    5.33
114)  1,2-dichlorobenzene
       1.754 1.873 1.951 1.814 1.814 1.877 1.838 1.921 2.026 1.831  1.870    4.21
115)  benzyl chloride
       1.569 1.648 1.785 1.669 1.639 1.735 1.629 1.765 1.769 1.609  1.682    4.52
116)  n-butylbenzene
       1.531 1.689 1.798 1.643 1.656 1.732 1.628 1.641 1.693 1.489  1.650    5.45
117)  hexachloroethane
             0.505 0.744 0.626 0.583 0.764 0.529       0.536        0.612   17.08
118)  1,2-dibromo-3-chloropropane
       0.191 0.226 0.264 0.250 0.235 0.261 0.234       0.231        0.237    9.84
119)  1,3,5-trichlorobenzene
       1.550 1.672 1.909 1.745 1.708 1.893 1.685 1.623 1.770 1.722  1.728    6.40
120)  1,2,4-trichlorobenzene
       1.328 1.466 1.716 1.569 1.524 1.687 1.474 1.390 1.483 1.540  1.518    7.90
121)  2-ethylhexyl acrylate
                   0.893 0.689 0.530 0.965 0.456                    0.707   31.27
              ----- Linear regression -----  Coefficient =  0.9908
                Response Ratio = -0.02347 + 0.95312 *A

122)  hexachlorobutadiene
       0.742 0.823 0.938 0.838 0.840 0.900 0.818 0.812 0.931        0.849    7.45
123)  naphthalene
       2.706 3.042 3.496 3.262 3.137 3.362 3.054 2.811 3.110 3.137  3.112    7.55
124)  1,2,3-trichlorobenzene
       1.196 1.337 1.575 1.449 1.363 1.519 1.364 1.277 1.376 1.409  1.387    7.95
125)  2-methylnaphthalene
                   1.799 1.560 1.326 1.783 1.198                    1.533   17.54
126)  Bis(chloromethyl)ether
                                                                    0.000   -1.00
127)  Ethylenimine
                                                                    0.000   -1.00
 ---------------------------------------------------------------------------
 (#) = Out of Range  ###  Number of calibration levels exceeded format  ###

           M4B3793.M         Mon Apr 08 14:37:51 2019   GCMS4B
```

Initial Calibration Verification

Job Number: JC88209 **Sample:** V4B3793-ICV3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89764.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\V4B3793\4B89764.D Vial: 14
Acq On : 6 Apr 2019 11:57 pm Operator: CHELSEAS
Sample : ICV3793-50 Inst : MS4B
Misc : MS33655,V4B3793,5,,,,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\M4B3793.M (RTE Integrator)
Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
Last Update : Tue Apr 09 08:39:45 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	103	0.01	6.76
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.414	1.389	1.8	102	0.01	6.86
4		1,4-dioxane	0.106	0.114	-7.5	106	0.00	10.24
5	I	pentafluorobenzene	1.000	1.000	0.0	101	0.00	8.76
6		chlorodifluoromethane	1.027	1.031	-0.4	106	0.00	3.91
7		dichlorodifluoromethane	1.003	1.109	-10.6	106	0.00	3.88
8		chloromethane	1.152	1.134	1.6	103	0.00	4.24
9		vinyl chloride	0.998	1.020	-2.2	100	0.00	4.45
10		1,3-butadiene	0.757	0.848	-12.0	117	0.00	4.47
11		bromomethane	0.671	0.692	-3.1	103	0.00	4.99
12		chloroethane	0.510	0.508	0.4	103	0.01	5.13
13		trichlorofluoromethane	0.966	1.012	-4.8	103	0.00	5.53
14		vinyl bromide	0.523	0.552	-5.5	105	0.00	5.43
15		ethyl ether	0.302	0.298	1.3	102	0.00	5.82
16		2-chloropropane	1.127	1.098	2.6	108	0.00	6.02
17		acrolein	0.115	0.120	-4.3	107	0.00	6.03
18		freon 113	0.547	0.615	-12.4	116	0.00	6.21
19		1,1-dichloroethene	1.030	0.942	8.5	97	0.01	6.22
20		acetone	0.051	0.052	-2.0	100	-0.01	6.18
21		acetonitrile	0.083	0.062	25.3	77	0.00	6.55
22		iodomethane	1.084	1.224	-12.9	117	0.01	6.45
23		carbon disulfide	2.197	2.629	-19.7	131	0.00	6.59
24		methylene chloride	0.718	0.677	5.7	101	0.00	6.81
25		methyl acetate	0.440	0.419	4.8	96	0.00	6.58
26		methyl tert butyl ether	1.652	1.525	6.1	99	0.00	7.11
27		trans-1,2-dichloroethene	0.885	0.842	4.9	101	0.00	7.15
28		hexane	0.472	0.449	4.9	103	0.00	7.45
29		di-isopropyl ether	2.200	1.972	10.4	97	0.00	7.63
30		2-butanone	0.060	0.059	1.7	100	0.00	8.21
31		1,1-dichloroethane	1.089	1.054	3.2	103	0.00	7.65
32		chloroprene	0.839	0.839	0.0	105	0.00	7.74
33		acrylonitrile	0.228	0.245	-7.5	111	0.00	7.05
34		vinyl acetate	0.088	0.085	3.4	95	0.00	7.58
35		ethyl tert-butyl ether	1.934	1.750	9.5	97	0.00	8.05
36		ethyl acetate	0.081	0.076	6.2	99	0.00	8.22
37		2,2-dichloropropane	0.853	0.744	12.8	97	0.00	8.33
38		cis-1,2-dichloroethene	0.660	0.623	5.6	100	0.00	8.29
39		propionitrile	0.087	0.087	0.0	104	0.00	8.29
40		methyl acrylate	0.075	0.077	-2.7	101	0.00	8.30
41		methacrylonitrile	0.210	0.210	0.0	100	0.00	8.46

Job Number: JC88209 **Sample:** V4B3793-ICV3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89764.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		bromochloromethane	0.316	0.312	1.3	102	0.00	8.56
43		tetrahydrofuran	0.075	0.074	1.3	102	0.00	8.58
44		chloroform	1.038	0.976	6.0	102	0.00	8.63
45		tert-butyl formate	0.452	0.402	11.1	90	0.00	8.66
46	S	dibromofluoromethane (s)	0.452	0.451	0.2	101	0.00	8.80
47		1,1,1-trichloroethane	0.919	0.877	4.6	100	0.00	8.88
48		cyclohexane	0.931	1.092	-17.3	120	0.00	8.99
49		isobutyl alcohol		----------NA----------				
50		1,1-dichloropropene	0.736	0.714	3.0	103	0.00	9.03
51		carbon tetrachloride	0.768	0.769	-0.1	104	0.00	9.07
52		tert-amyl alcohol	0.038	0.039	-2.6	108	0.00	9.13
53		isopropyl acetate	0.104	0.099	4.8	97	0.00	9.14
54	I	1,4-difluorobenzene	1.000	1.000	0.0	101	0.00	9.63
55	S	1,2-dichloroethane-d4 (s)	0.330	0.320	3.0	101	0.00	9.20
56		n-butyl alcohol	0.010	0.010	0.0	104	0.00	9.66
57		2,2,4-trimethylpentane	1.772	1.681	5.1	101	0.00	9.34
58		benzene	1.698	1.600	5.8	102	0.00	9.26
59		tert-amyl methyl ether	1.392	1.227	11.9	96	0.00	9.32
60		heptane	0.308	0.346	-12.3	116	0.00	9.48
61		1,2-dichloroethane	0.501	0.458	8.6	100	0.00	9.27
62		ethyl acrylate	0.444	0.439	1.1	102	0.00	9.89
63		trichloroethene	0.406	0.404	0.5	105	0.00	9.93
64		2-chloroethyl vinyl ether	0.228	0.236	-3.5	105	0.00	10.68
65		methyl methacrylate	0.090	0.094	-4.4	101	0.00	10.15
66		methylcyclohexane	0.859	0.828	3.6	102	0.00	10.22
67		1,2-dichloropropane	0.423	0.408	3.5	101	0.00	10.21
68		dibromomethane	0.245	0.235	4.1	100	0.00	10.31
69		bromodichloromethane	0.515	0.502	2.5	101	0.00	10.46
		----------	True	Calc.	% Drift	----------		
70		2-nitropropane	50.000	43.949	12.1	114	0.00	10.65
		----------	AvgRF	CCRF	% Dev	----------		
71		epichlorohydrin	0.039	0.039	0.0	102	0.00	10.77
72		cis-1,3-dichloropropene	0.606	0.594	2.0	101	0.00	10.91
73		4-methyl-2-pentanone	0.163	0.155	4.9	101	0.00	11.00
74		isoamyl alcohol	0.013	0.013	0.0	104	0.00	10.99
75	I	chlorobenzene-d5	1.000	1.000	0.0	101	0.00	12.81
76	S	toluene-d8 (s)	1.258	1.251	0.6	101	0.00	11.22
77		toluene	1.042	1.012	2.9	102	0.00	11.29
78		ethyl methacrylate	0.507	0.509	-0.4	102	0.00	11.46
79		trans-1,3-dichloropropene	0.564	0.566	-0.4	103	0.00	11.48
80		1,1,2-trichloroethane	0.314	0.306	2.5	101	0.00	11.71
81		tetrachloroethene	0.391	0.387	1.0	105	0.00	11.87
82		2-hexanone	0.164	0.154	6.1	98	0.00	11.87
83		1,3-dichloropropane	0.584	0.563	3.6	101	0.00	11.90
84		butyl acetate	0.286	0.268	6.3	99	0.00	11.95
85		dibromochloromethane	0.411	0.432	-5.1	104	0.00	12.17
86		1,2-dibromoethane	0.492	0.489	0.6	102	0.00	12.33
87		n-butyl ether	1.906	1.873	1.7	106	0.00	12.79
88		chlorobenzene	1.168	1.137	2.7	103	0.00	12.85
89		1,1,1,2-tetrachloroethane	0.468	0.468	0.0	102	0.00	12.92
90		ethylbenzene	2.046	1.948	4.8	102	0.00	12.91
91		m,p-xylene	0.777	0.748	3.7	102	0.00	13.04
92		o-xylene	1.734	1.635	5.7	100	0.00	13.47
93		styrene	1.265	1.257	0.6	102	0.00	13.49
94		butyl acrylate	0.917	0.853	7.0	98	0.00	13.28
95		isopropylbenzene	2.197	2.116	3.7	101	0.00	13.86

Initial Calibration Verification

Job Number: JC88209 **Sample:** V4B3793-ICV3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B89764.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

96	bromoform	0.296	0.323	-9.1	108	0.00	13.74
97	cis-1,4-dichloro-2-butene	0.153	0.153	0.0	100	0.00	13.89
98 I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	100	0.00	15.38
99 S	4-bromofluorobenzene (s)	0.823	0.824	-0.1	100	0.00	14.08
100	1,1,2,2-tetrachloroethane	0.956	0.923	3.5	99	0.00	14.17
101	trans-1,4-dichloro-2-bute	0.192	0.214	-11.5	109	0.00	14.20
102	1,2,3-trichloropropane	0.227	0.220	3.1	97	0.00	14.26
103	bromobenzene	0.944	0.951	-0.7	102	0.00	14.29
104	n-propylbenzene	4.108	4.091	0.4	102	0.00	14.32
105	2-chlorotoluene	0.861	0.851	1.2	99	0.00	14.46
106	4-chlorotoluene	2.411	2.383	1.2	103	0.00	14.59
107	1,3,5-trimethylbenzene	3.088	3.079	0.3	101	0.00	14.49
108	tert-butylbenzene	2.640	2.708	-2.6	103	0.00	14.87
109	1,2,4-trimethylbenzene	3.095	3.133	-1.2	103	0.00	14.92
110	sec-butylbenzene	4.014	4.066	-1.3	101	0.00	15.11
111	p-isopropyltoluene	3.417	3.463	-1.3	101	0.00	15.26
112	1,3-dichlorobenzene	1.808	1.793	0.8	103	0.00	15.30
113	1,4-dichlorobenzene	1.816	1.816	0.0	102	0.00	15.41
114	1,2-dichlorobenzene	1.870	1.845	1.3	102	0.00	15.82
115	benzyl chloride	1.682	2.008	-19.4	120	0.00	15.51
116	n-butylbenzene	1.650	1.656	-0.4	101	0.00	15.71
117	hexachloroethane	0.612	0.674	-10.1	108	0.00	16.15
118	1,2-dibromo-3-chloropropa	0.237	0.238	-0.4	95	0.00	16.66
119	1,3,5-trichlorobenzene	1.728	1.761	-1.9	101	0.00	16.87
120	1,2,4-trichlorobenzene	1.518	1.553	-2.3	99	0.00	17.55
		True	Calc.	% Drift			
121	2-ethylhexyl acrylate	10.000	9.619	3.8	116	0.00	17.55
		AvgRF	CCRF	% Dev			
122	hexachlorobutadiene	0.849	0.813	4.2	97	0.00	17.67
123	naphthalene	3.112	3.256	-4.6	100	0.00	17.86
124	1,2,3-trichlorobenzene	1.387	1.449	-4.5	100	0.00	18.09
125	2-methylnaphthalene	1.533	1.603	-4.6	103	0.00	19.14
126	Bis(chloromethyl)ether		----------NA----------				
127	Ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
4B89759.D M4B3793.M Tue Apr 09 08:40:52 2019 GCMS4B

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3854-CC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B90953.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ja...-19\v4b3854\4b90953.d Vial: 2
Acq On : 23 May 2019 6:57 am Operator: deving
Sample : cc3793-20 Inst : MS4B
Misc : MS34883,V4B3854,5,,,,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\M4B3793.M (RTE Integrator)
Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
Last Update : Tue Apr 09 08:39:45 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	81	-0.02	6.73
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.414	1.326	6.2	77	-0.02	6.83
4		1,4-dioxane	0.106	0.098	7.5	77	0.00	10.25
5	I	pentafluorobenzene	1.000	1.000	0.0	80	0.00	8.76
6		chlorodifluoromethane	1.027	1.061	-3.3	86	0.01	3.91
7		dichlorodifluoromethane	1.003	1.192	-18.8	90	0.00	3.89
8		chloromethane	1.152	1.321	-14.7	94	0.00	4.24
9		vinyl chloride	0.998	1.163	-16.5	90	0.00	4.44
10		1,3-butadiene	0.757	0.757	0.0	82	0.00	4.47
11		bromomethane	0.671	0.792	-18.0	92	0.00	4.98
12		chloroethane	0.510	0.585	-14.7	90	0.00	5.12
13		trichlorofluoromethane	0.966	1.119	-15.8	88	0.00	5.52
14		vinyl bromide	0.523	0.752	-43.8#	111	0.00	5.43
15		ethyl ether	0.302	0.308	-2.0	82	0.00	5.82
16		2-chloropropane	1.127	1.211	-7.5	93	0.00	6.02
17		acrolein	0.115	0.132	-14.8	90	0.00	6.02
18		freon 113	0.547	0.562	-2.7	83	0.00	6.21
19		1,1-dichloroethene	1.030	1.137	-10.4	91	0.00	6.20
20		acetone	0.051	0.074	-45.1#	118	0.00	6.19
21		acetonitrile	0.083	0.091	-9.6	91	-0.01	6.54
22		iodomethane	1.084	1.171	-8.0	88	0.00	6.44
23		carbon disulfide	2.197	2.311	-5.2	90	-0.01	6.58
24		methylene chloride	0.718	0.773	-7.7	90	0.00	6.81
25		methyl acetate	0.440	0.478	-8.6	91	0.00	6.58
26		methyl tert butyl ether	1.652	1.726	-4.5	88	0.00	7.12
27		trans-1,2-dichloroethene	0.885	0.988	-11.6	91	0.00	7.15
28		hexane	0.472	0.458	3.0	80	0.00	7.45
29		di-isopropyl ether	2.200	2.383	-8.3	92	0.00	7.63
30		2-butanone	0.060	0.067	-11.7	90	0.00	8.21
31		1,1-dichloroethane	1.089	1.190	-9.3	89	0.00	7.65
32		chloroprene	0.839	0.881	-5.0	86	0.00	7.74
33		acrylonitrile	0.228	0.252	-10.5	90	0.00	7.05
34		vinyl acetate	0.088	0.097	-10.2	88	0.00	7.57
35		ethyl tert-butyl ether	1.934	2.018	-4.3	88	0.00	8.04
36		ethyl acetate	0.081	0.092	-13.6	91	0.00	8.22
37		2,2-dichloropropane	0.853	0.986	-15.6	100	0.00	8.33
38		cis-1,2-dichloroethene	0.660	0.685	-3.8	87	0.00	8.29
39		propionitrile	0.087	0.094	-8.0	86	0.00	8.28
40		methyl acrylate	0.075	0.075	0.0	77	0.00	8.30
41		methacrylonitrile	0.210	0.210	0.0	79	0.00	8.46

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3854-CC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B90953.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		bromochloromethane	0.316	0.326	-3.2	84	0.00	8.56
43		tetrahydrofuran	0.075	0.076	-1.3	84	0.00	8.57
44		chloroform	1.038	1.098	-5.8	89	0.00	8.63
45		tert-butyl formate	0.452	0.454	-0.4	83	0.00	8.66
46	S	dibromofluoromethane (s)	0.452	0.495	-9.5	88	0.00	8.80
47		1,1,1-trichloroethane	0.919	1.031	-12.2	93	0.00	8.88
48		cyclohexane	0.931	1.001	-7.5	75	0.00	8.99
49		isobutyl alcohol		----------NA----------				
50		1,1-dichloropropene	0.736	0.766	-4.1	85	0.00	9.03
51		carbon tetrachloride	0.768	0.898	-16.9	96	0.00	9.07
52		tert-amyl alcohol	0.038	0.033	13.2	73	-0.01	9.12
53		isopropyl acetate	0.104	0.108	-3.8	83	0.00	9.14
54	I	1,4-difluorobenzene	1.000	1.000	0.0	84	0.00	9.63
55	S	1,2-dichloroethane-d4 (s)	0.330	0.373	-13.0	94	0.00	9.19
56		n-butyl alcohol	0.010	0.010	0.0	77	0.00	9.65
57		2,2,4-trimethylpentane	1.772	1.726	2.6	81	0.00	9.34
58		benzene	1.698	1.646	3.1	84	0.00	9.26
59		tert-amyl methyl ether	1.392	1.362	2.2	87	0.00	9.32
60		heptane	0.308	0.297	3.6	79	0.00	9.48
61		1,2-dichloroethane	0.501	0.525	-4.8	91	0.00	9.27
62		ethyl acrylate	0.444	0.427	3.8	80	0.00	9.90
63		trichloroethene	0.406	0.409	-0.7	86	0.00	9.93
64		2-chloroethyl vinyl ether	0.228	0.230	-0.9	85	0.00	10.68
65		methyl methacrylate	0.090	0.079	12.2	73	0.00	10.15
66		methylcyclohexane	0.859	0.797	7.2	79	0.00	10.22
67		1,2-dichloropropane	0.423	0.436	-3.1	88	0.00	10.20
68		dibromomethane	0.245	0.255	-4.1	89	0.00	10.31
69		bromodichloromethane	0.515	0.549	-6.6	91	0.00	10.45
		----------	True	Calc.	% Drift	----------		
70		2-nitropropane	20.000	29.339	-46.7#	158	0.00	10.64
		----------	AvgRF	CCRF	% Dev	----------		
71		epichlorohydrin	0.039	0.039	0.0	82	0.00	10.77
72		cis-1,3-dichloropropene	0.606	0.625	-3.1	87	0.00	10.90
73		4-methyl-2-pentanone	0.163	0.166	-1.8	87	0.00	11.00
74		isoamyl alcohol	0.013	0.012	7.7	73	0.00	10.99
75	I	chlorobenzene-d5	1.000	1.000	0.0	90	0.00	12.81
76	S	toluene-d8 (s)	1.258	1.218	3.2	87	0.00	11.22
77		toluene	1.042	0.980	6.0	85	0.00	11.29
78		ethyl methacrylate	0.507	0.450	11.2	79	0.00	11.46
79		trans-1,3-dichloropropene	0.564	0.572	-1.4	91	0.00	11.48
80		1,1,2-trichloroethane	0.314	0.306	2.5	87	0.00	11.71
81		tetrachloroethene	0.391	0.357	8.7	84	0.00	11.87
82		2-hexanone	0.164	0.161	1.8	88	0.00	11.87
83		1,3-dichloropropane	0.584	0.583	0.2	92	0.00	11.90
84		butyl acetate	0.286	0.274	4.2	86	0.00	11.95
85		dibromochloromethane	0.411	0.416	-1.2	91	0.00	12.16
86		1,2-dibromoethane	0.492	0.419	14.8	77	0.00	12.33
87		n-butyl ether	1.906	1.793	5.9	88	0.00	12.79
88		chlorobenzene	1.168	1.129	3.3	89	0.00	12.84
89		1,1,1,2-tetrachloroethane	0.468	0.476	-1.7	93	0.00	12.91
90		ethylbenzene	2.046	1.966	3.9	89	0.00	12.90
91		m,p-xylene	0.777	0.736	5.3	87	0.00	13.04
92		o-xylene	1.734	1.685	2.8	90	0.00	13.47
93		styrene	1.265	1.174	7.2	83	0.00	13.49
94		butyl acrylate	0.917	0.823	10.3	81	0.00	13.28
95		isopropylbenzene	2.197	2.077	5.5	87	0.00	13.86

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3854-CC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B90953.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

96	bromoform	0.296	0.315	-6.4	99	0.00	13.74
97	cis-1,4-dichloro-2-butene	0.153	0.160	-4.6	93	0.00	13.89
98 I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	89	0.00	15.38
99 S	4-bromofluorobenzene (s)	0.823	0.839	-1.9	91	0.00	14.08
100	1,1,2,2-tetrachloroethane	0.956	0.962	-0.6	93	0.00	14.16
101	trans-1,4-dichloro-2-bute	0.192	0.197	-2.6	91	0.00	14.20
102	1,2,3-trichloropropane	0.227	0.230	-1.3	89	0.00	14.26
103	bromobenzene	0.944	0.922	2.3	88	0.00	14.29
104	n-propylbenzene	4.108	4.165	-1.4	92	0.00	14.32
105	2-chlorotoluene	0.861	0.888	-3.1	93	0.00	14.46
106	4-chlorotoluene	2.411	2.436	-1.0	92	0.00	14.59
107	1,3,5-trimethylbenzene	3.088	3.081	0.2	90	0.00	14.49
108	tert-butylbenzene	2.640	2.447	7.3	83	0.00	14.87
109	1,2,4-trimethylbenzene	3.095	3.079	0.5	90	0.00	14.92
110	sec-butylbenzene	4.014	3.928	2.1	87	0.00	15.11
111	p-isopropyltoluene	3.417	3.298	3.5	87	0.00	15.26
112	1,3-dichlorobenzene	1.808	1.789	1.1	90	0.00	15.30
113	1,4-dichlorobenzene	1.816	1.790	1.4	90	0.00	15.41
114	1,2-dichlorobenzene	1.870	1.823	2.5	90	0.00	15.82
115	benzyl chloride	1.682	1.819	-8.1	99	0.00	15.50
116	n-butylbenzene	1.650	1.703	-3.2	92	0.00	15.71
117	hexachloroethane	0.612	0.593	3.1	91	0.00	16.15
118	1,2-dibromo-3-chloropropa	0.237	0.225	5.1	86	0.00	16.66
119	1,3,5-trichlorobenzene	1.728	1.746	-1.0	91	0.00	16.87
120	1,2,4-trichlorobenzene	1.518	1.547	-1.9	91	0.00	17.55
	----------	True	Calc.	% Drift	----------		
121	2-ethylhexyl acrylate	4.000	2.524	36.9#	52	0.00	17.55
	----------	AvgRF	CCRF	% Dev	----------		
122	hexachlorobutadiene	0.849	0.818	3.7	87	0.00	17.66
123	naphthalene	3.112	3.000	3.6	85	0.00	17.85
124	1,2,3-trichlorobenzene	1.387	1.407	-1.4	92	0.00	18.09
125	2-methylnaphthalene	1.533	1.130	26.3#	76	0.00	19.14
126	Bis(chloromethyl)ether		----------NA----------				
127	Ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
4B89758.D M4B3793.M Thu May 23 20:35:23 2019

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3854-ECC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B90975.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ja...-19\v4b3854\4b90975.d Vial: 24
Acq On : 23 May 2019 5:55 pm Operator: CHELSEAS
Sample : ecc3793-50 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\M4B3793.M (RTE Integrator)
Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
Last Update : Tue Apr 09 08:39:45 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 50% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	85	0.00	6.75
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.414	1.385	2.1	84	0.00	6.85
4		1,4-dioxane	0.106	0.105	0.9	80	0.00	10.24
5	I	pentafluorobenzene	1.000	1.000	0.0	91	0.00	8.76
6		chlorodifluoromethane	1.027	1.010	1.7	93	0.00	3.90
7		dichlorodifluoromethane	1.003	1.050	-4.7	90	0.00	3.89
8		chloromethane	1.152	1.137	1.3	93	0.00	4.24
9		vinyl chloride	0.998	1.053	-5.5	92	0.00	4.44
10		1,3-butadiene	0.757	0.876	-15.7	109	0.00	4.47
11		bromomethane	0.671	0.682	-1.6	91	0.00	4.99
12		chloroethane	0.510	0.519	-1.8	94	0.01	5.13
13		trichlorofluoromethane	0.966	1.080	-11.8	99	0.00	5.52
14		vinyl bromide	0.523	0.654	-25.0	112	0.00	5.43
15		ethyl ether	0.302	0.321	-6.3	99	0.00	5.82
16		2-chloropropane	1.127	1.178	-4.5	105	0.00	6.02
17		acrolein	0.115	0.117	-1.7	94	0.00	6.02
18		freon 113	0.547	0.580	-6.0	99	0.00	6.21
19		1,1-dichloroethene	1.030	1.131	-9.8	105	0.00	6.22
20		acetone	0.051	0.058	-13.7	100	0.00	6.19
21		acetonitrile	0.083	0.084	-1.2	95	0.00	6.55
22		iodomethane	1.084	1.141	-5.3	98	0.00	6.45
23		carbon disulfide	2.197	2.228	-1.4	100	0.00	6.59
24		methylene chloride	0.718	0.742	-3.3	99	0.00	6.81
25		methyl acetate	0.440	0.478	-8.6	99	0.00	6.58
26		methyl tert butyl ether	1.652	1.625	1.6	95	0.00	7.11
27		trans-1,2-dichloroethene	0.885	0.969	-9.5	104	0.00	7.15
28		hexane	0.472	0.504	-6.8	104	0.00	7.45
29		di-isopropyl ether	2.200	2.304	-4.7	102	0.00	7.63
30		2-butanone	0.060	0.066	-10.0	100	0.00	8.21
31		1,1-dichloroethane	1.089	1.162	-6.7	102	0.00	7.65
32		chloroprene	0.839	0.892	-6.3	100	0.00	7.74
33		acrylonitrile	0.228	0.251	-10.1	103	0.00	7.04
34		vinyl acetate	0.088	0.106	-20.5	107	0.00	7.58
35		ethyl tert-butyl ether	1.934	1.906	1.4	95	0.00	8.04
36		ethyl acetate	0.081	0.097	-19.8	114	0.00	8.22
37		2,2-dichloropropane	0.853	0.895	-4.9	105	0.00	8.32
38		cis-1,2-dichloroethene	0.660	0.673	-2.0	97	0.00	8.29
39		propionitrile	0.087	0.093	-6.9	101	0.00	8.28
40		methyl acrylate	0.075	0.084	-12.0	99	0.00	8.30
41		methacrylonitrile	0.210	0.233	-11.0	100	0.00	8.46

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3854-ECC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B90975.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		bromochloromethane	0.316	0.333	-5.4	98	0.00	8.56
43		tetrahydrofuran	0.075	0.078	-4.0	96	0.00	8.57
44		chloroform	1.038	1.082	-4.2	102	0.00	8.63
45		tert-butyl formate	0.452	0.438	3.1	89	0.00	8.66
46	S	dibromofluoromethane (s)	0.452	0.483	-6.9	97	0.00	8.80
47		1,1,1-trichloroethane	0.919	0.999	-8.7	103	0.00	8.88
48		cyclohexane	0.931	0.994	-6.8	98	0.00	8.99
49		isobutyl alcohol		----------NA----------				
50		1,1-dichloropropene	0.736	0.787	-6.9	103	0.00	9.03
51		carbon tetrachloride	0.768	0.865	-12.6	105	0.00	9.07
52		tert-amyl alcohol	0.038	0.032	15.8	81	0.00	9.12
53		isopropyl acetate	0.104	0.114	-9.6	100	0.00	9.14
54	I	1,4-difluorobenzene	1.000	1.000	0.0	94	0.00	9.63
55	S	1,2-dichloroethane-d4 (s)	0.330	0.361	-9.4	105	0.00	9.19
56		n-butyl alcohol	0.010	0.009	10.0	87	0.00	9.65
57		2,2,4-trimethylpentane	1.772	1.810	-2.1	101	0.00	9.34
58		benzene	1.698	1.682	0.9	100	0.00	9.26
59		tert-amyl methyl ether	1.392	1.287	7.5	94	0.00	9.32
60		heptane	0.308	0.336	-9.1	104	0.00	9.48
61		1,2-dichloroethane	0.501	0.540	-7.8	109	0.00	9.27
62		ethyl acrylate	0.444	0.471	-6.1	101	0.00	9.89
63		trichloroethene	0.406	0.420	-3.4	101	0.00	9.93
64		2-chloroethyl vinyl ether	0.228	0.238	-4.4	98	0.00	10.68
65		methyl methacrylate	0.090	0.090	0.0	90	0.00	10.15
66		methylcyclohexane	0.859	0.840	2.2	96	0.00	10.22
67		1,2-dichloropropane	0.423	0.448	-5.9	103	0.00	10.21
68		dibromomethane	0.245	0.261	-6.5	103	0.00	10.31
69		bromodichloromethane	0.515	0.567	-10.1	105	0.00	10.46
		----------	True	Calc.	% Drift	----------		
70		2-nitropropane	50.000	67.907	-35.8	172	0.00	10.64
		----------	AvgRF	CCRF	% Dev	----------		
71		epichlorohydrin	0.039	0.041	-5.1	99	0.00	10.77
72		cis-1,3-dichloropropene	0.606	0.649	-7.1	102	0.00	10.90
73		4-methyl-2-pentanone	0.163	0.169	-3.7	101	0.00	11.00
74		isoamyl alcohol	0.013	0.011	15.4	82	0.00	10.99
75	I	chlorobenzene-d5	1.000	1.000	0.0	95	0.00	12.81
76	S	toluene-d8 (s)	1.258	1.244	1.1	95	0.00	11.22
77		toluene	1.042	1.024	1.7	98	0.00	11.29
78		ethyl methacrylate	0.507	0.520	-2.6	98	0.00	11.46
79		trans-1,3-dichloropropene	0.564	0.612	-8.5	105	0.00	11.48
80		1,1,2-trichloroethane	0.314	0.325	-3.5	101	0.00	11.71
81		tetrachloroethene	0.391	0.387	1.0	99	0.00	11.87
82		2-hexanone	0.164	0.164	0.0	99	0.00	11.87
83		1,3-dichloropropane	0.584	0.605	-3.6	103	0.00	11.90
84		butyl acetate	0.286	0.290	-1.4	102	0.00	11.95
85		dibromochloromethane	0.411	0.447	-8.8	102	0.00	12.16
86		1,2-dibromoethane	0.492	0.442	10.2	87	0.00	12.33
87		n-butyl ether	1.906	1.849	3.0	99	0.00	12.79
88		chlorobenzene	1.168	1.149	1.6	99	0.00	12.84
89		1,1,1,2-tetrachloroethane	0.468	0.487	-4.1	100	0.00	12.91
90		ethylbenzene	2.046	1.986	2.9	98	0.00	12.90
91		m,p-xylene	0.777	0.744	4.2	96	0.00	13.04
92		o-xylene	1.734	1.707	1.6	99	0.00	13.47
93		styrene	1.265	1.259	0.5	96	0.00	13.49
94		butyl acrylate	0.917	0.895	2.4	97	0.00	13.28
95		isopropylbenzene	2.197	2.128	3.1	96	0.00	13.86

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3854-ECC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B90975.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

96		bromoform	0.296	0.324	-9.5	102	0.00	13.74
97		cis-1,4-dichloro-2-butene	0.153	0.116	24.2	72	0.00	13.89
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	93	0.00	15.38
99	S	4-bromofluorobenzene (s)	0.823	0.860	-4.5	97	0.00	14.08
100		1,1,2,2-tetrachloroethane	0.956	1.005	-5.1	100	0.00	14.16
101		trans-1,4-dichloro-2-bute	0.192	0.153	20.3	73	0.00	14.20
102		1,2,3-trichloropropane	0.227	0.243	-7.0	100	0.00	14.26
103		bromobenzene	0.944	0.986	-4.4	98	0.00	14.29
104		n-propylbenzene	4.108	4.319	-5.1	100	0.00	14.32
105		2-chlorotoluene	0.861	0.916	-6.4	99	0.00	14.46
106		4-chlorotoluene	2.411	2.533	-5.1	102	0.00	14.59
107		1,3,5-trimethylbenzene	3.088	3.202	-3.7	98	0.00	14.49
108		tert-butylbenzene	2.640	2.731	-3.4	96	0.00	14.87
109		1,2,4-trimethylbenzene	3.095	3.231	-4.4	99	0.00	14.92
110		sec-butylbenzene	4.014	4.139	-3.1	96	0.00	15.11
111		p-isopropyltoluene	3.417	3.497	-2.3	95	0.00	15.26
112		1,3-dichlorobenzene	1.808	1.863	-3.0	99	0.00	15.30
113		1,4-dichlorobenzene	1.816	1.862	-2.5	97	0.00	15.40
114		1,2-dichlorobenzene	1.870	1.904	-1.8	97	0.00	15.82
115		benzyl chloride	1.682	1.864	-10.8	104	0.00	15.50
116		n-butylbenzene	1.650	1.784	-8.1	101	0.00	15.71
117		hexachloroethane	0.612	0.621	-1.5	92	0.00	16.15
118		1,2-dibromo-3-chloropropa	0.237	0.247	-4.2	92	0.00	16.66
119		1,3,5-trichlorobenzene	1.728	1.831	-6.0	98	0.00	16.87
120		1,2,4-trichlorobenzene	1.518	1.646	-8.4	97	0.00	17.55
			True	Calc.	% Drift			
121		2-ethylhexyl acrylate	10.000	6.340	36.6	66	0.00	17.55
			AvgRF	CCRF	% Dev			
122		hexachlorobutadiene	0.849	0.853	-0.5	95	0.00	17.66
123		naphthalene	3.112	3.309	-6.3	94	0.00	17.85
124		1,2,3-trichlorobenzene	1.387	1.498	-8.0	96	0.00	18.09
125		2-methylnaphthalene	1.533	1.430	6.7	85	0.00	19.14
126		Bis(chloromethyl)ether		----------NA----------				
127		Ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
4B89759.D M4B3793.M Thu May 23 20:36:22 2019

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3857-CC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B91006.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ke... 28\v4b3857\4b91006.d Vial: 3
Acq On : 24 May 2019 10:46 am Operator: CHELSEAS
Sample : cc3793-20 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\M4B3793.M (RTE Integrator)
Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
Last Update : Tue Apr 09 08:39:45 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	84	0.00	6.75
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.414	1.479	-4.6	90	0.00	6.85
4		1,4-dioxane	0.106	0.114	-7.5	94	0.00	10.25
5	I	pentafluorobenzene	1.000	1.000	0.0	82	0.00	8.76
6		chlorodifluoromethane	1.027	1.039	-1.2	87	0.00	3.91
7		dichlorodifluoromethane	1.003	1.089	-8.6	85	0.00	3.89
8		chloromethane	1.152	1.217	-5.6	89	0.01	4.25
9		vinyl chloride	0.998	1.065	-6.7	85	0.00	4.45
10		1,3-butadiene	0.757	0.696	8.1	78	0.00	4.47
11		bromomethane	0.671	0.638	4.9	76	0.00	4.99
12		chloroethane	0.510	0.505	1.0	80	0.01	5.13
13		trichlorofluoromethane	0.966	1.024	-6.0	82	0.00	5.53
14		vinyl bromide	0.523	0.642	-22.8#	98	0.00	5.43
15		ethyl ether	0.302	0.318	-5.3	88	0.00	5.82
16		2-chloropropane	1.127	1.216	-7.9	96	0.00	6.02
17		acrolein	0.115	0.046	60.0#	32#	0.00	6.02
18		freon 113	0.547	0.556	-1.6	84	0.01	6.22
19		1,1-dichloroethene	1.030	1.155	-12.1	95	0.00	6.21
20		acetone	0.051	0.062	-21.6#	100	0.00	6.19
21		acetonitrile	0.083	0.099	-19.3	102	0.00	6.56
22		iodomethane	1.084	1.199	-10.6	93	0.02	6.46
23		carbon disulfide	2.197	2.154	2.0	86	0.00	6.59
24		methylene chloride	0.718	0.766	-6.7	92	0.00	6.81
25		methyl acetate	0.440	0.691	-57.0#	136	0.00	6.58
26		methyl tert butyl ether	1.652	1.784	-8.0	94	0.00	7.12
27		trans-1,2-dichloroethene	0.885	0.983	-11.1	93	0.00	7.15
28		hexane	0.472	0.321	32.0#	57	0.00	7.44
29		di-isopropyl ether	2.200	2.391	-8.7	95	0.00	7.63
30		2-butanone	0.060	0.061	-1.7	85	0.00	8.21
31		1,1-dichloroethane	1.089	1.209	-11.0	93	0.00	7.65
32		chloroprene	0.839	0.903	-7.6	90	0.00	7.74
33		acrylonitrile	0.228	0.233	-2.2	86	0.01	7.06
34		vinyl acetate	0.088	0.060	31.8#	55	0.00	7.58
35		ethyl tert-butyl ether	1.934	2.087	-7.9	94	0.00	8.04
36		ethyl acetate	0.081	0.085	-4.9	87	0.00	8.22
37		2,2-dichloropropane	0.853	0.333	61.0#	35#	0.00	8.32
38		cis-1,2-dichloroethene	0.660	0.693	-5.0	91	0.00	8.29
39		propionitrile	0.087	0.093	-6.9	88	0.00	8.28
40		methyl acrylate	0.075	0.083	-10.7	87	0.00	8.30
41		methacrylonitrile	0.210	0.215	-2.4	83	0.00	8.46

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3857-CC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B91006.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		bromochloromethane	0.316	0.337	-6.6	89	0.00	8.56
43		tetrahydrofuran	0.075	0.075	0.0	85	0.00	8.58
44		chloroform	1.038	1.125	-8.4	94	0.00	8.63
45		tert-butyl formate	0.452	0.447	1.1	84	0.00	8.66
46	S	dibromofluoromethane (s)	0.452	0.472	-4.4	87	0.00	8.80
47		1,1,1-trichloroethane	0.919	1.054	-14.7	98	0.00	8.88
48		cyclohexane	0.931	0.973	-4.5	75	0.00	8.99
49		isobutyl alcohol		----------NA----------				
50		1,1-dichloropropene	0.736	0.780	-6.0	89	0.00	9.03
51		carbon tetrachloride	0.768	0.913	-18.9	100	0.00	9.07
52		tert-amyl alcohol	0.038	0.039	-2.6	87	0.00	9.13
53		isopropyl acetate	0.104	0.099	4.8	78	0.00	9.14
54	I	1,4-difluorobenzene	1.000	1.000	0.0	83	0.00	9.63
55	S	1,2-dichloroethane-d4 (s)	0.330	0.358	-8.5	90	0.00	9.19
56		n-butyl alcohol	0.010	0.010	0.0	82	0.00	9.65
57		2,2,4-trimethylpentane	1.772	1.429	19.4	67	0.00	9.34
58		benzene	1.698	1.734	-2.1	88	0.00	9.25
59		tert-amyl methyl ether	1.392	1.431	-2.8	90	0.00	9.32
60		heptane	0.308	0.171	44.5#	45#	0.00	9.48
61		1,2-dichloroethane	0.501	0.556	-11.0	96	0.00	9.27
62		ethyl acrylate	0.444	0.420	5.4	78	0.00	9.90
63		trichloroethene	0.406	0.431	-6.2	90	0.00	9.93
64		2-chloroethyl vinyl ether	0.228	0.228	0.0	84	0.00	10.68
65		methyl methacrylate	0.090	0.086	4.4	78	0.00	10.15
66		methylcyclohexane	0.859	0.790	8.0	77	0.00	10.22
67		1,2-dichloropropane	0.423	0.453	-7.1	91	0.00	10.21
68		dibromomethane	0.245	0.259	-5.7	90	0.00	10.31
69		bromodichloromethane	0.515	0.566	-9.9	93	0.00	10.45
		----------	True	Calc.	% Drift	----------		
70		2-nitropropane	20.000	29.592	-48.0#	158	0.00	10.65
		----------	AvgRF	CCRF	% Dev	----------		
71		epichlorohydrin	0.039	0.030	23.1#	63	0.00	10.77
72		cis-1,3-dichloropropene	0.606	0.531	12.4	73	0.00	10.91
73		4-methyl-2-pentanone	0.163	0.168	-3.1	87	0.00	11.00
74		isoamyl alcohol	0.013	0.012	7.7	76	0.00	10.99
75	I	chlorobenzene-d5	1.000	1.000	0.0	86	0.00	12.81
76	S	toluene-d8 (s)	1.258	1.239	1.5	84	0.00	11.22
77		toluene	1.042	1.051	-0.9	87	0.00	11.29
78		ethyl methacrylate	0.507	0.486	4.1	82	0.00	11.46
79		trans-1,3-dichloropropene	0.564	0.489	13.3	74	0.00	11.48
80		1,1,2-trichloroethane	0.314	0.321	-2.2	87	0.00	11.71
81		tetrachloroethene	0.391	0.381	2.6	86	0.00	11.87
82		2-hexanone	0.164	0.160	2.4	84	0.00	11.87
83		1,3-dichloropropane	0.584	0.611	-4.6	92	0.00	11.90
84		butyl acetate	0.286	0.248	13.3	74	0.00	11.95
85		dibromochloromethane	0.411	0.436	-6.1	91	0.00	12.16
86		1,2-dibromoethane	0.492	0.431	12.4	76	0.00	12.33
87		n-butyl ether	1.906	1.892	0.7	88	0.00	12.79
88		chlorobenzene	1.168	1.182	-1.2	89	0.00	12.84
89		1,1,1,2-tetrachloroethane	0.468	0.507	-8.3	94	0.00	12.92
90		ethylbenzene	2.046	2.046	0.0	88	0.00	12.90
91		m,p-xylene	0.777	0.765	1.5	86	0.00	13.04
92		o-xylene	1.734	1.759	-1.4	89	0.00	13.47
93		styrene	1.265	0.041	96.8#	3#	-0.02	13.47
94		butyl acrylate	0.917	0.767	16.4	72	0.00	13.28
95		isopropylbenzene	2.197	2.181	0.7	87	0.00	13.86

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3857-CC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B91006.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

96	bromoform	0.296	0.316	-6.8	94	0.00	13.74
97	cis-1,4-dichloro-2-butene	0.153	0.095	37.9#	53	0.00	13.89
98 I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	86	0.00	15.38
99 S	4-bromofluorobenzene (s)	0.823	0.853	-3.6	89	0.00	14.08
100	1,1,2,2-tetrachloroethane	0.956	0.955	0.1	89	0.00	14.17
101	trans-1,4-dichloro-2-bute	0.192	0.116	39.6#	52	0.00	14.20
102	1,2,3-trichloropropane	0.227	0.237	-4.4	89	0.00	14.26
103	bromobenzene	0.944	0.959	-1.6	89	0.00	14.29
104	n-propylbenzene	4.108	4.073	0.9	87	0.00	14.32
105	2-chlorotoluene	0.861	0.908	-5.5	91	0.00	14.46
106	4-chlorotoluene	2.411	2.404	0.3	88	0.00	14.59
107	1,3,5-trimethylbenzene	3.088	3.156	-2.2	89	0.00	14.49
108	tert-butylbenzene	2.640	2.634	0.2	86	0.00	14.87
109	1,2,4-trimethylbenzene	3.095	3.118	-0.7	88	0.00	14.92
110	sec-butylbenzene	4.014	3.953	1.5	85	0.00	15.11
111	p-isopropyltoluene	3.417	3.334	2.4	85	0.00	15.26
112	1,3-dichlorobenzene	1.808	1.757	2.8	86	0.00	15.30
113	1,4-dichlorobenzene	1.816	1.749	3.7	85	0.00	15.41
114	1,2-dichlorobenzene	1.870	1.807	3.4	86	0.00	15.82
115	benzyl chloride	1.682	0.244	85.5#	13#	0.00	15.50
116	n-butylbenzene	1.650	1.560	5.5	81	0.00	15.71
117	hexachloroethane	0.612	0.613	-0.2	91	0.00	16.15
118	1,2-dibromo-3-chloropropa	0.237	0.232	2.1	85	0.00	16.66
119	1,3,5-trichlorobenzene	1.728	1.688	2.3	85	0.00	16.87
120	1,2,4-trichlorobenzene	1.518	1.468	3.3	83	0.00	17.55
	----------	True	Calc.	% Drift	----------		
121	2-ethylhexyl acrylate	4.000	2.972	25.7#	67	0.00	17.55
	----------	AvgRF	CCRF	% Dev	----------		
122	hexachlorobutadiene	0.849	0.857	-0.9	88	0.00	17.67
123	naphthalene	3.112	2.911	6.5	80	0.00	17.85
124	1,2,3-trichlorobenzene	1.387	1.387	0.0	88	0.00	18.09
125	2-methylnaphthalene	1.533	1.027	33.0#	67	0.00	19.14
126	Bis(chloromethyl)ether		----------NA----------				
127	Ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
4B89758.D M4B3793.M Tue May 28 03:05:20 2019

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3857-ECC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B91025.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ke... 28\v4b3857\4b91025.d Vial: 22
Acq On : 24 May 2019 8:42 pm Operator: CHELSEAS
Sample : ecc3793-50 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,1 Multiplr: 1.00
MS Integration Params: RTEINT.P

Method : C:\MSDCHEM\1\METHODS\M4B3793.M (RTE Integrator)
Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
Last Update : Tue Apr 09 08:39:45 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 50% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	89	0.00	6.75
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.414	1.508	-6.6	96	0.00	6.85
4		1,4-dioxane	0.106	0.120	-13.2	96	0.00	10.24
5	I	pentafluorobenzene	1.000	1.000	0.0	93	0.00	8.76
6		chlorodifluoromethane	1.027	0.974	5.2	91	0.00	3.90
7		dichlorodifluoromethane	1.003	1.056	-5.3	92	0.00	3.89
8		chloromethane	1.152	1.075	6.7	89	0.01	4.25
9		vinyl chloride	0.998	0.982	1.6	88	0.00	4.45
10		1,3-butadiene	0.757	0.738	2.5	93	0.01	4.48
11		bromomethane	0.671	0.630	6.1	86	0.00	4.99
12		chloroethane	0.510	0.471	7.6	87	0.01	5.13
13		trichlorofluoromethane	0.966	1.003	-3.8	93	0.00	5.52
14		vinyl bromide	0.523	0.553	-5.7	97	0.00	5.43
15		ethyl ether	0.302	0.311	-3.0	97	0.00	5.82
16		2-chloropropane	1.127	1.140	-1.2	103	0.00	6.03
17		acrolein	0.115	0.113	1.7	93	0.00	6.02
18		freon 113	0.547	0.570	-4.2	99	0.01	6.22
19		1,1-dichloroethene	1.030	1.106	-7.4	104	0.00	6.22
20		acetone	0.051	0.055	-7.8	96	0.00	6.19
21		acetonitrile	0.083	0.086	-3.6	99	0.00	6.55
22		iodomethane	1.084	1.154	-6.5	101	0.00	6.45
23		carbon disulfide	2.197	2.184	0.6	100	0.00	6.59
24		methylene chloride	0.718	0.721	-0.4	98	0.00	6.81
25		methyl acetate	0.440	0.458	-4.1	96	0.00	6.58
26		methyl tert butyl ether	1.652	1.630	1.3	97	0.00	7.11
27		trans-1,2-dichloroethene	0.885	0.949	-7.2	104	0.00	7.15
28		hexane	0.472	0.455	3.6	96	0.00	7.45
29		di-isopropyl ether	2.200	2.253	-2.4	102	0.00	7.63
30		2-butanone	0.060	0.062	-3.3	96	0.00	8.21
31		1,1-dichloroethane	1.089	1.130	-3.8	101	0.00	7.65
32		chloroprene	0.839	0.874	-4.2	100	0.00	7.74
33		acrylonitrile	0.228	0.239	-4.8	100	0.00	7.05
34		vinyl acetate	0.088	0.094	-6.8	97	0.00	7.58
35		ethyl tert-butyl ether	1.934	1.893	2.1	96	0.00	8.05
36		ethyl acetate	0.081	0.087	-7.4	103	0.00	8.22
37		2,2-dichloropropane	0.853	0.843	1.2	101	0.00	8.32
38		cis-1,2-dichloroethene	0.660	0.660	0.0	97	0.00	8.29
39		propionitrile	0.087	0.090	-3.4	99	0.00	8.28
40		methyl acrylate	0.075	0.079	-5.3	95	0.00	8.31
41		methacrylonitrile	0.210	0.221	-5.2	97	0.00	8.46

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3857-ECC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B91025.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		bromochloromethane	0.316	0.328	-3.8	99	0.00	8.56
43		tetrahydrofuran	0.075	0.075	0.0	94	0.00	8.58
44		chloroform	1.038	1.055	-1.6	101	0.00	8.63
45		tert-butyl formate	0.452	0.425	6.0	88	0.00	8.66
46	S	dibromofluoromethane (s)	0.452	0.462	-2.2	94	0.00	8.80
47		1,1,1-trichloroethane	0.919	0.985	-7.2	103	0.00	8.88
48		cyclohexane	0.931	0.918	1.4	93	0.00	8.99
49		isobutyl alcohol		----------NA----------				
50		1,1-dichloropropene	0.736	0.767	-4.2	102	0.00	9.03
51		carbon tetrachloride	0.768	0.857	-11.6	106	0.00	9.07
52		tert-amyl alcohol	0.038	0.036	5.3	92	0.00	9.12
53		isopropyl acetate	0.104	0.109	-4.8	98	0.00	9.15
54	I	1,4-difluorobenzene	1.000	1.000	0.0	94	0.00	9.63
55	S	1,2-dichloroethane-d4 (s)	0.330	0.350	-6.1	102	0.00	9.19
56		n-butyl alcohol	0.010	0.010	0.0	93	0.00	9.65
57		2,2,4-trimethylpentane	1.772	1.745	1.5	97	0.00	9.34
58		benzene	1.698	1.656	2.5	98	0.00	9.26
59		tert-amyl methyl ether	1.392	1.283	7.8	93	0.00	9.32
60		heptane	0.308	0.314	-1.9	98	0.00	9.48
61		1,2-dichloroethane	0.501	0.537	-7.2	109	0.00	9.27
62		ethyl acrylate	0.444	0.460	-3.6	99	0.00	9.89
63		trichloroethene	0.406	0.422	-3.9	102	0.00	9.93
64		2-chloroethyl vinyl ether	0.228	0.239	-4.8	98	0.00	10.68
65		methyl methacrylate	0.090	0.090	0.0	89	0.00	10.15
66		methylcyclohexane	0.859	0.810	5.7	93	0.00	10.23
67		1,2-dichloropropane	0.423	0.439	-3.8	101	0.00	10.21
68		dibromomethane	0.245	0.259	-5.7	102	0.00	10.31
69		bromodichloromethane	0.515	0.558	-8.3	104	0.00	10.46
		----------	True	Calc.	% Drift	----------		
70		2-nitropropane	50.000	67.078	-34.2	170	0.00	10.64
		----------	AvgRF	CCRF	% Dev	----------		
71		epichlorohydrin	0.039	0.040	-2.6	96	0.00	10.77
72		cis-1,3-dichloropropene	0.606	0.644	-6.3	101	0.00	10.90
73		4-methyl-2-pentanone	0.163	0.163	0.0	98	0.00	11.00
74		isoamyl alcohol	0.013	0.012	7.7	90	0.00	10.99
75	I	chlorobenzene-d5	1.000	1.000	0.0	93	0.00	12.81
76	S	toluene-d8 (s)	1.258	1.257	0.1	94	0.00	11.22
77		toluene	1.042	1.046	-0.4	98	0.00	11.29
78		ethyl methacrylate	0.507	0.523	-3.2	97	0.00	11.46
79		trans-1,3-dichloropropene	0.564	0.610	-8.2	102	0.00	11.48
80		1,1,2-trichloroethane	0.314	0.326	-3.8	99	0.00	11.71
81		tetrachloroethene	0.391	0.401	-2.6	101	0.00	11.87
82		2-hexanone	0.164	0.165	-0.6	98	0.00	11.87
83		1,3-dichloropropane	0.584	0.606	-3.8	101	0.00	11.90
84		butyl acetate	0.286	0.293	-2.4	101	0.00	11.95
85		dibromochloromethane	0.411	0.463	-12.7	104	0.00	12.16
86		1,2-dibromoethane	0.492	0.438	11.0	84	0.00	12.33
87		n-butyl ether	1.906	1.892	0.7	99	0.00	12.79
88		chlorobenzene	1.168	1.189	-1.8	100	0.00	12.84
89		1,1,1,2-tetrachloroethane	0.468	0.504	-7.7	102	0.00	12.92
90		ethylbenzene	2.046	2.035	0.5	98	0.00	12.90
91		m,p-xylene	0.777	0.765	1.5	96	0.00	13.04
92		o-xylene	1.734	1.748	-0.8	99	0.00	13.47
93		styrene	1.265	1.289	-1.9	97	0.00	13.49
94		butyl acrylate	0.917	0.920	-0.3	98	0.00	13.28
95		isopropylbenzene	2.197	2.169	1.3	96	0.00	13.86

Continuing Calibration Summary

Job Number: JC88209 **Sample:** V4B3857-ECC3793
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** 4B91025.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

96		bromoform	0.296	0.342	-15.5	106	0.00	13.74
97		cis-1,4-dichloro-2-butene	0.153	0.153	0.0	92	0.00	13.89
98	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	96	0.00	15.38
99	S	4-bromofluorobenzene (s)	0.823	0.838	-1.8	97	0.00	14.08
100		1,1,2,2-tetrachloroethane	0.956	0.957	-0.1	98	0.00	14.17
101		trans-1,4-dichloro-2-bute	0.192	0.182	5.2	89	0.00	14.20
102		1,2,3-trichloropropane	0.227	0.237	-4.4	100	0.00	14.26
103		bromobenzene	0.944	0.981	-3.9	100	0.00	14.29
104		n-propylbenzene	4.108	4.132	-0.6	98	0.00	14.32
105		2-chlorotoluene	0.861	0.899	-4.4	100	0.00	14.46
106		4-chlorotoluene	2.411	2.471	-2.5	102	0.00	14.59
107		1,3,5-trimethylbenzene	3.088	3.149	-2.0	99	0.00	14.49
108		tert-butylbenzene	2.640	2.698	-2.2	98	0.00	14.87
109		1,2,4-trimethylbenzene	3.095	3.137	-1.4	99	0.00	14.92
110		sec-butylbenzene	4.014	4.047	-0.8	96	0.00	15.11
111		p-isopropyltoluene	3.417	3.437	-0.6	96	0.00	15.26
112		1,3-dichlorobenzene	1.808	1.822	-0.8	100	0.00	15.30
113		1,4-dichlorobenzene	1.816	1.838	-1.2	99	0.00	15.40
114		1,2-dichlorobenzene	1.870	1.874	-0.2	99	0.00	15.82
115		benzyl chloride	1.682	1.727	-2.7	99	0.00	15.50
116		n-butylbenzene	1.650	1.705	-3.3	99	0.00	15.71
117		hexachloroethane	0.612	0.653	-6.7	100	0.00	16.15
118		1,2-dibromo-3-chloropropa	0.237	0.249	-5.1	95	0.00	16.66
119		1,3,5-trichlorobenzene	1.728	1.828	-5.8	100	0.00	16.87
120		1,2,4-trichlorobenzene	1.518	1.626	-7.1	99	0.00	17.55
		----------	True	Calc.	% Drift	----------		
121		2-ethylhexyl acrylate	10.000	6.425	35.8	69	0.00	17.55
		----------	AvgRF	CCRF	% Dev	----------		
122		hexachlorobutadiene	0.849	0.911	-7.3	104	0.00	17.66
123		naphthalene	3.112	3.161	-1.6	93	0.00	17.85
124		1,2,3-trichlorobenzene	1.387	1.488	-7.3	98	0.00	18.09
125		2-methylnaphthalene	1.533	1.397	8.9	86	0.00	19.14
126		Bis(chloromethyl)ether		----------NA----------				
127		Ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
4B89759.D M4B3793.M Tue May 28 03:01:30 2019

Initial Calibration Summary

Job Number: JC88209 **Sample:** VX7749-ICC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181287.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Response Factor Report ACC-VOA-M

Method : C:\MSDCHEM\1\METHODS\MX7749.M (RTE Integrator)
Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
Last Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

Calibration Files
1 =X181282.D 2 =X181283.D 100 =X181288.D 50 =X181287.D
20 =X181286.D 200 =X181289.D 4 =X181284.D 8 =X181285.D
0.5 =X181281.D 0.2 =X181280.D = =

Compound	1	2	100	50	20	200	4	8	0.5	0.2	Avg	%RSD
1) I tert butyl alcohol-d9	----------ISTD----------											
2) ethanol											0.000	-1.00
3) tertiary butyl alcohol	1.126	1.146	1.163	1.122	1.176	1.050	1.152				1.134	3.65
4) 1,4-dioxane		0.099	0.101	0.096	0.101	0.075	0.090				0.093	10.89
5) I pentafluorobenzene	----------ISTD----------											
6) chlorodifluoromethane	1.656	1.625	1.511	1.546	1.520	1.326	1.466	1.533	1.566		1.528	6.23
7) dichlorodifluoromethane	1.461	1.603	1.591	1.638	1.566	1.479	1.535	1.607	1.179		1.518	9.23
8) chloromethane	2.149	2.094	1.838	1.922	1.905	1.573	1.940	1.988			1.926	9.10
9) vinyl chloride	1.663	1.660	1.487	1.558	1.550	1.301	1.547	1.612	1.628	1.876	1.588	9.21
10) bromomethane	0.899	0.847	0.764	0.817	0.764	0.639	0.782	0.812			0.790	9.61
11) chloroethane	0.605	0.538	0.524	0.551	0.503	0.466	0.515	0.552	0.566	0.502	0.532	7.34
12) vinyl bromide	0.584	0.636	0.628	0.645	0.570	0.578	0.552	0.598	0.565		0.595	5.67
13) trichlorofluoromethane	0.975	1.040	0.987	1.010	0.953	0.924	0.956	1.012	0.854		0.968	5.73
14) 1,3-butadiene	0.769	0.791	0.626	0.669	0.643	0.577	0.667	0.718	0.711	0.612	0.678	10.11
15) ethyl ether	0.203	0.216	0.222	0.220	0.217	0.204	0.219	0.221			0.215	3.55
16) acrolein		0.090	0.093	0.103	0.081		0.133				0.100	19.97
17) 1,1-dichloroethene	0.373	0.392	0.351	0.352	0.354	0.316	0.362	0.380	0.364	0.362	0.361	5.63
18) freon 113	0.541	0.657	0.558	0.592	0.570	0.555	0.545	0.622			0.580	7.10
19) acetone	0.149	0.124	0.125	0.137	0.114	0.124	0.147				0.131	9.97
20) acetonitrile		0.080	0.084	0.089	0.075	0.096	0.099				0.087	10.42
21) iodomethane	0.733	0.708	0.701	0.695	0.683	0.649	0.644	0.700	0.674	0.751	0.694	4.80
22) carbon disulfide	1.356	1.318	1.243	1.266	1.230	1.140	1.217	1.292	1.288	1.471	1.282	6.94
23) methylene chloride												

Job Number: JC88209 Sample: VX7749-ICC7749
Account: USACEPAP USACE-Philadelphia District Lab FileID: X181287.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

0.471 0.475 0.437 0.431 0.433 0.405 0.442 0.463 0.547 0.456 8.91
24) methyl acetate
0.392 0.310 0.324 0.339 0.293 0.418 0.356 0.347 12.87
25) methyl tert butyl ether
1.657 1.615 1.501 1.535 1.502 1.402 1.500 1.545 1.593 1.847 1.570 7.69
26) trans-1,2-dichloroethene
0.437 0.413 0.372 0.375 0.384 0.329 0.378 0.406 0.403 0.399 0.390 7.52
27) hexane
0.573 0.646 0.538 0.568 0.558 0.560 0.545 0.578 0.571 5.83
28) di-isopropyl ether
1.915 1.904 1.617 1.703 1.699 1.519 1.746 1.770 1.977 2.160 1.801 10.48
29) 2-butanone
0.035 0.048 0.049 0.048 0.047 0.043 0.045 0.045 10.64
30) 1,1-dichloroethane
0.819 0.762 0.712 0.727 0.742 0.641 0.721 0.784 0.817 0.744 0.747 7.09
31) chloroprene
0.634 0.567 0.554 0.562 0.572 0.511 0.576 0.576 0.497 0.516 0.556 7.20
32) acrylonitrile
0.173 0.172 0.170 0.165 0.129 0.168 0.163 10.37
33) vinyl acetate
0.079 0.078 0.078 0.077 0.070 0.076 4.95
34) ethyl tert-butyl ether
1.669 1.677 1.681 1.705 1.634 1.597 1.584 1.675 1.730 1.722 1.667 2.94
35) ethyl acetate
0.070 0.074 0.079 0.068 0.060 0.067 0.070 9.54
36) 2,2-dichloropropane
0.928 0.844 0.697 0.731 0.722 0.670 0.762 0.775 0.766 10.99
37) cis-1,2-dichloroethene
0.526 0.506 0.421 0.430 0.443 0.381 0.443 0.468 0.420 0.449 10.06
38) methyl acrylate
0.058 0.061 0.060 0.056 0.034 0.049 0.053 19.01
39) propionitrile
0.065 0.066 0.061 0.066 0.067 0.059 0.063 0.066 0.064 4.70
40) tert-butyl formate
0.445 0.439 0.403 0.427 0.418 0.378 0.441 0.442 0.377 0.419 6.48
41) bromochloromethane
0.221 0.232 0.231 0.233 0.232 0.216 0.233 0.232 0.226 0.229 2.66
42) tetrahydrofuran
0.054 0.058 0.061 0.053 0.048 0.053 0.055 8.48
43) chloroform
0.805 0.758 0.688 0.695 0.699 0.634 0.718 0.729 0.839 0.729 8.64
44) dibromofluoromethane (s)
0.402 0.401 0.420 0.402 0.400 0.412 0.401 0.413 0.404 0.413 0.407 1.73
45) methacrylonitrile
0.159 0.170 0.172 0.169 0.167 0.149 0.168 0.165 4.91
46) 1,1,1-trichloroethane
0.817 0.746 0.773 0.774 0.724 0.770 0.709 0.727 0.785 0.664 0.749 5.90
47) cyclohexane
0.872 0.802 0.853 0.890 0.847 0.855 0.760 0.779 0.768 0.850 0.828 5.60
48) tert amyl alcohol
0.030 0.024 0.025 0.026 0.025 0.025 0.027 0.026 7.46
49) 1,1-dichloropropene
0.514 0.523 0.468 0.482 0.497 0.430 0.464 0.497 0.450 0.481 6.28
50) isobutyl alcohol
0.000 -1.00
51) carbon tetrachloride
0.714 0.686 0.611 0.637 0.614 0.599 0.624 0.624 0.562 0.616 0.629 6.85
52) isopropyl acetate
0.074 0.091 0.094 0.092 0.091 0.079 0.084 0.086 8.53

Job Number: JC88209 **Sample:** VX7749-ICC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181287.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

53) I 1,4-difluorobenzene ----------ISTD----------
54) 1,2-dichloroethane-d4 (s)
0.341 0.339 0.309 0.320 0.337 0.291 0.334 0.342 0.343 0.343 0.330 5.36
55) iso-octane
0.869 0.953 0.929 0.894 0.833 1.024 0.808 0.860 0.732 0.980 0.888 9.75
56) epichlorohydrin
0.034 0.036 0.034 0.035 0.035 0.033 0.037 0.038 0.035 4.32
57) n-butyl alcohol
0.010 0.011 0.012 0.012 0.011 0.012 0.011 0.011 0.011 5.99
58) benzene
1.295 1.219 1.063 1.116 1.136 0.995 1.147 1.152 1.319 1.160 8.96
59) tert-amyl methyl ether
1.179 1.199 1.062 1.092 1.090 1.007 1.080 1.116 1.161 1.282 1.127 7.04
60) heptane
0.179 0.199 0.171 0.182 0.180 0.182 0.167 0.173 0.161 0.177 6.10
61) 1,2-dichloroethane
0.471 0.441 0.351 0.367 0.379 0.322 0.402 0.398 0.391 12.27
62) trichloroethene
0.303 0.324 0.306 0.309 0.311 0.285 0.303 0.316 0.288 0.301 0.304 3.85
63) ethyl acrylate
0.323 0.389 0.389 0.404 0.413 0.377 0.365 0.397 0.382 7.35
64) 2-nitropropane
0.083 0.086 0.087 0.083 0.105 0.091 0.089 9.36
65) 2-chloroethyl vinyl ether
0.208 0.230 0.211 0.224 0.229 0.198 0.220 0.225 0.199 0.220 0.216 5.39
66) methyl methacrylate
0.085 0.085 0.083 0.084 0.073 0.075 0.081 6.82
67) 1,2-dichloropropane
0.125 0.135 0.122 0.130 0.134 0.112 0.132 0.134 0.128 6.10
68) dibromomethane
0.189 0.201 0.185 0.195 0.196 0.174 0.203 0.201 0.195 0.193 4.76
69) methylcyclohexane
0.552 0.599 0.503 0.530 0.511 0.526 0.522 0.519 0.533 5.71
70) bromodichloromethane
0.433 0.430 0.416 0.425 0.426 0.401 0.422 0.425 0.446 0.495 0.432 5.82
71) cis-1,3-dichloropropene
0.519 0.522 0.513 0.522 0.518 0.490 0.522 0.516 0.473 0.609 0.520 6.75
72) 4-methyl-2-pentanone
0.125 0.146 0.129 0.141 0.140 0.131 0.138 0.138 0.104 0.119 0.131 9.50
73) 3-methyl-1-butanol
0.008 0.011 0.011 0.012 0.012 0.011 0.011 0.012 0.011 10.71

74) I chlorobenzene-d5 ----------ISTD----------
75) toluene-d8 (s)
1.235 1.231 1.141 1.185 1.189 1.145 1.223 1.197 1.223 1.218 1.199 2.84
76) toluene
0.810 0.767 0.679 0.727 0.733 0.647 0.734 0.734 0.740 0.861 0.743 8.12
77) trans-1,3-dichloropropene
0.511 0.520 0.461 0.479 0.491 0.425 0.480 0.495 0.431 0.531 0.482 7.31
78) ethyl methacrylate
0.352 0.402 0.391 0.422 0.423 0.374 0.402 0.415 0.397 6.17
79) 1,1,2-trichloroethane
0.256 0.274 0.234 0.252 0.254 0.221 0.259 0.256 0.266 0.254 0.252 5.99
80) tetrachloroethene
0.296 0.300 0.253 0.271 0.275 0.239 0.287 0.279 0.241 0.271 8.37
81) 1,3-dichloropropane
0.529 0.531 0.408 0.450 0.482 0.366 0.499 0.495 0.456 0.519 0.473 11.40
82) 2-hexanone
0.112 0.128 0.110 0.121 0.128 0.106 0.124 0.134 0.120 8.34
83) butyl acetate

0.240 0.254 0.227 0.243 0.244 0.222 0.255 0.258 0.243 5.38
84) dibromochloromethane
0.375 0.386 0.340 0.352 0.345 0.324 0.356 0.342 0.355 0.342 0.352 5.07
85) 1,2-dibromoethane
0.339 0.368 0.329 0.351 0.352 0.306 0.356 0.346 0.296 0.331 0.337 6.65
86) n-butyl ether
1.548 1.440 1.212 1.333 1.338 1.136 1.370 1.350 1.341 9.45
87) chlorobenzene
0.916 0.905 0.786 0.823 0.834 0.738 0.823 0.850 0.833 0.980 0.849 8.12
88) 1,1,1,2-tetrachloroethane
0.418 0.397 0.333 0.375 0.374 0.325 0.384 0.382 0.387 0.375 7.84
89) ethylbenzene
1.626 1.534 1.200 1.316 1.376 1.110 1.432 1.404 1.514 1.390 11.77
90) m,p-xylene
0.611 0.608 0.492 0.528 0.547 0.465 0.570 0.568 0.601 0.555 9.31
91) o-xylene
1.398 1.362 1.121 1.240 1.250 1.071 1.299 1.294 1.434 1.274 9.46
92) styrene
1.006 1.004 0.810 0.884 0.917 0.742 0.952 0.961 0.903 1.016 0.920 9.71
93) butyl acrylate
0.863 0.812 0.710 0.739 0.754 0.683 0.766 0.755 0.754 0.914 0.775 8.99
94) bromoform
0.284 0.278 0.241 0.250 0.244 0.232 0.260 0.243 0.233 0.218 0.248 8.31
95) isopropylbenzene
1.844 1.723 1.460 1.634 1.592 1.426 1.639 1.605 1.779 1.633 8.35
96) cis-1,4-dichloro-2-butene
0.150 0.157 0.123 0.130 0.136 0.114 0.129 0.140 0.135 10.43

97) I 1,4-dichlorobenzene-d ----------ISTD----------
98) 4-bromofluorobenzene (s)
0.776 0.771 0.900 0.876 0.841 0.901 0.784 0.808 0.763 0.771 0.819 6.81
99) bromobenzene
0.706 0.736 0.718 0.751 0.731 0.669 0.696 0.725 0.705 0.810 0.725 5.20
100) 1,1,2,2-tetrachloroethane
0.755 0.760 0.817 0.839 0.782 0.803 0.737 0.742 0.712 0.892 0.784 6.96
101) trans-1,4-dichloro-2-butene
0.190 0.167 0.187 0.187 0.185 0.172 0.176 0.181 0.159 0.178 5.88
102) 1,2,3-trichloropropane
0.177 0.194 0.199 0.207 0.208 0.190 0.202 0.196 0.197 5.08
103) n-propylbenzene
3.011 3.034 2.931 3.124 2.973 2.832 2.884 2.899 2.914 3.619 3.022 7.48
104) 2-chlorotoluene
0.656 0.680 0.698 0.735 0.686 0.695 0.664 0.635 0.624 0.775 0.685 6.59
105) 4-chlorotoluene
1.925 1.811 1.752 1.816 1.789 1.664 1.755 1.775 1.868 2.244 1.840 8.59
106) 1,3,5-trimethylbenzene
2.252 2.339 2.309 2.469 2.327 2.353 2.246 2.225 2.149 2.297 4.00
107) tert-butylbenzene
1.933 1.980 2.285 2.336 2.106 2.286 1.884 1.940 1.937 2.179 2.087 8.31
108) 1,2,4-trimethylbenzene
2.427 2.432 2.334 2.505 2.386 2.314 2.318 2.355 2.491 2.396 3.01
109) sec-butylbenzene
3.024 3.061 3.280 3.421 3.096 3.352 2.930 2.949 2.808 3.685 3.161 8.49
110) 1,3-dichlorobenzene
1.575 1.539 1.267 1.346 1.374 1.176 1.407 1.384 1.501 1.397 9.19
111) p-isopropyltoluene
2.653 2.690 2.744 2.890 2.668 2.781 2.547 2.604 2.650 3.294 2.752 7.75
112) 1,4-dichlorobenzene
1.465 1.392 1.321 1.350 1.330 1.267 1.333 1.334 1.401 1.355 4.22
113) 1,2-dichlorobenzene

Job Number: JC88209 **Sample:** VX7749-ICC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181287.D
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```
      1.599 1.635 1.457 1.556 1.544 1.394 1.541 1.554 1.601        1.542    4.86
114)  benzyl chloride
      1.661 1.636 1.503 1.569 1.540 1.422 1.526 1.534 1.634        1.558    4.88
115)  n-butylbenzene
      1.327 1.304 1.323 1.410 1.307 1.310 1.216 1.245 1.233 1.444  1.312    5.53
116)  1,2-dibromo-3-chloropropane
      0.222 0.243 0.276 0.283 0.267 0.285 0.231 0.248              0.257    9.40
117)  1,3,5-trichlorobenzene
      1.554 1.518 1.542 1.642 1.592 1.531 1.508 1.556 1.452 1.578  1.547    3.33
118)  hexachlorobutadiene
      0.506 0.525 0.531 0.552 0.513 0.536 0.497 0.510 0.456 0.640  0.527    8.99
119)  naphthalene
                  3.886 4.014 3.826 3.797 2.957 3.467              3.658   10.62
120)  2-ethylhexyl acrylate *This compound fails Initial Calibration criteria*
                  0.908 0.734 0.399 1.063       0.225              0.665   52.42
121)  1,2,4-trichlorobenzene
      1.194 1.280 1.622 1.700 1.628 1.593 1.339 1.510              1.483   12.61
122)  1,2,3-trichlorobenzene
      1.170 1.251 1.712 1.742 1.648 1.656 1.327 1.519              1.503   14.90
123)  hexachloroethane
            0.401 0.564 0.557 0.475 0.584 0.402 0.426              0.487   16.50
124)  2-methylnaphthalene
                  2.755 2.269 1.572 2.862       0.987              2.089   38.26
            ----- Linear regression -----  Coefficient =  0.9961
              Response Ratio = -0.19403 + 2.90387 *A

125)  bis(chloromethyl)ether
                                                                   0.000   -1.00
126)  ethylenimine
                                                                   0.000   -1.00
 ---------------------------------------------------------------------------
 (#) = Out of Range  ###  Number of calibration levels exceeded format  ###

           MX7749.M          Thu May 09 14:53:07 2019   GCMSX
```

Initial Calibration Verification

Job Number: JC88209 **Sample:** VX7749-ICV7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181292.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\VX7749\X181292.D Vial: 14
Acq On : 2 May 2019 10:45 pm Operator: juntaep
Sample : icv7749-50 Inst : ACC-VOA-M
Misc : MS34046,VX7749,5,,,,1 Multiplr: 1.00
MS Integration Params: ACETONE.P

Method : C:\MSDCHEM\1\METHODS\MX7749.M (RTE Integrator)
Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
Last Update : Thu May 09 14:26:25 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

	Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1 I	tert butyl alcohol-d9	1.000	1.000	0.0	95	0.00	7.40
2	ethanol		----------NA----------				
3	tertiary butyl alcohol	1.134	1.252	-10.4	102	0.00	7.54
4	1,4-dioxane	0.093	0.104	-11.8	98	0.00	12.24
5 I	pentafluorobenzene	1.000	1.000	0.0	101	0.00	10.20
6	chlorodifluoromethane	1.528	1.758	-15.1	115	0.00	3.89
7	dichlorodifluoromethane	1.518	1.677	-10.5	103	0.00	3.88
8	chloromethane	1.926	1.970	-2.3	103	0.00	4.27
9	vinyl chloride	1.588	1.552	2.3	100	-0.01	4.50
10	bromomethane	0.790	0.810	-2.5	100	0.00	5.12
11	chloroethane	0.532	0.548	-3.0	100	-0.01	5.30
12	vinyl bromide	0.595	0.607	-2.0	95	0.00	5.66
13	trichlorofluoromethane	0.968	0.992	-2.5	99	-0.02	5.80
14	1,3-butadiene	0.678	0.789	-16.4	119	-0.01	4.52
15	ethyl ether	0.215	0.233	-8.4	107	0.00	6.21
16	acrolein	0.100	0.097	3.0	105	0.00	6.44
17	1,1-dichloroethene	0.361	0.346	4.2	99	0.00	6.66
18	freon 113	0.580	0.673	-16.0	115	0.00	6.70
19	acetone	0.131	0.139	-6.1	112	0.00	6.66
20	acetonitrile	0.087	0.077	11.5	92	0.00	7.10
21	iodomethane	0.694	0.792	-14.1	115	0.00	6.93
22	carbon disulfide	1.282	1.397	-9.0	111	0.00	7.10
23	methylene chloride	0.456	0.434	4.8	102	0.00	7.46
24	methyl acetate	0.347	0.332	4.3	103	0.00	7.18
25	methyl tert butyl ether	1.570	1.498	4.6	99	0.00	7.88
26	trans-1,2-dichloroethene	0.390	0.364	6.7	98	0.00	7.92
27	hexane	0.571	0.612	-7.2	109	0.00	8.36
28	di-isopropyl ether	1.801	1.640	8.9	97	0.00	8.61
29	2-butanone	0.045	0.050	-11.1	102	0.00	9.39
30	1,1-dichloroethane	0.747	0.758	-1.5	105	0.00	8.60
31	chloroprene	0.556	0.604	-8.6	108	0.00	8.73
32	acrylonitrile	0.163	0.200	-22.7	117	0.00	7.78
33	vinyl acetate	0.076	0.079	-3.9	103	0.00	8.53
34	ethyl tert-butyl ether	1.667	1.668	-0.1	99	0.00	9.18
35	ethyl acetate	0.070	0.076	-8.6	103	0.00	9.43
36	2,2-dichloropropane	0.766	0.682	11.0	94	0.00	9.52
37	cis-1,2-dichloroethene	0.449	0.427	4.9	100	0.00	9.48
38	methyl acrylate	0.053	0.062	-17.0	103	0.00	9.54
39	propionitrile	0.064	0.070	-9.4	106	0.00	9.47
40	tert-butyl formate	0.419	0.390	6.9	92	0.00	10.02
41	bromochloromethane	0.229	0.246	-7.4	106	0.00	9.85

Initial Calibration Verification

Job Number: JC88209 **Sample:** VX7749-ICV7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181292.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.055	0.061	-10.9	106	-0.01	9.88
43		chloroform	0.729	0.718	1.5	104	0.00	9.97
44	S	dibromofluoromethane (s)	0.407	0.409	-0.5	103	0.00	10.21
45		methacrylonitrile	0.165	0.182	-10.3	107	0.00	9.73
46		1,1,1-trichloroethane	0.749	0.776	-3.6	101	0.00	10.30
47		cyclohexane	0.828	0.888	-7.2	101	0.00	10.45
48	m	tert amyl alcohol	0.026	0.027	-3.8	107	0.00	10.69
49		1,1-dichloropropene	0.481	0.494	-2.7	104	0.00	10.52
50		isobutyl alcohol		----------NA----------				
51		carbon tetrachloride	0.629	0.650	-3.3	103	0.00	10.56
52		isopropyl acetate	0.086	0.095	-10.5	102	0.00	10.75
53	I	1,4-difluorobenzene	1.000	1.000	0.0	101	0.00	11.39
54	S	1,2-dichloroethane-d4 (s)	0.330	0.318	3.6	101	0.00	10.75
55		iso-octane	0.888	0.919	-3.5	104	0.00	10.98
56		epichlorohydrin	0.035	0.037	-5.7	107	0.00	12.96
57		n-butyl alcohol	0.011	0.012	-9.1	102	0.00	11.47
58		benzene	1.160	1.157	0.3	105	0.00	10.83
59		tert-amyl methyl ether	1.127	1.065	5.5	99	0.00	10.97
60		heptane	0.177	0.227	-28.2	126	0.00	11.21
61		1,2-dichloroethane	0.391	0.373	4.6	103	0.00	10.86
62		trichloroethene	0.304	0.325	-6.9	106	0.00	11.79
63	m	ethyl acrylate	0.382	0.435	-13.9	109	0.00	11.80
64		2-nitropropane	0.089	0.094	-5.6	110	0.00	12.79
65		2-chloroethyl vinyl ether	0.216	0.243	-12.5	110	0.00	12.87
66		methyl methacrylate	0.081	0.084	-3.7	100	0.00	12.15
67		1,2-dichloropropane	0.128	0.124	3.1	97	0.00	12.17
68		dibromomethane	0.193	0.190	1.6	98	0.00	12.31
69		methylcyclohexane	0.533	0.538	-0.9	103	0.00	12.19
70		bromodichloromethane	0.432	0.425	1.6	101	0.00	12.53
71		cis-1,3-dichloropropene	0.520	0.537	-3.3	104	0.00	13.16
72		4-methyl-2-pentanone	0.131	0.146	-11.5	105	0.00	13.30
73		3-methyl-1-butanol	0.011	0.012	-9.1	104	0.00	13.32
74	I	chlorobenzene-d5	1.000	1.000	0.0	101	0.00	15.60
75	S	toluene-d8 (s)	1.199	1.169	2.5	100	0.00	13.57
76		toluene	0.743	0.748	-0.7	104	0.00	13.67
77		trans-1,3-dichloropropene	0.482	0.502	-4.1	106	0.00	13.93
78		ethyl methacrylate	0.397	0.444	-11.8	107	0.00	13.95
79		1,1,2-trichloroethane	0.252	0.261	-3.6	105	0.00	14.22
80		tetrachloroethene	0.271	0.288	-6.3	107	0.00	14.42
81		1,3-dichloropropane	0.473	0.465	1.7	105	0.00	14.46
82		2-hexanone	0.120	0.123	-2.5	103	0.00	14.46
83		butyl acetate	0.243	0.245	-0.8	102	0.00	14.60
84		dibromochloromethane	0.352	0.377	-7.1	108	0.00	14.79
85		1,2-dibromoethane	0.337	0.358	-6.2	103	0.00	14.99
86	m	n-butyl ether	1.341	1.432	-6.8	109	0.00	15.66
87		chlorobenzene	0.849	0.864	-1.8	106	0.00	15.64
88		1,1,1,2-tetrachloroethane	0.375	0.379	-1.1	103	0.00	15.74
89		ethylbenzene	1.390	1.355	2.5	104	0.00	15.74
90		m,p-xylene	0.555	0.548	1.3	105	0.00	15.91
91		o-xylene	1.274	1.266	0.6	103	0.00	16.43
92		styrene	0.920	0.907	1.4	104	0.00	16.45
93		butyl acrylate	0.775	0.755	2.6	103	0.00	16.25
94		bromoform	0.248	0.272	-9.7	110	0.00	16.72
95		isopropylbenzene	1.633	1.666	-2.0	103	0.00	16.88
96		cis-1,4-dichloro-2-butene	0.135	0.134	0.7	104	0.00	16.92
97	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	100	0.00	18.39
98	S	4-bromofluorobenzene (s)	0.819	0.886	-8.2	101	0.00	17.11

Initial Calibration Verification

Job Number: JC88209 **Sample:** VX7749-ICV7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181292.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99	bromobenzene	0.725	0.762	-5.1	101	0.00	17.31
100	1,1,2,2-tetrachloroethane	0.784	0.874	-11.5	104	0.00	17.21
101	trans-1,4-dichloro-2-bute	0.178	0.217	-21.9	116	0.00	17.25
102	1,2,3-trichloropropane	0.197	0.214	-8.6	103	0.00	17.30
103	n-propylbenzene	3.022	3.256	-7.7	104	0.00	17.37
104	2-chlorotoluene	0.685	0.743	-8.5	101	0.00	17.51
105	4-chlorotoluene	1.840	1.931	-4.9	106	0.00	17.63
106	1,3,5-trimethylbenzene	2.297	2.566	-11.7	103	0.00	17.56
107	tert-butylbenzene	2.087	2.455	-17.6	105	0.00	17.92
108	1,2,4-trimethylbenzene	2.396	2.555	-6.6	102	0.00	17.98
109	sec-butylbenzene	3.161	3.551	-12.3	103	0.00	18.16
110	1,3-dichlorobenzene	1.397	1.398	-0.1	103	0.00	18.32
111	p-isopropyltoluene	2.752	3.033	-10.2	104	0.00	18.30
112	1,4-dichlorobenzene	1.355	1.411	-4.1	104	0.00	18.42
113	1,2-dichlorobenzene	1.542	1.621	-5.1	104	0.00	18.78
114	benzyl chloride	1.558	1.918	-23.1	122	0.00	18.51
115	n-butylbenzene	1.312	1.445	-10.1	102	0.00	18.71
116	1,2-dibromo-3-chloropropa	0.257	0.285	-10.9	100	0.00	19.51
117	1,3,5-trichlorobenzene	1.547	1.690	-9.2	102	0.00	19.69
118	hexachlorobutadiene	0.527	0.554	-5.1	100	0.00	20.38
119	naphthalene	3.658	4.190	-14.5	104	0.00	20.54
120	2-ethylhexyl acrylate	0.665	0.799	-20.2	108	0.00	20.28
121	1,2,4-trichlorobenzene	1.483	1.748	-17.9	102	0.00	20.28
122 m	1,2,3-trichlorobenzene	1.503	1.797	-19.6	103	0.00	20.74
123	hexachloroethane	0.487	0.590	-21.1	106	0.00	19.07
		True	Calc.	% Drift			
124	2-methylnaphthalene	25.000	23.436	6.3	102	0.00	21.61
		AvgRF	CCRF	% Dev			
125	bis(chloromethyl)ether		----------NA----------				
126	ethylenimine		----------NA----------				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
X181287.D MX7749.M Thu May 09 14:52:52 2019 GCMSX

Initial Calibration Verification

Job Number: JC88209 **Sample:** VX7749-ICV7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181293.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\MSDCHEM\1\DATA\VX7749\X181293.D Vial: 15
Acq On : 2 May 2019 11:14 pm Operator: juntaep
Sample : icv7749-50 Inst : ACC-VOA-M
Misc : MS34046,VX7749,5,,,,1 Multiplr: 1.00
MS Integration Params: ACETONE.P

Method : C:\MSDCHEM\1\METHODS\MX7749.M (RTE Integrator)
Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
Last Update : Thu May 09 14:26:25 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 30% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	107	-0.01	7.39
2		ethanol		----------NA----------				
3		tertiary butyl alcohol		----------NA----------				
4		1,4-dioxane		----------NA----------				
5	I	pentafluorobenzene	1.000	1.000	0.0	107	0.00	10.20
6		chlorodifluoromethane		----------NA----------				
7		dichlorodifluoromethane		----------NA----------				
8		chloromethane		----------NA----------				
9		vinyl chloride		----------NA----------				
10		bromomethane		----------NA----------				
11		chloroethane		----------NA----------				
12		vinyl bromide		----------NA----------				
13		trichlorofluoromethane		----------NA----------				
14		1,3-butadiene		----------NA----------				
15		ethyl ether		----------NA----------				
16		acrolein		----------NA----------				
17		1,1-dichloroethene		----------NA----------				
18		freon 113		----------NA----------				
19		acetone		----------NA----------				
20		acetonitrile	0.087	0.092	-5.7	117	0.00	7.10
21		iodomethane		----------NA----------				
22		carbon disulfide		----------NA----------				
23		methylene chloride		----------NA----------				
24		methyl acetate		----------NA----------				
25		methyl tert butyl ether		----------NA----------				
26		trans-1,2-dichloroethene		----------NA----------				
27		hexane		----------NA----------				
28		di-isopropyl ether		----------NA----------				
29		2-butanone		----------NA----------				
30		1,1-dichloroethane		----------NA----------				
31		chloroprene		----------NA----------				
32		acrylonitrile	0.163	0.165	-1.2	103	0.00	7.78
33		vinyl acetate		----------NA----------				
34		ethyl tert-butyl ether		----------NA----------				
35		ethyl acetate		----------NA----------				
36		2,2-dichloropropane		----------NA----------				
37		cis-1,2-dichloroethene		----------NA----------				
38		methyl acrylate		----------NA----------				
39		propionitrile		----------NA----------				
40		tert-butyl formate		----------NA----------				
41		bromochloromethate		----------NA----------				

Job Number: JC88209 **Sample:** VX7749-ICV7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181293.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran		----------NA----------					
43		chloroform		----------NA----------					
44	S	dibromofluoromethane (s)	0.407	0.415	-2.0	110	0.00		10.21
45		methacrylonitrile		----------NA----------					
46		1,1,1-trichloroethane		----------NA----------					
47		cyclohexane		----------NA----------					
48	m	tert amyl alcohol		----------NA----------					
49		1,1-dichloropropene		----------NA----------					
50		isobutyl alcohol		----------NA----------					
51		carbon tetrachloride		----------NA----------					
52		isopropyl acetate		----------NA----------					
53	I	1,4-difluorobenzene	1.000	1.000	0.0	105	0.00		11.39
54	S	1,2-dichloroethane-d4 (s)	0.330	0.343	-3.9	113	0.00		10.75
55		iso-octane		----------NA----------					
56		epichlorohydrin		----------NA----------					
57		n-butyl alcohol		----------NA----------					
58		benzene		----------NA----------					
59		tert-amyl methyl ether		----------NA----------					
60		heptane		----------NA----------					
61		1,2-dichloroethane		----------NA----------					
62		trichloroethene		----------NA----------					
63	m	ethyl acrylate		----------NA----------					
64		2-nitropropane		----------NA----------					
65		2-chloroethyl vinyl ether		----------NA----------					
66		methyl methacrylate		----------NA----------					
67		1,2-dichloropropane		----------NA----------					
68		dibromomethane		----------NA----------					
69		methylcyclohexane		----------NA----------					
70		bromodichloromethane		----------NA----------					
71		cis-1,3-dichloropropene		----------NA----------					
72		4-methyl-2-pentanone		----------NA----------					
73		3-methyl-1-butanol		----------NA----------					
74	I	chlorobenzene-d5	1.000	1.000	0.0	101	0.00		15.60
75	S	toluene-d8 (s)	1.199	1.234	-2.9	105	0.00		13.57
76		toluene		----------NA----------					
77		trans-1,3-dichloropropene		----------NA----------					
78		ethyl methacrylate		----------NA----------					
79		1,1,2-trichloroethane		----------NA----------					
80		tetrachloroethene	0.271	0.284	-4.8	106	0.00		14.42
81		1,3-dichloropropane		----------NA----------					
82		2-hexanone		----------NA----------					
83		butyl acetate		----------NA----------					
84		dibromochloromethane		----------NA----------					
85		1,2-dibromoethane		----------NA----------					
86	m	n-butyl ether		----------NA----------					
87		chlorobenzene		----------NA----------					
88		1,1,1,2-tetrachloroethane		----------NA----------					
89		ethylbenzene		----------NA----------					
90		m,p-xylene		----------NA----------					
91		o-xylene		----------NA----------					
92		styrene		----------NA----------					
93		butyl acrylate		----------NA----------					
94		bromoform		----------NA----------					
95		isopropylbenzene		----------NA----------					
96		cis-1,4-dichloro-2-butene		----------NA----------					
97	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	129	0.00		18.39
98	S	4-bromofluorobenzene (s)	0.819	0.769	6.1	113	0.00		17.11

Initial Calibration Verification

Job Number: JC88209 **Sample:** VX7749-ICV7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181293.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99	bromobenzene	----------NA----------	
100	1,1,2,2-tetrachloroethane	----------NA----------	
101	trans-1,4-dichloro-2-bute	----------NA----------	
102	1,2,3-trichloropropane	----------NA----------	
103	n-propylbenzene	----------NA----------	
104	2-chlorotoluene	----------NA----------	
105	4-chlorotoluene	----------NA----------	
106	1,3,5-trimethylbenzene	----------NA----------	
107	tert-butylbenzene	----------NA----------	
108	1,2,4-trimethylbenzene	----------NA----------	
109	sec-butylbenzene	----------NA----------	
110	1,3-dichlorobenzene	----------NA----------	
111	p-isopropyltoluene	----------NA----------	
112	1,4-dichlorobenzene	----------NA----------	
113	1,2-dichlorobenzene	----------NA----------	
114	benzyl chloride	----------NA----------	
115	n-butylbenzene	----------NA----------	
116	1,2-dibromo-3-chloropropa	----------NA----------	
117	1,3,5-trichlorobenzene	----------NA----------	
118	hexachlorobutadiene	----------NA----------	
119	naphthalene	----------NA----------	
120	2-ethylhexyl acrylate	----------NA----------	
121	1,2,4-trichlorobenzene	----------NA----------	
122 m	1,2,3-trichlorobenzene	----------NA----------	
123	hexachloroethane	----------NA----------	
	---------- True	Calc.	% Drift ----------
124	2-methylnaphthalene	----------NA----------	
	---------- AvgRF	CCRF	% Dev ----------
125	bis(chloromethyl)ether	----------NA----------	
126	ethylenimine	----------NA----------	

(#) = Out of Range SPCC's out = 0 CCC's out = 0
X181287.D MX7749.M Thu May 09 14:52:53 2019 GCMSX

Continuing Calibration Summary

Job Number: JC88209 **Sample:** VX7769-CC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181595.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ke...y 29\vx7769\x181595.d Vial: 2
Acq On : 28 May 2019 7:07 am Operator: payalr
Sample : CC7749-20 Inst : ACC-VOA-MSX
Misc : MS34959,VX7769,5,,,,1 Multiplr: 1.00
MS Integration Params: ACETONE.P

Method : C:\MSDCHEM\1\METHODS\MX7749.M (RTE Integrator)
Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
Last Update : Thu May 09 14:26:25 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 20% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	120	0.00	7.41
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.134	1.051	7.3	112	0.00	7.55
4		1,4-dioxane	0.093	0.101	-8.6	125	0.02	12.26
5	I	pentafluorobenzene	1.000	1.000	0.0	129	0.01	10.21
6		chlorodifluoromethane	1.528	1.541	-0.9	131	0.00	3.90
7		dichlorodifluoromethane	1.518	1.718	-13.2	142	0.00	3.87
8		chloromethane	1.926	1.934	-0.4	131	0.00	4.28
9		vinyl chloride	1.588	1.664	-4.8	139	0.00	4.52
10		bromomethane	0.790	0.839	-6.2	142	0.01	5.14
11		chloroethane	0.532	0.530	0.4	136	0.00	5.32
12		vinyl bromide	0.595	0.664	-11.6	151	0.01	5.67
13		trichlorofluoromethane	0.968	0.974	-0.6	132	0.01	5.82
14		1,3-butadiene	0.678	0.686	-1.2	138	0.01	4.54
15		ethyl ether	0.215	0.230	-7.0	137	0.01	6.23
16		acrolein	0.100	0.067	33.0#	84	0.01	6.45
17		1,1-dichloroethene	0.361	0.396	-9.7	145	0.02	6.68
18		freon 113	0.580	0.625	-7.8	142	0.02	6.71
19		acetone	0.131	0.099	24.4#	93	0.02	6.67
20		acetonitrile	0.087	0.066	24.1#	96	0.02	7.12
21		iodomethane	0.694	0.684	1.4	129	0.02	6.95
22		carbon disulfide	1.282	1.307	-2.0	137	0.02	7.11
23		methylene chloride	0.456	0.459	-0.7	137	0.01	7.47
24		methyl acetate	0.347	0.280	19.3	107	0.02	7.21
25		methyl tert butyl ether	1.570	1.392	11.3	120	0.01	7.90
26		trans-1,2-dichloroethene	0.390	0.417	-6.9	140	0.01	7.93
27		hexane	0.571	0.620	-8.6	144	0.02	8.37
28		di-isopropyl ether	1.801	1.609	10.7	122	0.02	8.63
29		2-butanone	0.045	0.044	2.2	120	0.02	9.41
30		1,1-dichloroethane	0.747	0.772	-3.3	135	0.01	8.61
31		chloroprene	0.556	0.547	1.6	124	0.02	8.74
32		acrylonitrile	0.163	0.150	8.0	114	0.01	7.79
33		vinyl acetate	0.076	0.082	-7.9	136	0.01	8.54
34		ethyl tert-butyl ether	1.667	1.565	6.1	124	0.01	9.19
35		ethyl acetate	0.070	0.065	7.1	106	0.02	9.45
36		2,2-dichloropropane	0.766	0.764	0.3	137	0.02	9.54
37		cis-1,2-dichloroethene	0.449	0.482	-7.3	141	0.01	9.50
38		methyl acrylate	0.053	0.055	-3.8	119	0.02	9.56
39		propionitrile	0.064	0.058	9.4	112	0.01	9.49
40		tert-butyl formate	0.419	0.372	11.2	115	0.02	10.03
41		bromochloromethane	0.229	0.248	-8.3	138	0.00	9.86

Continuing Calibration Summary

Job Number: JC88209 **Sample:** VX7769-CC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181595.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.055	0.054	1.8	114	0.01	9.90
43		chloroform	0.729	0.745	-2.2	138	0.02	9.99
44	S	dibromofluoromethane (s)	0.407	0.410	-0.7	132	0.01	10.22
45		methacrylonitrile	0.165	0.157	4.8	119	0.02	9.75
46		1,1,1-trichloroethane	0.749	0.753	-0.5	134	0.01	10.31
47		cyclohexane	0.828	0.863	-4.2	132	0.00	10.46
48	m	tert amyl alcohol	0.026	0.022	15.4	108	0.01	10.71
49		1,1-dichloropropene	0.481	0.515	-7.1	134	0.02	10.54
50		isobutyl alcohol		----------NA----------				
51		carbon tetrachloride	0.629	0.638	-1.4	134	0.01	10.57
52		isopropyl acetate	0.086	0.088	-2.3	124	0.02	10.76
53	I	1,4-difluorobenzene	1.000	1.000	0.0	134	0.01	11.40
54	S	1,2-dichloroethane-d4 (s)	0.330	0.298	9.7	118	0.01	10.76
55		iso-octane	0.888	0.886	0.2	142	0.01	11.00
56		epichlorohydrin	0.035	0.029	17.1	111	0.02	12.98
57		n-butyl alcohol	0.011	0.009	18.2	109	0.02	11.48
58		benzene	1.160	1.177	-1.5	138	0.01	10.84
59		tert-amyl methyl ether	1.127	1.021	9.4	125	0.01	10.98
60		heptane	0.177	0.197	-11.3	146	0.02	11.22
61		1,2-dichloroethane	0.391	0.343	12.3	121	0.01	10.88
62		trichloroethene	0.304	0.322	-5.9	138	0.01	11.81
63	m	ethyl acrylate	0.382	0.343	10.2	111	0.02	11.81
64		2-nitropropane	0.089	0.065	27.0#	99	0.01	12.80
65		2-chloroethyl vinyl ether	0.216	0.210	2.8	122	0.01	12.89
66		methyl methacrylate	0.081	0.076	6.2	122	0.02	12.17
67		1,2-dichloropropane	0.128	0.130	-1.6	130	0.01	12.18
68		dibromomethane	0.193	0.187	3.1	127	0.01	12.32
69		methylcyclohexane	0.533	0.567	-6.4	148	0.01	12.21
70		bromodichloromethane	0.432	0.417	3.5	131	0.01	12.55
71		cis-1,3-dichloropropene	0.520	0.546	-5.0	141	0.01	13.17
72		4-methyl-2-pentanone	0.131	0.123	6.1	117	0.01	13.31
73		3-methyl-1-butanol	0.011	0.010	9.1	114	0.01	13.34
74	I	chlorobenzene-d5	1.000	1.000	0.0	138	0.01	15.62
75	S	toluene-d8 (s)	1.199	1.171	2.3	136	0.01	13.59
76		toluene	0.743	0.737	0.8	139	0.01	13.69
77		trans-1,3-dichloropropene	0.482	0.478	0.8	134	0.01	13.95
78		ethyl methacrylate	0.397	0.368	7.3	120	0.02	13.97
79		1,1,2-trichloroethane	0.252	0.245	2.8	133	0.01	14.24
80		tetrachloroethene	0.271	0.281	-3.7	141	0.02	14.44
81		1,3-dichloropropane	0.473	0.465	1.7	133	0.01	14.48
82		2-hexanone	0.120	0.104	13.3	113	0.01	14.48
83		butyl acetate	0.243	0.212	12.8	120	0.02	14.62
84		dibromochloromethane	0.352	0.337	4.3	134	0.01	14.80
85		1,2-dibromoethane	0.337	0.333	1.2	131	0.01	15.00
86	m	n-butyl ether	1.341	1.265	5.7	130	0.01	15.67
87		chlorobenzene	0.849	0.843	0.7	139	0.01	15.66
88		1,1,1,2-tetrachloroethane	0.375	0.364	2.9	134	0.01	15.75
89		ethylbenzene	1.390	1.360	2.2	136	0.02	15.76
90		m,p-xylene	0.555	0.556	-0.2	140	0.01	15.92
91		o-xylene	1.274	1.267	0.5	140	0.01	16.44
92		styrene	0.920	0.918	0.2	138	0.01	16.46
93		butyl acrylate	0.775	0.632	18.5	115	0.02	16.26
94		bromoform	0.248	0.231	6.9	130	0.01	16.73
95		isopropylbenzene	1.633	1.607	1.6	139	0.02	16.89
96		cis-1,4-dichloro-2-butene	0.135	0.122	9.6	124	0.01	16.93
97	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	132	0.01	18.40
98	S	4-bromofluorobenzene (s)	0.819	0.853	-4.2	134	0.01	17.12

Continuing Calibration Summary

Job Number: JC88209 **Sample:** VX7769-CC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181595.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99	bromobenzene	0.725	0.760	-4.8	138	0.01	17.32
100	1,1,2,2-tetrachloroethane	0.784	0.754	3.8	128	0.01	17.22
101	trans-1,4-dichloro-2-bute	0.178	0.153	14.0	110	0.01	17.26
102	1,2,3-trichloropropane	0.197	0.189	4.1	120	0.00	17.31
103	n-propylbenzene	3.022	3.155	-4.4	141	0.01	17.38
104	2-chlorotoluene	0.685	0.733	-7.0	141	0.01	17.52
105	4-chlorotoluene	1.840	1.879	-2.1	139	0.01	17.64
106	1,3,5-trimethylbenzene	2.297	2.425	-5.6	138	0.01	17.57
107	tert-butylbenzene	2.087	2.182	-4.6	137	0.01	17.93
108	1,2,4-trimethylbenzene	2.396	2.507	-4.6	139	0.01	17.99
109	sec-butylbenzene	3.161	3.316	-4.9	142	0.01	18.17
110	1,3-dichlorobenzene	1.397	1.426	-2.1	137	0.01	18.33
111	p-isopropyltoluene	2.752	2.825	-2.7	140	0.01	18.31
112	1,4-dichlorobenzene	1.355	1.372	-1.3	137	0.01	18.43
113	1,2-dichlorobenzene	1.542	1.588	-3.0	136	0.01	18.80
114	benzyl chloride	1.558	1.547	0.7	133	0.01	18.52
115	n-butylbenzene	1.312	1.394	-6.2	141	0.00	18.72
116	1,2-dibromo-3-chloropropa	0.257	0.229	10.9	114	0.01	19.52
117	1,3,5-trichlorobenzene	1.547	1.672	-8.1	139	0.01	19.70
118	hexachlorobutadiene	0.527	0.572	-8.5	148	0.01	20.39
119	naphthalene	3.658	3.512	4.0	122	0.00	20.55
120	2-ethylhexyl acrylate	0.665	0.418	37.1#	139	0.01	20.29
121	1,2,4-trichlorobenzene	1.483	1.663	-12.1	135	0.01	20.29
122 m	1,2,3-trichlorobenzene	1.503	1.645	-9.4	132	0.01	20.75
123	hexachloroethane	0.487	0.510	-4.7	142	0.01	19.08
		True	Calc.	% Drift			
124	2-methylnaphthalene	10.000	8.637	13.6	130	0.02	21.63
		AvgRF	CCRF	% Dev			
125	bis(chloromethyl)ether		NA				
126	ethylenimine		NA				

(#) = Out of Range SPCC's out = 0 CCC's out = 0
X181286.D MX7749.M Tue May 28 23:30:00 2019

Continuing Calibration Summary

Job Number: JC88209 **Sample:** VX7769-ECC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181615.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

Evaluate Continuing Calibration Report

Data File : C:\msdchem\1\data\ke...y 29\vx7769\x181615.d Vial: 22
Acq On : 28 May 2019 5:42 pm Operator: jessicap
Sample : ecc7749-50 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,1 Multiplr: 1.00
MS Integration Params: ACETONE.P

Method : C:\MSDCHEM\1\METHODS\MX7749.M (RTE Integrator)
Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
Last Update : Thu May 09 14:26:25 2019
Response via : Multiple Level Calibration

Min. RRF : 0.000 Min. Rel. Area : 50% Max. R.T. Dev 0.50min
Max. RRF Dev : 50% Max. Rel. Area : 200%

		Compound	AvgRF	CCRF	%Dev	Area%	Dev(min)	R.T.
1	I	tert butyl alcohol-d9	1.000	1.000	0.0	114	0.03	7.43
2		ethanol		----------NA----------				
3		tertiary butyl alcohol	1.134	1.200	-5.8	118	0.02	7.57
4		1,4-dioxane	0.093	0.109	-17.2	124	0.03	12.27
5	I	pentafluorobenzene	1.000	1.000	0.0	108	0.03	10.22
6		chlorodifluoromethane	1.528	1.764	-15.4	123	0.02	3.92
7		dichlorodifluoromethane	1.518	1.679	-10.6	111	0.01	3.89
8		chloromethane	1.926	2.024	-5.1	114	0.02	4.29
9		vinyl chloride	1.588	1.808	-13.9	125	0.03	4.54
10		bromomethane	0.790	1.001	-26.7	133	0.03	5.17
11		chloroethane	0.532	0.662	-24.4	130	0.03	5.34
12		vinyl bromide	0.595	0.846	-42.2	142	0.03	5.69
13		trichlorofluoromethane	0.968	1.218	-25.8	130	0.03	5.84
14		1,3-butadiene	0.678	0.851	-25.5	138	0.03	4.56
15		ethyl ether	0.215	0.269	-25.1	132	0.02	6.24
16		acrolein	0.100	0.103	-3.0	119	0.02	6.46
17		1,1-dichloroethene	0.361	0.486	-34.6	150	0.02	6.69
18		freon 113	0.580	0.714	-23.1	130	0.02	6.72
19		acetone	0.131	0.129	1.5	111	0.03	6.68
20		acetonitrile	0.087	0.085	2.3	110	0.02	7.13
21		iodomethane	0.694	0.889	-28.1	138	0.03	6.96
22		carbon disulfide	1.282	1.678	-30.9	143	0.03	7.12
23		methylene chloride	0.456	0.557	-22.1	140	0.03	7.48
24		methyl acetate	0.347	0.323	6.9	108	0.03	7.21
25		methyl tert butyl ether	1.570	1.715	-9.2	121	0.02	7.91
26		trans-1,2-dichloroethene	0.390	0.481	-23.3	139	0.03	7.95
27		hexane	0.571	0.601	-5.3	115	0.03	8.38
28		di-isopropyl ether	1.801	1.769	1.8	112	0.03	8.64
29		2-butanone	0.045	0.056	-24.4	123	0.03	9.42
30		1,1-dichloroethane	0.747	0.877	-17.4	130	0.02	8.62
31		chloroprene	0.556	0.638	-14.7	123	0.03	8.75
32		acrylonitrile	0.163	0.191	-17.2	120	0.02	7.80
33		vinyl acetate	0.076	0.094	-23.7	131	0.03	8.56
34		ethyl tert-butyl ether	1.667	1.833	-10.0	116	0.03	9.21
35		ethyl acetate	0.070	0.068	2.9	99	0.04	9.47
36		2,2-dichloropropane	0.766	0.869	-13.4	129	0.02	9.55
37		cis-1,2-dichloroethene	0.449	0.528	-17.6	133	0.02	9.51
38		methyl acrylate	0.053	0.066	-24.5	118	0.03	9.56
39		propionitrile	0.064	0.070	-9.4	114	0.02	9.50
40		tert-butyl formate	0.419	0.408	2.6	104	0.03	10.05
41		bromochloromethane	0.229	0.274	-19.7	127	0.02	9.88

Continuing Calibration Summary

Job Number: JC88209 **Sample:** VX7769-ECC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181615.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

42		tetrahydrofuran	0.055	0.068	-23.6	126	0.02	9.90
43		chloroform	0.729	0.831	-14.0	129	0.03	10.00
44	S	dibromofluoromethane (s)	0.407	0.448	-10.1	121	0.03	10.24
45		methacrylonitrile	0.165	0.193	-17.0	121	0.03	9.76
46		1,1,1-trichloroethane	0.749	0.921	-23.0	129	0.03	10.33
47		cyclohexane	0.828	0.910	-9.9	111	0.03	10.48
48	m	tert amyl alcohol	0.026	0.029	-11.5	123	0.03	10.72
49		1,1-dichloropropene	0.481	0.581	-20.8	131	0.03	10.55
50		isobutyl alcohol		----------NA----------				
51		carbon tetrachloride	0.629	0.737	-17.2	125	0.03	10.58
52		isopropyl acetate	0.086	0.105	-22.1	122	0.03	10.77
53	I	1,4-difluorobenzene	1.000	1.000	0.0	115	0.03	11.42
54	S	1,2-dichloroethane-d4 (s)	0.330	0.303	8.2	109	0.03	10.77
55		iso-octane	0.888	0.977	-10.0	126	0.03	11.01
56		epichlorohydrin	0.035	0.035	0.0	114	0.02	12.99
57		n-butyl alcohol	0.011	0.012	-9.1	115	0.03	11.49
58		benzene	1.160	1.239	-6.8	128	0.03	10.86
59		tert-amyl methyl ether	1.127	1.129	-0.2	119	0.03	10.99
60		heptane	0.177	0.182	-2.8	116	0.03	11.24
61		1,2-dichloroethane	0.391	0.372	4.9	117	0.03	10.89
62		trichloroethene	0.304	0.348	-14.5	130	0.03	11.82
63	m	ethyl acrylate	0.382	0.401	-5.0	114	0.03	11.82
64		2-nitropropane	0.089	0.070	21.3	93	0.02	12.81
65		2-chloroethyl vinyl ether	0.216	0.216	0.0	111	0.02	12.90
66		methyl methacrylate	0.081	0.088	-8.6	120	0.03	12.18
67		1,2-dichloropropane	0.128	0.134	-4.7	119	0.03	12.20
68		dibromomethane	0.193	0.206	-6.7	122	0.03	12.34
69		methylcyclohexane	0.533	0.581	-9.0	127	0.03	12.23
70		bromodichloromethane	0.432	0.457	-5.8	124	0.02	12.56
71		cis-1,3-dichloropropene	0.520	0.568	-9.2	125	0.02	13.18
72		4-methyl-2-pentanone	0.131	0.138	-5.3	113	0.02	13.32
73		3-methyl-1-butanol	0.011	0.012	-9.1	117	0.02	13.35
74	I	chlorobenzene-d5	1.000	1.000	0.0	119	0.02	15.63
75	S	toluene-d8 (s)	1.199	1.152	3.9	116	0.02	13.60
76		toluene	0.743	0.768	-3.4	126	0.02	13.70
77		trans-1,3-dichloropropene	0.482	0.502	-4.1	125	0.02	13.96
78		ethyl methacrylate	0.397	0.418	-5.3	118	0.02	13.97
79		1,1,2-trichloroethane	0.252	0.267	-6.0	126	0.02	14.25
80		tetrachloroethene	0.271	0.285	-5.2	125	0.03	14.45
81		1,3-dichloropropane	0.473	0.470	0.6	124	0.03	14.49
82		2-hexanone	0.120	0.121	-0.8	118	0.02	14.49
83		butyl acetate	0.243	0.238	2.1	116	0.02	14.62
84		dibromochloromethane	0.352	0.373	-6.0	126	0.02	14.82
85		1,2-dibromoethane	0.337	0.370	-9.8	125	0.02	15.01
86	m	n-butyl ether	1.341	1.295	3.4	116	0.02	15.68
87		chlorobenzene	0.849	0.883	-4.0	128	0.02	15.67
88		1,1,1,2-tetrachloroethane	0.375	0.359	4.3	114	0.02	15.76
89		ethylbenzene	1.390	1.382	0.6	125	0.03	15.77
90		m,p-xylene	0.555	0.560	-0.9	126	0.02	15.93
91		o-xylene	1.274	1.256	1.4	121	0.02	16.45
92		styrene	0.920	0.926	-0.7	125	0.02	16.47
93		butyl acrylate	0.775	0.730	5.8	118	0.02	16.27
94		bromoform	0.248	0.261	-5.2	124	0.02	16.74
95		isopropylbenzene	1.633	1.633	0.0	119	0.02	16.90
96		cis-1,4-dichloro-2-butene	0.135	0.128	5.2	117	0.02	16.93
97	I	1,4-dichlorobenzene-d4	1.000	1.000	0.0	120	0.02	18.41
98	S	4-bromofluorobenzene (s)	0.819	0.876	-7.0	120	0.02	17.13

Continuing Calibration Summary

Job Number: JC88209 **Sample:** VX7769-ECC7749
Account: USACEPAP USACE-Philadelphia District **Lab FileID:** X181615.D
Project: Defense Supply Center (DSCP), 2990 South 20th Street, Philadelphia, PA

99	bromobenzene	0.725	0.779	-7.4	125	0.02	17.33
100	1,1,2,2-tetrachloroethane	0.784	0.860	-9.7	123	0.02	17.23
101	trans-1,4-dichloro-2-bute	0.178	0.177	0.6	114	0.02	17.27
102	1,2,3-trichloropropane	0.197	0.210	-6.6	122	0.02	17.32
103	n-propylbenzene	3.022	3.229	-6.8	124	0.02	17.39
104	2-chlorotoluene	0.685	0.764	-11.5	125	0.02	17.53
105	4-chlorotoluene	1.840	1.929	-4.8	127	0.02	17.66
106	1,3,5-trimethylbenzene	2.297	2.465	-7.3	120	0.02	17.58
107	tert-butylbenzene	2.087	2.394	-14.7	123	0.02	17.94
108	1,2,4-trimethylbenzene	2.396	2.502	-4.4	120	0.02	18.00
109	sec-butylbenzene	3.161	3.484	-10.2	122	0.02	18.18
110	1,3-dichlorobenzene	1.397	1.412	-1.1	126	0.02	18.34
111	p-isopropyltoluene	2.752	2.929	-6.4	122	0.02	18.32
112	1,4-dichlorobenzene	1.355	1.428	-5.4	127	0.02	18.44
113	1,2-dichlorobenzene	1.542	1.594	-3.4	123	0.02	18.80
114	benzyl chloride	1.558	1.639	-5.2	125	0.02	18.53
115	n-butylbenzene	1.312	1.480	-12.8	126	0.02	18.73
116	1,2-dibromo-3-chloropropa	0.257	0.298	-16.0	126	0.02	19.53
117	1,3,5-trichlorobenzene	1.547	1.709	-10.5	125	0.02	19.71
118	hexachlorobutadiene	0.527	0.581	-10.2	126	0.02	20.40
119	naphthalene	3.658	4.209	-15.1	126	0.02	20.56
120	2-ethylhexyl acrylate	0.665	0.771	-15.9	126	0.02	20.29
121	1,2,4-trichlorobenzene	1.483	1.776	-19.8	125	0.02	20.30
122 m	1,2,3-trichlorobenzene	1.503	1.828	-21.6	126	0.02	20.76
123	hexachloroethane	0.487	0.564	-15.8	122	0.02	19.09
		True	Calc.	% Drift			
124	2-methylnaphthalene	25.000	23.413	6.3	123	0.02	21.64
		AvgRF	CCRF	% Dev			
125	bis(chloromethyl)ether			NA			
126	ethylenimine			NA			

(#) = Out of Range SPCC's out = 0 CCC's out = 0
X181287.D MX7749.M Tue May 28 22:15:46 2019

MS Volatiles

Raw Data

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91019.d
Acq On : 24 May 2019 5:54 pm
Operator : CHELSEAS
Sample : jc88209-1 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,50
ALS Vial : 16 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:47:22 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

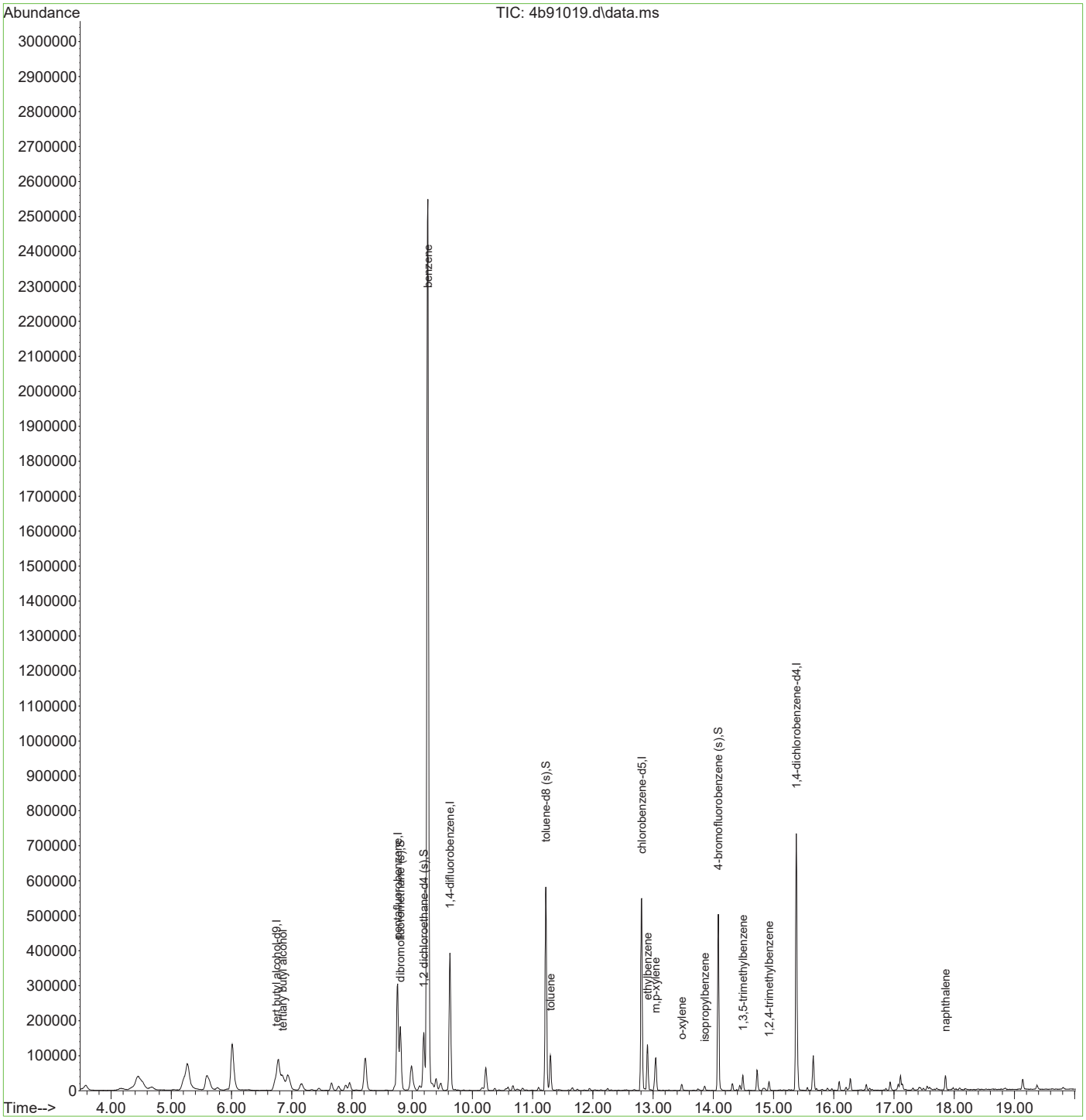
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.749	65	141002	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	256743	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	339180	50.00	ug/L	0.00
75) chlorobenzene-d5	12.811	117	313930	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	194705	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	119218	51.35	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.70%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	121822	54.47	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 108.94%			
76) toluene-d8 (s)	11.221	98	387626	49.06	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.12%			
99) 4-bromofluorobenzene (s)	14.082	95	164536	51.33	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.66%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	6.848	59	2236	5.61	ug/L	# 1
58) benzene	9.259	78	2520498	218.83	ug/L	99
77) toluene	11.294	92	42514	6.50	ug/L	99
90) ethylbenzene	12.905	91	95848	7.46	ug/L	99
91) m,p-xylene	13.041	106	32839	6.73	ug/L	98
92) o-xylene	13.475	91	10976	1.01	ug/L	95
95) isopropylbenzene	13.862	105	7680	0.56	ug/L	96
107) 1,3,5-trimethylbenzene	14.490	105	24435	2.03	ug/L	94
109) 1,2,4-trimethylbenzene	14.924	105	13785	1.14	ug/L	95
123) naphthalene	17.858	128	33314	2.75	ug/L	97

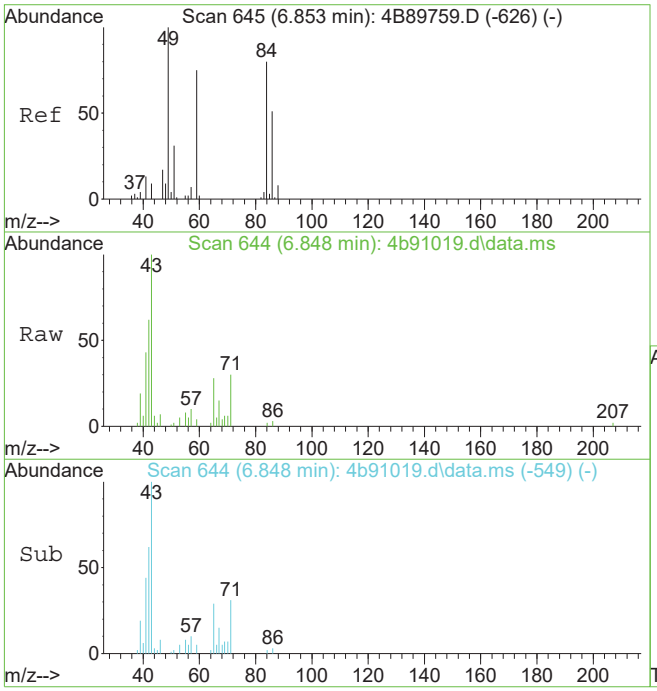
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91019.d
Acq On : 24 May 2019 5:54 pm
Operator : CHELSEAS
Sample : jc88209-1 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,50
ALS Vial : 16 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:47:22 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

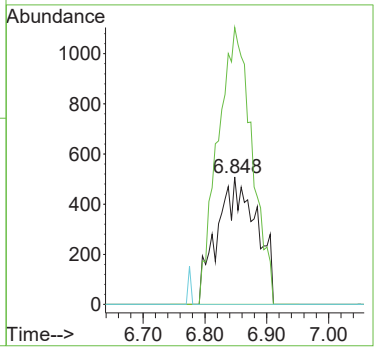


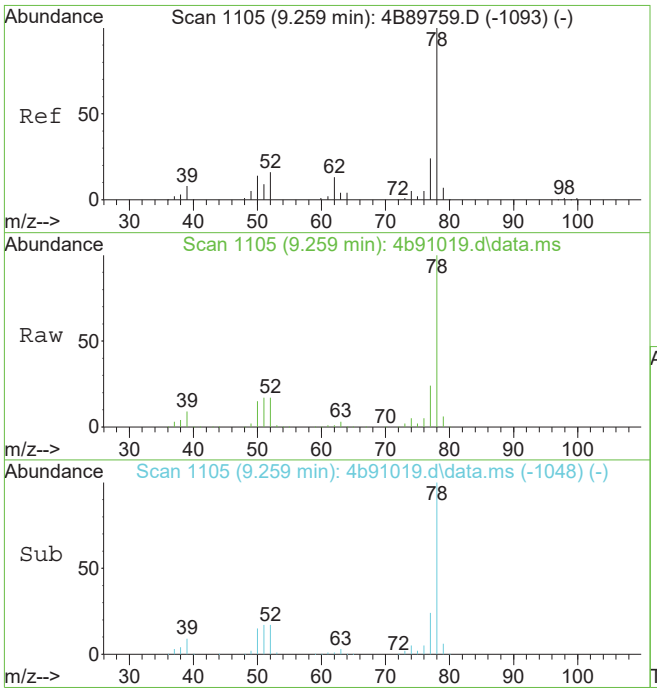


#3
tertiary butyl alcohol
Concen: 5.61 ug/L
RT: 6.848 min Scan# 644
Delta R.T. -0.005 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion: 59 Resp: 2236

Ion	Ratio	Lower	Upper
59	100		
57	217.5	0.0	39.9#
60	0.0	0.0	33.3

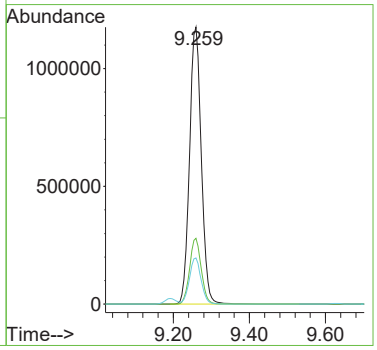


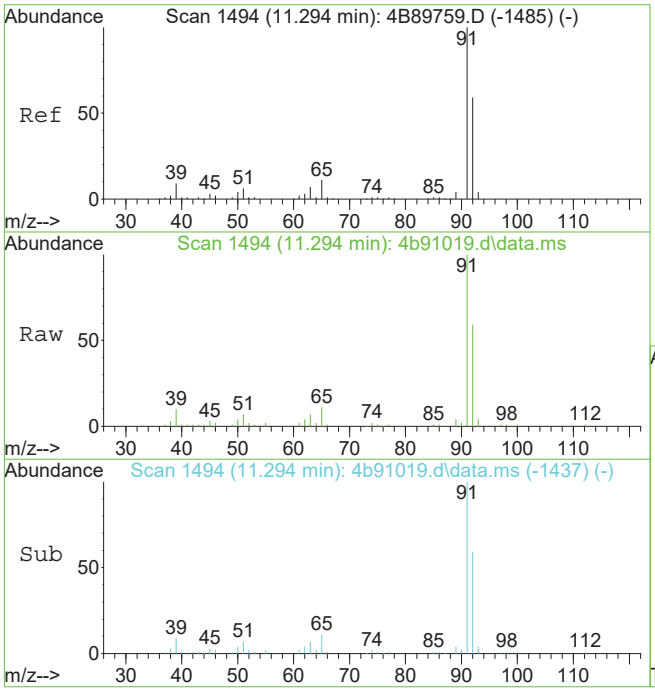


#58
benzene
Concen: 218.83 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion: 78 Resp: 2520498

Ion	Ratio	Lower	Upper
78	100		
77	23.7	0.0	53.9
51	16.6	0.0	47.3

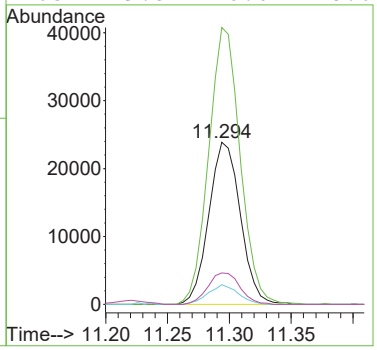


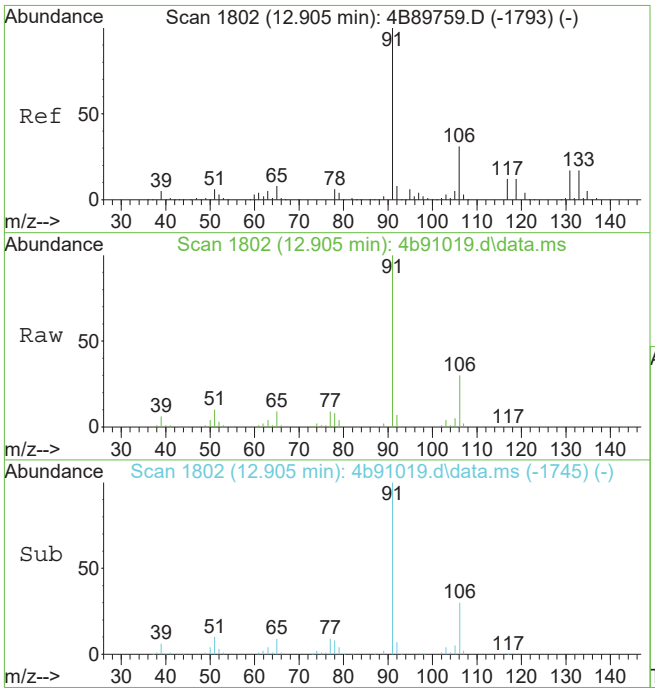


#77
toluene
Concen: 6.50 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion: 92 Resp: 42514

Ion	Ratio	Lower	Upper
92	100		
91	170.8	150.2	190.2
51	12.2	0.0	40.3
65	19.3	0.0	48.6

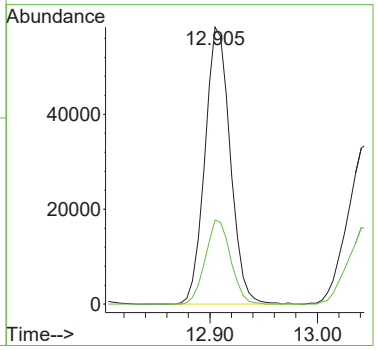


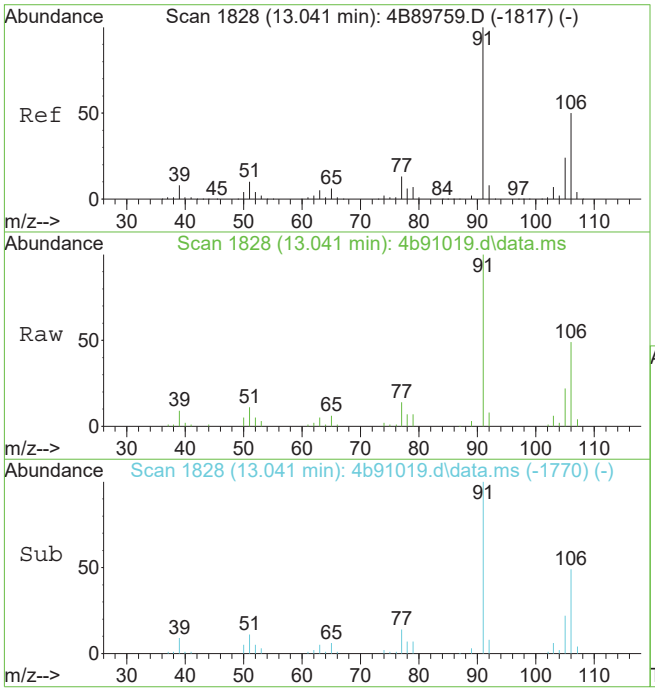


#90
ethylbenzene
Concen: 7.46 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. 0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion: 91 Resp: 95848

Ion	Ratio	Lower	Upper
91	100		
106	30.3	1.0	61.0

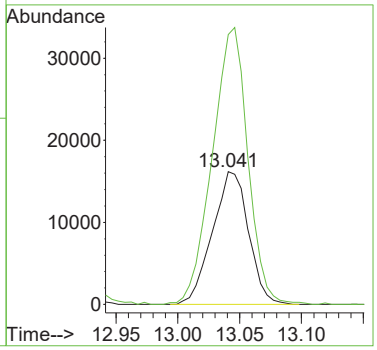


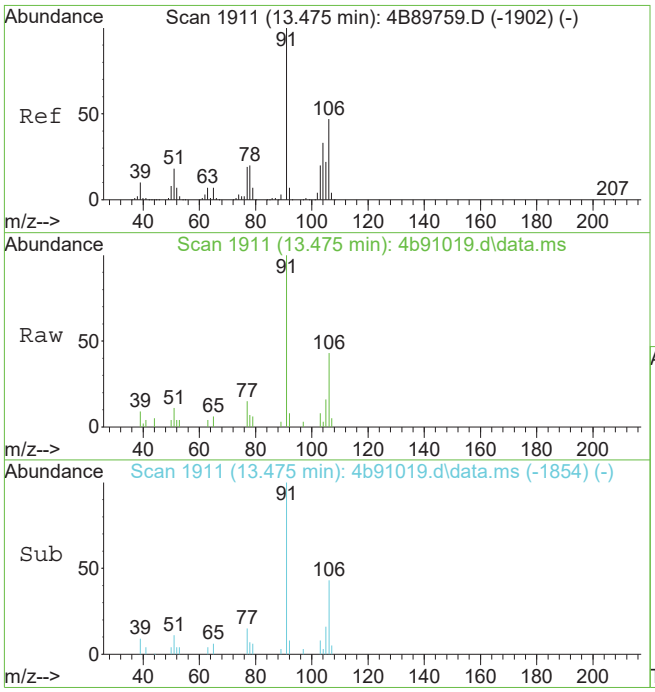


#91
m,p-xylene
Concen: 6.73 ug/L
RT: 13.041 min Scan# 1828
Delta R.T. 0.001 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion:106 Resp: 32839

Ion	Ratio	Lower	Upper
106	100		
91	202.1	169.3	229.3

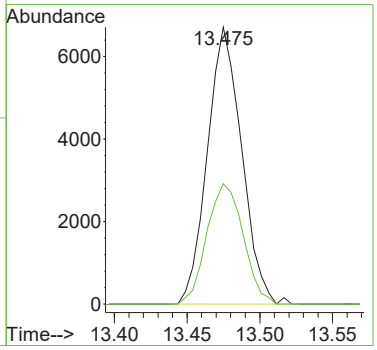


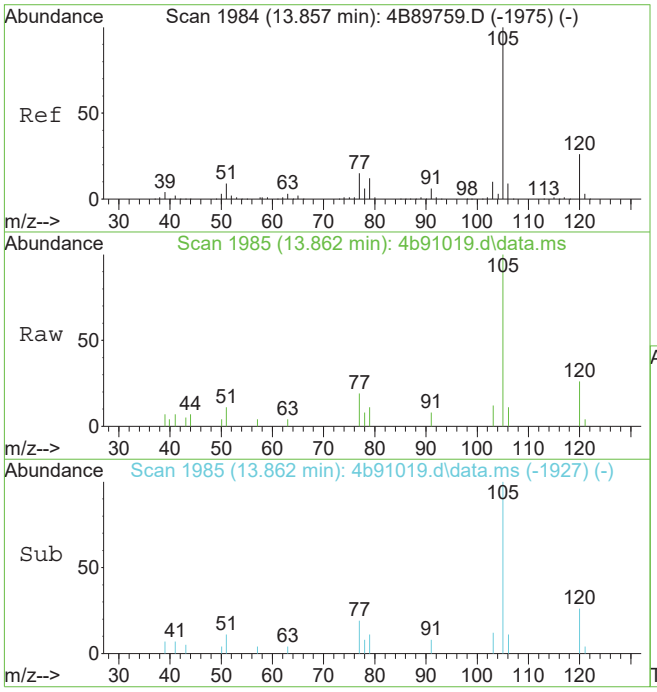


#92
o-xylene
Concen: 1.01 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. 0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion: 91 Resp: 10976

Ion	Ratio	Lower	Upper
91	100		
106	43.4	16.9	76.9

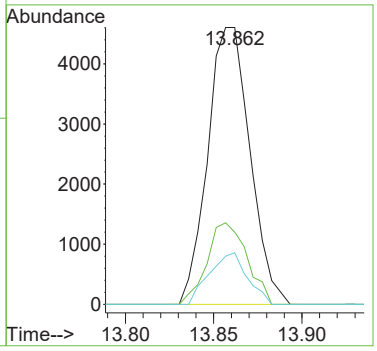


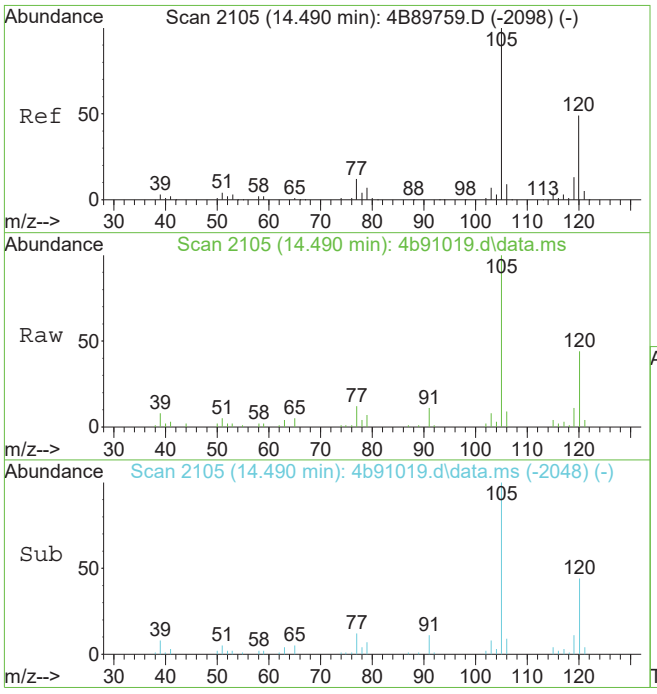


#95
isopropylbenzene
Concen: 0.56 ug/L
RT: 13.862 min Scan# 1985
Delta R.T. 0.005 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion:105 Resp: 7680

Ion	Ratio	Lower	Upper
105	100		
120	26.1	5.8	45.8
77	18.7	0.0	34.8

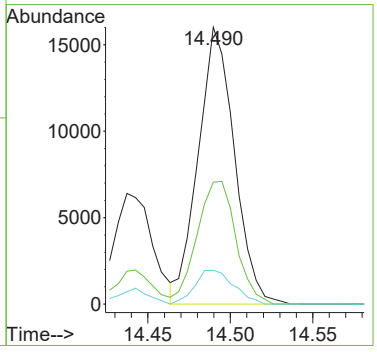


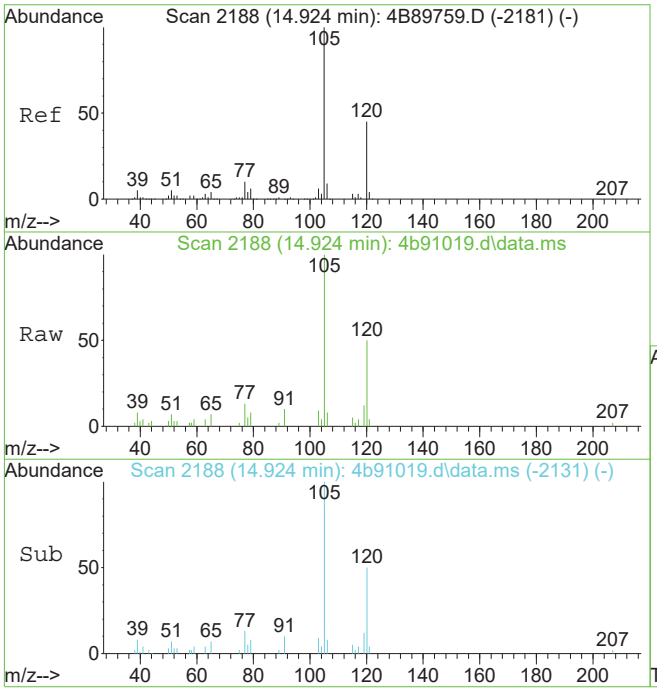


#107
1,3,5-trimethylbenzene
Concen: 2.03 ug/L
RT: 14.490 min Scan# 2105
Delta R.T. 0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion:105 Resp: 24435

Ion	Ratio	Lower	Upper
105	100		
120	44.0	19.2	79.2
77	12.2	0.0	42.1

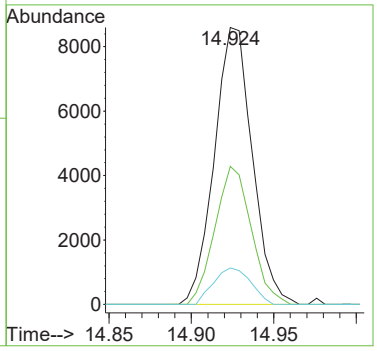


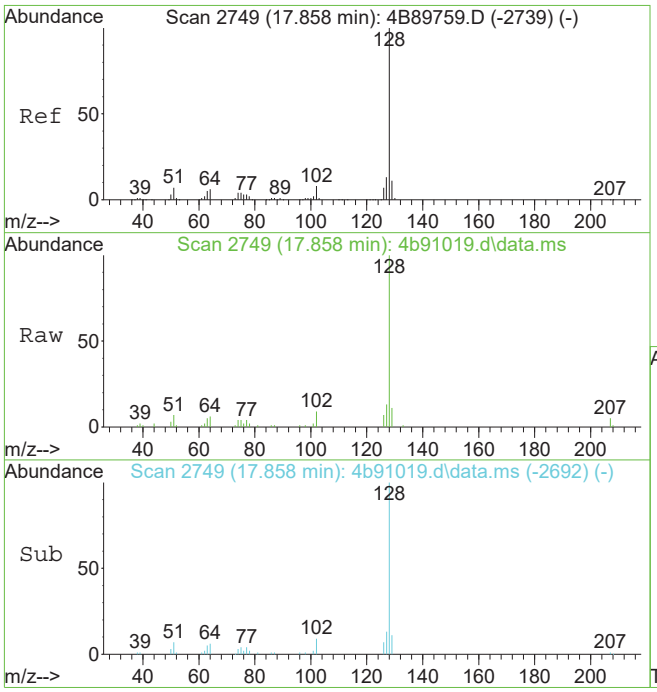


#109
1,2,4-trimethylbenzene
Concen: 1.14 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion:105 Resp: 13785

Ion	Ratio	Lower	Upper
105	100		
120	49.9	16.3	76.3
77	13.1	0.0	41.8

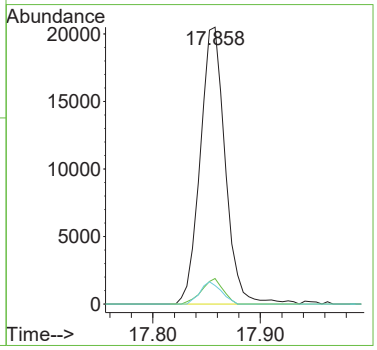




#123
naphthalene
Concen: 2.75 ug/L
RT: 17.858 min Scan# 2749
Delta R.T. 0.000 min
Lab File: 4b91019.d
Acq: 24 May 2019 5:54 pm

Tgt Ion:128 Resp: 33314

Ion	Ratio	Lower	Upper
128	100		
102	9.2	0.0	37.6
51	6.7	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\May 28\v4b3857\
Data File : 4b91020.d
Acq On : 24 May 2019 6:22 pm
Operator : CHELSEAS
Sample : jc88209-1 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,500
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 28 02:54:40 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

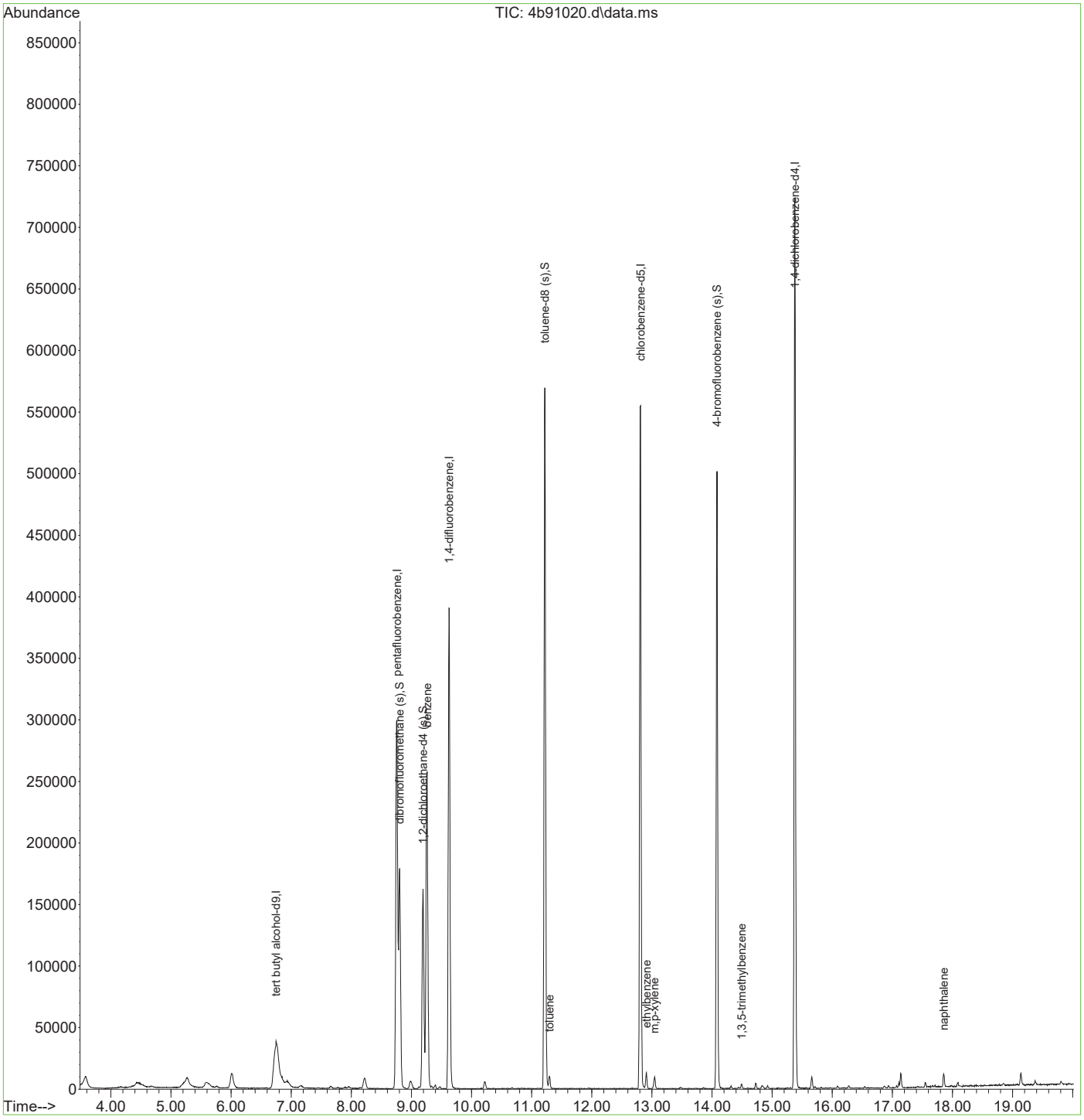
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.749	65	133871	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	255814	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	337878	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	316393	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	194628	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	118577	51.26	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.52%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	122627	55.04	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 110.08%			
76) toluene-d8 (s)	11.220	98	388077	48.74	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.48%			
99) 4-bromofluorobenzene (s)	14.081	95	166170	51.86	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.72%			
Target Compounds						Qvalue
58) benzene	9.259	78	252862	22.04	ug/L	99
77) toluene	11.294	92	4203	0.64	ug/L	96
90) ethylbenzene	12.910	91	9520	0.74	ug/L	99
91) m,p-xylene	13.041	106	3417	0.70	ug/L	92
107) 1,3,5-trimethylbenzene	14.489	105	2698	0.22	ug/L	95
123) naphthalene	17.858	128	9165	0.76	ug/L	97

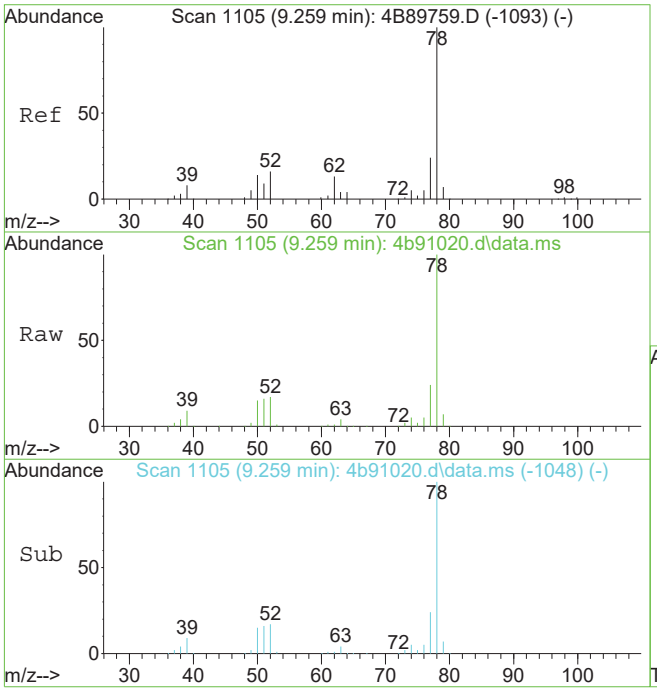
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\May 28\v4b3857\
Data File : 4b91020.d
Acq On : 24 May 2019 6:22 pm
Operator : CHELSEAS
Sample : jc88209-1 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,500
ALS Vial : 17 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 28 02:54:40 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

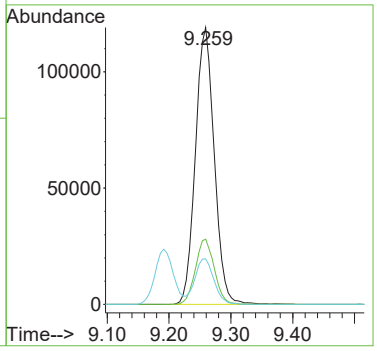


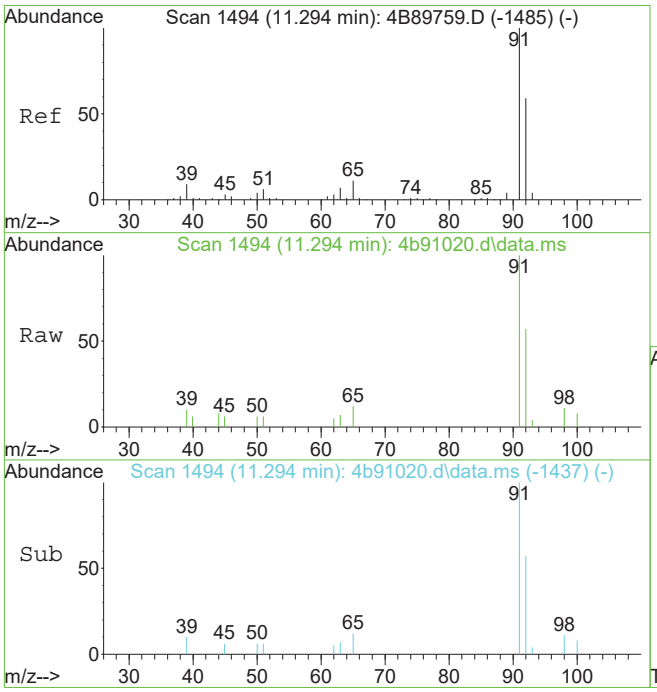


#58
benzene
Concen: 22.04 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91020.d
Acq: 24 May 2019 6:22 pm

Tgt Ion: 78 Resp: 252862

Ion	Ratio	Lower	Upper
78	100		
77	23.5	0.0	53.9
51	16.5	0.0	47.3

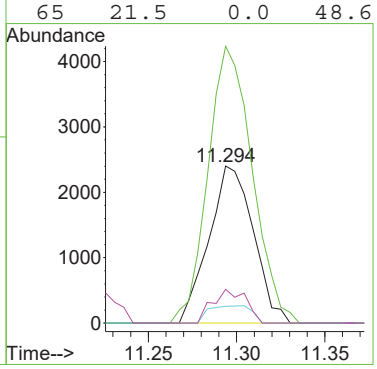


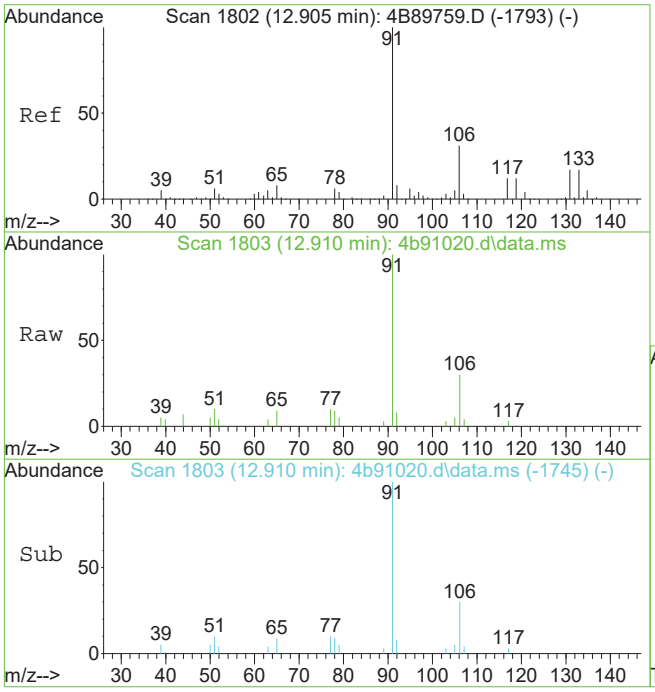


#77
toluene
Concen: 0.64 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91020.d
Acq: 24 May 2019 6:22 pm

Tgt Ion: 92 Resp: 4203

Ion	Ratio	Lower	Upper
92	100		
91	176.3	150.2	190.2
51	10.7	0.0	40.3
65	21.5	0.0	48.6

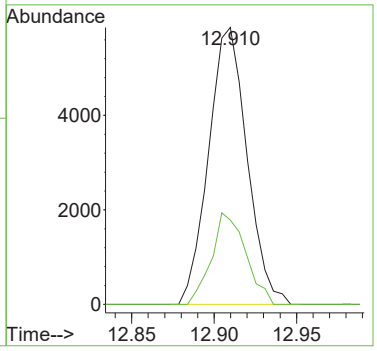


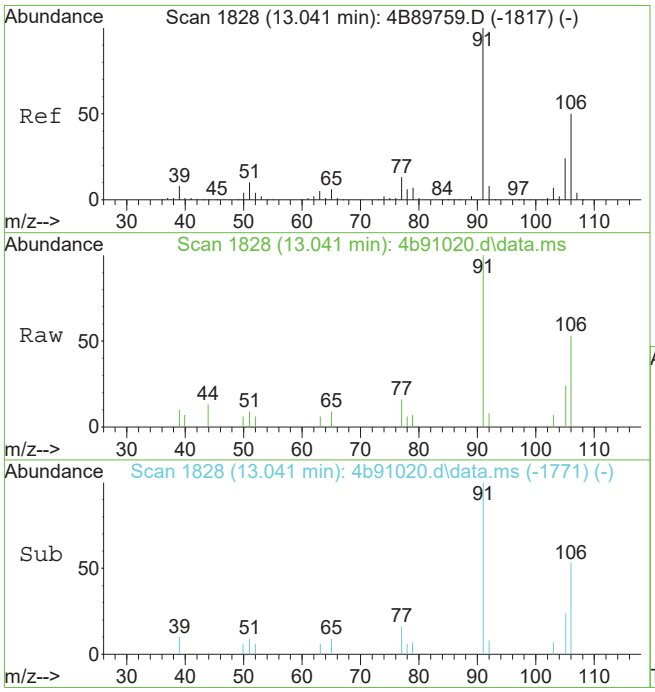


#90
ethylbenzene
Concen: 0.74 ug/L
RT: 12.910 min Scan# 1803
Delta R.T. 0.005 min
Lab File: 4b91020.d
Acq: 24 May 2019 6:22 pm

Tgt Ion: 91 Resp: 9520

Ion	Ratio	Lower	Upper
91	100		
106	30.4	1.0	61.0

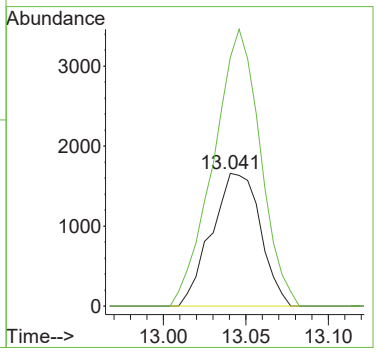


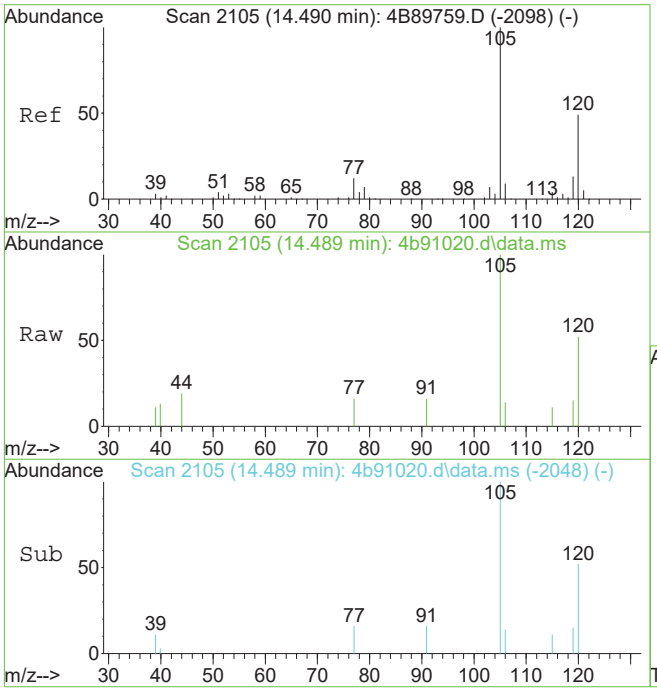


#91
m,p-xylene
Concen: 0.70 ug/L
RT: 13.041 min Scan# 1828
Delta R.T. 0.001 min
Lab File: 4b91020.d
Acq: 24 May 2019 6:22 pm

Tgt Ion:106 Resp: 3417

Ion	Ratio	Lower	Upper
106	100		
91	187.5	169.3	229.3

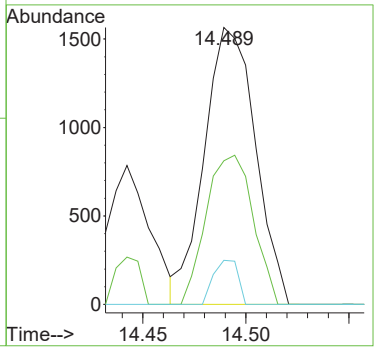


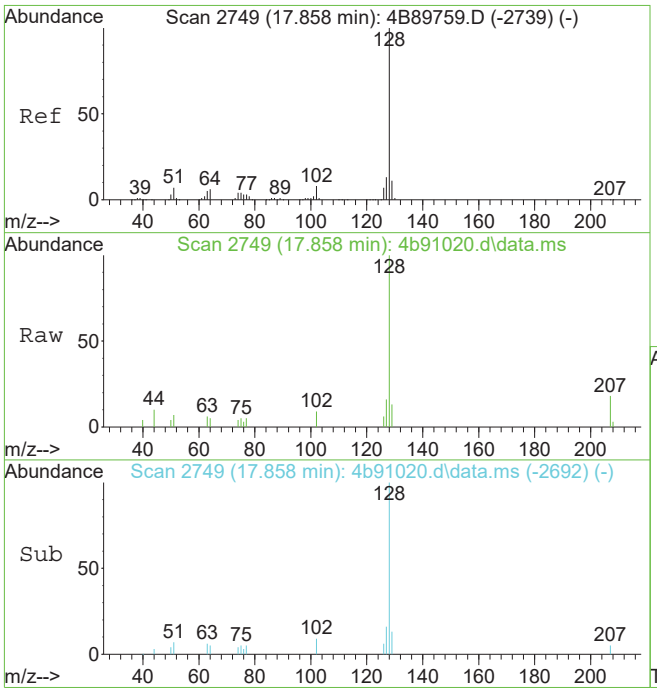


#107
1,3,5-trimethylbenzene
Concen: 0.22 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b91020.d
Acq: 24 May 2019 6:22 pm

Tgt Ion:105 Resp: 2698

Ion	Ratio	Lower	Upper
105	100		
120	51.9	19.2	79.2
77	16.0	0.0	42.1

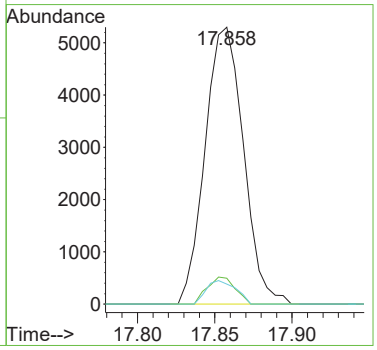




#123
naphthalene
Concen: 0.76 ug/L
RT: 17.858 min Scan# 2749
Delta R.T. -0.000 min
Lab File: 4b91020.d
Acq: 24 May 2019 6:22 pm

Tgt Ion:128 Resp: 9165

Ion	Ratio	Lower	Upper
128	100		
102	9.4	0.0	37.6
51	7.2	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181602.d
Acq On : 28 May 2019 11:25 am
Operator : jessicap
Sample : JC88209-1 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,20
ALS Vial : 9 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:12:22 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

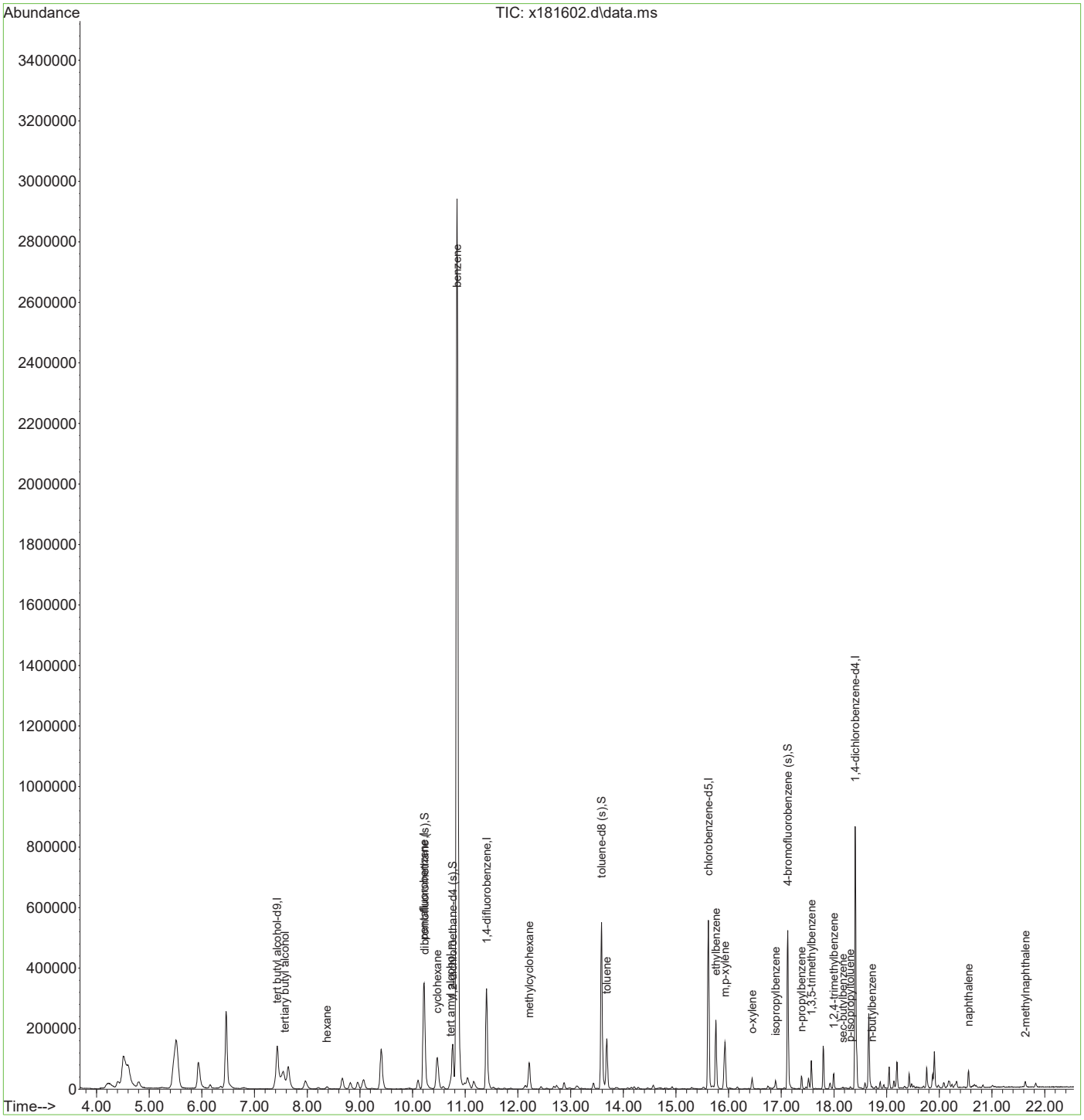
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.425	65	210539	500.00	ug/L	0.02
5) pentafluorobenzene	10.212	168	274364	50.00	ug/L	0.02
53) 1,4-difluorobenzene	11.405	114	367958	50.00	ug/L	0.02
74) chlorobenzene-d5	15.615	117	369671	50.00	ug/L	0.01
97) 1,4-dichlorobenzene-d4	18.403	152	229449	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	10.228	113	115569	51.77	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.54%			
54) 1,2-dichloroethane-d4 (s)	10.762	65	118026	48.63	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 97.26%			
75) toluene-d8 (s)	13.586	98	452391	51.05	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.10%			
98) 4-bromofluorobenzene (s)	17.122	95	180615	48.05	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.10%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	7.571	59	6261	13.12	ug/L #	1
27) hexane	8.371	57	5897	1.88	ug/L	81
47) cyclohexane	10.469	84	66745	14.70	ug/L #	54
48) tert amyl alcohol	10.720	55	17152	120.10	ug/L #	53
58) benzene	10.845	78	3814640	446.76	ug/L	99
69) methylcyclohexane	12.216	83	48534	12.38	ug/L	96
76) toluene	13.685	92	86344	15.72	ug/L	98
89) ethylbenzene	15.756	91	189070	18.40	ug/L	98
90) m,p-xylene	15.929	106	66621	16.25	ug/L	98
91) o-xylene	16.447	91	23414	2.49	ug/L	98
95) isopropylbenzene	16.891	105	17701	1.47	ug/L	99
103) n-propylbenzene	17.383	91	33882	2.44	ug/L	95
106) 1,3,5-trimethylbenzene	17.571	105	51425	4.88	ug/L	96
108) 1,2,4-trimethylbenzene	17.995	105	26882	2.45	ug/L	98
109) sec-butylbenzene	18.168	105	3272	0.23	ug/L	95
111) p-isopropyltoluene	18.309	119	3544	0.28	ug/L	91
115) n-butylbenzene	18.722	92	1729	0.29	ug/L	89
119) naphthalene	20.553	128	45571	2.71	ug/L	99
124) 2-methylnaphthalene	21.635	142	10940	4.16	ug/L	98

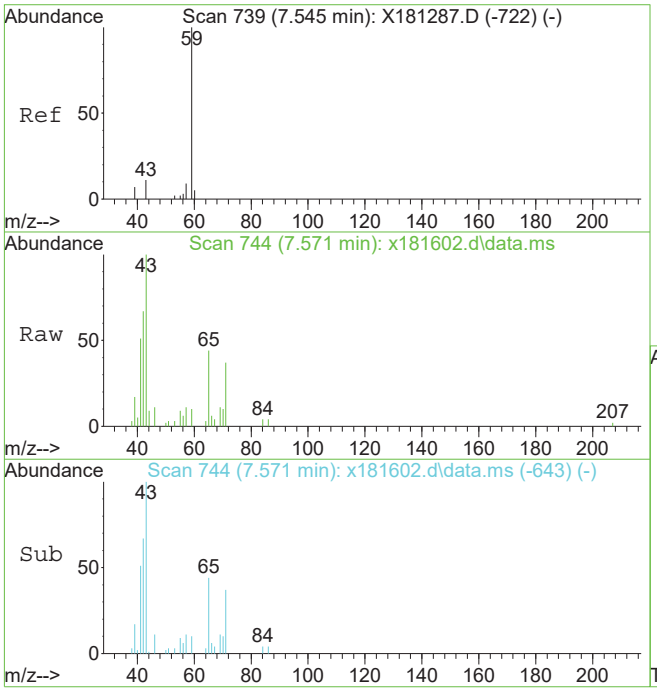
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181602.d
Acq On : 28 May 2019 11:25 am
Operator : jessicap
Sample : JC88209-1 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,20
ALS Vial : 9 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:12:22 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

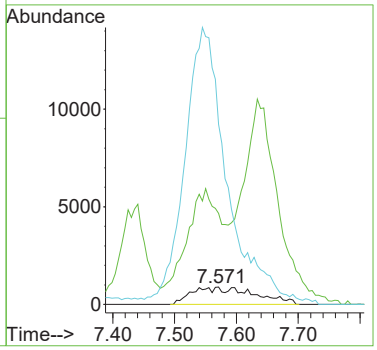


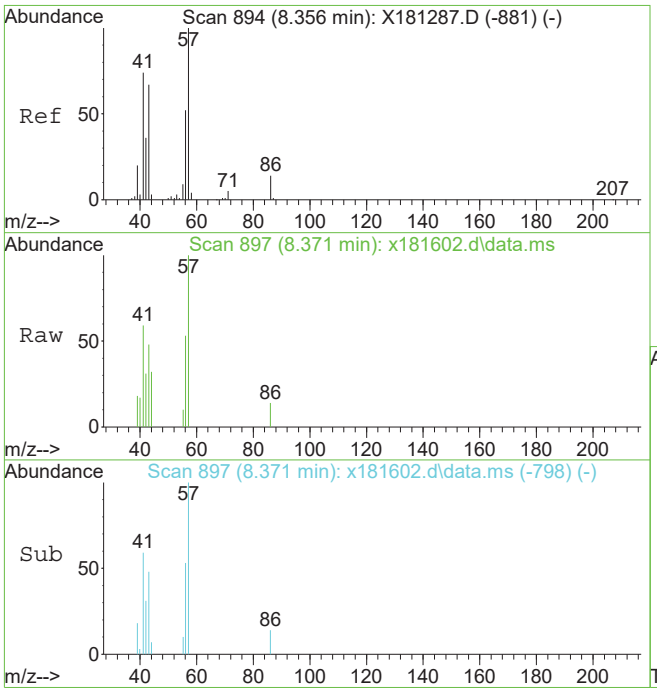


#3
tertiary butyl alcohol
Concen: 13.12 ug/L
RT: 7.571 min Scan# 744
Delta R.T. 0.026 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 59 Resp: 6261

Ion	Ratio	Lower	Upper
59	100		
41	387.0	0.0	48.1#
43	1009.9	0.0	43.1#

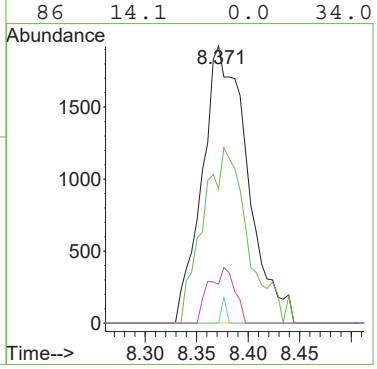


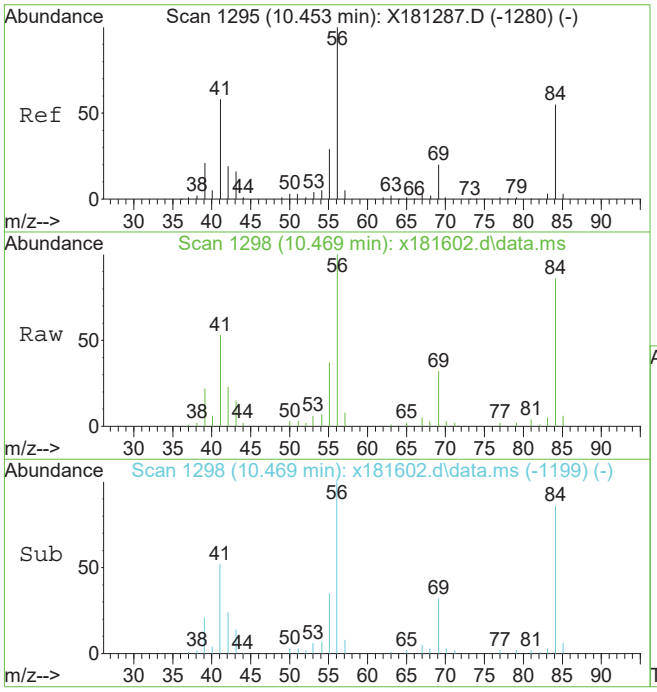


#27
hexane
Concen: 1.88 ug/L
RT: 8.371 min Scan# 897
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 57 Resp: 5897

Ion	Ratio	Lower	Upper
57	100		
43	48.5	47.2	87.2
71	0.0	0.0	24.7
86	14.1	0.0	34.0

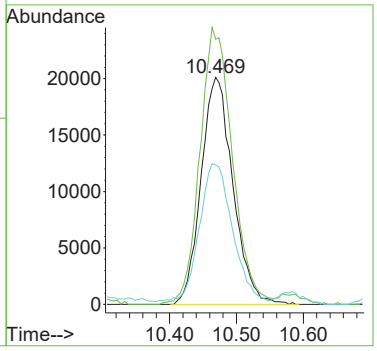


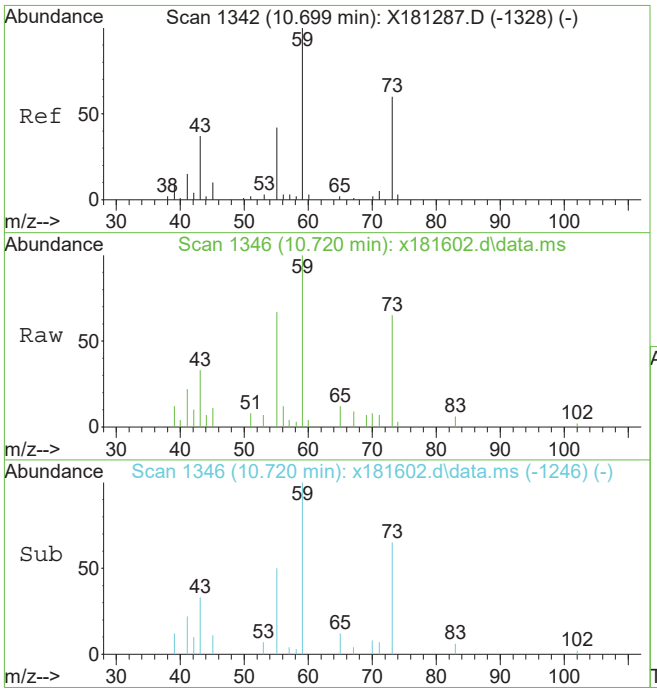


#47
cyclohexane
Concen: 14.70 ug/L
RT: 10.469 min Scan# 1298
Delta R.T. 0.015 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 84 Resp: 66745

Ion	Ratio	Lower	Upper
84	100		
56	115.4	153.1	213.1#
41	59.5	75.5	135.5#

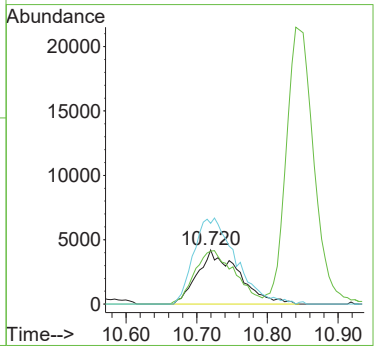


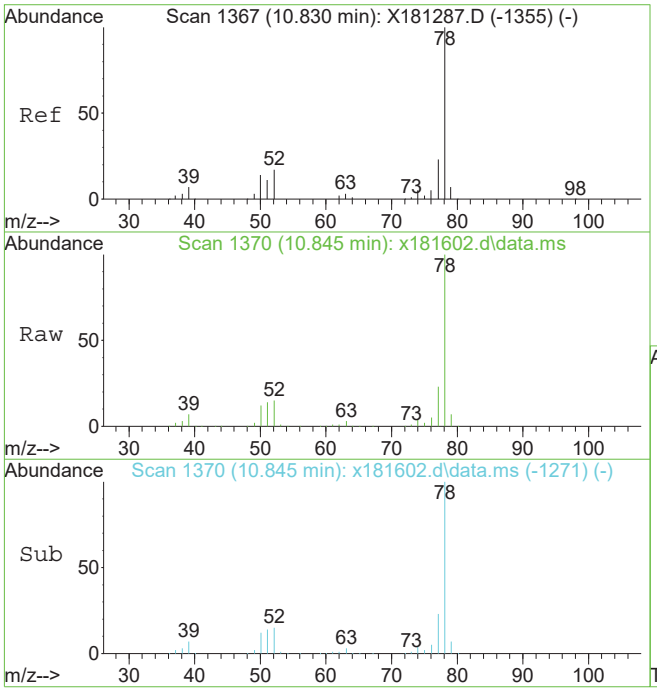


#48
tert amyl alcohol
Concen: 120.10 ug/L
RT: 10.720 min Scan# 1346
Delta R.T. 0.021 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 55 Resp: 17152

Ion	Ratio	Lower	Upper
55	100		
73	97.7	112.7	172.7#
59	149.2	208.4	268.4#

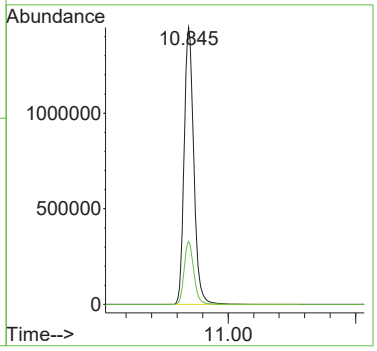


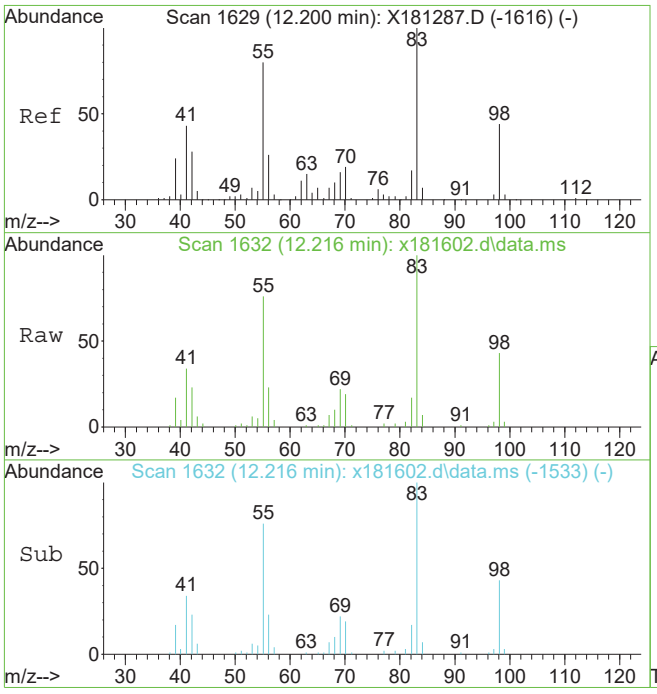


#58
benzene
Concen: 446.76 ug/L
RT: 10.845 min Scan# 1370
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 78 Resp: 3814640

Ion	Ratio	Lower	Upper
78	100		
77	22.7	0.0	53.2

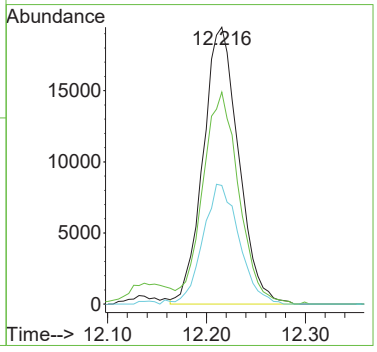


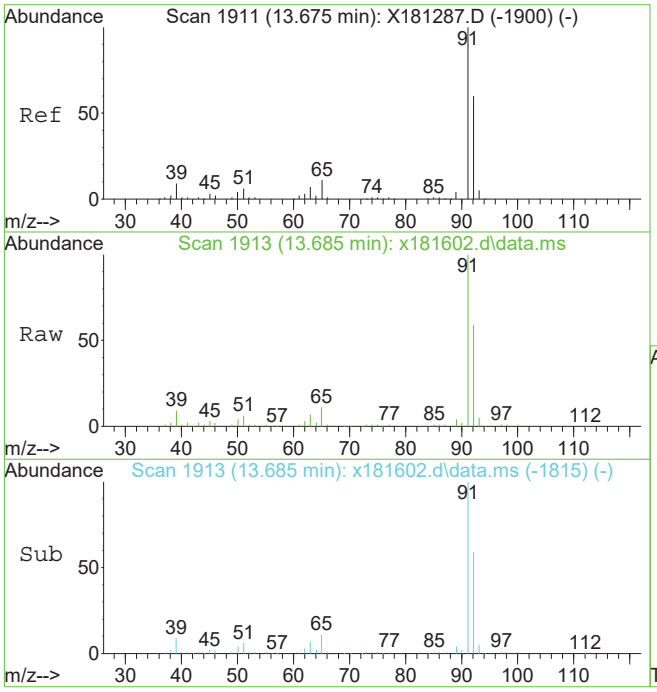


#69
methylcyclohexane
Concen: 12.38 ug/L
RT: 12.216 min Scan# 1632
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 83 Resp: 48534

Ion	Ratio	Lower	Upper
83	100		
55	76.5	50.6	110.6
98	42.9	14.3	74.3

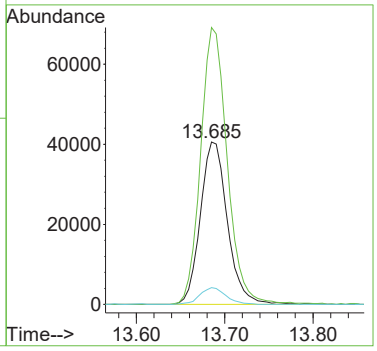


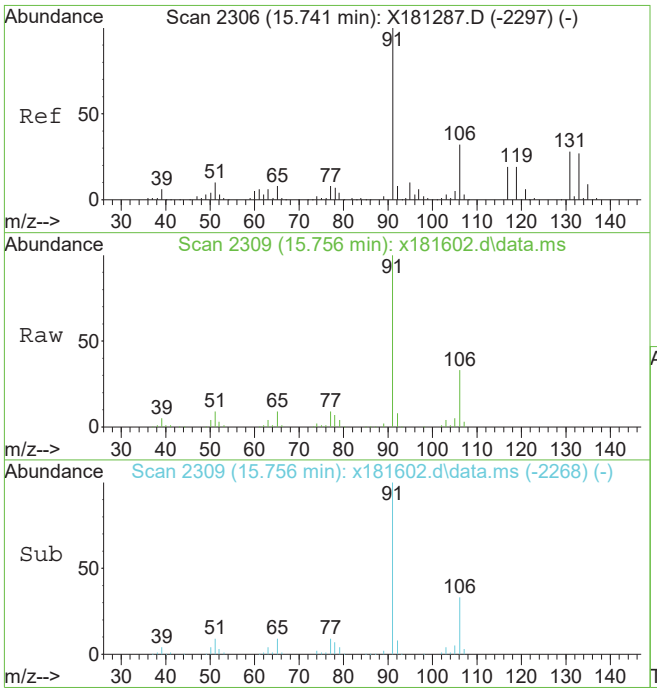


#76
toluene
Concen: 15.72 ug/L
RT: 13.685 min Scan# 1913
Delta R.T. 0.010 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 92 Resp: 86344

Ion	Ratio	Lower	Upper
92	100		
91	170.5	147.8	187.8
51	10.4	0.0	30.8

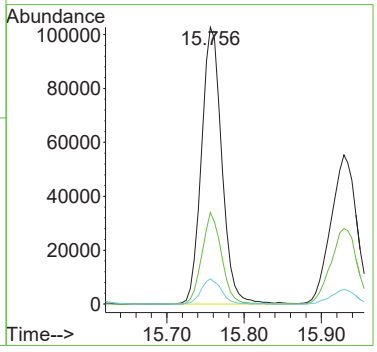


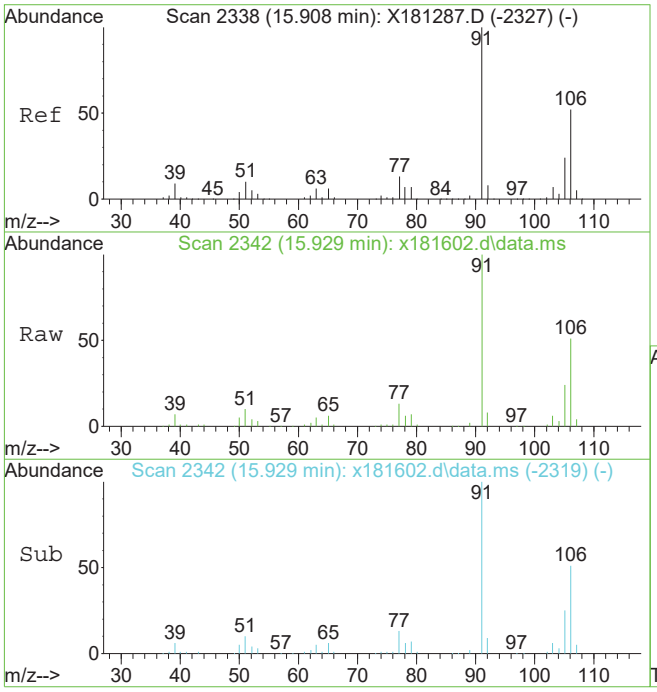


#89
ethylbenzene
Concen: 18.40 ug/L
RT: 15.756 min Scan# 2309
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 91 Resp: 189070

Ion	Ratio	Lower	Upper
91	100		
106	33.1	2.2	62.2
51	9.1	0.0	40.0

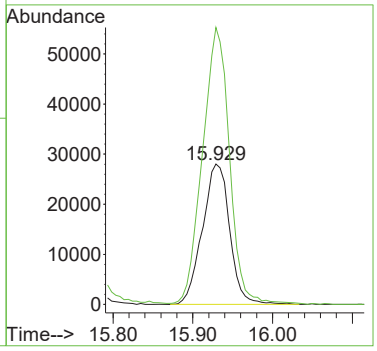


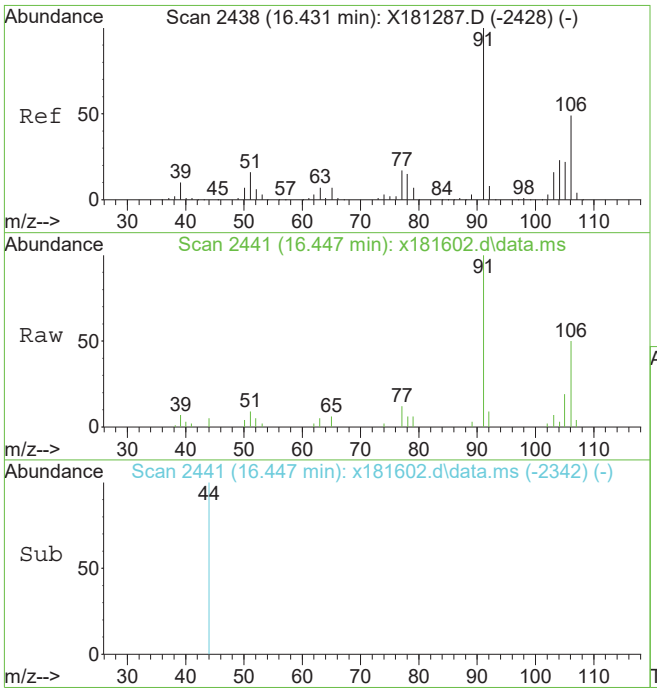


#90
m,p-xylene
Concen: 16.25 ug/L
RT: 15.929 min Scan# 2342
Delta R.T. 0.021 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:106 Resp: 66621

Ion	Ratio	Lower	Upper
106	100		
91	196.8	163.1	223.1

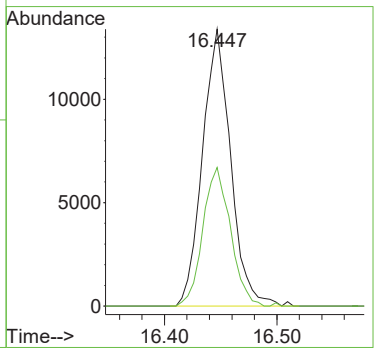


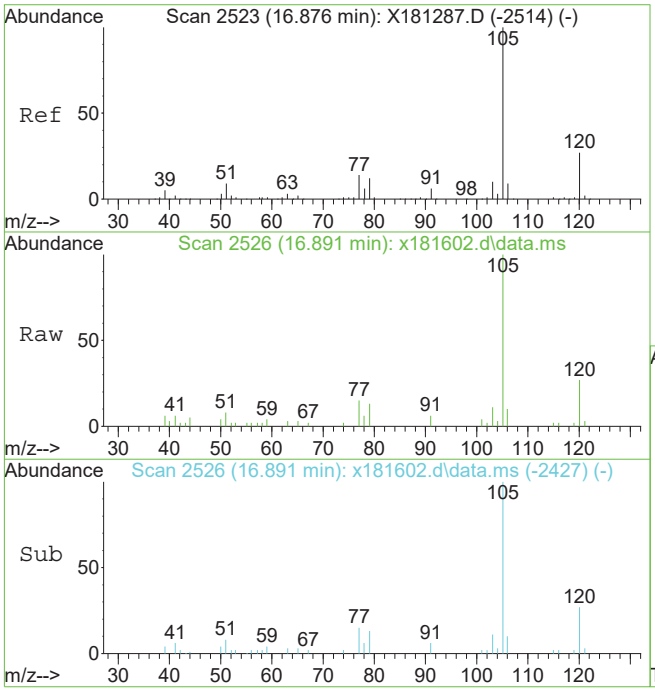


#91
o-xylene
Concen: 2.49 ug/L
RT: 16.447 min Scan# 2441
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 91 Resp: 23414

Ion	Ratio	Lower	Upper
91	100		
106	50.1	18.9	78.9

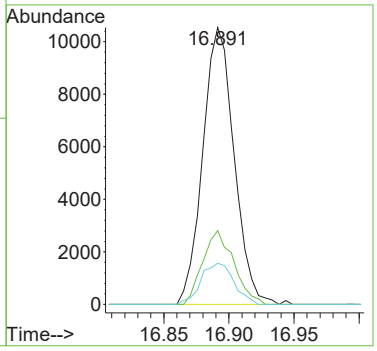


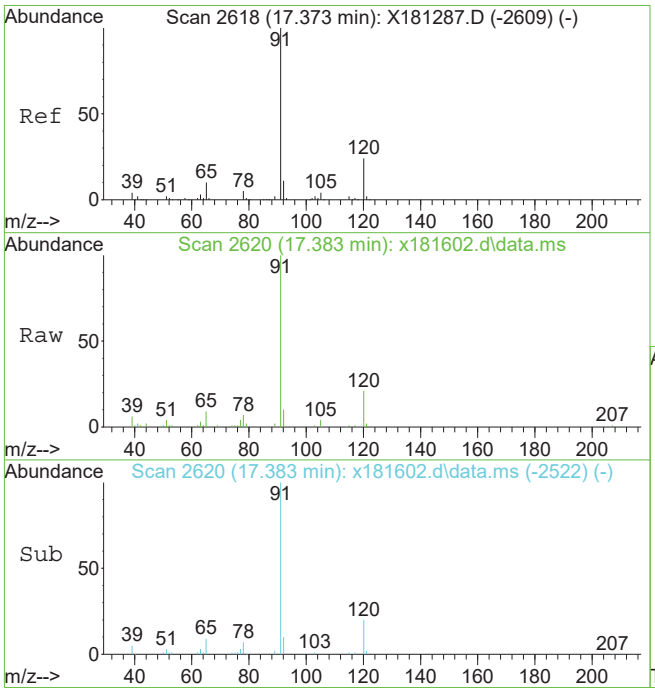


#95
isopropylbenzene
Concen: 1.47 ug/L
RT: 16.891 min Scan# 2526
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:105 Resp: 17701

Ion	Ratio	Lower	Upper
105	100		
120	26.6	6.9	46.9
77	14.8	0.0	34.4

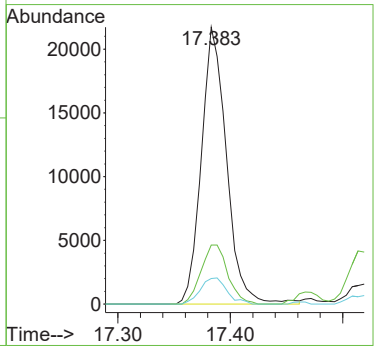


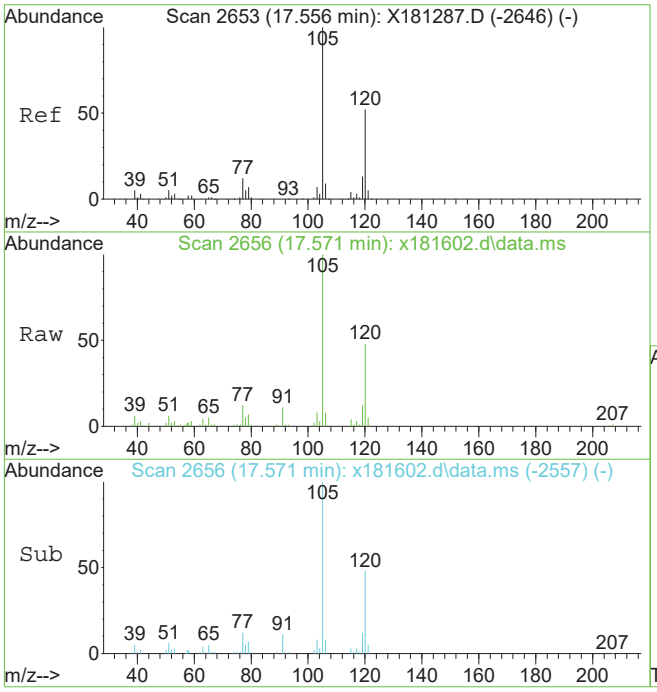


#103
n-propylbenzene
Concen: 2.44 ug/L
RT: 17.383 min Scan# 2620
Delta R.T. 0.010 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 91 Resp: 33882

Ion	Ratio	Lower	Upper
91	100		
120	21.3	0.0	54.1
65	9.3	0.0	39.9

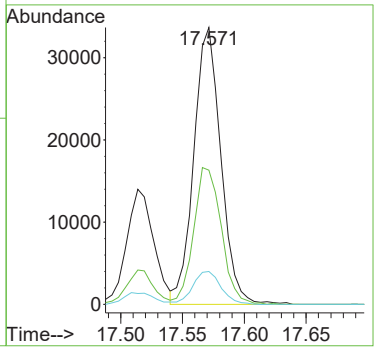


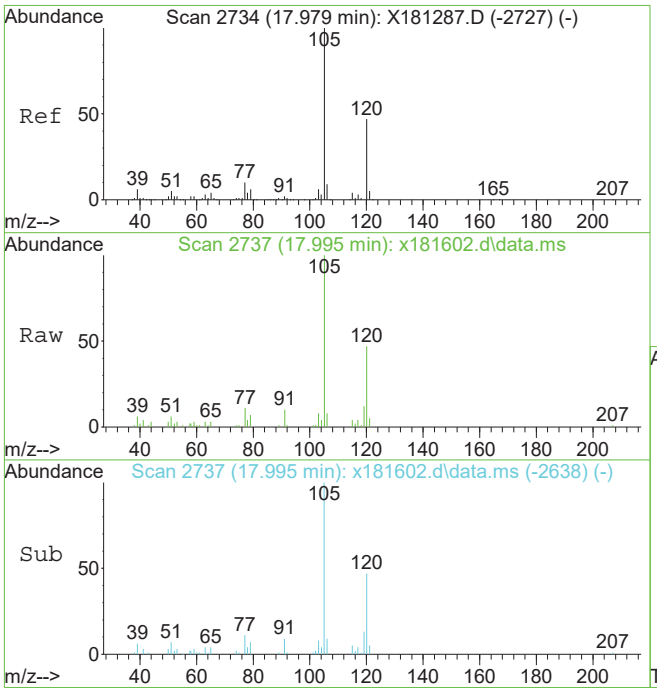


#106
1,3,5-trimethylbenzene
Concen: 4.88 ug/L
RT: 17.571 min Scan# 2656
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:105 Resp: 51425

Ion	Ratio	Lower	Upper
105	100		
120	48.4	21.7	81.7
77	11.9	0.0	42.1

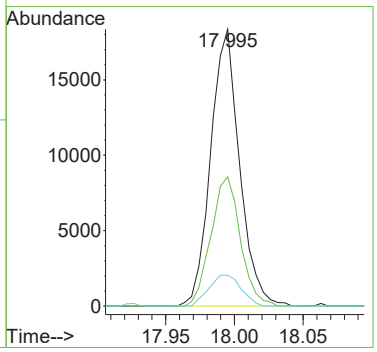


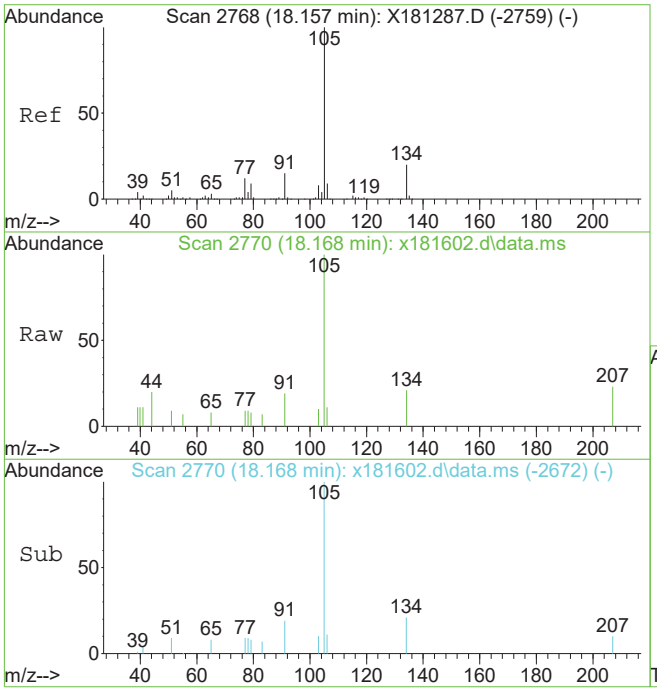


#108
1,2,4-trimethylbenzene
Concen: 2.45 ug/L
RT: 17.995 min Scan# 2737
Delta R.T. 0.016 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:105 Resp: 26882

Ion	Ratio	Lower	Upper
105	100		
120	46.6	18.0	78.0
77	11.1	0.0	41.6

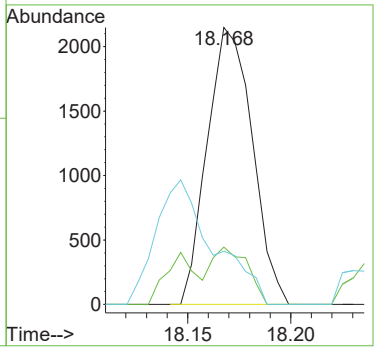


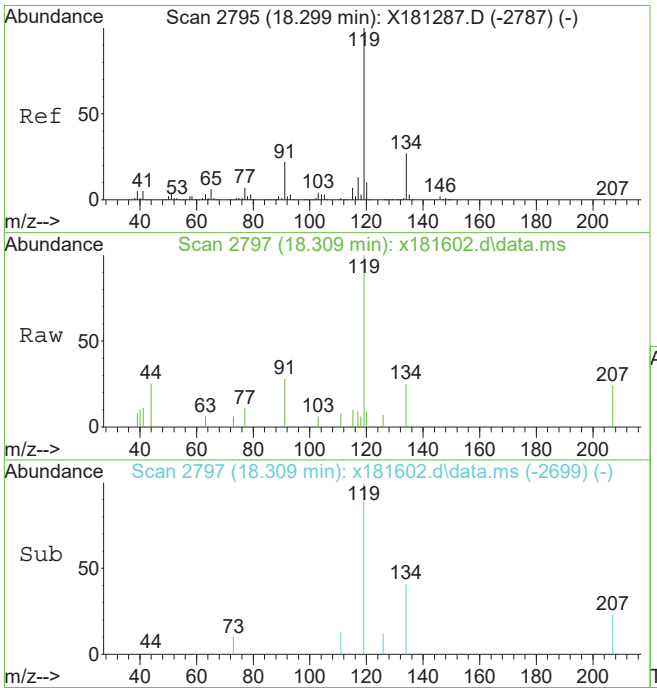


#109
sec-butylbenzene
Concen: 0.23 ug/L
RT: 18.168 min Scan# 2770
Delta R.T. 0.010 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:105 Resp: 3272

Ion	Ratio	Lower	Upper
105	100		
134	20.7	0.0	50.4
91	19.2	0.0	44.8

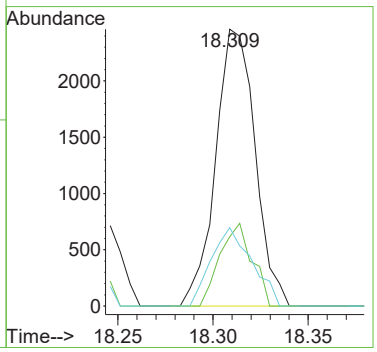


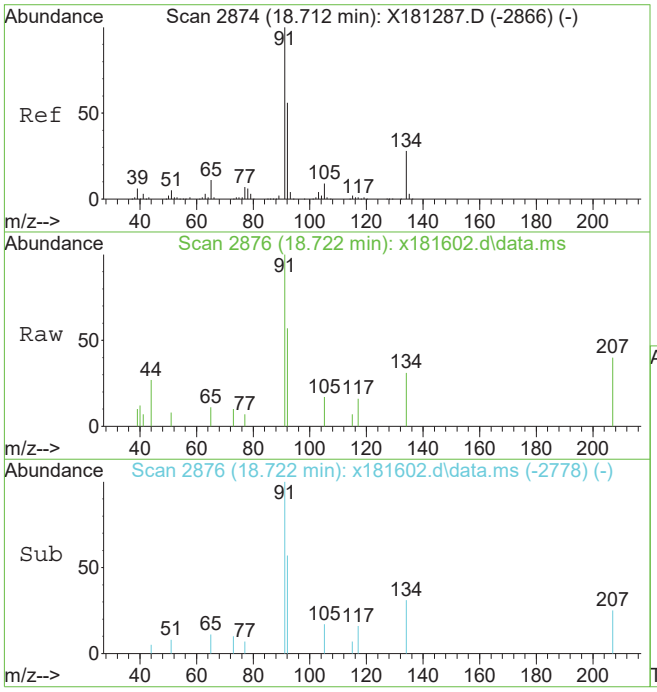


#111
p-isopropyltoluene
Concen: 0.28 ug/L
RT: 18.309 min Scan# 2797
Delta R.T. 0.010 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:119 Resp: 3544

Ion	Ratio	Lower	Upper
119	100		
134	25.0	0.0	57.1
91	28.4	0.0	51.5

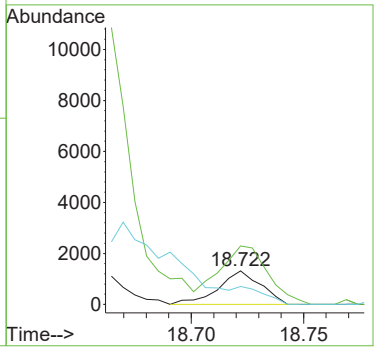


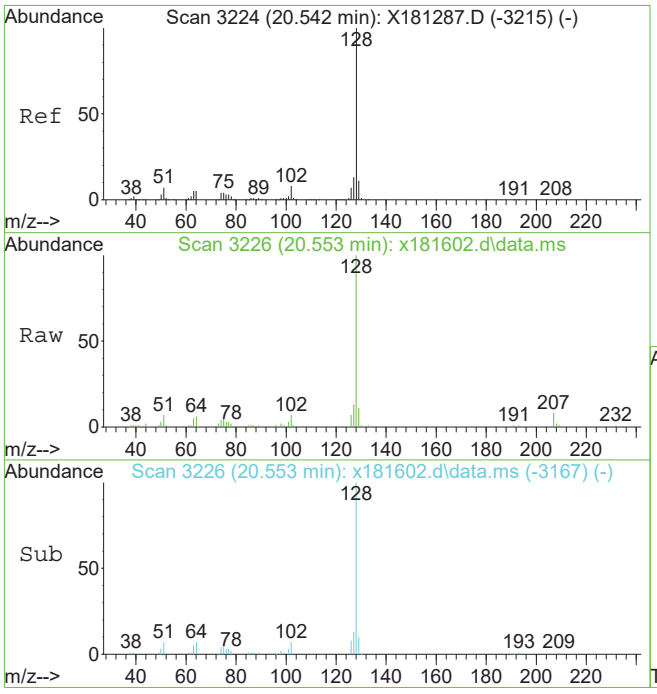


#115
n-butylbenzene
Concen: 0.29 ug/L
RT: 18.722 min Scan# 2876
Delta R.T. 0.010 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion: 92 Resp: 1729

Ion	Ratio	Lower	Upper
92	100		
91	161.9	149.6	209.6
134	53.6	20.5	80.5

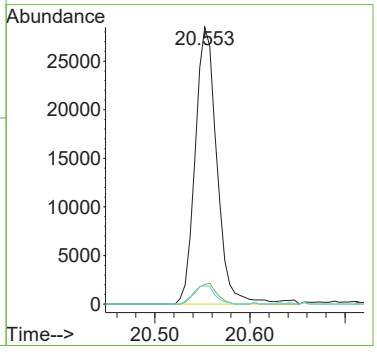


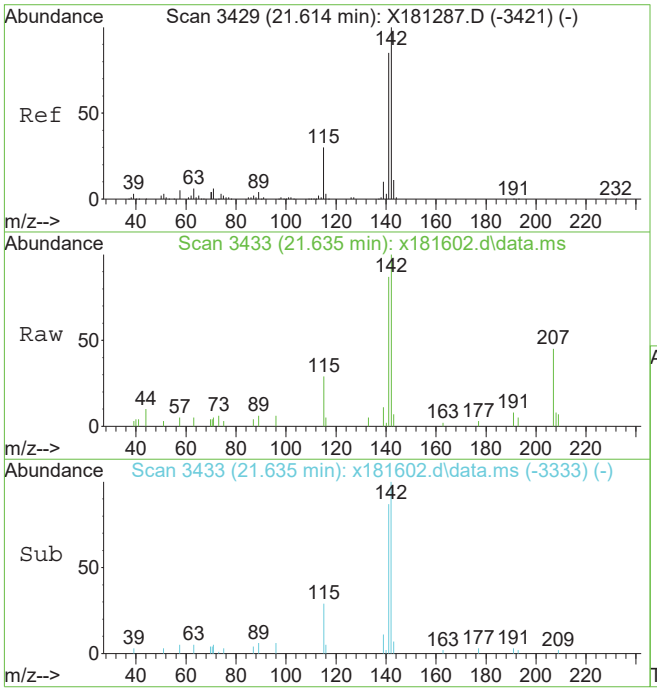


#119
naphthalene
Concen: 2.71 ug/L
RT: 20.553 min Scan# 3226
Delta R.T. 0.011 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:128 Resp: 45571

Ion	Ratio	Lower	Upper
128	100		
102	7.2	0.0	37.7
51	6.6	0.0	36.7

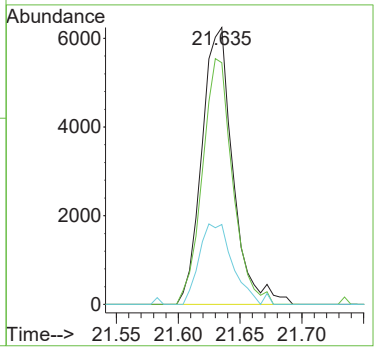




#124
2-methylnaphthalene
Concen: 4.16 ug/L
RT: 21.635 min Scan# 3433
Delta R.T. 0.021 min
Lab File: x181602.d
Acq: 28 May 2019 11:25 am

Tgt Ion:142 Resp: 10940

Ion	Ratio	Lower	Upper
142	100		
141	87.2	65.5	105.5
115	28.9	10.3	50.3



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90974.d
Acq On : 23 May 2019 5:27 pm
Operator : CHELSEAS
Sample : jc88209-2 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 23 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:30:37 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

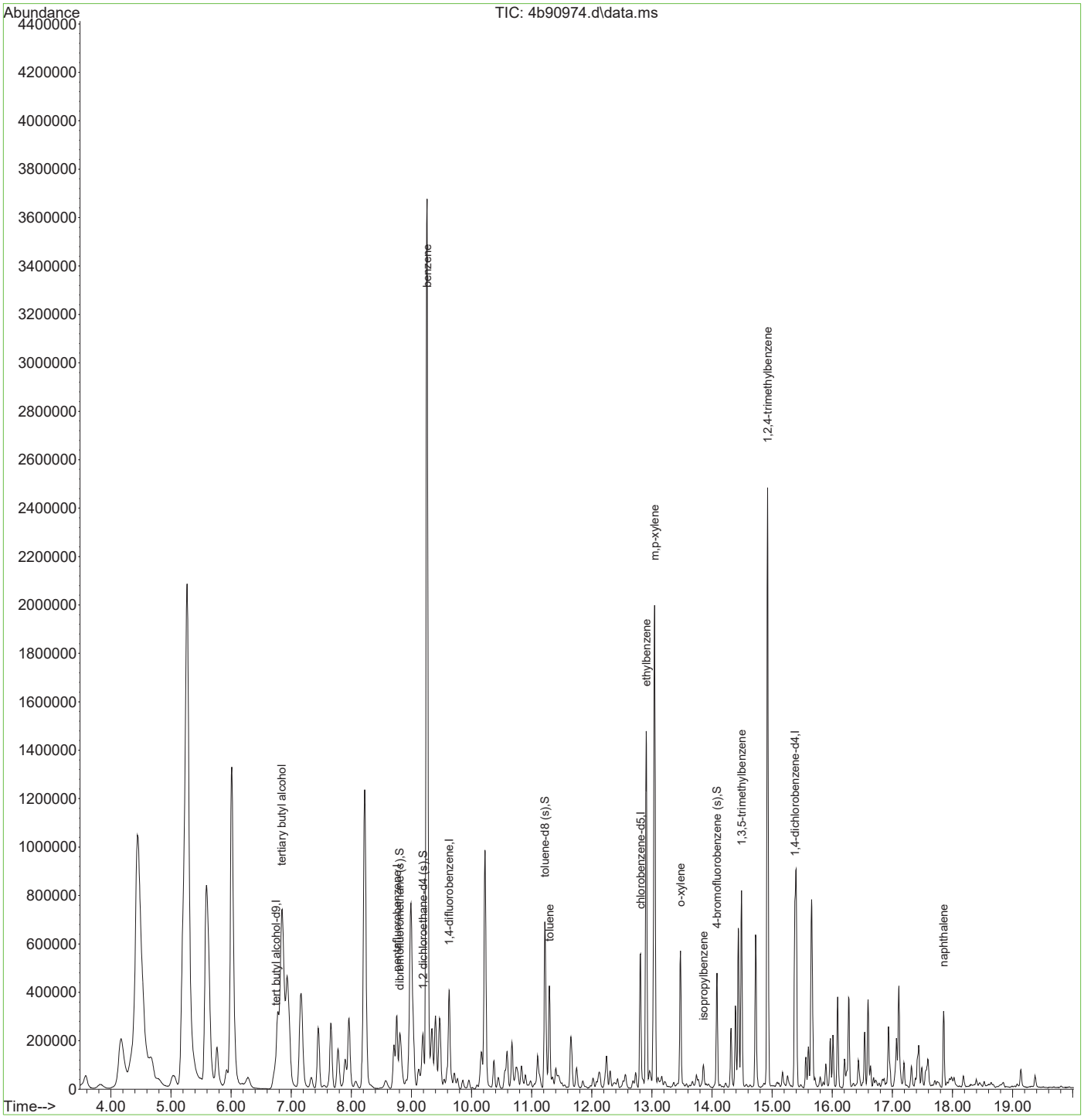
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.749	65	168313	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	243258	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	332226	50.00	ug/L	0.00
75) chlorobenzene-d5	12.811	117	309330	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	182087	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	118140	53.71	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 107.42%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	120564	55.03	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 110.06%			
76) toluene-d8 (s)	11.221	98	393859	50.59	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 101.18%			
99) 4-bromofluorobenzene (s)	14.082	95	159869	53.33	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 106.66%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	6.843	59	13926	29.26	ug/L	# 1
58) benzene	9.259	78	3673697	325.62	ug/L	99
77) toluene	11.294	92	151790	23.54	ug/L	98
90) ethylbenzene	12.905	91	1076371	85.06	ug/L	99
91) m,p-xylene	13.046	106	634771	132.12	ug/L	96
92) o-xylene	13.475	91	323245	30.14	ug/L	99
95) isopropylbenzene	13.857	105	49632	3.65	ug/L	97
107) 1,3,5-trimethylbenzene	14.489	105	441482	39.26	ug/L	99
109) 1,2,4-trimethylbenzene	14.924	105	1343893	119.24	ug/L	99
123) naphthalene	17.853	128	254294	22.44	ug/L	99

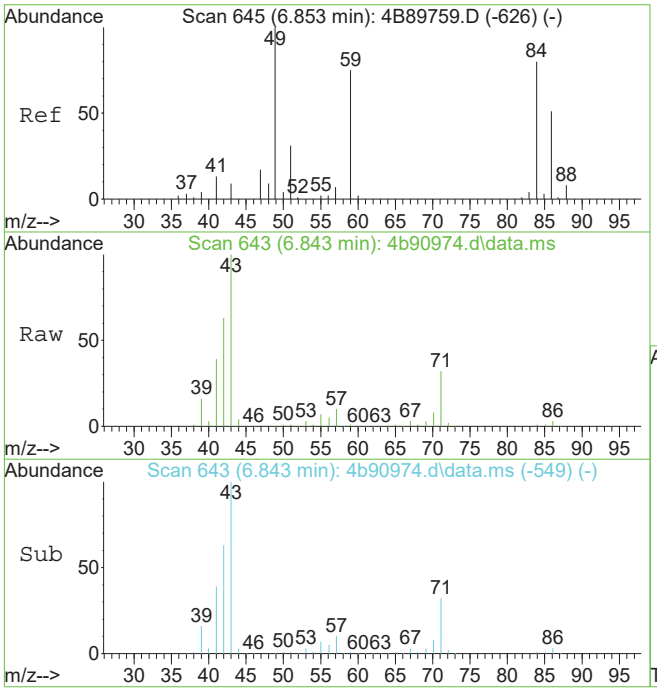
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90974.d
Acq On : 23 May 2019 5:27 pm
Operator : CHELSEAS
Sample : jc88209-2 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 23 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:30:37 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

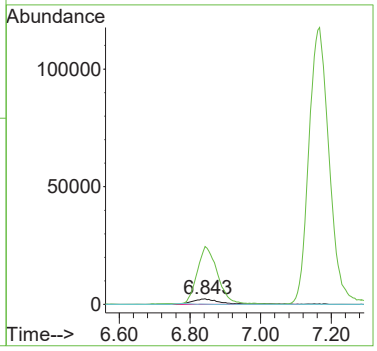


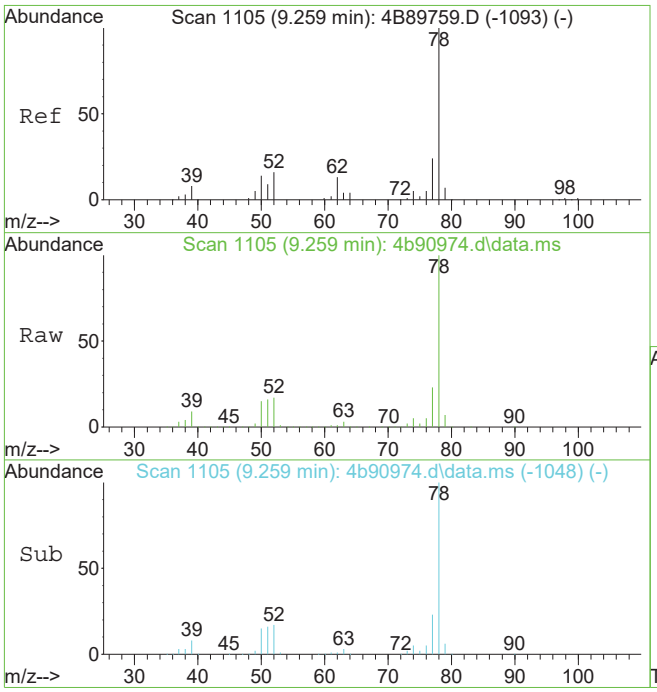


#3
tertiary butyl alcohol
Concen: 29.26 ug/L
RT: 6.843 min Scan# 643
Delta R.T. -0.011 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion: 59 Resp: 13926

Ion	Ratio	Lower	Upper
59	100		
57	996.9	0.0	39.9#
60	7.6	0.0	33.3

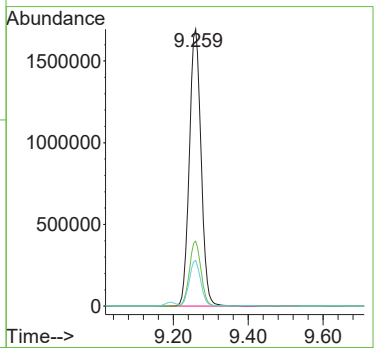


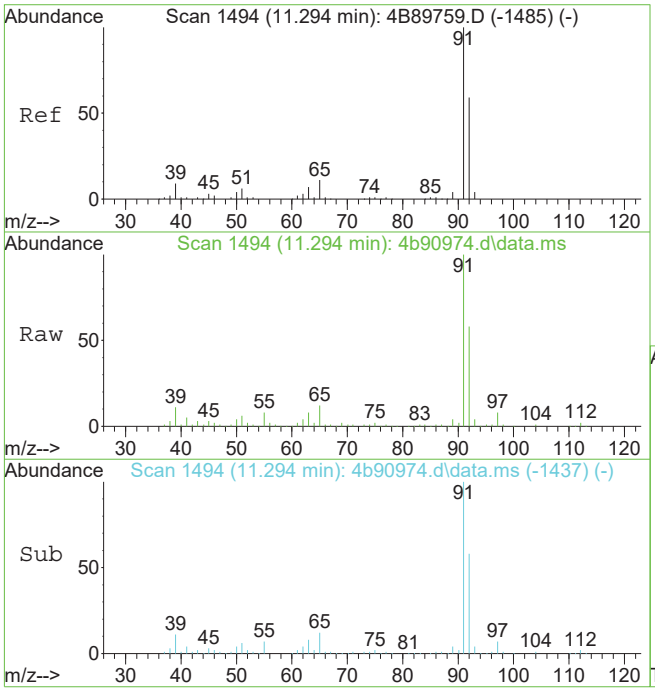


#58
benzene
Concen: 325.62 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion: 78 Resp: 3673697

Ion	Ratio	Lower	Upper
78	100		
77	23.4	0.0	53.9
51	16.4	0.0	47.3

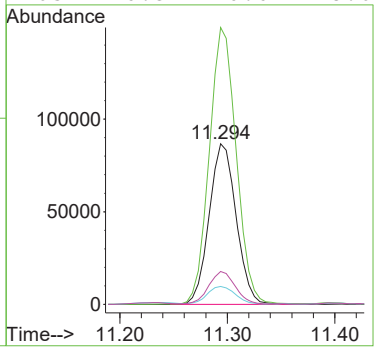


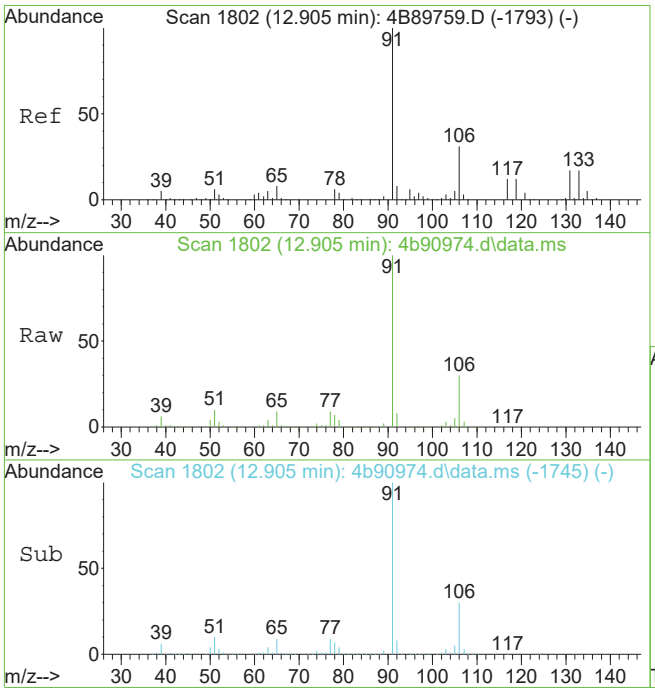


#77
toluene
Concen: 23.54 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion: 92 Resp: 151790

Ion	Ratio	Lower	Upper
92	100		
91	172.1	150.2	190.2
51	10.9	0.0	40.3
65	20.3	0.0	48.6

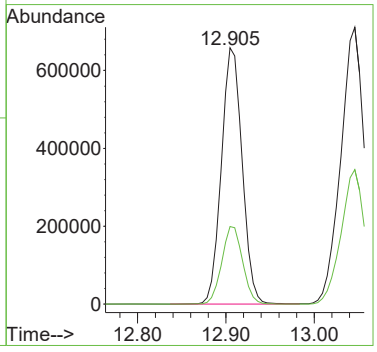


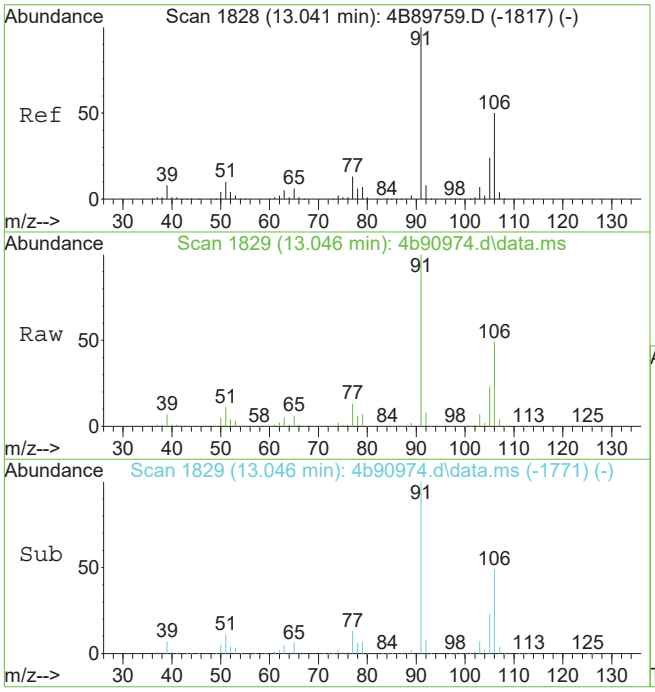


#90
ethylbenzene
Concen: 85.06 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion: 91 Resp: 1076371

Ion	Ratio	Lower	Upper
91	100		
106	30.3	1.0	61.0

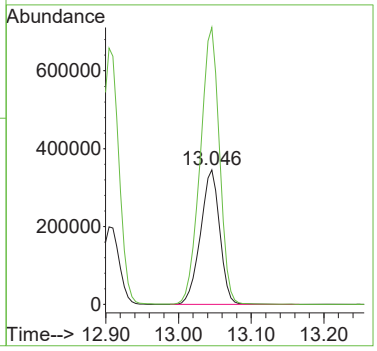


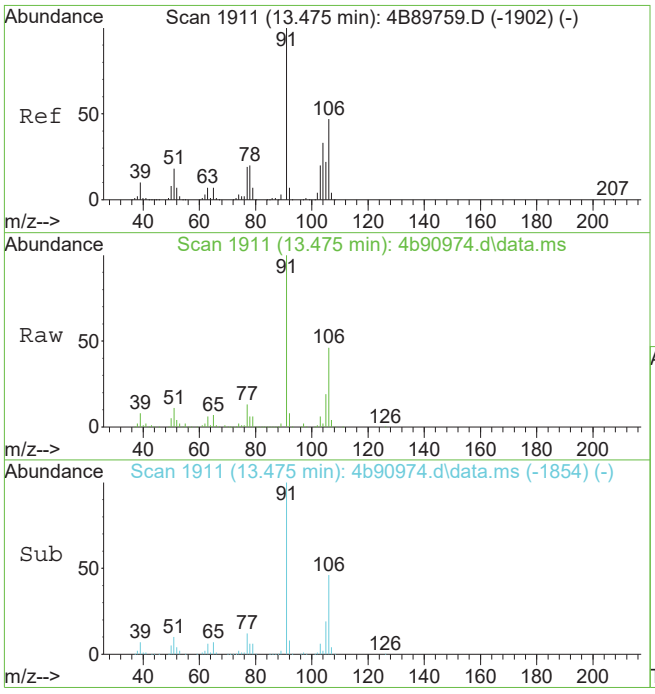


#91
m,p-xylene
Concen: 132.12 ug/L
RT: 13.046 min Scan# 1829
Delta R.T. 0.006 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion:106 Resp: 634771

Ion	Ratio	Lower	Upper
106	100		
91	206.0	169.3	229.3

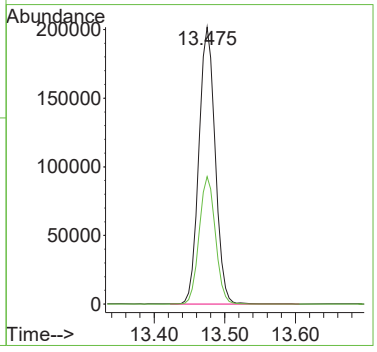


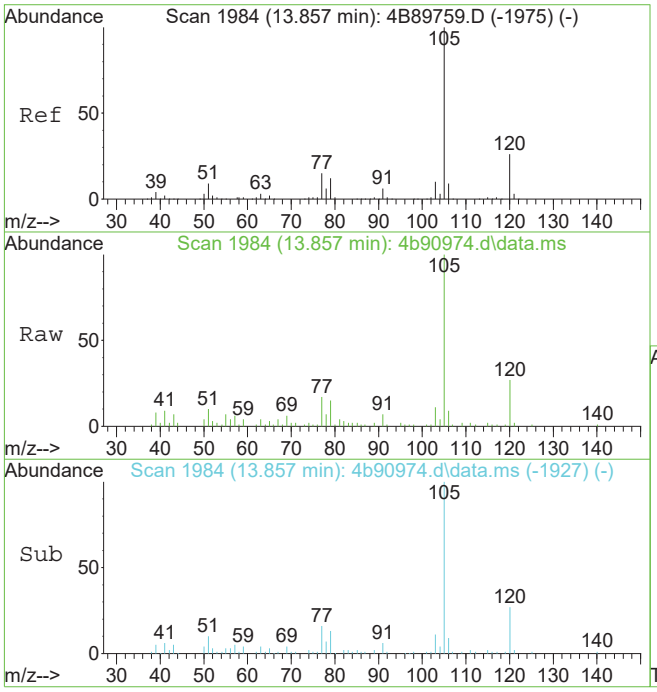


#92
o-xylene
Concen: 30.14 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion: 91 Resp: 323245

Ion	Ratio	Lower	Upper
91	100		
106	46.0	16.9	76.9

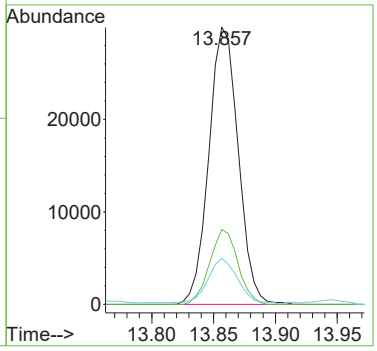


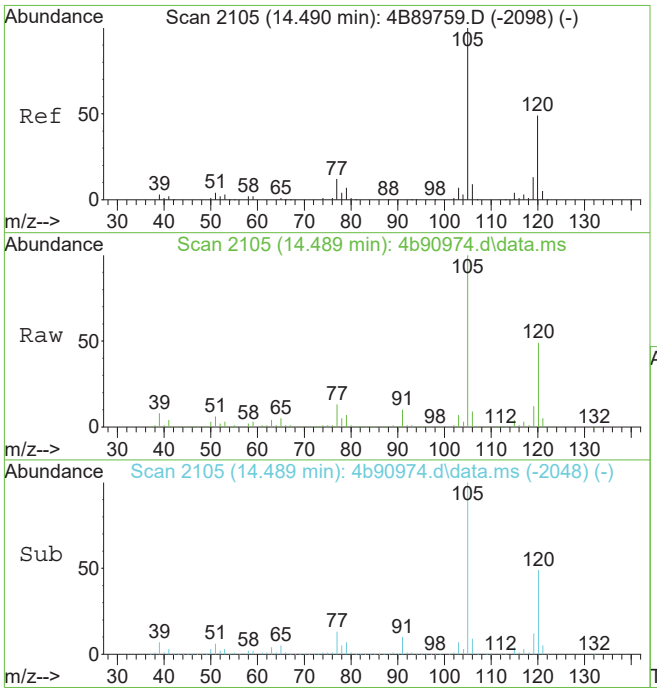


#95
isopropylbenzene
Concen: 3.65 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion:105 Resp: 49632

Ion	Ratio	Lower	Upper
105	100		
120	27.0	5.8	45.8
77	16.0	0.0	34.8

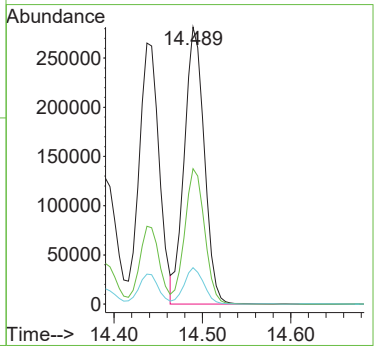


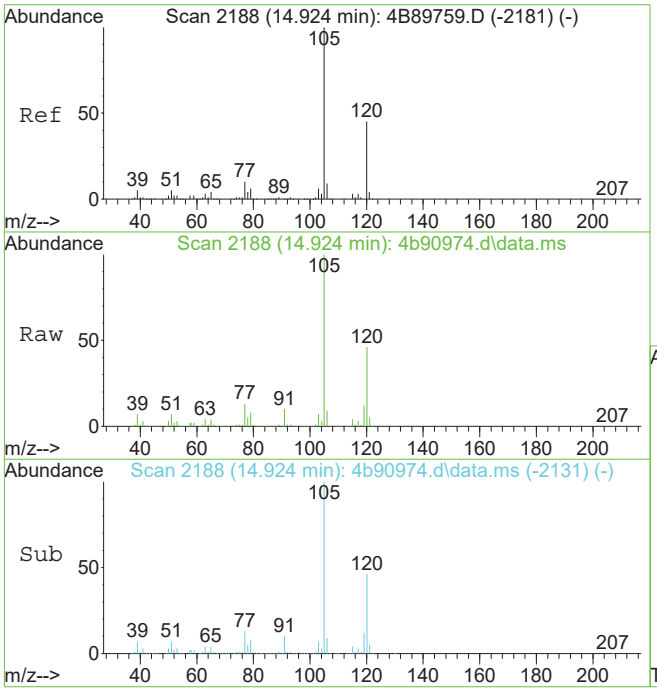


#107
1,3,5-trimethylbenzene
Concen: 39.26 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion:105 Resp: 441482

Ion	Ratio	Lower	Upper
105	100		
120	48.8	19.2	79.2
77	13.0	0.0	42.1

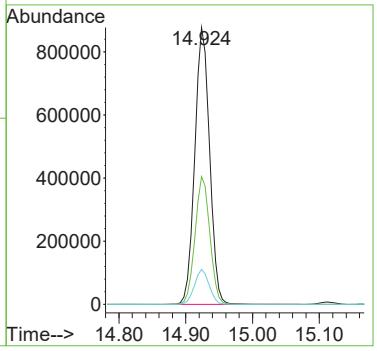


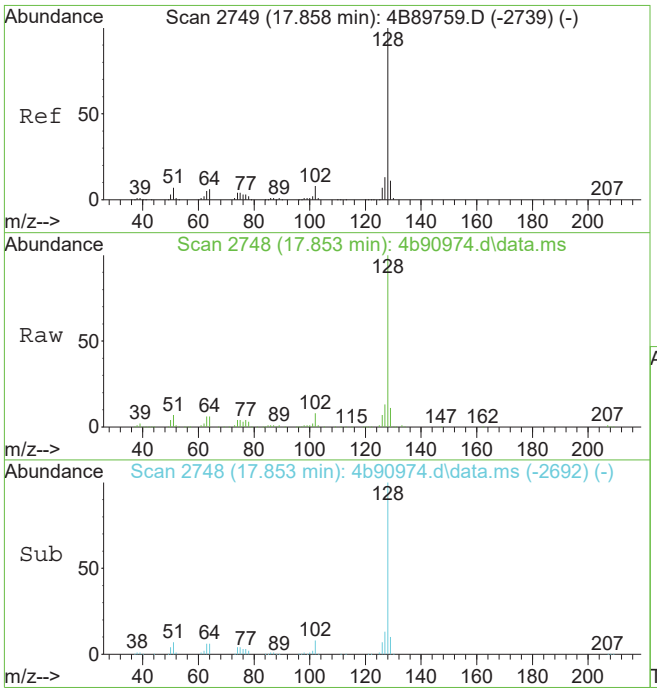


#109
1,2,4-trimethylbenzene
Concen: 119.24 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion:105 Resp: 1343893

Ion	Ratio	Lower	Upper
105	100		
120	46.1	16.3	76.3
77	12.6	0.0	41.8

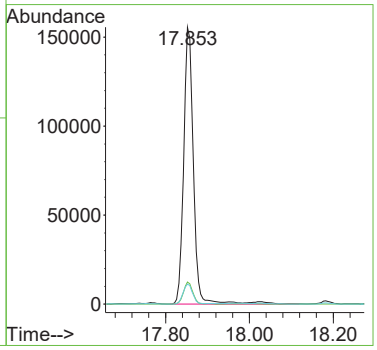




#123
naphthalene
Concen: 22.44 ug/L
RT: 17.853 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b90974.d
Acq: 23 May 2019 5:27 pm

Tgt Ion:128 Resp: 254294

Ion	Ratio	Lower	Upper
128	100		
102	8.0	0.0	37.6
51	7.3	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181601.d
Acq On : 28 May 2019 10:56 am
Operator : jessicap
Sample : JC88209-2 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,10
ALS Vial : 8 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:10:05 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

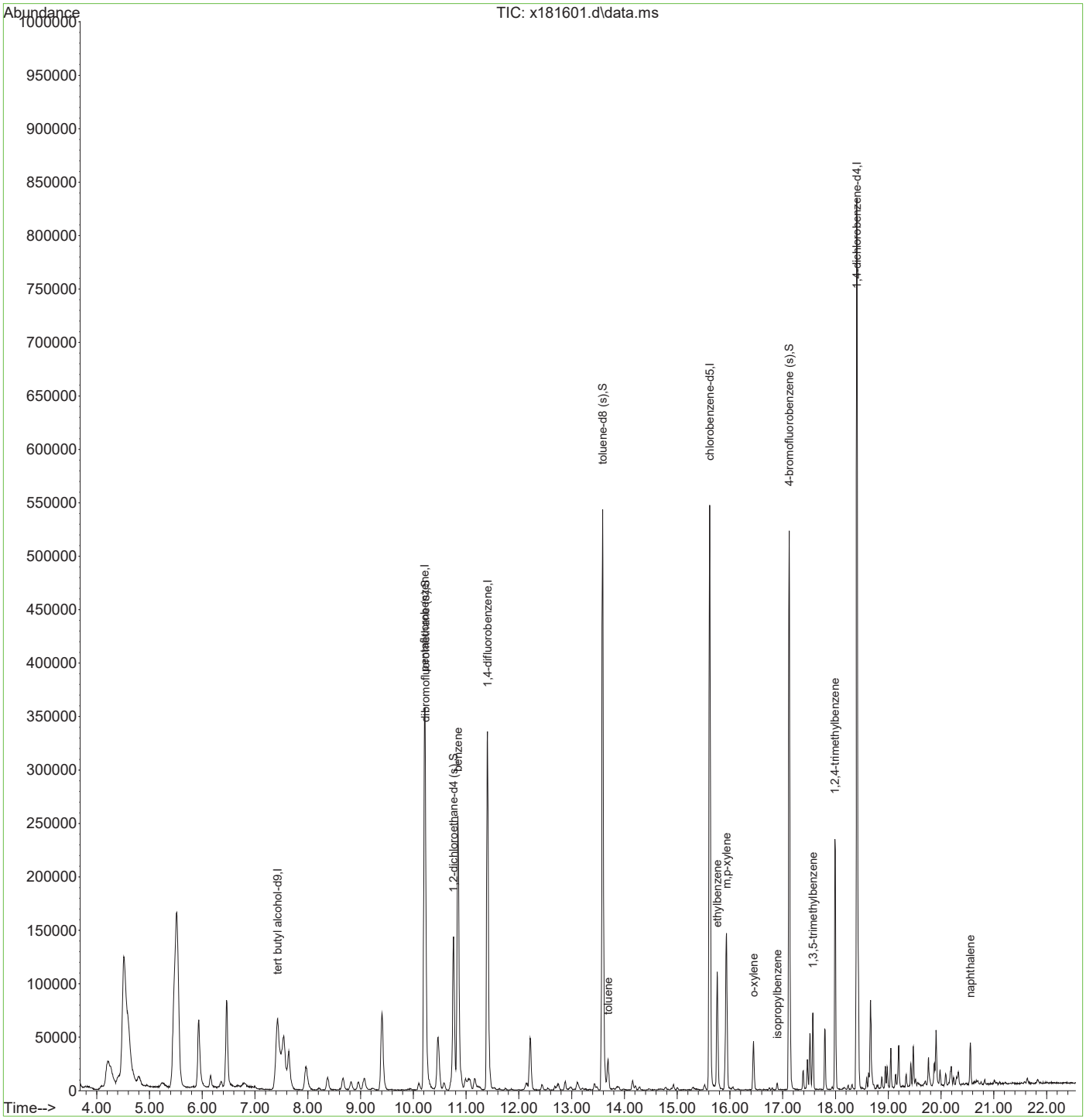
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.425	65	209285	500.00	ug/L	0.02
5) pentafluorobenzene	10.213	168	270736	50.00	ug/L	0.02
53) 1,4-difluorobenzene	11.405	114	370130	50.00	ug/L	0.02
74) chlorobenzene-d5	15.615	117	368435	50.00	ug/L	0.01
97) 1,4-dichlorobenzene-d4	18.403	152	225533	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	10.228	113	116316	52.80	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 105.60%			
54) 1,2-dichloroethane-d4 (s)	10.762	65	119217	48.83	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 97.66%			
75) toluene-d8 (s)	13.586	98	445675	50.46	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.92%			
98) 4-bromofluorobenzene (s)	17.122	95	179743	48.65	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.30%			
Target Compounds						Qvalue
58) benzene	10.845	78	310963	36.21	ug/L	98
76) toluene	13.691	92	13687	2.50	ug/L	98
89) ethylbenzene	15.757	91	92183	9.00	ug/L	99
90) m,p-xylene	15.934	106	59079	14.45	ug/L	98
91) o-xylene	16.447	91	29983	3.19	ug/L	98
95) isopropylbenzene	16.897	105	4582	0.38	ug/L	91
106) 1,3,5-trimethylbenzene	17.571	105	39576	3.82	ug/L	94
108) 1,2,4-trimethylbenzene	17.990	105	125720	11.63	ug/L	100
119) naphthalene	20.553	128	32452	1.97	ug/L	99

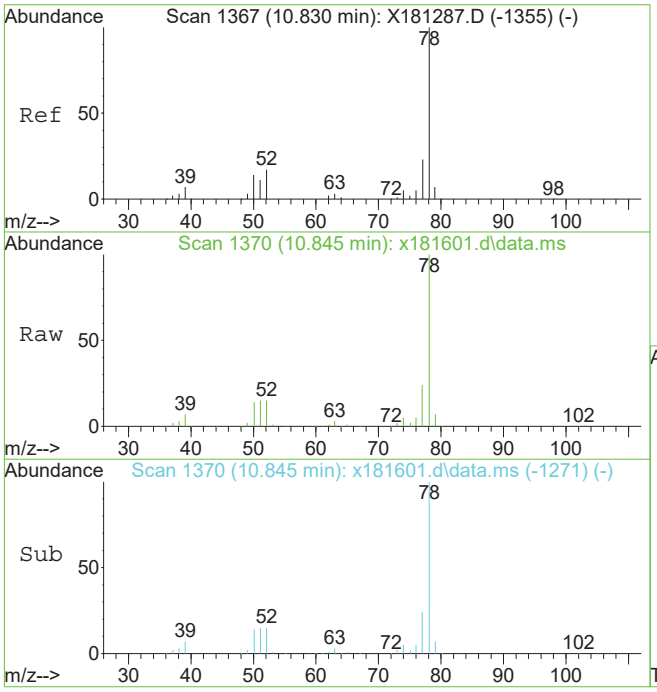
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181601.d
Acq On : 28 May 2019 10:56 am
Operator : jessicap
Sample : JC88209-2 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,10
ALS Vial : 8 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:10:05 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

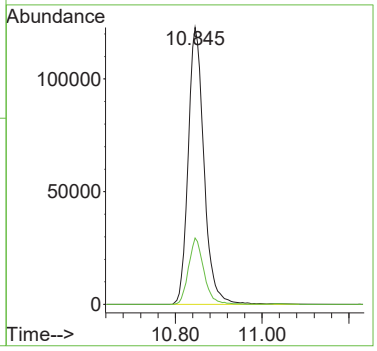


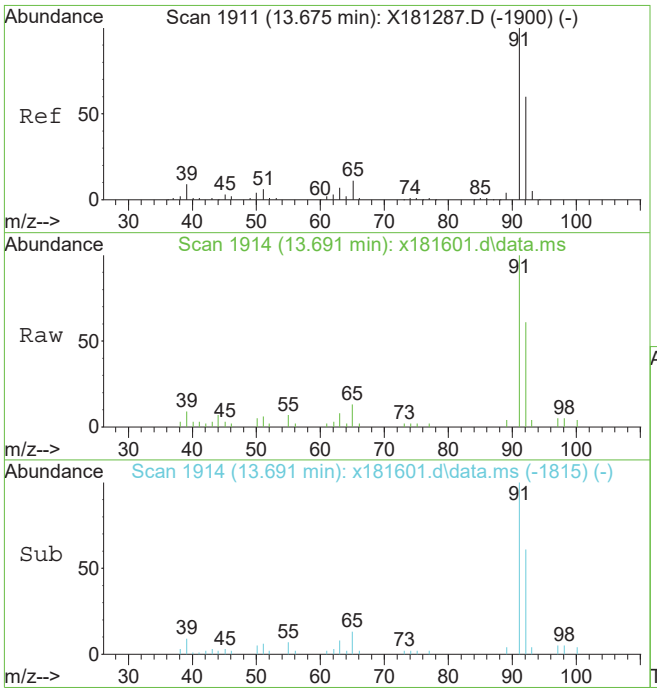


#58
benzene
Concen: 36.21 ug/L
RT: 10.845 min Scan# 1370
Delta R.T. 0.016 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion: 78 Resp: 310963

Ion	Ratio	Lower	Upper
78	100		
77	23.9	0.0	53.2

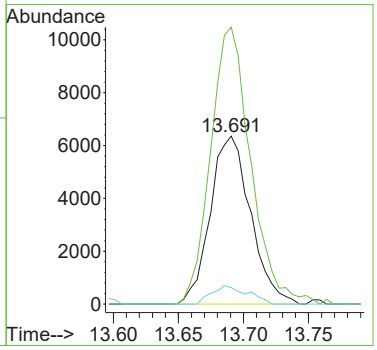


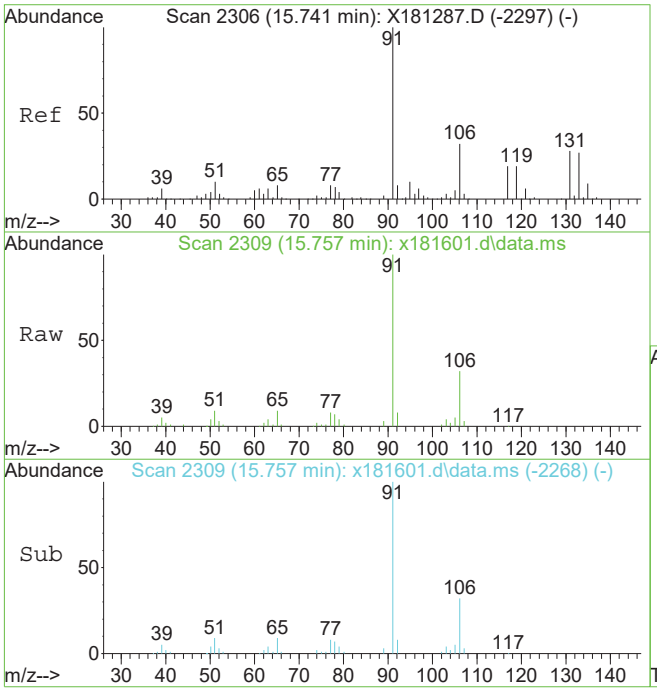


#76
toluene
Concen: 2.50 ug/L
RT: 13.691 min Scan# 1914
Delta R.T. 0.016 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion: 92 Resp: 13687

Ion	Ratio	Lower	Upper
92	100		
91	164.9	147.8	187.8
51	9.8	0.0	30.8

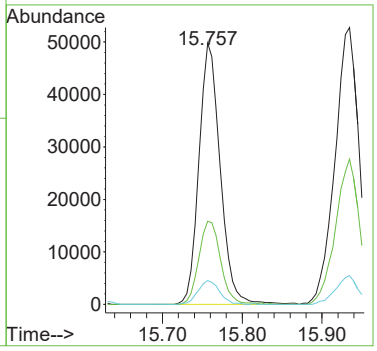


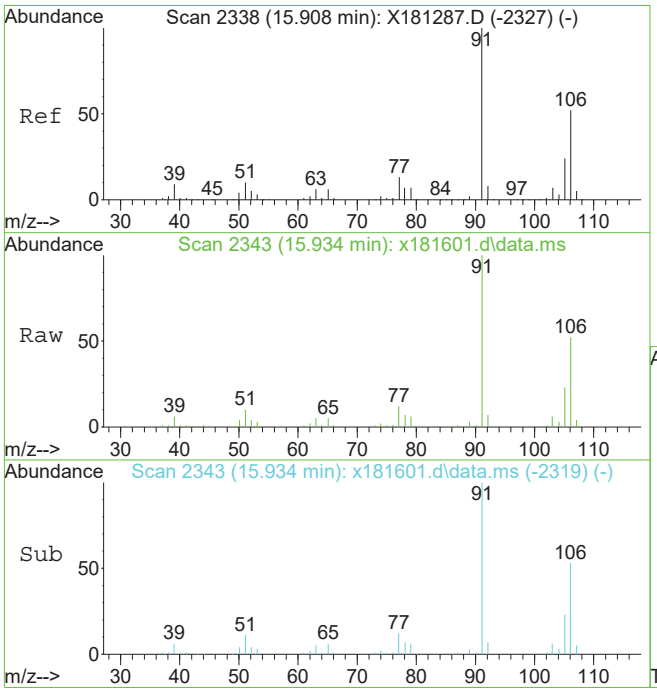


#89
ethylbenzene
Concen: 9.00 ug/L
RT: 15.757 min Scan# 2309
Delta R.T. 0.017 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion: 91 Resp: 92183

Ion	Ratio	Lower	Upper
91	100		
106	31.8	2.2	62.2
51	9.1	0.0	40.0

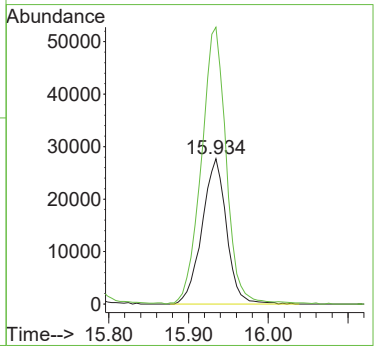


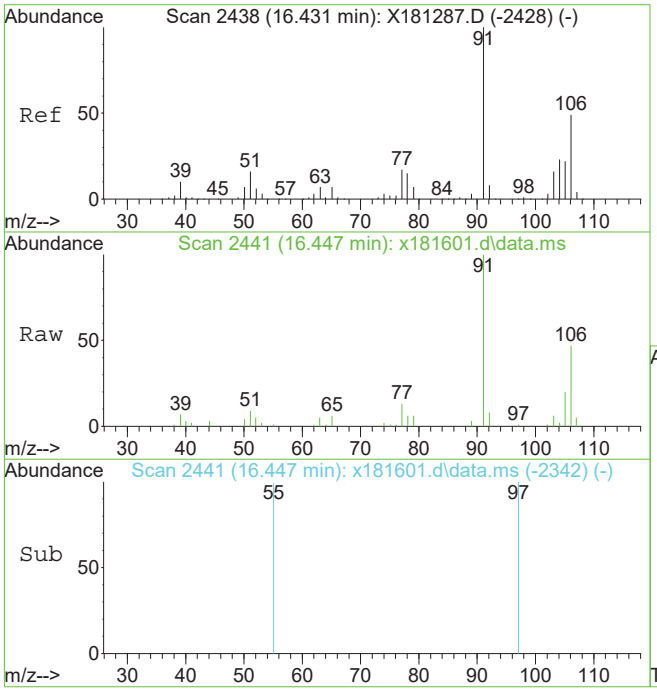


#90
m,p-xylene
Concen: 14.45 ug/L
RT: 15.934 min Scan# 2343
Delta R.T. 0.026 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion:106 Resp: 59079

Ion	Ratio	Lower	Upper
106	100		
91	189.8	163.1	223.1

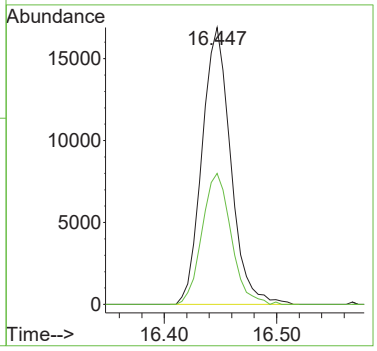


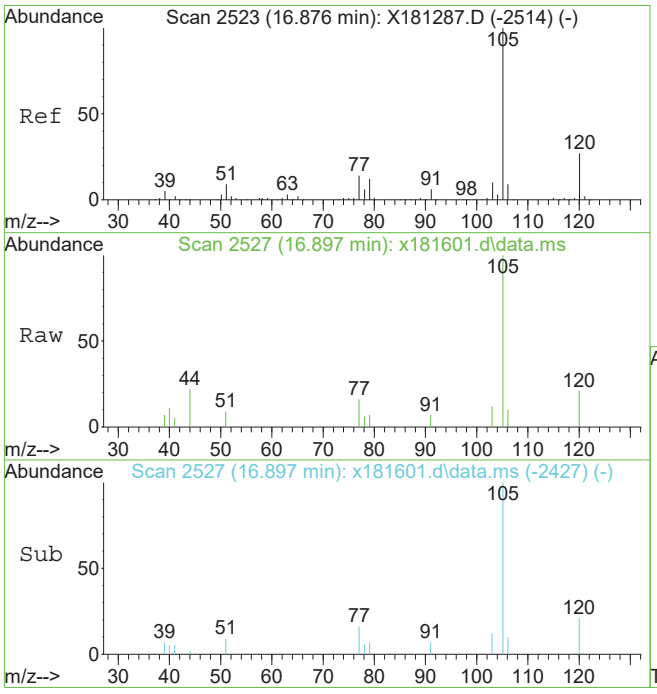


#91
o-xylene
Concen: 3.19 ug/L
RT: 16.447 min Scan# 2441
Delta R.T. 0.016 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion: 91 Resp: 29983

Ion	Ratio	Lower	Upper
91	100		
106	47.3	18.9	78.9

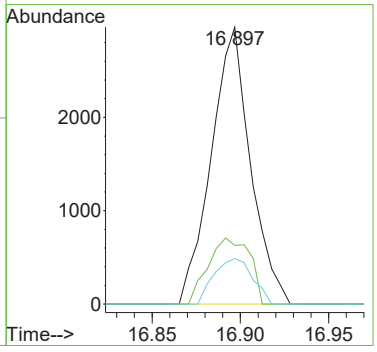


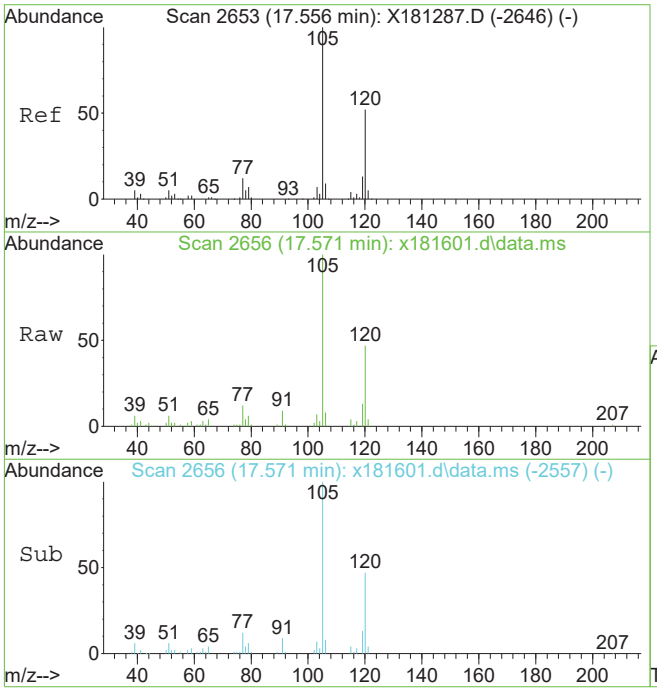


#95
isopropylbenzene
Concen: 0.38 ug/L
RT: 16.897 min Scan# 2527
Delta R.T. 0.022 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion:105 Resp: 4582

Ion	Ratio	Lower	Upper
105	100		
120	21.2	6.9	46.9
77	16.4	0.0	34.4

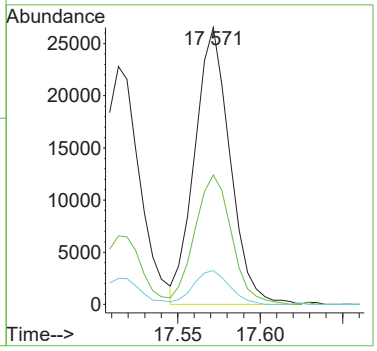


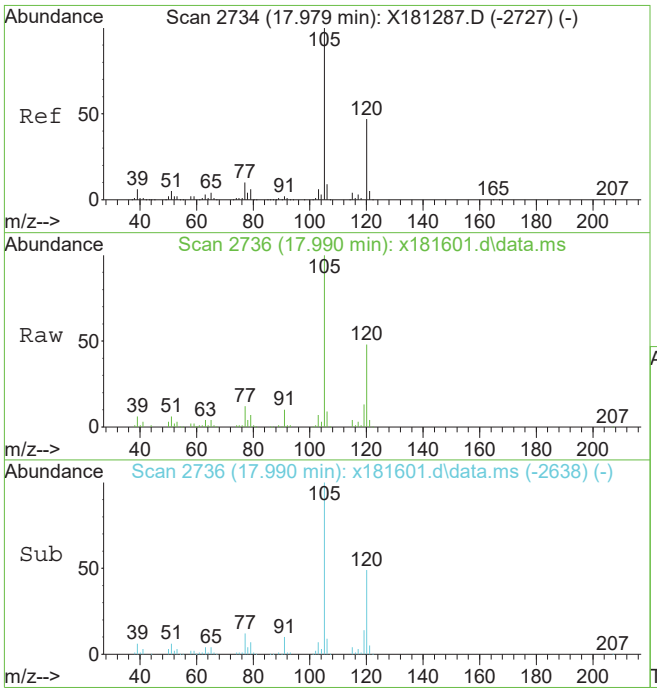


#106
1,3,5-trimethylbenzene
Concen: 3.82 ug/L
RT: 17.571 min Scan# 2656
Delta R.T. 0.016 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion:105 Resp: 39576

Ion	Ratio	Lower	Upper
105	100		
120	46.7	21.7	81.7
77	11.5	0.0	42.1

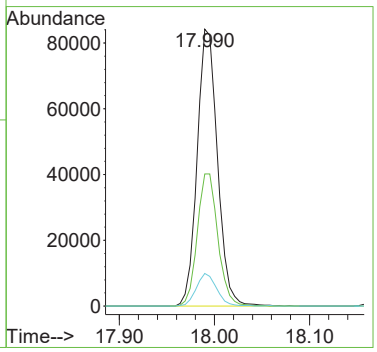


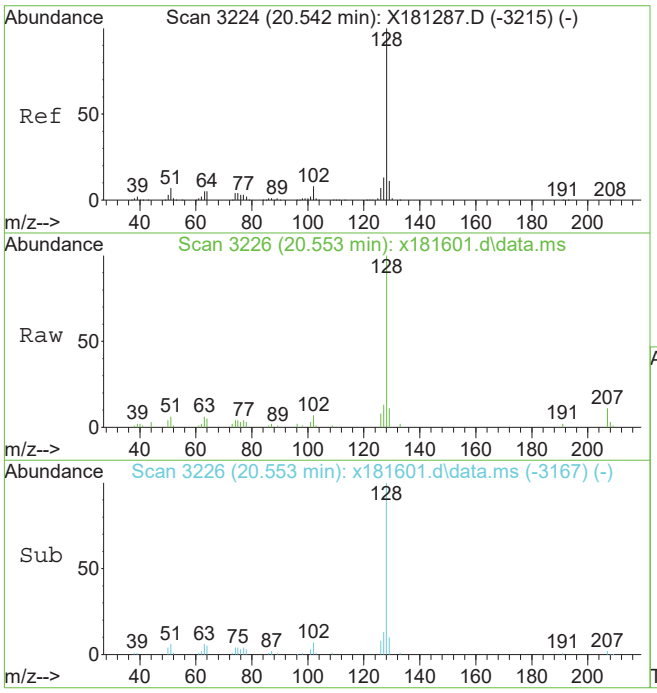


#108
1,2,4-trimethylbenzene
Concen: 11.63 ug/L
RT: 17.990 min Scan# 2736
Delta R.T. 0.011 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion:105 Resp: 125720

Ion	Ratio	Lower	Upper
105	100		
120	47.7	18.0	78.0
77	11.8	0.0	41.6

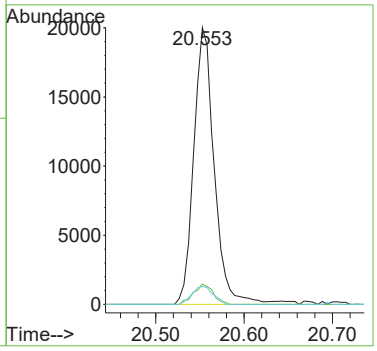




#119
naphthalene
Concen: 1.97 ug/L
RT: 20.553 min Scan# 3226
Delta R.T. 0.011 min
Lab File: x181601.d
Acq: 28 May 2019 10:56 am

Tgt Ion:128 Resp: 32452

Ion	Ratio	Lower	Upper
128	100		
102	7.3	0.0	37.7
51	6.5	0.0	36.7



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90972.d
Acq On : 23 May 2019 4:30 pm
Operator : CHELSEAS
Sample : jc88209-3 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 21 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:24:05 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

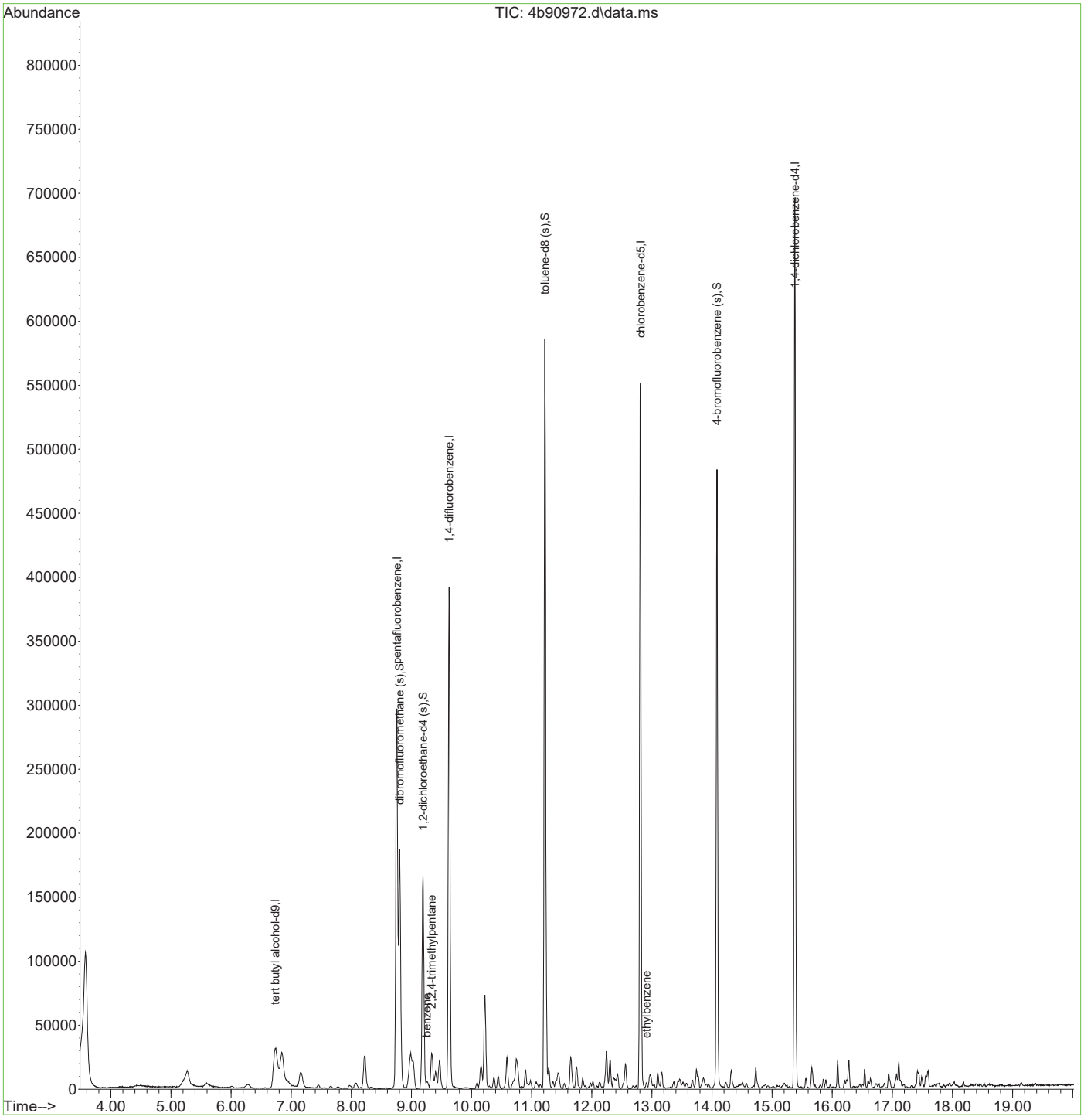
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.738	65	118618	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	244188	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	334005	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	310301	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.378	152	184053	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	119548	54.14	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 108.28%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	123116	55.90	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 111.80%			
76) toluene-d8 (s)	11.220	98	382860	49.02	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.04%			
99) 4-bromofluorobenzene (s)	14.081	95	161151	53.19	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 106.38%			
Target Compounds						Qvalue
57) 2,2,4-trimethylpentane	9.338	57	20092	1.70	ug/L	60
58) benzene	9.254	78	2325	0.20	ug/L	71
90) ethylbenzene	12.905	91	2509	0.20	ug/L	88

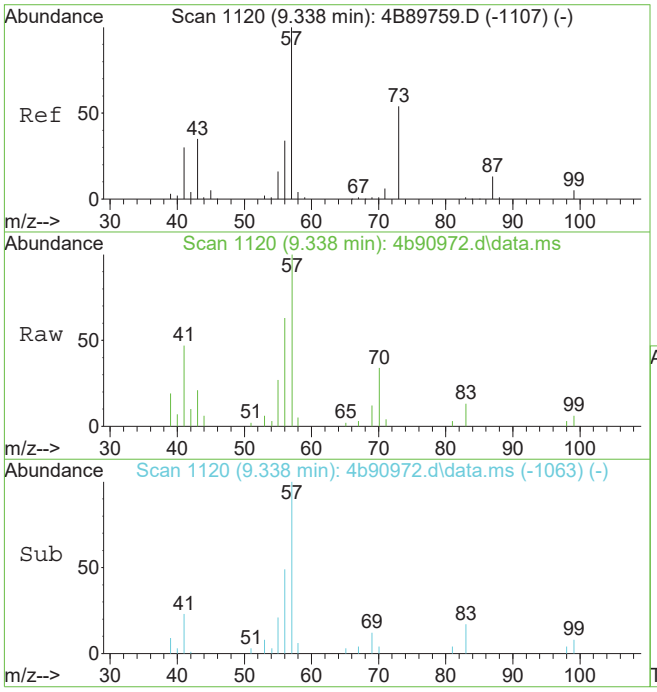
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90972.d
Acq On : 23 May 2019 4:30 pm
Operator : CHELSEAS
Sample : jc88209-3 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 21 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:24:05 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

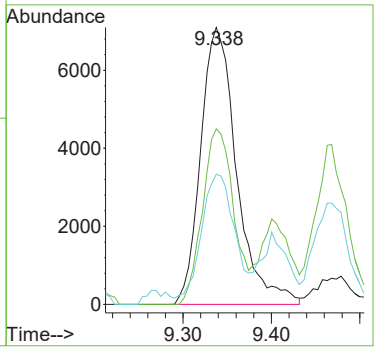


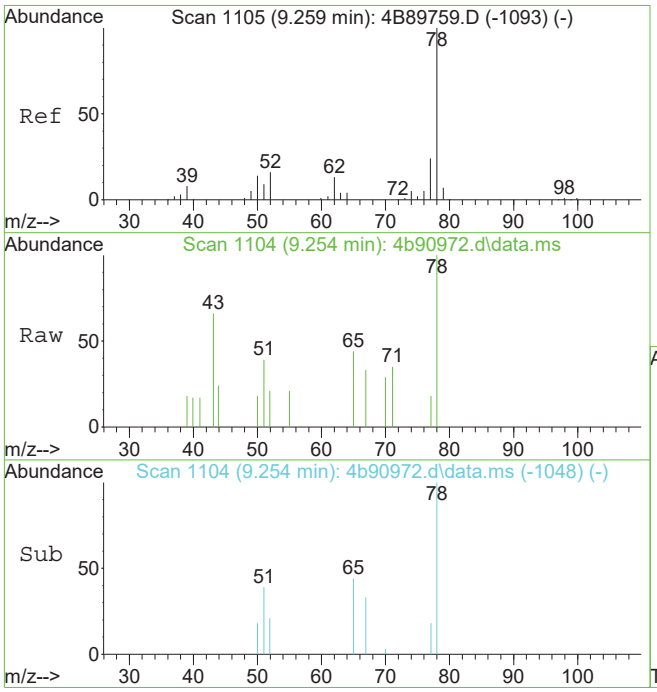


#57
2,2,4-trimethylpentane
Concen: 1.70 ug/L
RT: 9.338 min Scan# 1120
Delta R.T. -0.000 min
Lab File: 4b90972.d
Acq: 23 May 2019 4:30 pm

Tgt Ion: 57 Resp: 20092

Ion	Ratio	Lower	Upper
57	100		
56	63.4	3.8	63.8
41	44.1	0.0	59.9

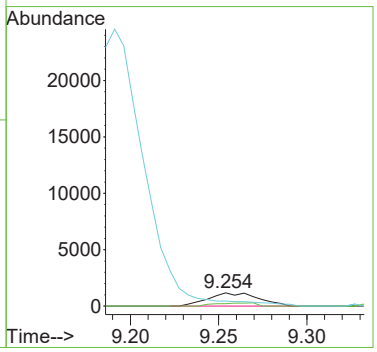


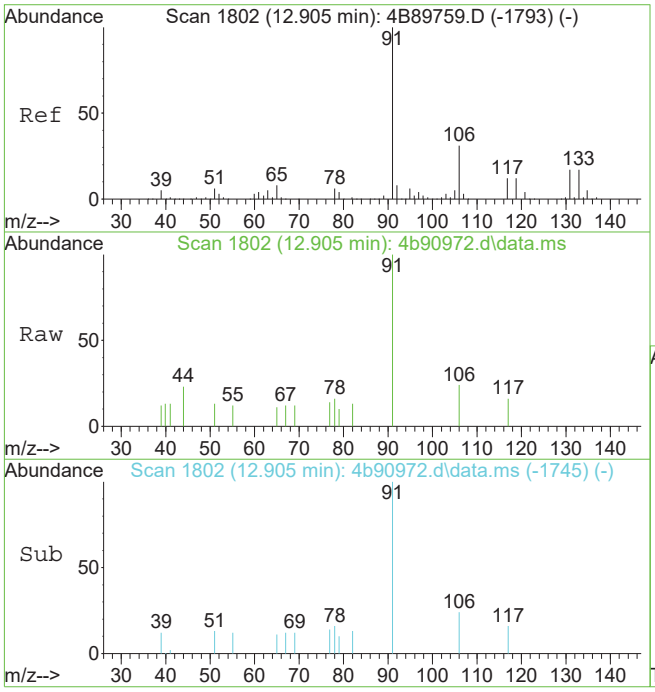


#58
benzene
Concen: 0.20 ug/L
RT: 9.254 min Scan# 1104
Delta R.T. -0.005 min
Lab File: 4b90972.d
Acq: 23 May 2019 4:30 pm

Tgt Ion: 78 Resp: 2325

Ion	Ratio	Lower	Upper
78	100		
77	17.5	0.0	53.9
51	39.1	0.0	47.3

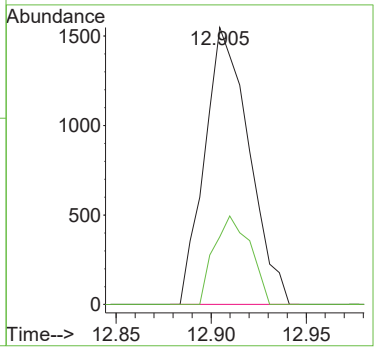




#90
ethylbenzene
Concen: 0.20 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b90972.d
Acq: 23 May 2019 4:30 pm

Tgt Ion: 91 Resp: 2509

Ion	Ratio	Lower	Upper
91	100		
106	24.5	1.0	61.0



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91021.d
Acq On : 24 May 2019 6:50 pm
Operator : CHELSEAS
Sample : jc88209-4 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,50
ALS Vial : 18 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:48:05 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

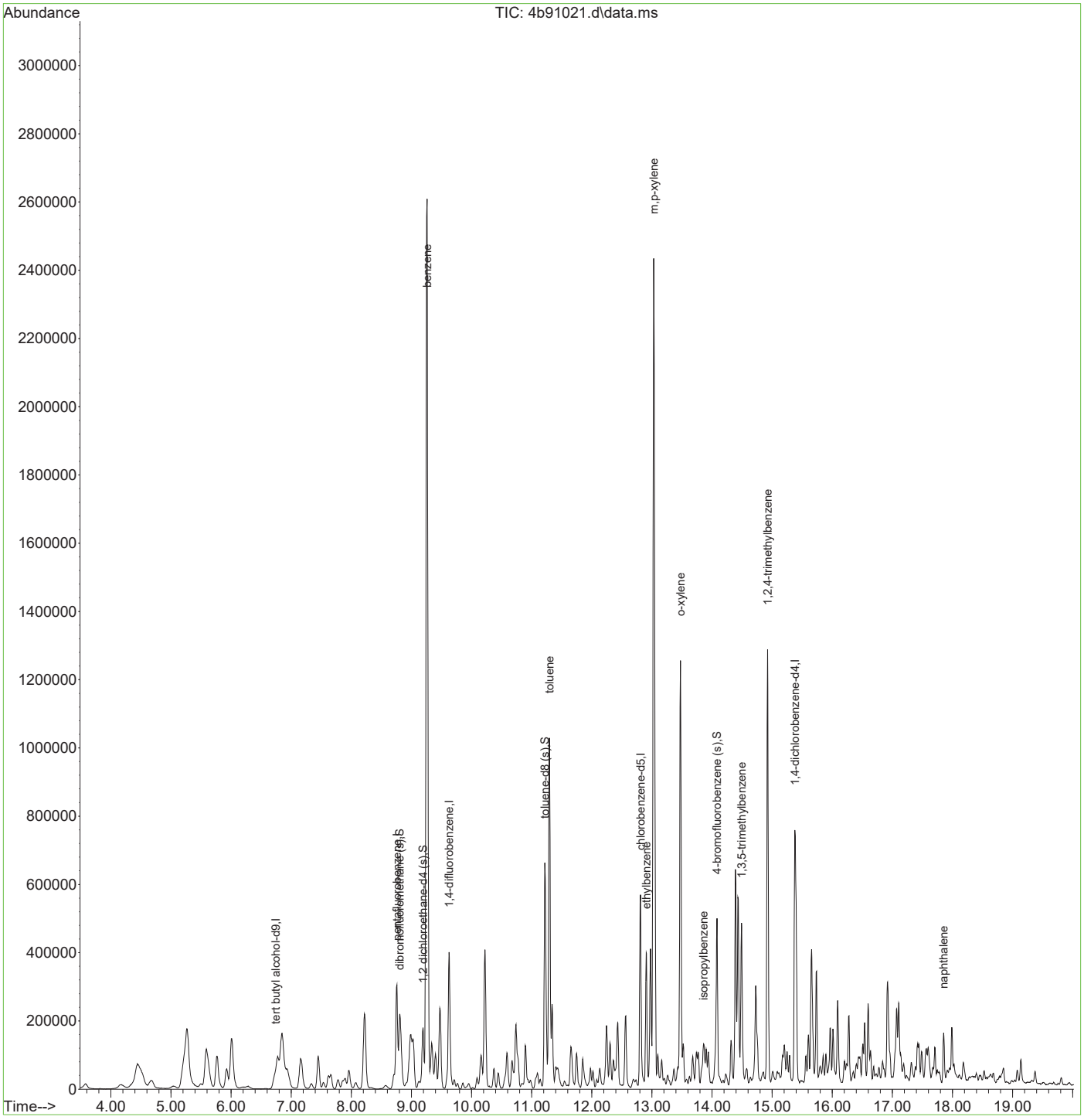
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.743	65	146812	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	252135	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	330949	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	310432	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	188901	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	115799	50.79	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 101.58%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	120017	55.00	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 110.00%			
76) toluene-d8 (s)	11.220	98	392689	50.26	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.52%			
99) 4-bromofluorobenzene (s)	14.081	95	166309	53.48	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 106.96%			
Target Compounds						Qvalue
58) benzene	9.259	78	2587046	230.19	ug/L	98
77) toluene	11.294	92	417245	64.49	ug/L	99
90) ethylbenzene	12.910	91	281973	22.20	ug/L	98
91) m,p-xylene	13.030	106	848246	175.92	ug/L	96
92) o-xylene	13.475	91	713021	66.24	ug/L	99
95) isopropylbenzene	13.857	105	27335	2.00	ug/L	97
107) 1,3,5-trimethylbenzene	14.489	105	238586	20.45	ug/L	99
109) 1,2,4-trimethylbenzene	14.924	105	691166	59.11	ug/L	100
123) naphthalene	17.852	128	116942	9.95	ug/L	98

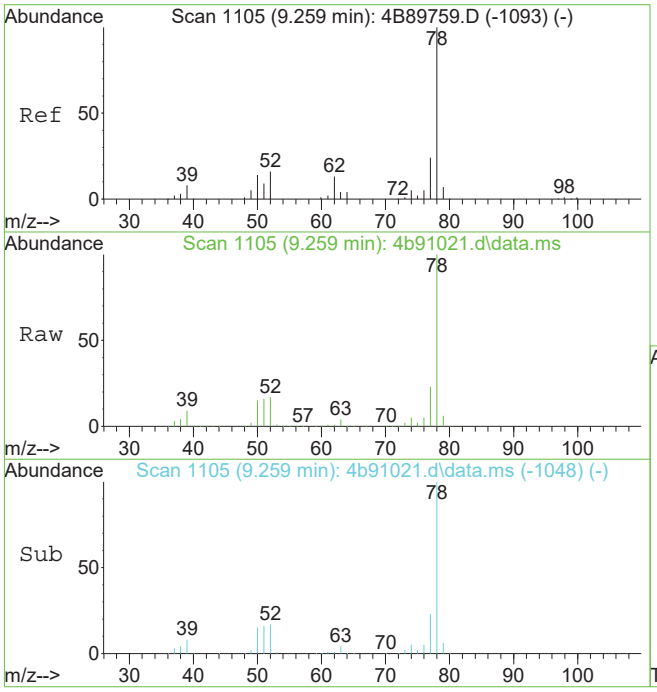
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91021.d
Acq On : 24 May 2019 6:50 pm
Operator : CHELSEAS
Sample : jc88209-4 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,50
ALS Vial : 18 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:48:05 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

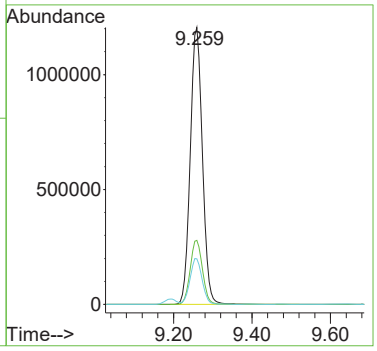


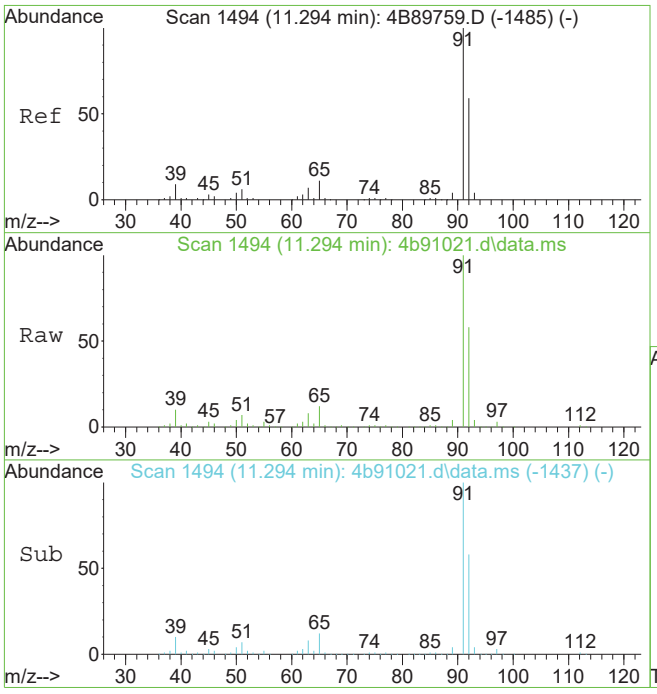


#58
benzene
Concen: 230.19 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion: 78 Resp: 2587046

Ion	Ratio	Lower	Upper
78	100		
77	23.1	0.0	53.9
51	16.4	0.0	47.3

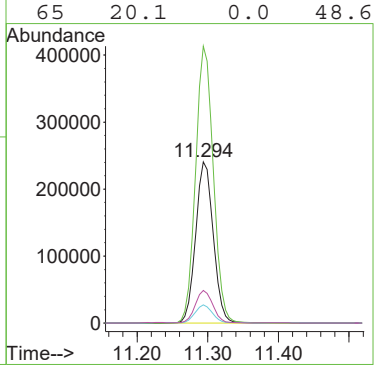


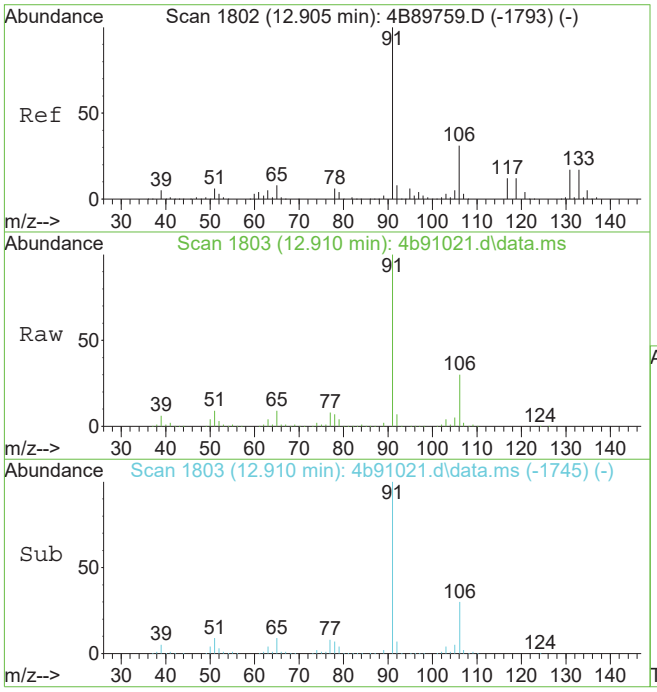


#77
toluene
Concen: 64.49 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion: 92 Resp: 417245

Ion	Ratio	Lower	Upper
92	100		
91	171.7	150.2	190.2
51	11.2	0.0	40.3
65	20.1	0.0	48.6

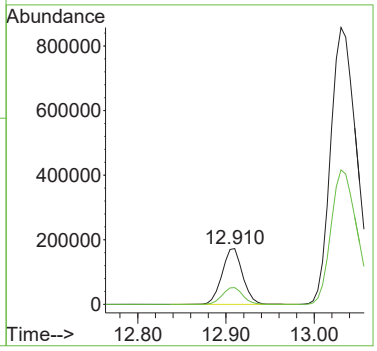


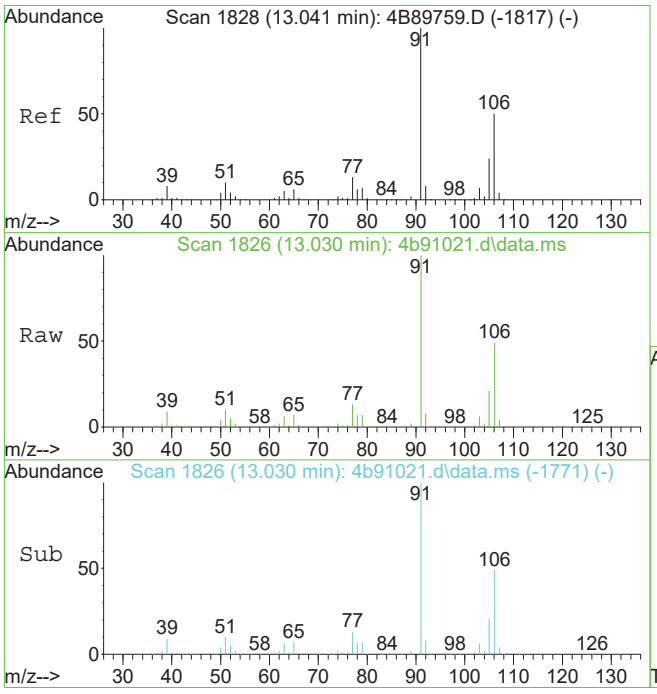


#90
ethylbenzene
Concen: 22.20 ug/L
RT: 12.910 min Scan# 1803
Delta R.T. 0.005 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion: 91 Resp: 281973

Ion	Ratio	Lower	Upper
91	100		
106	29.9	1.0	61.0

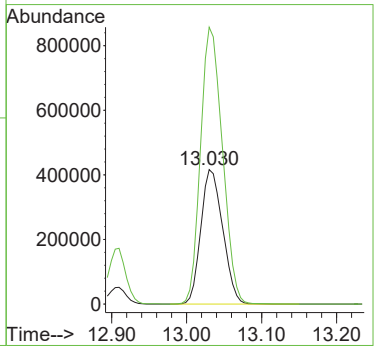


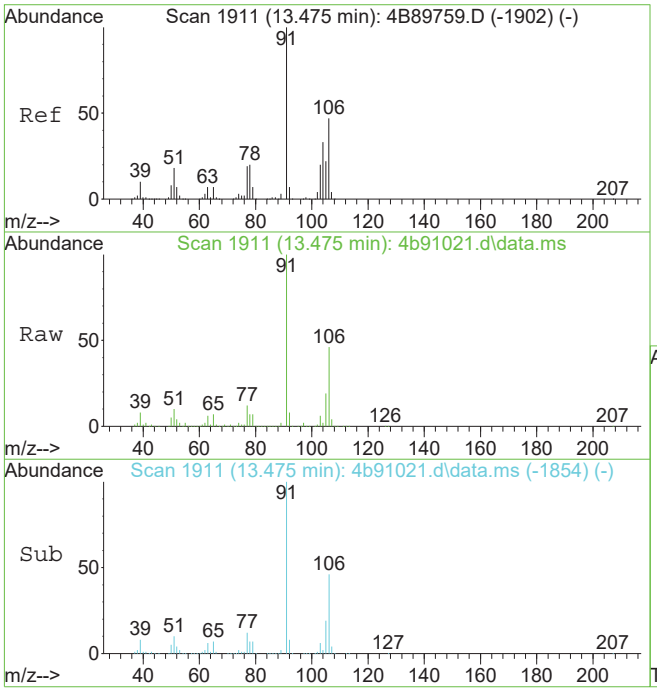


#91
m,p-xylene
Concen: 175.92 ug/L
RT: 13.030 min Scan# 1826
Delta R.T. -0.010 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion:106 Resp: 848246

Ion	Ratio	Lower	Upper
106	100		
91	205.8	169.3	229.3

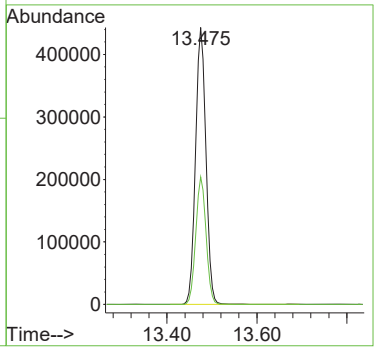


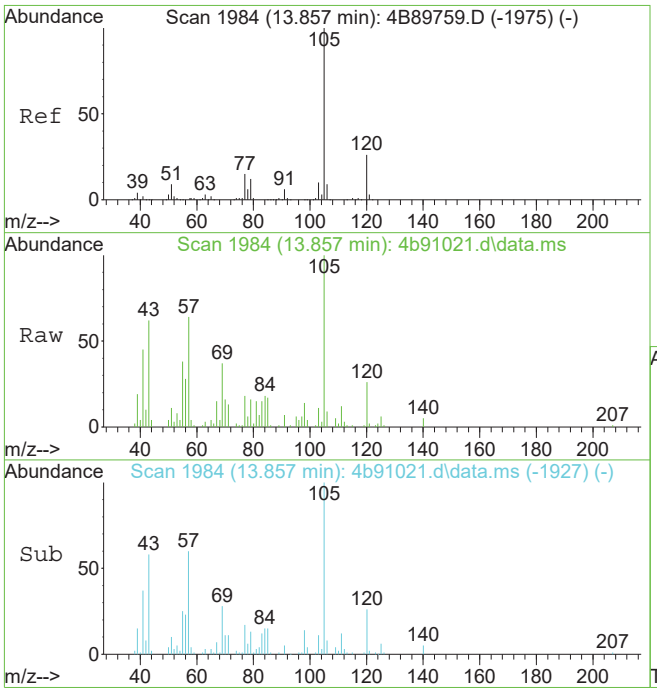


#92
o-xylene
Concen: 66.24 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion: 91 Resp: 713021

Ion	Ratio	Lower	Upper
91	100		
106	46.0	16.9	76.9

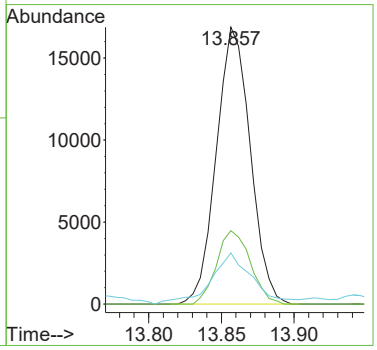


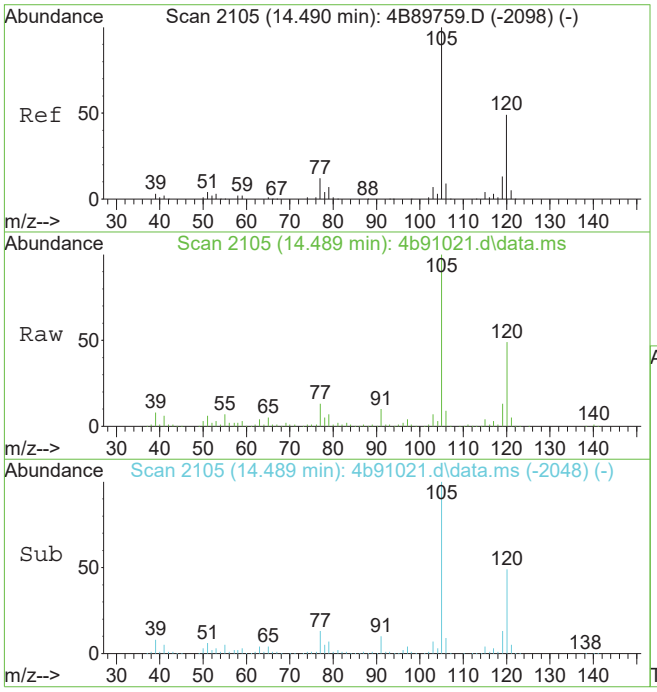


#95
isopropylbenzene
Concen: 2.00 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. -0.000 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion:105 Resp: 27335

Ion	Ratio	Lower	Upper
105	100		
120	26.5	5.8	45.8
77	16.9	0.0	34.8

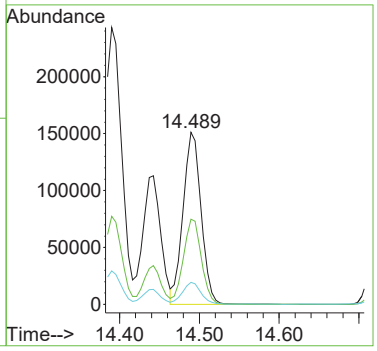


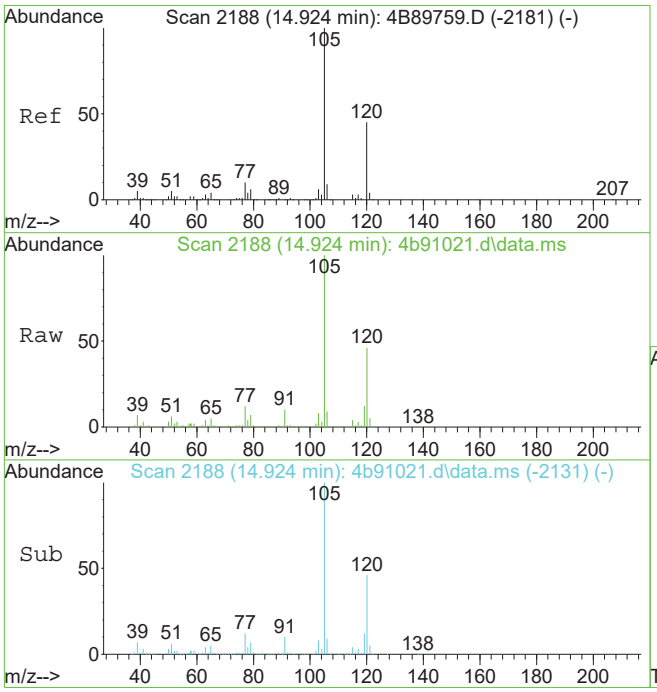


#107
1,3,5-trimethylbenzene
Concen: 20.45 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion:105 Resp: 238586

Ion	Ratio	Lower	Upper
105	100		
120	49.5	19.2	79.2
77	12.6	0.0	42.1

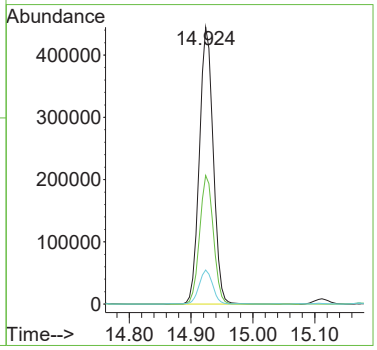


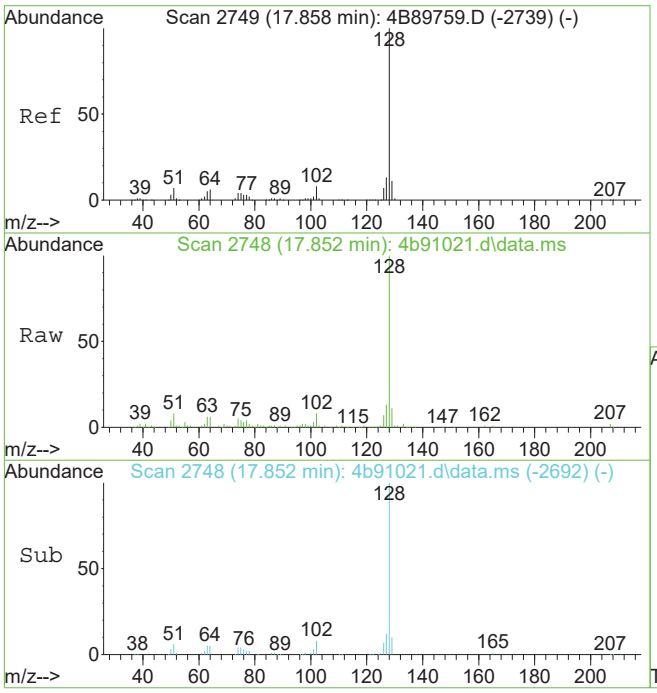


#109
1,2,4-trimethylbenzene
Concen: 59.11 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion:105 Resp: 691166

Ion	Ratio	Lower	Upper
105	100		
120	46.4	16.3	76.3
77	12.2	0.0	41.8

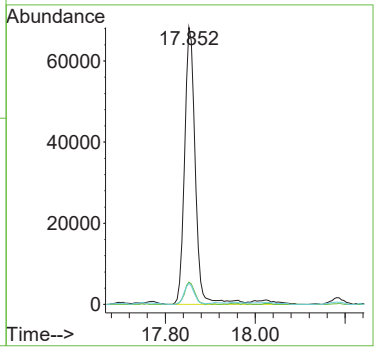




#123
naphthalene
Concen: 9.95 ug/L
RT: 17.852 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b91021.d
Acq: 24 May 2019 6:50 pm

Tgt Ion:128 Resp: 116942

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.6
51	7.7	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91022.d
Acq On : 24 May 2019 7:18 pm
Operator : CHELSEAS
Sample : jc88209-4 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,500
ALS Vial : 19 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:48:20 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

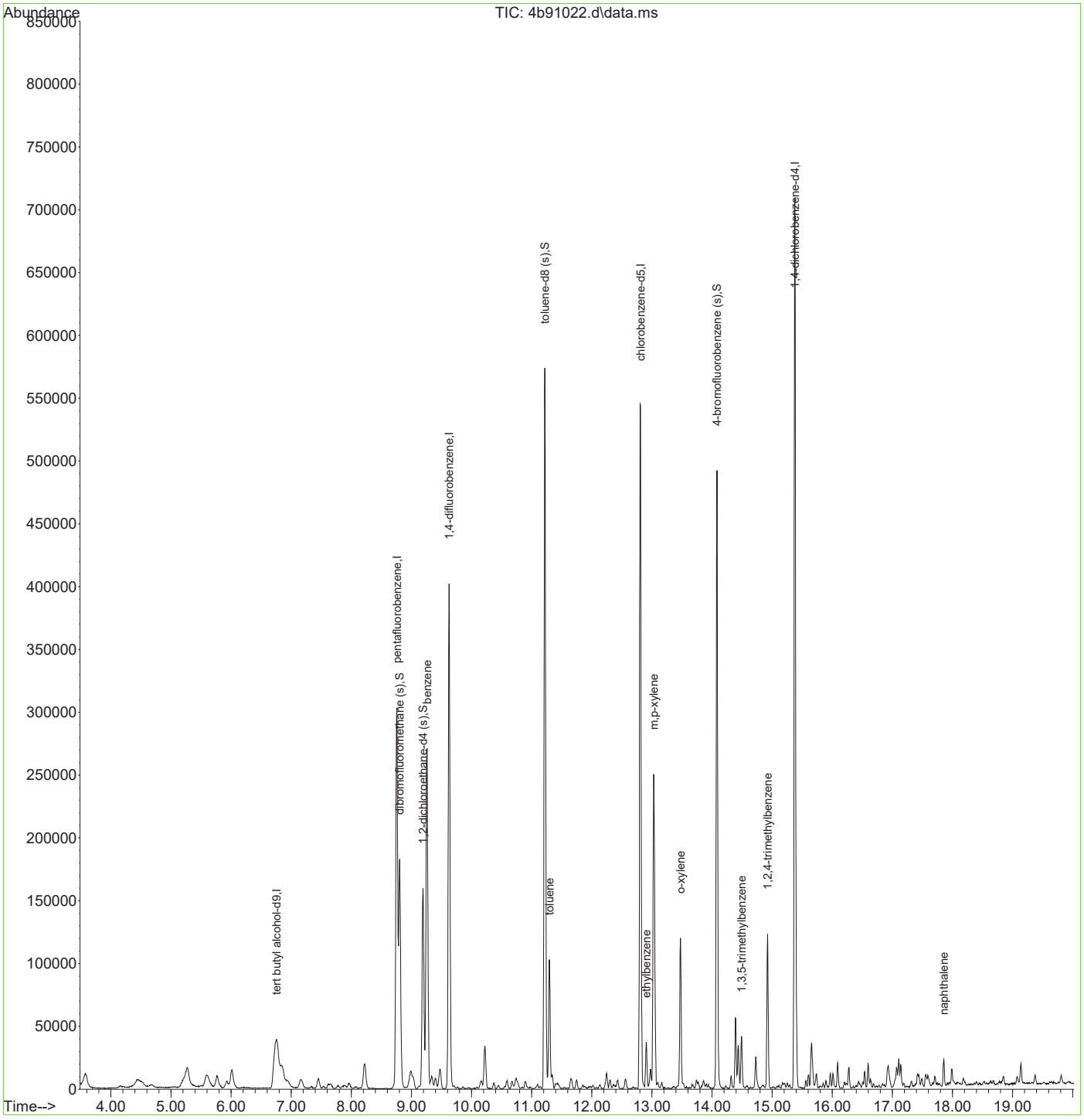
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.754	65	135981	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	256794	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	341435	50.00	ug/L	0.00
75) chlorobenzene-d5	12.811	117	312000	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	190617	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	119836	51.61	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.22%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	122016	54.20	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 108.40%			
76) toluene-d8 (s)	11.221	98	388167	49.43	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.86%			
99) 4-bromofluorobenzene (s)	14.082	95	161789	51.56	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.12%			
Target Compounds						Qvalue
58) benzene	9.259	78	270419	23.32	ug/L	99
77) toluene	11.294	92	42580	6.55	ug/L	95
90) ethylbenzene	12.905	91	26977	2.11	ug/L	99
91) m,p-xylene	13.030	106	86323	17.81	ug/L	90
92) o-xylene	13.475	91	70483	6.51	ug/L	96
107) 1,3,5-trimethylbenzene	14.489	105	22640	1.92	ug/L	98
109) 1,2,4-trimethylbenzene	14.924	105	67910	5.76	ug/L	99
123) naphthalene	17.858	128	18279	1.54	ug/L	98

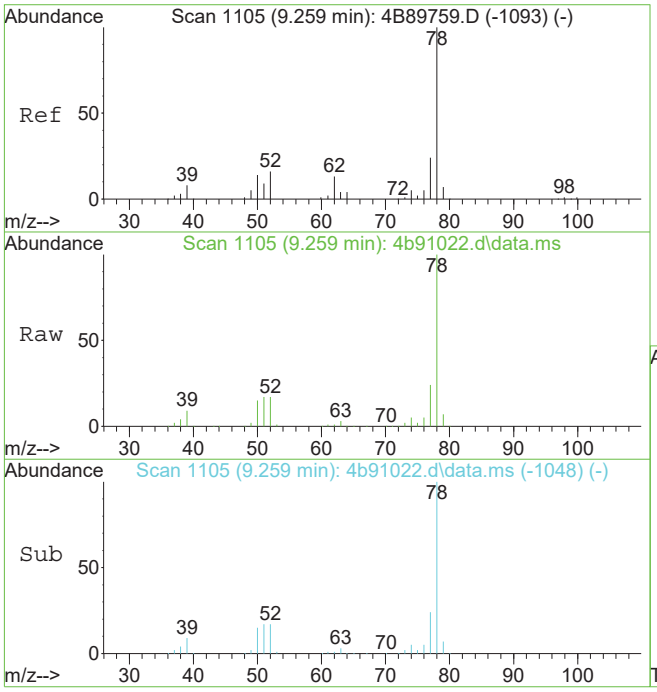
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91022.d
Acq On : 24 May 2019 7:18 pm
Operator : CHELSEAS
Sample : jc88209-4 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,500
ALS Vial : 19 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:48:20 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

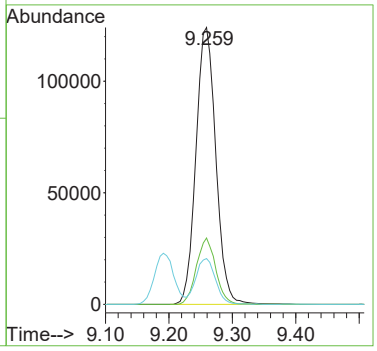


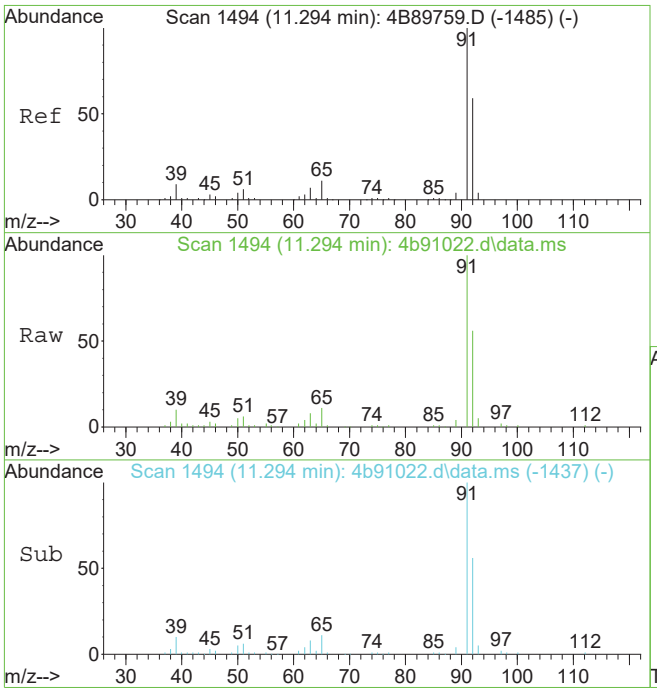


#58
benzene
Concen: 23.32 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion: 78 Resp: 270419

Ion	Ratio	Lower	Upper
78	100		
77	24.0	0.0	53.9
51	16.4	0.0	47.3

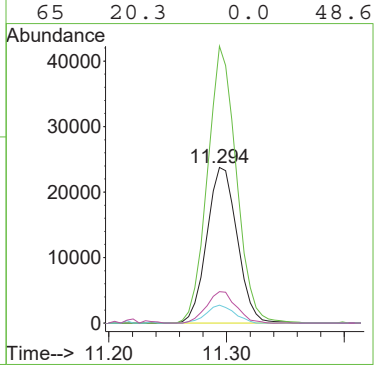


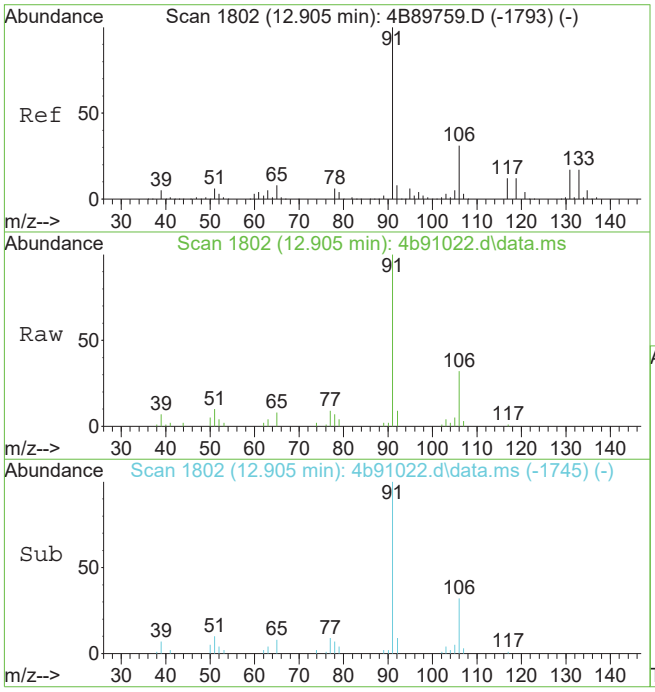


#77
toluene
Concen: 6.55 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion: 92 Resp: 42580

Ion	Ratio	Lower	Upper
92	100		
91	178.0	150.2	190.2
51	11.5	0.0	40.3
65	20.3	0.0	48.6

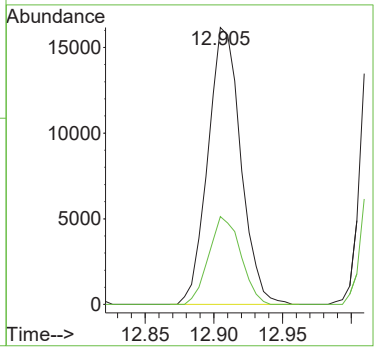


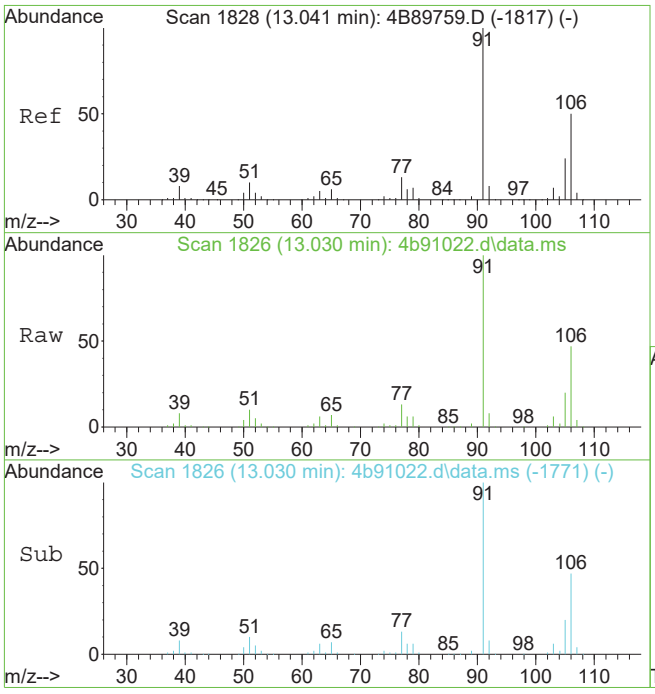


#90
ethylbenzene
Concen: 2.11 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion: 91 Resp: 26977

Ion	Ratio	Lower	Upper
91	100		
106	31.7	1.0	61.0

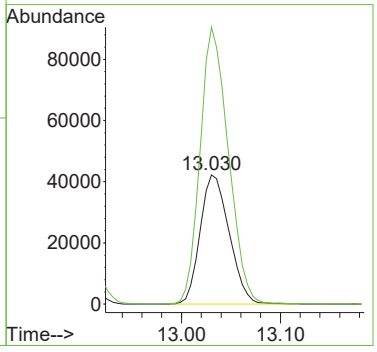


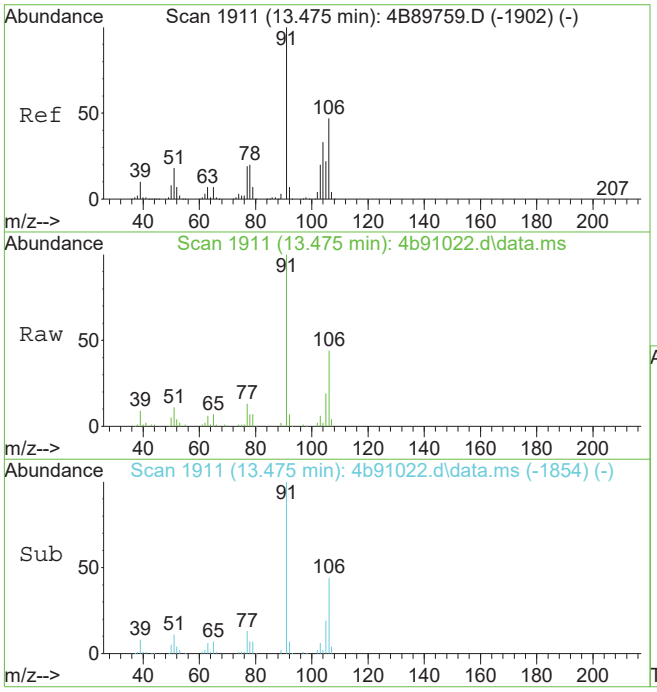


#91
m,p-xylene
Concen: 17.81 ug/L
RT: 13.030 min Scan# 1826
Delta R.T. -0.010 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion:106 Resp: 86323

Ion	Ratio	Lower	Upper
106	100		
91	214.0	169.3	229.3

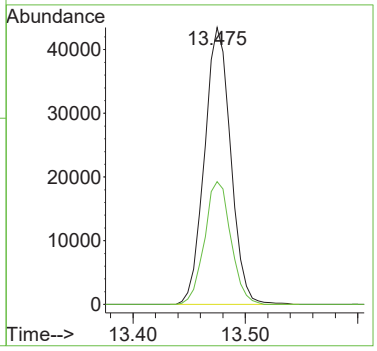


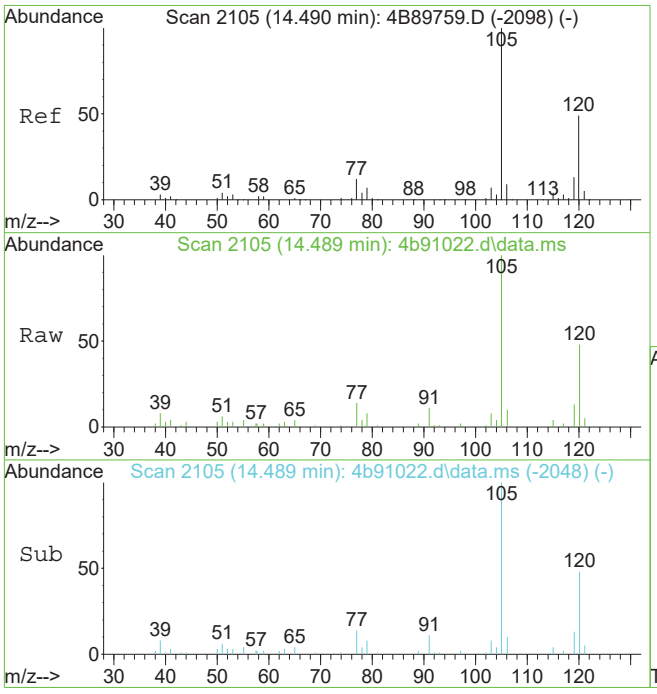


#92
o-xylene
Concen: 6.51 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion: 91 Resp: 70483

Ion	Ratio	Lower	Upper
91	100		
106	44.3	16.9	76.9

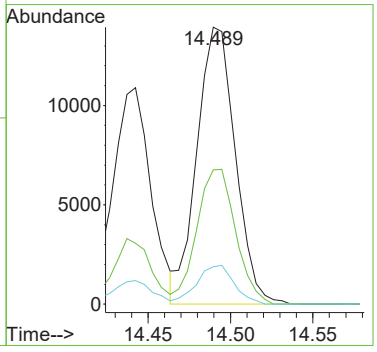


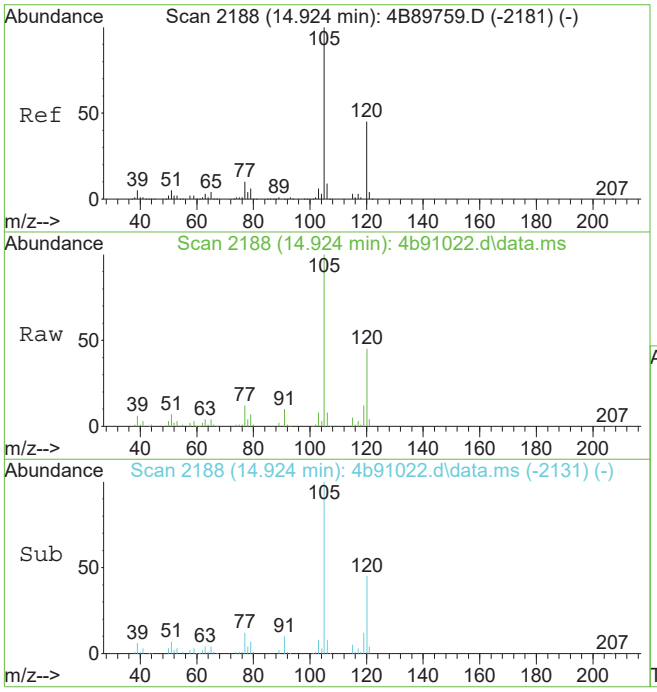


#107
1,3,5-trimethylbenzene
Concen: 1.92 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion:105 Resp: 22640

Ion	Ratio	Lower	Upper
105	100		
120	48.5	19.2	79.2
77	13.5	0.0	42.1

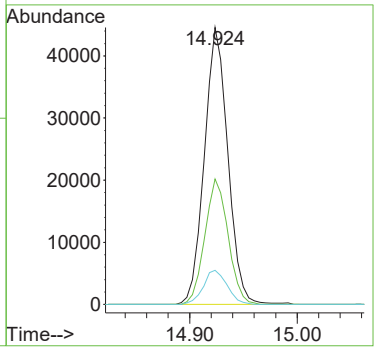


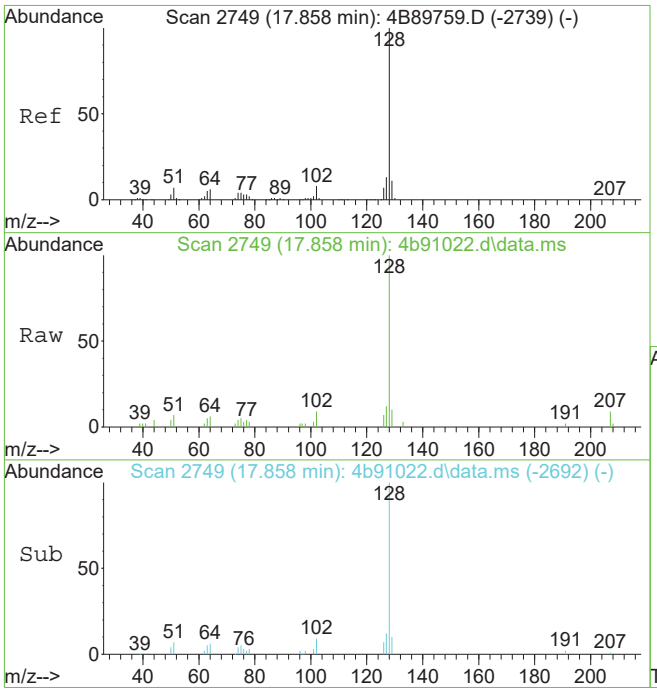


#109
1,2,4-trimethylbenzene
Concen: 5.76 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion:105 Resp: 67910

Ion	Ratio	Lower	Upper
105	100		
120	45.3	16.3	76.3
77	12.3	0.0	41.8

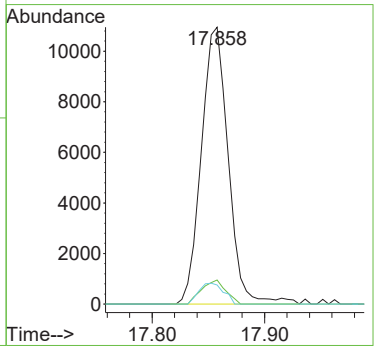




#123
naphthalene
Concen: 1.54 ug/L
RT: 17.858 min Scan# 2749
Delta R.T. -0.000 min
Lab File: 4b91022.d
Acq: 24 May 2019 7:18 pm

Tgt Ion:128 Resp: 18279

Ion	Ratio	Lower	Upper
128	100		
102	8.7	0.0	37.6
51	6.9	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181604.d
Acq On : 28 May 2019 12:25 pm
Operator : jessicap
Sample : JC88209-4 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,20
ALS Vial : 11 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:21:10 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

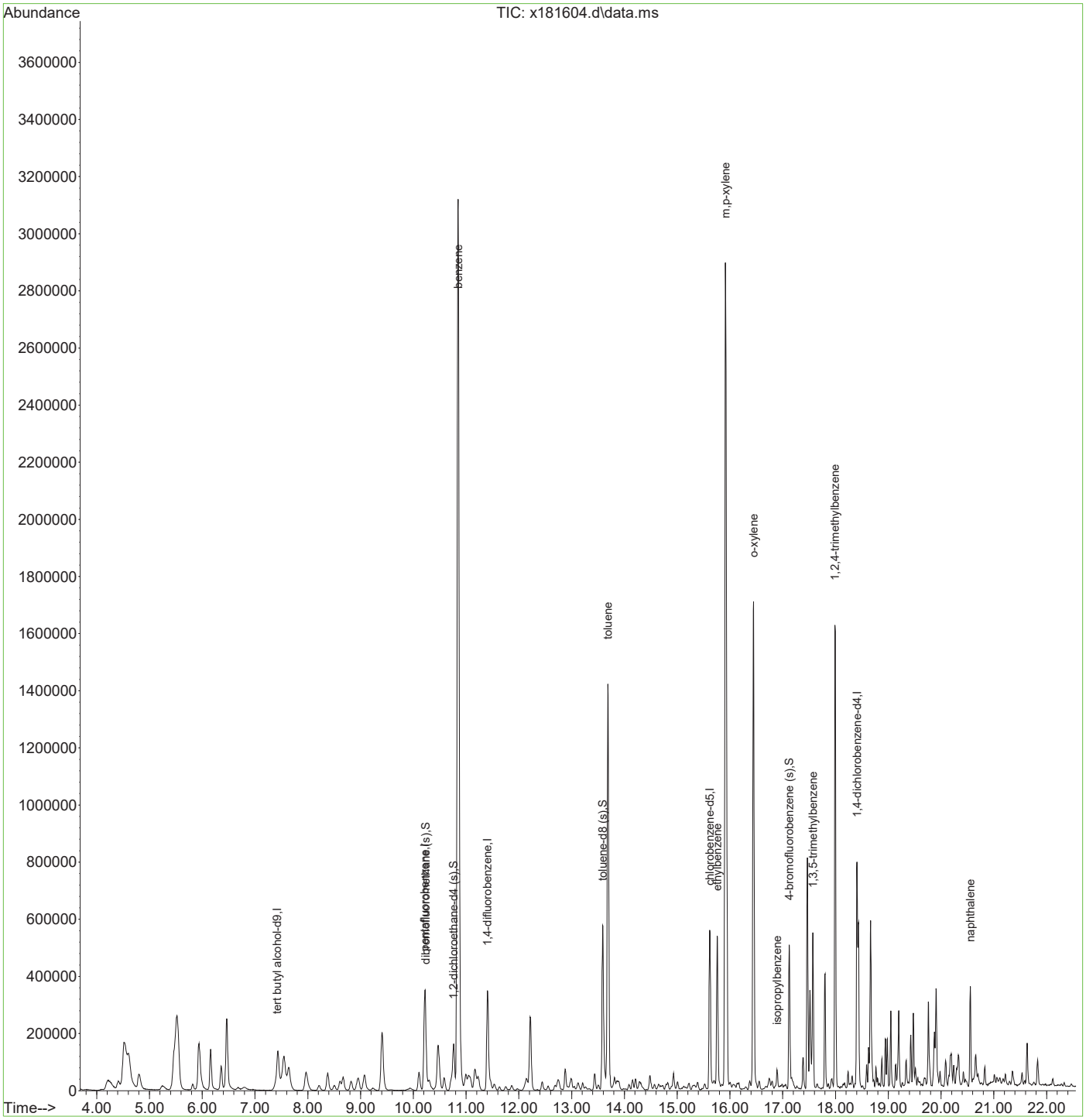
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.419	65	197904	500.00	ug/L	0.02
5) pentafluorobenzene	10.212	168	275910	50.00	ug/L	0.02
53) 1,4-difluorobenzene	11.405	114	369095	50.00	ug/L	0.02
74) chlorobenzene-d5	15.615	117	370496	50.00	ug/L	0.01
97) 1,4-dichlorobenzene-d4	18.408	152	209298	50.00	ug/L	0.02
System Monitoring Compounds						
44) dibromofluoromethane (s)	10.233	113	114279	50.90	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 101.80%			
54) 1,2-dichloroethane-d4 (s)	10.761	65	117812	48.39	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 96.78%			
75) toluene-d8 (s)	13.586	98	461346	51.94	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.88%			
98) 4-bromofluorobenzene (s)	17.121	95	176955	51.61	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.22%			
Target Compounds						Qvalue
58) benzene	10.850	78	4023493	469.77	ug/L	99
76) toluene	13.685	92	750545	136.31	ug/L	98
89) ethylbenzene	15.756	91	449831	43.67	ug/L	99
90) m,p-xylene	15.913	106	1259927	306.55	ug/L	95
91) o-xylene	16.447	91	1113462	117.93	ug/L	96
95) isopropylbenzene	16.891	105	39510	3.26	ug/L	97
106) 1,3,5-trimethylbenzene	17.571	105	291510	30.32	ug/L	98
108) 1,2,4-trimethylbenzene	17.990	105	881508	87.90	ug/L	98
119) naphthalene	20.552	128	279726	18.27	ug/L	99

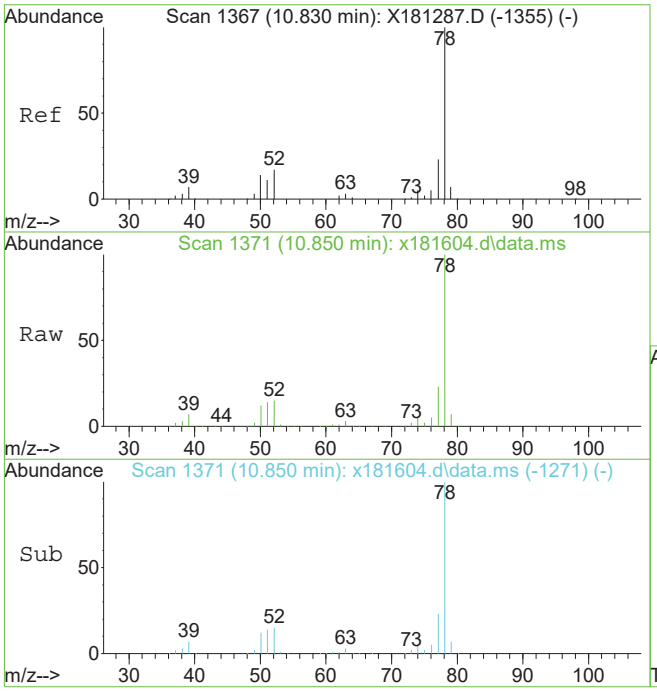
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181604.d
Acq On : 28 May 2019 12:25 pm
Operator : jessicap
Sample : JC88209-4 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,20
ALS Vial : 11 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:21:10 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

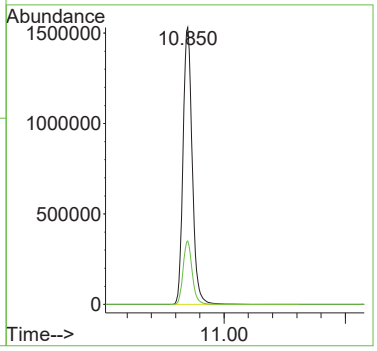


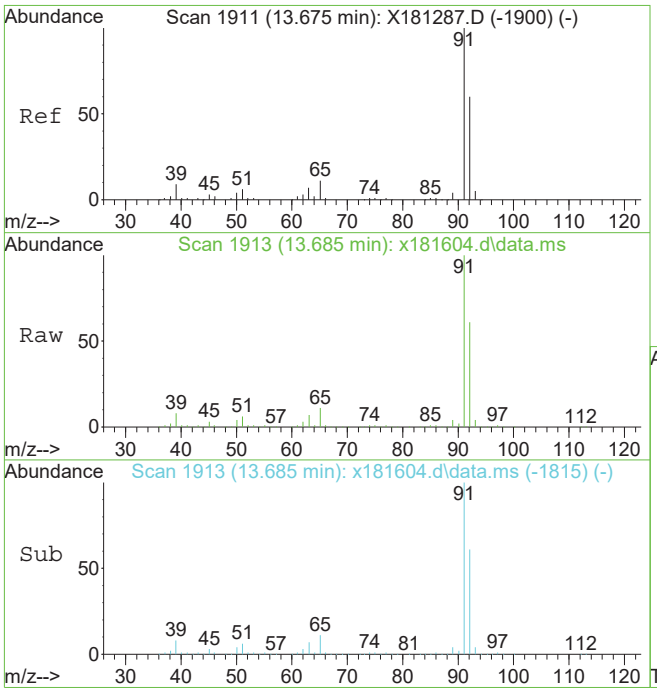


#58
benzene
Concen: 469.77 ug/L
RT: 10.850 min Scan# 1371
Delta R.T. 0.021 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion: 78 Resp: 4023493

Ion	Ratio	Lower	Upper
78	100		
77	22.9	0.0	53.2

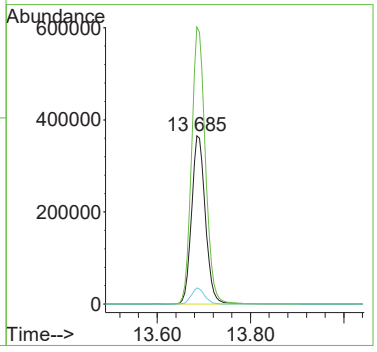


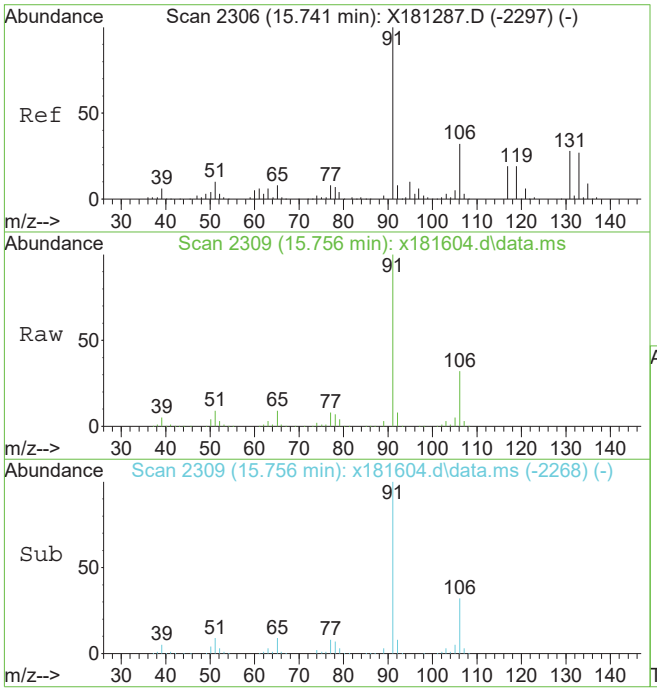


#76
toluene
Concen: 136.31 ug/L
RT: 13.685 min Scan# 1913
Delta R.T. 0.010 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion: 92 Resp: 750545

Ion	Ratio	Lower	Upper
92	100		
91	164.8	147.8	187.8
51	9.6	0.0	30.8

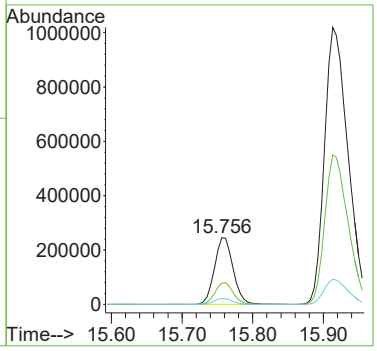


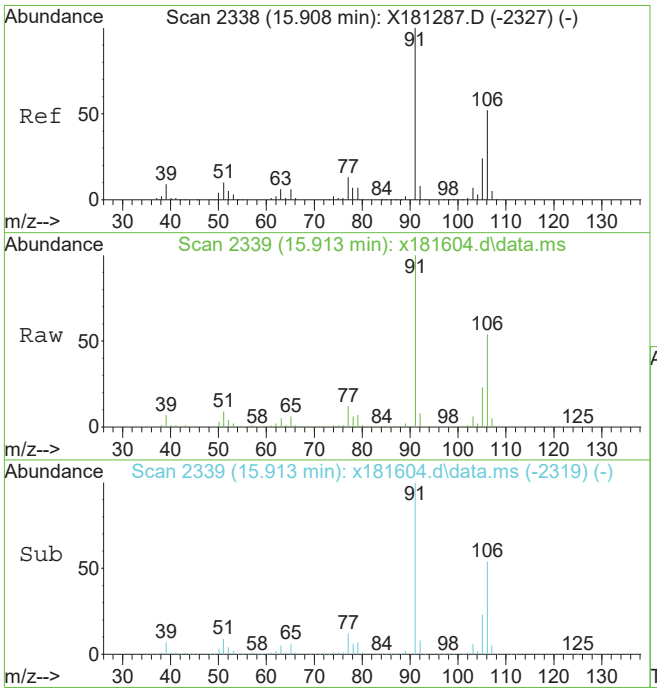


#89
ethylbenzene
Concen: 43.67 ug/L
RT: 15.756 min Scan# 2309
Delta R.T. 0.016 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion: 91 Resp: 449831

Ion	Ratio	Lower	Upper
91	100		
106	31.9	2.2	62.2
51	8.9	0.0	40.0

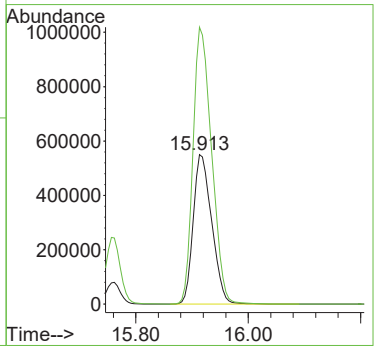


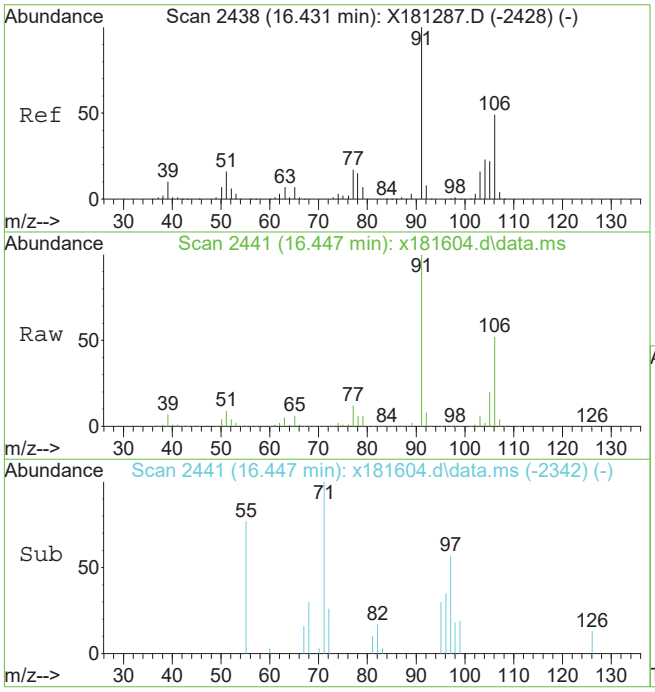


#90
m,p-xylene
Concen: 306.55 ug/L
RT: 15.913 min Scan# 2339
Delta R.T. 0.005 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion:106 Resp: 1259927

Ion	Ratio	Lower	Upper
106	100		
91	185.3	163.1	223.1

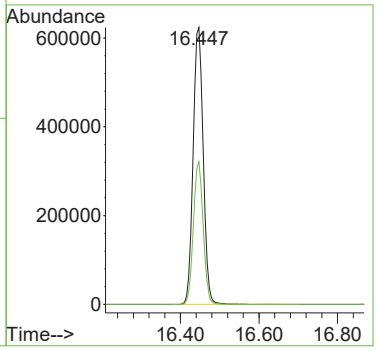


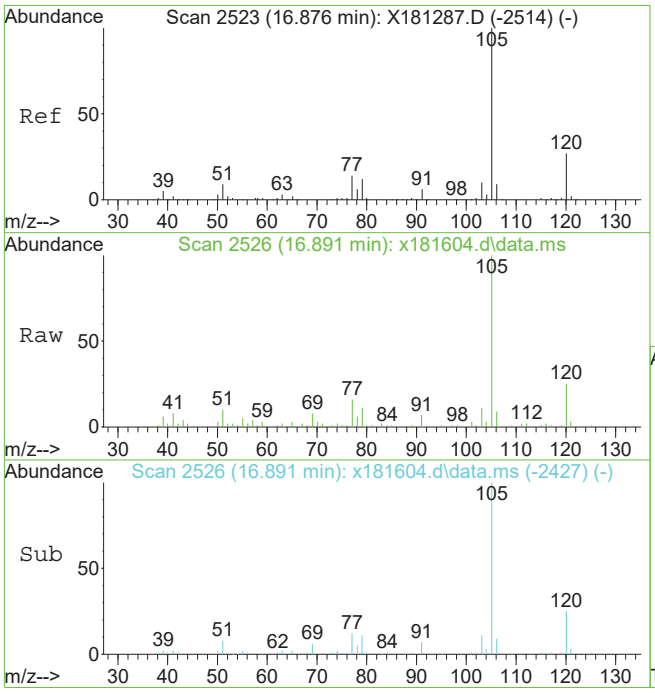


#91
o-xylene
Concen: 117.93 ug/L
RT: 16.447 min Scan# 2441
Delta R.T. 0.016 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion: 91 Resp: 1113462

Ion	Ratio	Lower	Upper
91	100		
106	51.5	18.9	78.9

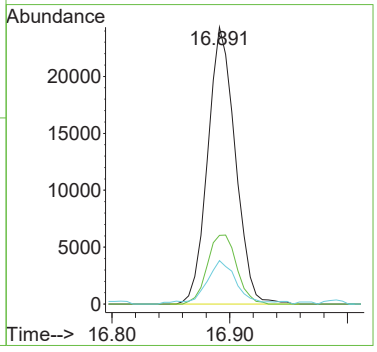


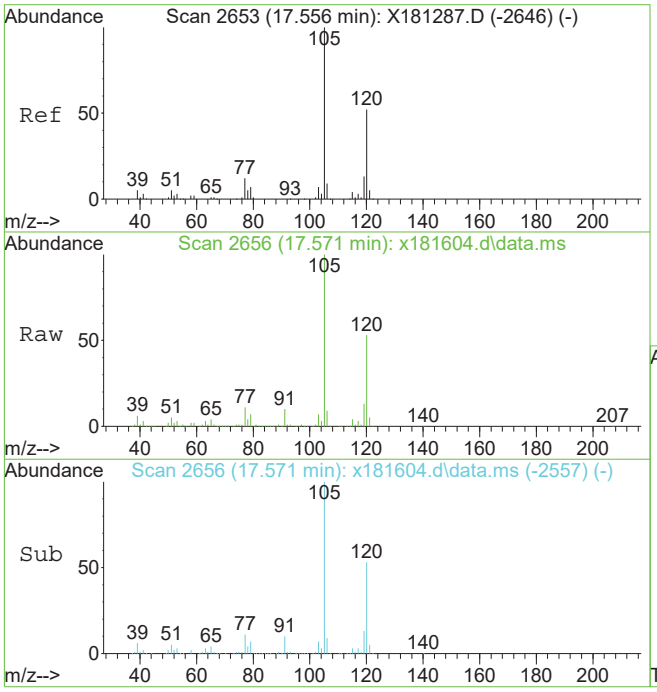


#95
isopropylbenzene
Concen: 3.26 ug/L
RT: 16.891 min Scan# 2526
Delta R.T. 0.016 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion:105 Resp: 39510

Ion	Ratio	Lower	Upper
105	100		
120	24.8	6.9	46.9
77	15.1	0.0	34.4

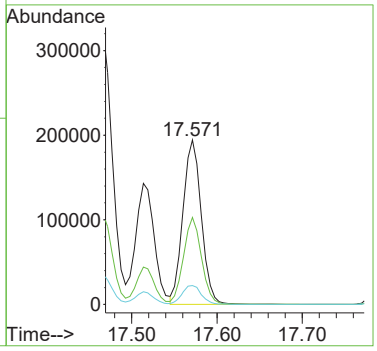


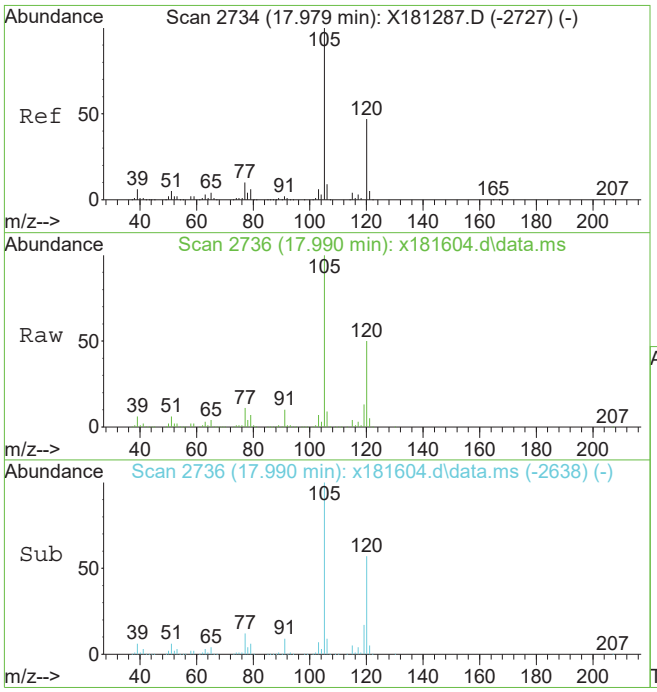


#106
1,3,5-trimethylbenzene
Concen: 30.32 ug/L
RT: 17.571 min Scan# 2656
Delta R.T. 0.016 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion:105 Resp: 291510

Ion	Ratio	Lower	Upper
105	100		
120	52.9	21.7	81.7
77	11.3	0.0	42.1

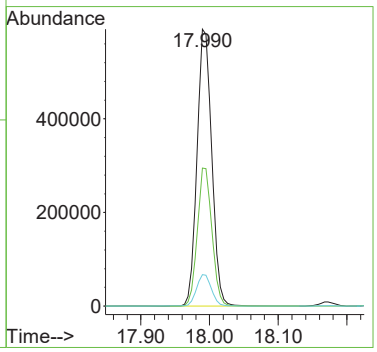


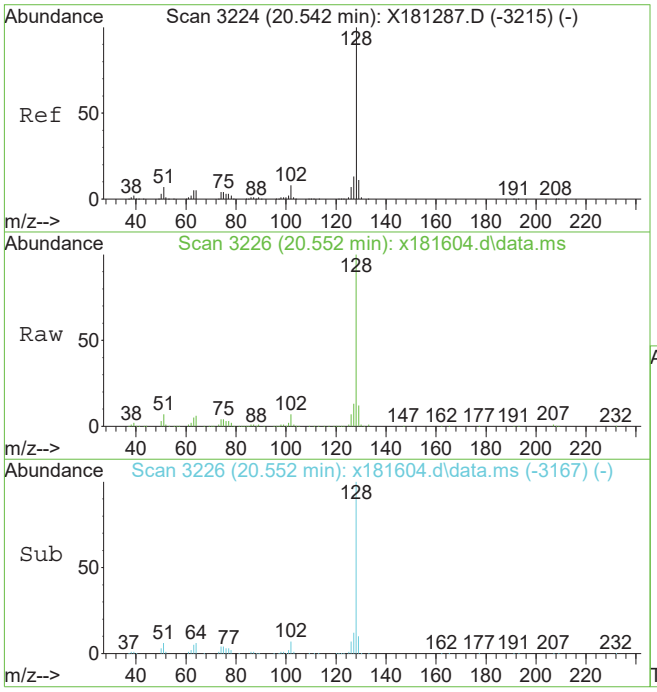


#108
1,2,4-trimethylbenzene
Concen: 87.90 ug/L
RT: 17.990 min Scan# 2736
Delta R.T. 0.011 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion:105 Resp: 881508

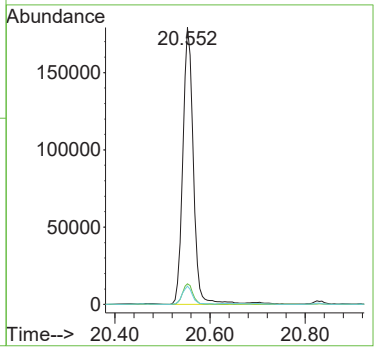
Ion	Ratio	Lower	Upper
105	100		
120	49.9	18.0	78.0
77	11.4	0.0	41.6





#119
naphthalene
Concen: 18.27 ug/L
RT: 20.552 min Scan# 3226
Delta R.T. 0.010 min
Lab File: x181604.d
Acq: 28 May 2019 12:25 pm

Tgt Ion:128	Resp:	279726	
Ion	Ratio	Lower	Upper
128	100		
102	7.4	0.0	37.7
51	6.6	0.0	36.7



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90973.d
Acq On : 23 May 2019 4:59 pm
Operator : CHELSEAS
Sample : jc88209-5 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 22 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:26:12 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

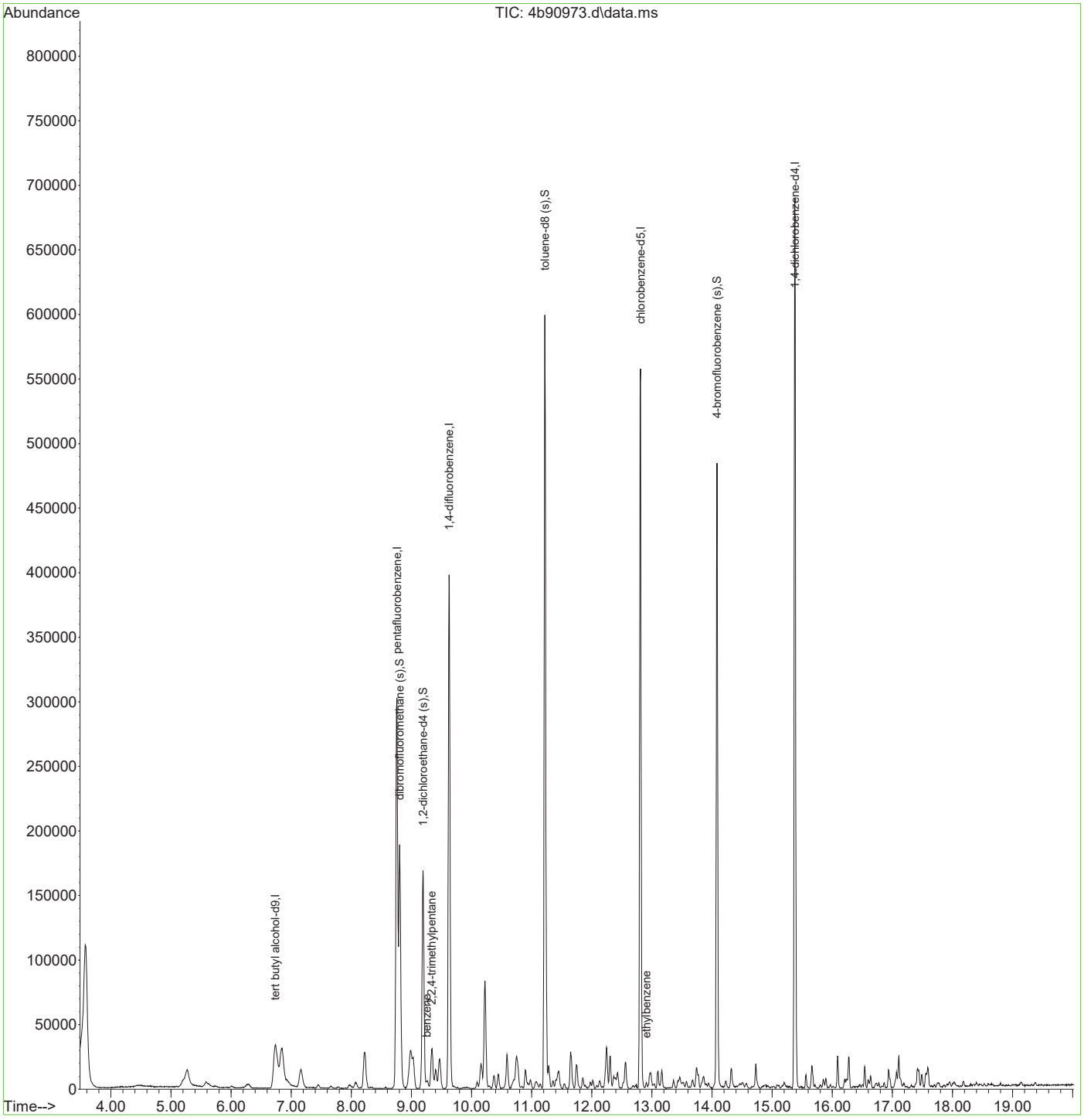
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.738	65	123764	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	247378	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	343287	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	311406	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	184037	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	121229	54.19	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 108.38%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	125530	55.46	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 110.92%			
76) toluene-d8 (s)	11.220	98	387998	49.51	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 99.02%			
99) 4-bromofluorobenzene (s)	14.081	95	161416	53.28	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 106.56%			
Target Compounds						Qvalue
57) 2,2,4-trimethylpentane	9.338	57	21734	1.79	ug/L	65
58) benzene	9.254	78	2488	0.21	ug/L	77
90) ethylbenzene	12.910	91	2783	0.22	ug/L	94

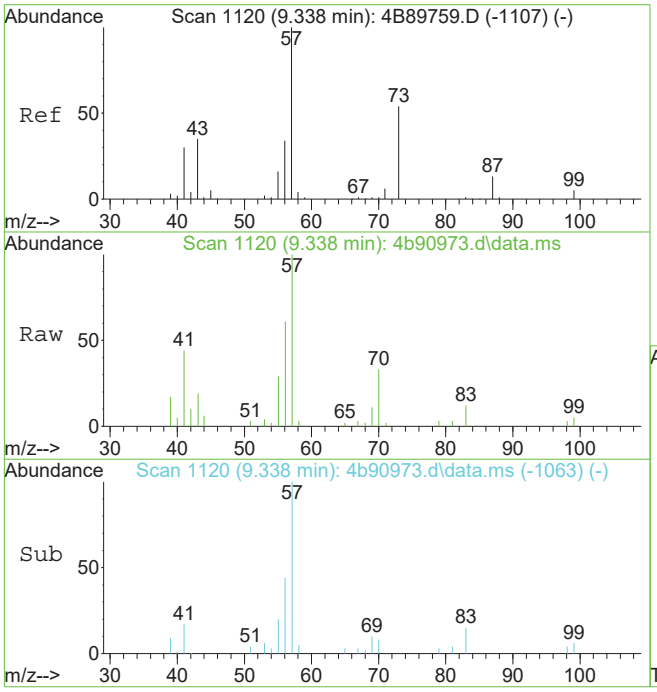
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90973.d
Acq On : 23 May 2019 4:59 pm
Operator : CHELSEAS
Sample : jc88209-5 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 22 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:26:12 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

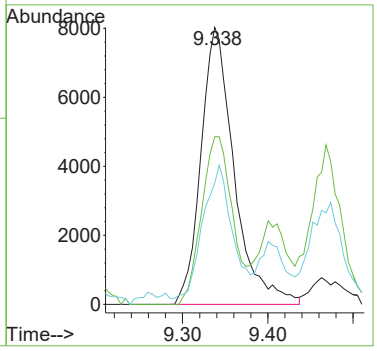


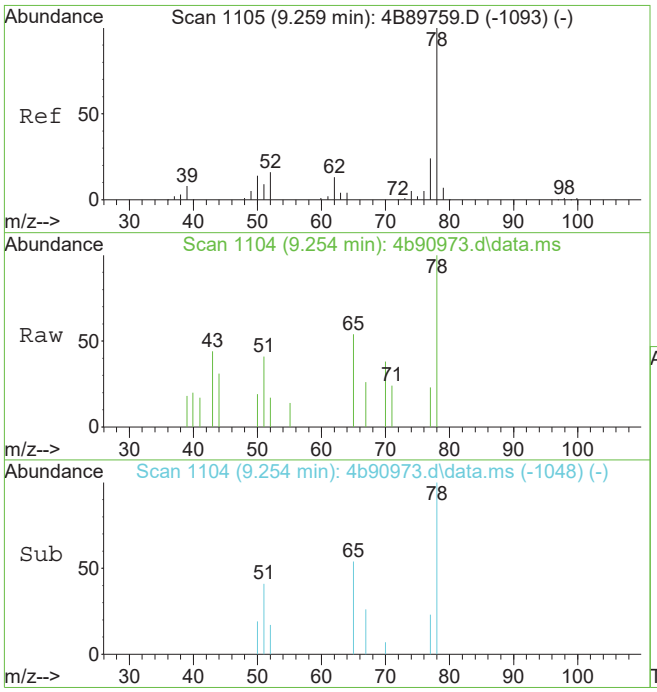


#57
2,2,4-trimethylpentane
Concen: 1.79 ug/L
RT: 9.338 min Scan# 1120
Delta R.T. -0.000 min
Lab File: 4b90973.d
Acq: 23 May 2019 4:59 pm

Tgt Ion: 57 Resp: 21734

Ion	Ratio	Lower	Upper
57	100		
56	60.6	3.8	63.8
41	41.7	0.0	59.9

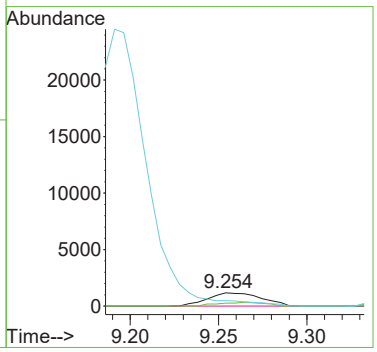


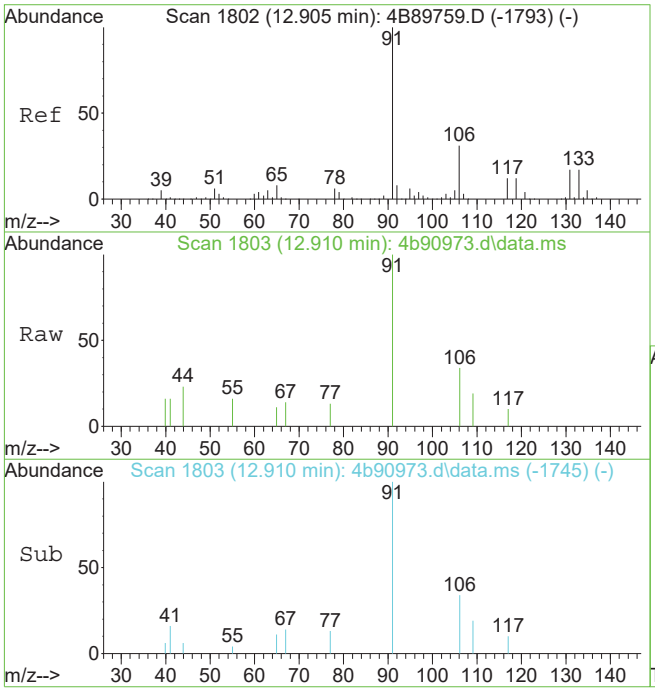


#58
benzene
Concen: 0.21 ug/L
RT: 9.254 min Scan# 1104
Delta R.T. -0.005 min
Lab File: 4b90973.d
Acq: 23 May 2019 4:59 pm

Tgt Ion: 78 Resp: 2488

Ion	Ratio	Lower	Upper
78	100		
77	23.5	0.0	53.9
51	40.7	0.0	47.3

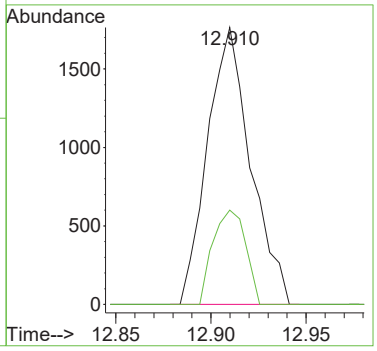




#90
ethylbenzene
Concen: 0.22 ug/L
RT: 12.910 min Scan# 1803
Delta R.T. 0.005 min
Lab File: 4b90973.d
Acq: 23 May 2019 4:59 pm

Tgt Ion: 91 Resp: 2783

Ion	Ratio	Lower	Upper
91	100		
106	34.1	1.0	61.0



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91010.d
Acq On : 24 May 2019 1:05 pm
Operator : CHELSEAS
Sample : jc88209-6 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,5
ALS Vial : 7 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:47:07 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

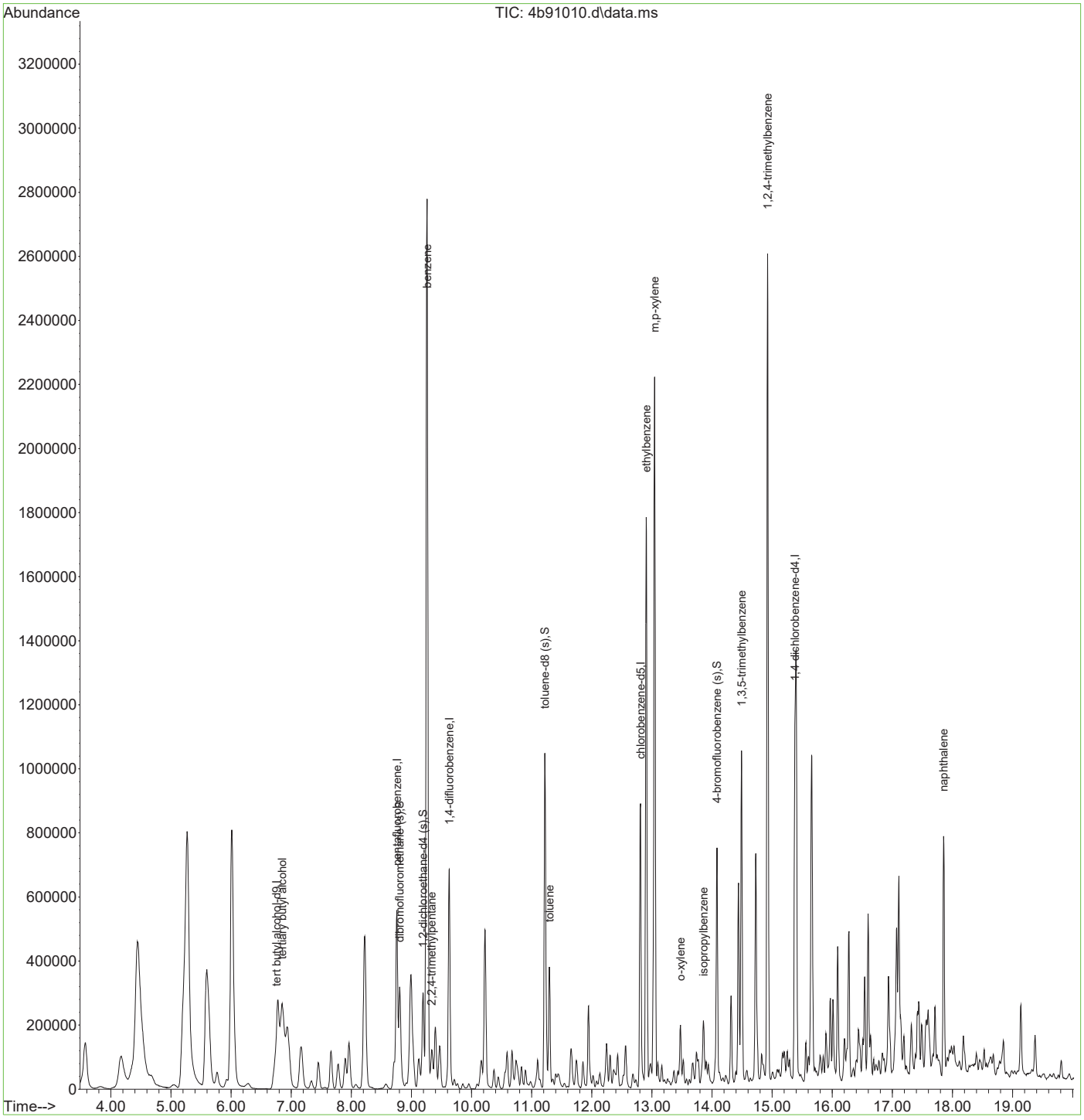
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.754	65	277450	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	459576	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.630	114	586531	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	494411	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	264634	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	197271	47.47	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 94.94%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	202403	52.33	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 104.66%			
76) toluene-d8 (s)	11.220	98	649087	52.16	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 104.32%			
99) 4-bromofluorobenzene (s)	14.081	95	247685	56.85	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 113.70%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	6.848	59	10688	13.62	ug/L #	1
57) 2,2,4-trimethylpentane	9.338	57	52816	2.54	ug/L #	2
58) benzene	9.259	78	2729719	137.05	ug/L	99
77) toluene	11.294	92	139838	13.57	ug/L	99
90) ethylbenzene	12.905	91	1307647	64.65	ug/L	99
91) m,p-xylene	13.046	106	674552	87.84	ug/L	96
92) o-xylene	13.475	91	94541	5.51	ug/L	98
95) isopropylbenzene	13.857	105	88405	4.07	ug/L	99
107) 1,3,5-trimethylbenzene	14.489	105	556521	34.05	ug/L	99
109) 1,2,4-trimethylbenzene	14.923	105	1458193	89.02	ug/L	100
123) naphthalene	17.852	128	617357	37.48	ug/L	99

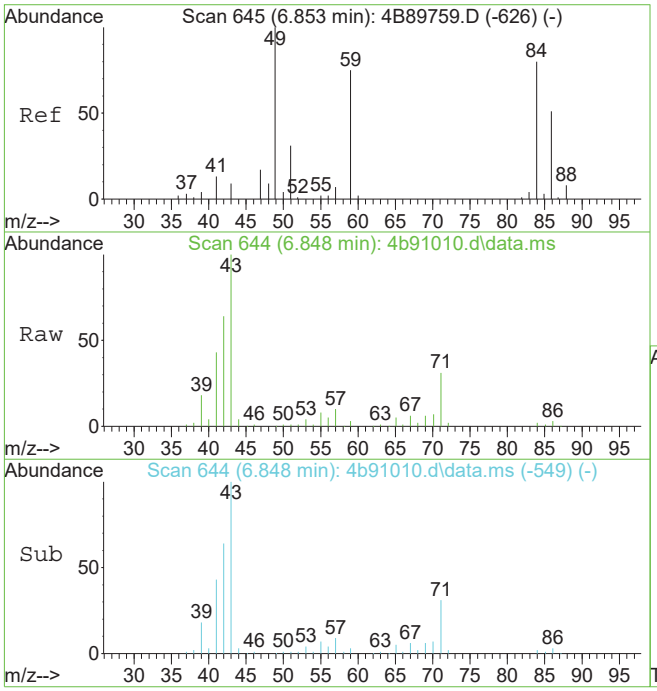
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91010.d
Acq On : 24 May 2019 1:05 pm
Operator : CHELSEAS
Sample : jc88209-6 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,5
ALS Vial : 7 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:47:07 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

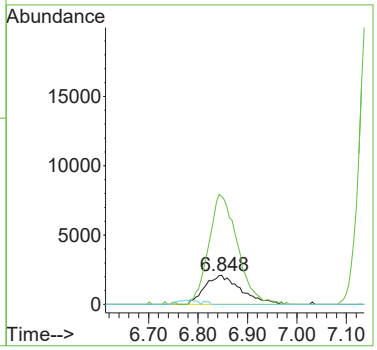


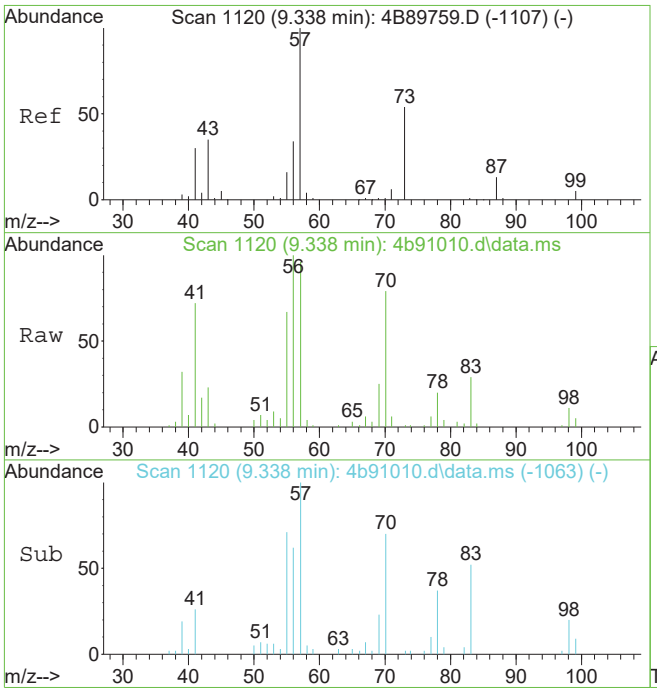


#3
tertiary butyl alcohol
Concen: 13.62 ug/L
RT: 6.848 min Scan# 644
Delta R.T. -0.005 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion: 59 Resp: 10688

Ion	Ratio	Lower	Upper
59	100		
57	369.9	0.0	39.9#
60	0.0	0.0	33.3

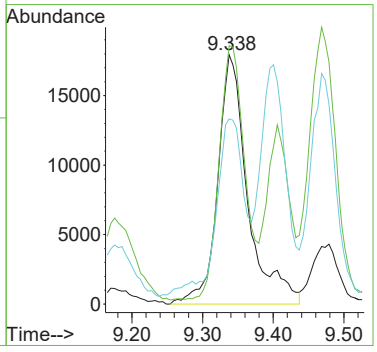


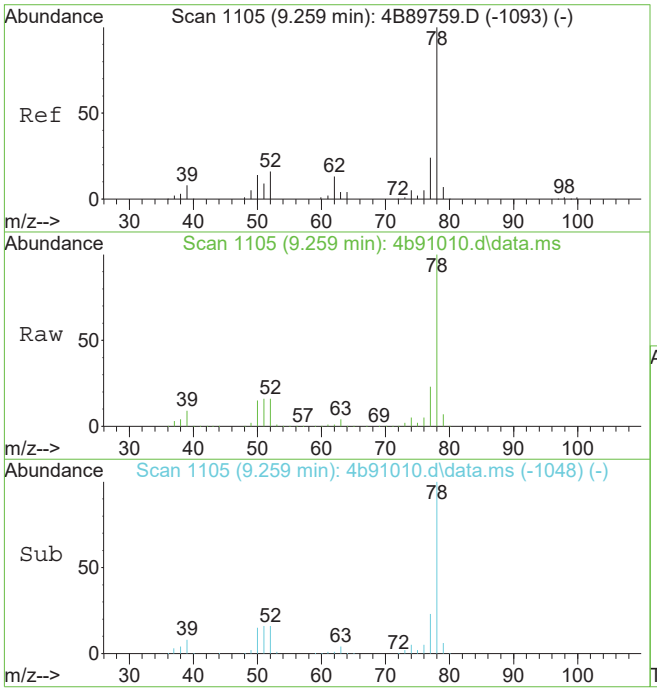


#57
2,2,4-trimethylpentane
Concen: 2.54 ug/L
RT: 9.338 min Scan# 1120
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion: 57 Resp: 52816

Ion	Ratio	Lower	Upper
57	100		
56	102.0	3.8	63.8#
41	69.9	0.0	59.9#

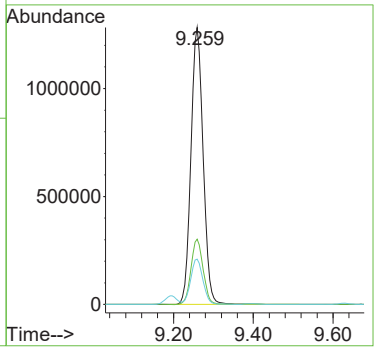


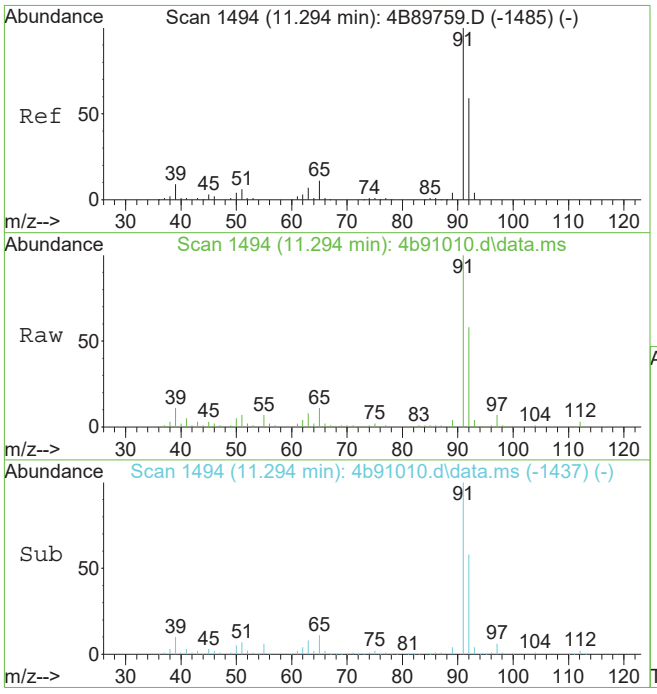


#58
benzene
Concen: 137.05 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion: 78 Resp: 2729719

Ion	Ratio	Lower	Upper
78	100		
77	23.5	0.0	53.9
51	16.3	0.0	47.3

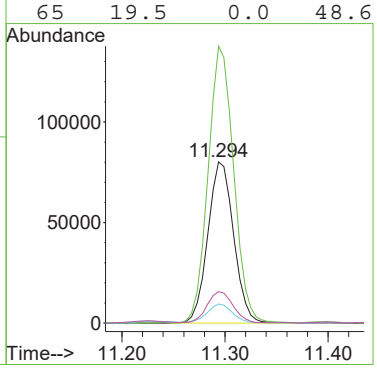


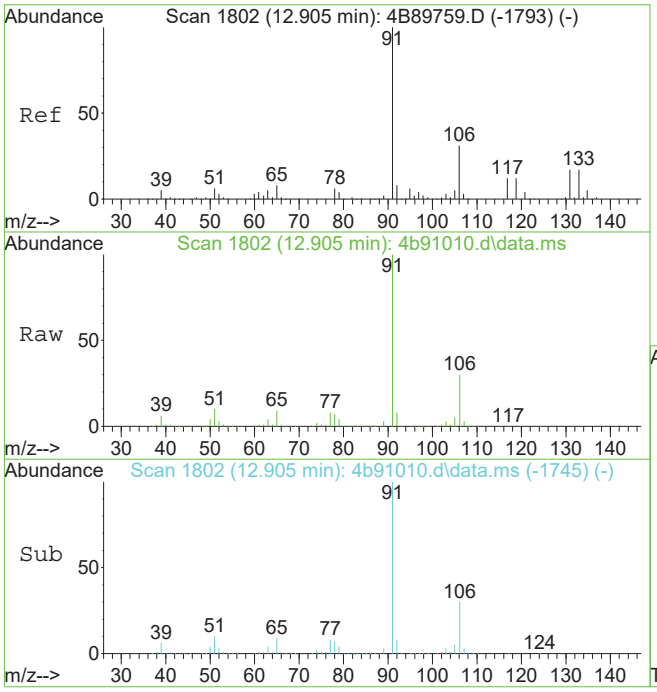


#77
toluene
Concen: 13.57 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion: 92 Resp: 139838

Ion	Ratio	Lower	Upper
92	100		
91	171.8	150.2	190.2
51	11.7	0.0	40.3
65	19.5	0.0	48.6

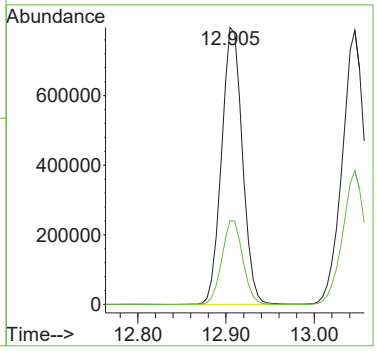


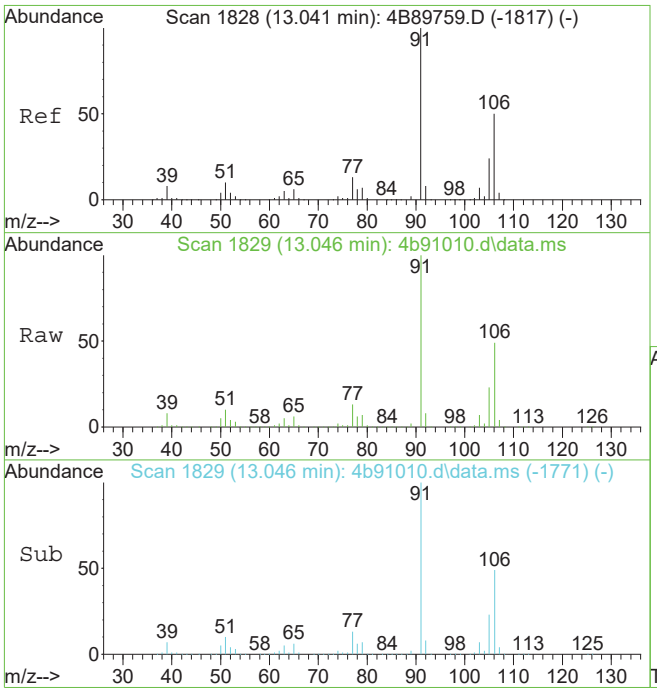


#90
ethylbenzene
Concen: 64.65 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion: 91 Resp: 1307647

Ion	Ratio	Lower	Upper
91	100		
106	30.2	1.0	61.0

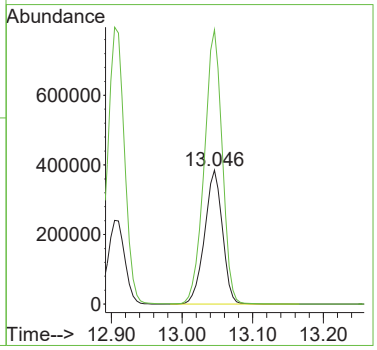


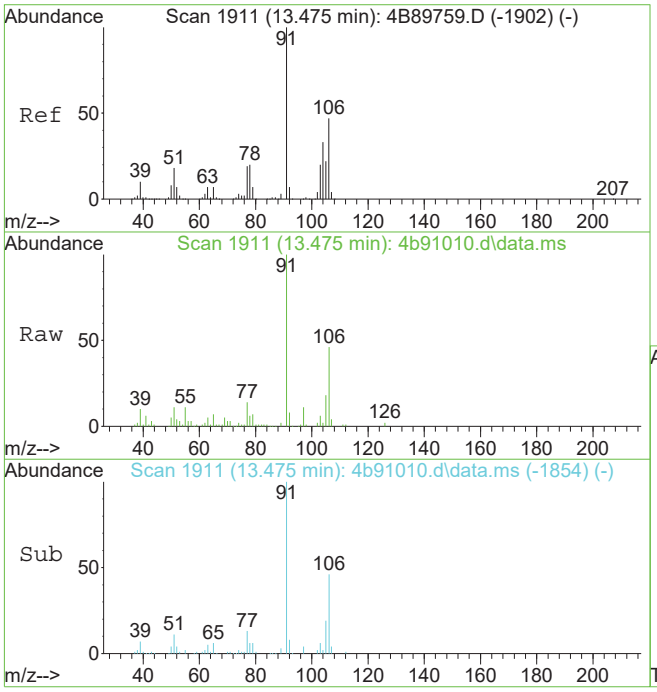


#91
m,p-xylene
Concen: 87.84 ug/L
RT: 13.046 min Scan# 1829
Delta R.T. 0.006 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion:106 Resp: 674552

Ion	Ratio	Lower	Upper
106	100		
91	204.8	169.3	229.3

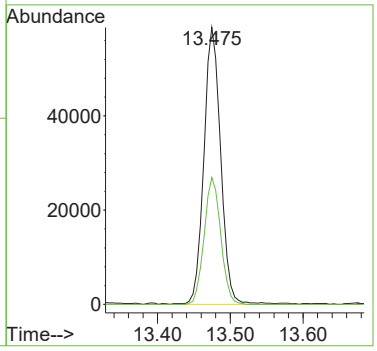


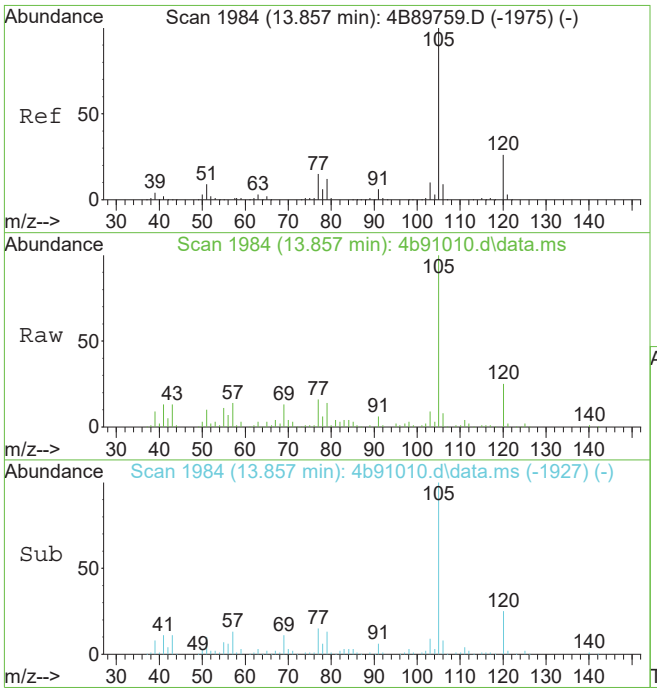


#92
o-xylene
Concen: 5.51 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion: 91 Resp: 94541

Ion	Ratio	Lower	Upper
91	100		
106	45.8	16.9	76.9

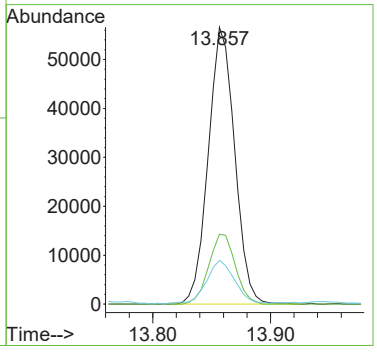


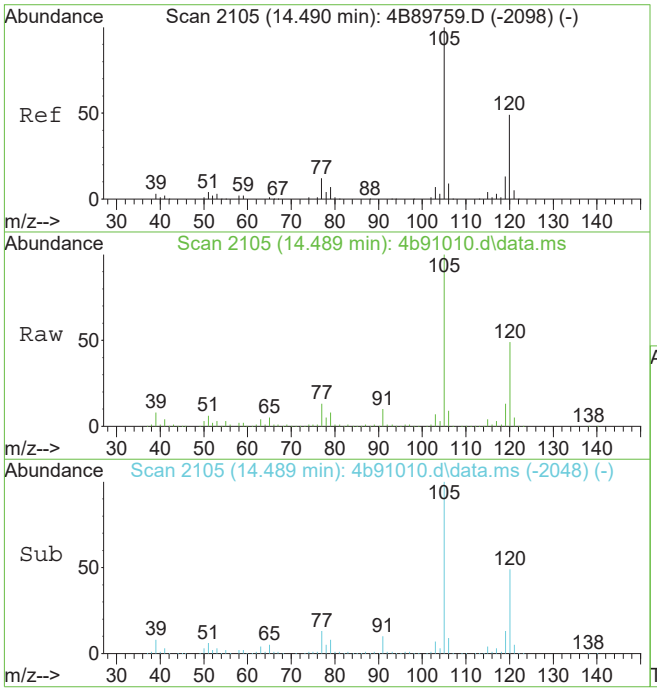


#95
isopropylbenzene
Concen: 4.07 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion:105 Resp: 88405

Ion	Ratio	Lower	Upper
105	100		
120	25.2	5.8	45.8
77	15.4	0.0	34.8

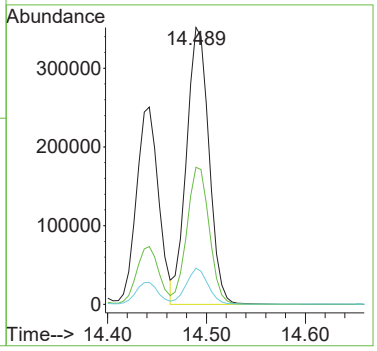


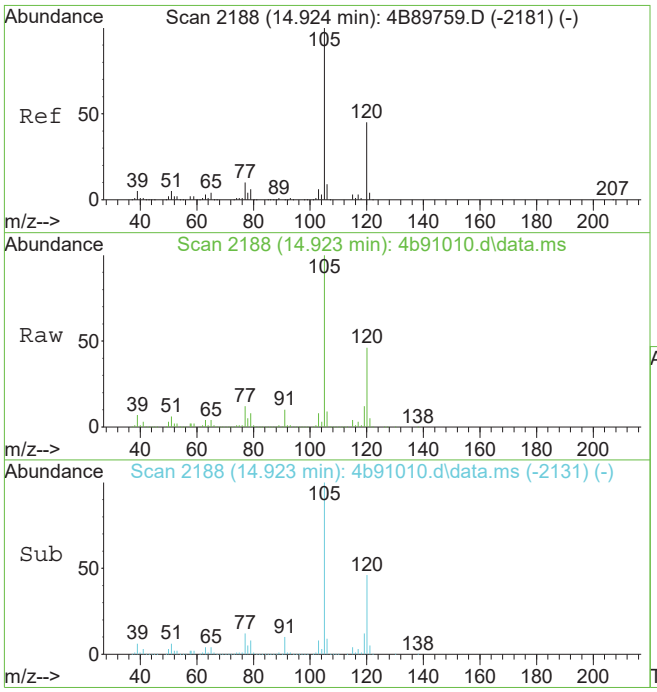


#107
1,3,5-trimethylbenzene
Concen: 34.05 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion:105 Resp: 556521

Ion	Ratio	Lower	Upper
105	100		
120	49.5	19.2	79.2
77	12.9	0.0	42.1

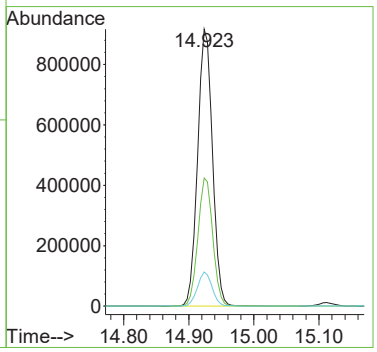


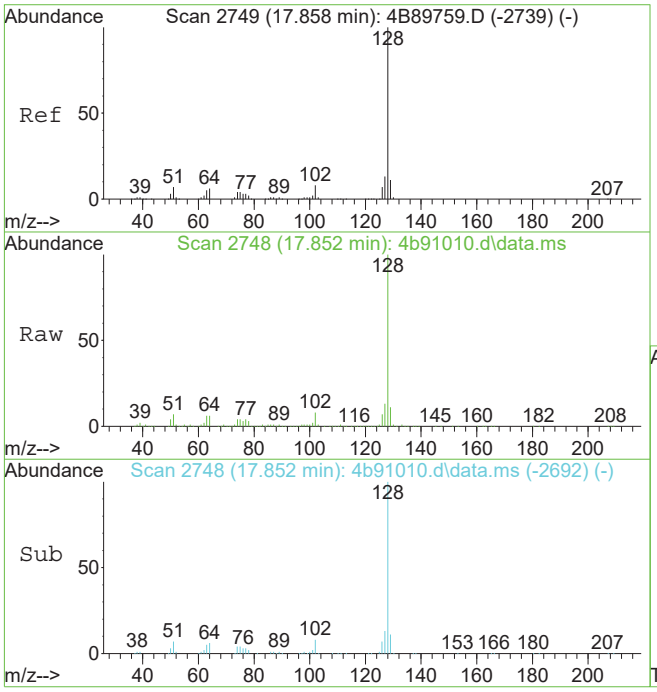


#109
1,2,4-trimethylbenzene
Concen: 89.02 ug/L
RT: 14.923 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion:105 Resp: 1458193

Ion	Ratio	Lower	Upper
105	100		
120	46.2	16.3	76.3
77	12.3	0.0	41.8

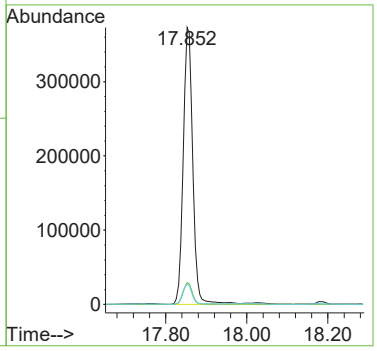




#123
naphthalene
Concen: 37.48 ug/L
RT: 17.852 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b91010.d
Acq: 24 May 2019 1:05 pm

Tgt Ion:128 Resp: 617357

Ion	Ratio	Lower	Upper
128	100		
102	7.8	0.0	37.6
51	7.2	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\May 28\v4b3857\
Data File : 4b91018.d
Acq On : 24 May 2019 5:26 pm
Operator : CHELSEAS
Sample : jc88209-6 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,10
ALS Vial : 15 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 28 02:51:02 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

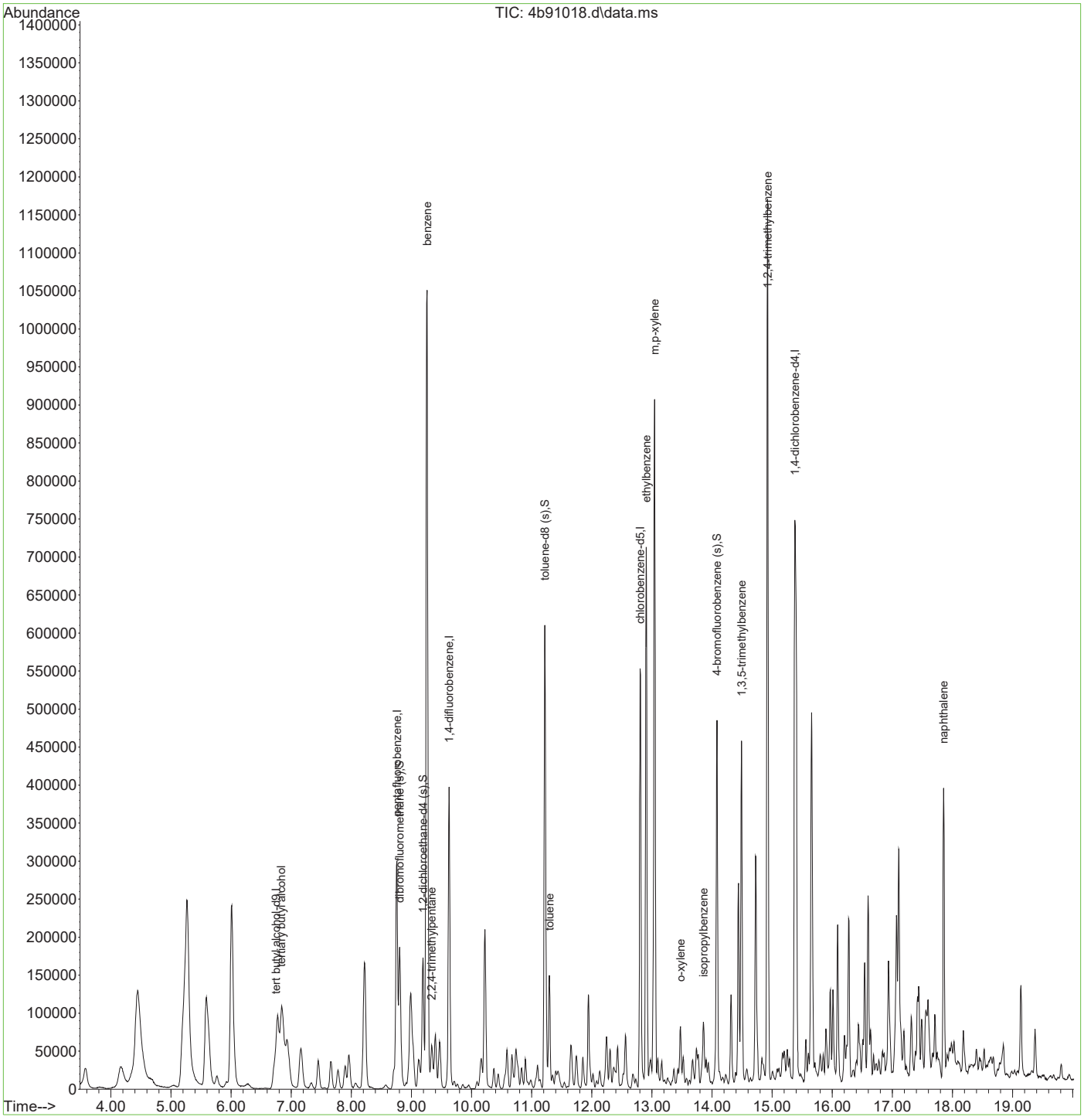
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.749	65	141121	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	251389	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	332881	50.00	ug/L	0.00
75) chlorobenzene-d5	12.805	117	307896	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	187084	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	115792	50.94	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 101.88%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	119346	54.37	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 108.74%			
76) toluene-d8 (s)	11.221	98	382593	49.37	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.74%			
99) 4-bromofluorobenzene (s)	14.082	95	163497	53.09	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 106.18%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	6.832	59	4834	12.11	ug/L #	1
57) 2,2,4-trimethylpentane	9.338	57	28229	2.39	ug/L #	17
58) benzene	9.259	78	1038816	91.90	ug/L	98
77) toluene	11.294	92	52613	8.20	ug/L	97
90) ethylbenzene	12.905	91	515759	40.95	ug/L	99
91) m,p-xylene	13.046	106	272743	57.03	ug/L	95
92) o-xylene	13.475	91	38134	3.57	ug/L	98
95) isopropylbenzene	13.857	105	34937	2.58	ug/L	98
107) 1,3,5-trimethylbenzene	14.489	105	239067	20.69	ug/L	98
109) 1,2,4-trimethylbenzene	14.924	105	640776	55.34	ug/L	99
123) naphthalene	17.852	128	311828	26.78	ug/L	99

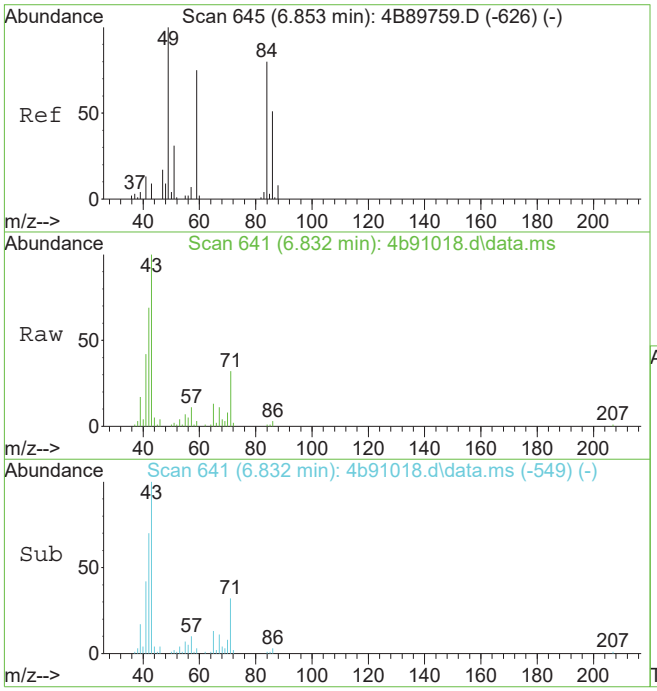
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\May 28\v4b3857\
Data File : 4b91018.d
Acq On : 24 May 2019 5:26 pm
Operator : CHELSEAS
Sample : jc88209-6 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,10
ALS Vial : 15 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 28 02:51:02 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

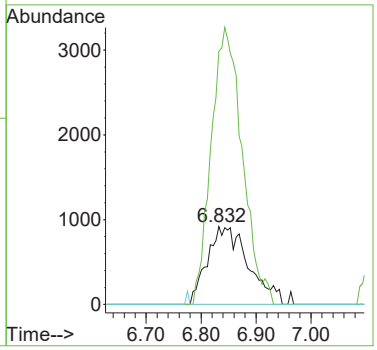


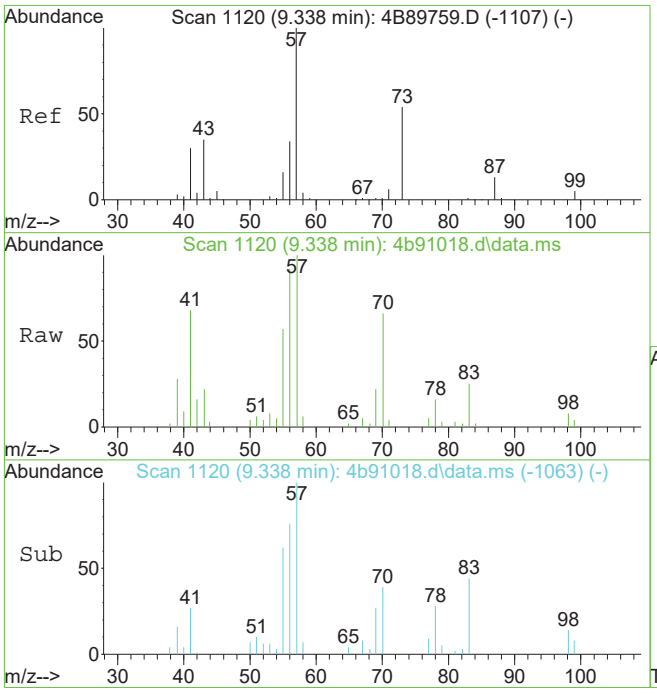


#3
tertiary butyl alcohol
Concen: 12.11 ug/L
RT: 6.832 min Scan# 641
Delta R.T. -0.021 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion: 59 Resp: 4834

Ion	Ratio	Lower	Upper
59	100		
57	324.7	0.0	39.9#
60	0.0	0.0	33.3

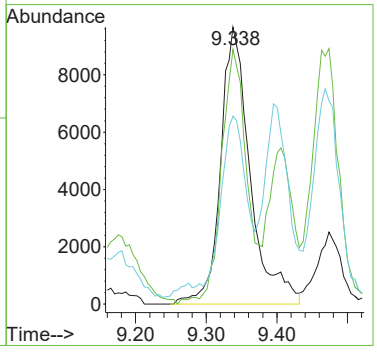


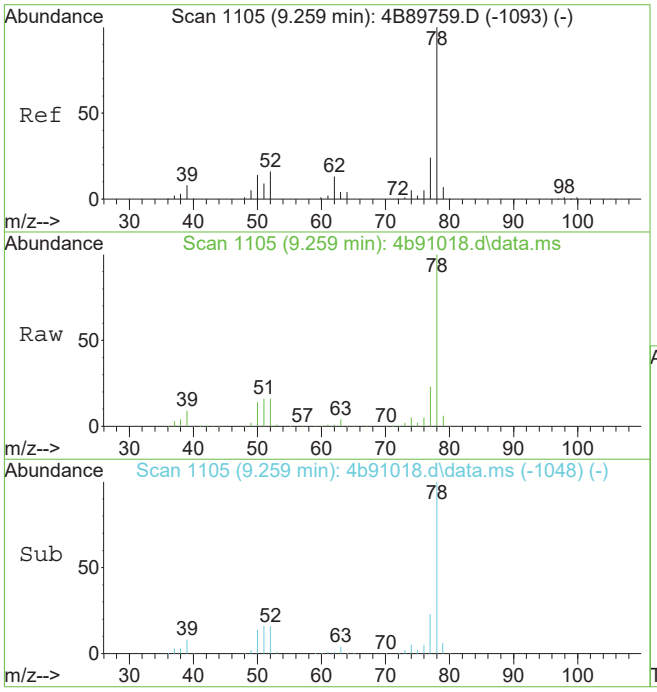


#57
2,2,4-trimethylpentane
Concen: 2.39 ug/L
RT: 9.338 min Scan# 1120
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion: 57 Resp: 28229

Ion	Ratio	Lower	Upper
57	100		
56	90.3	3.8	63.8#
41	64.9	0.0	59.9#

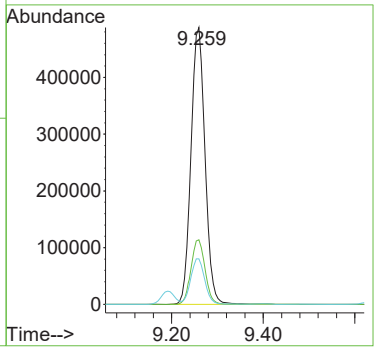


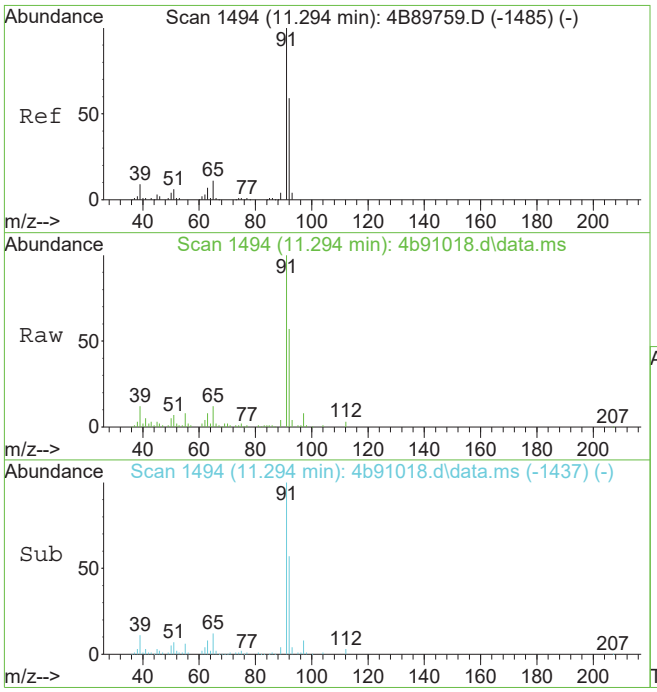


#58
benzene
Concen: 91.90 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion: 78 Resp: 1038816

Ion	Ratio	Lower	Upper
78	100		
77	23.4	0.0	53.9
51	16.3	0.0	47.3

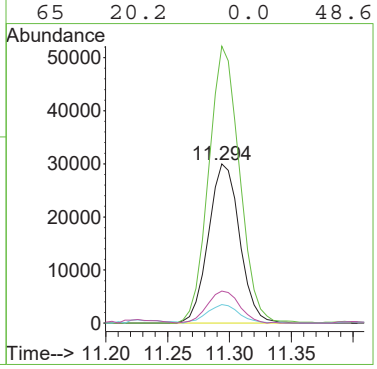


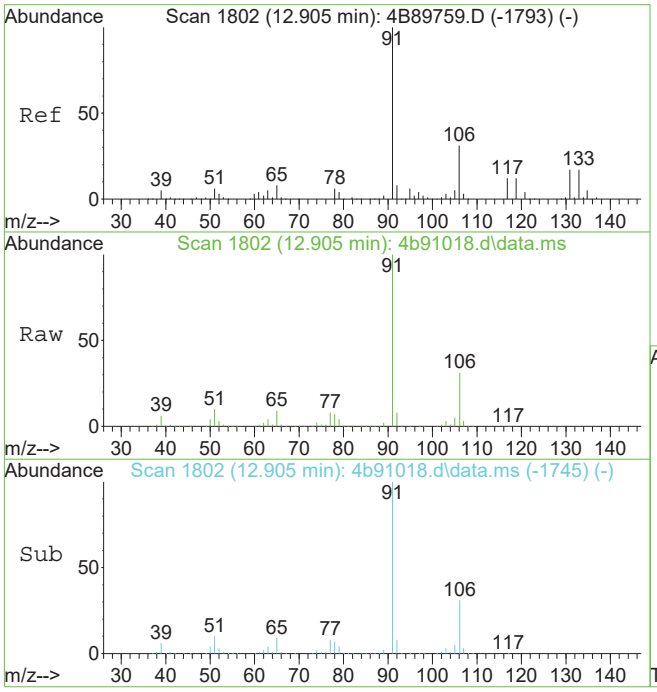


#77
toluene
Concen: 8.20 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion: 92 Resp: 52613

Ion	Ratio	Lower	Upper
92	100		
91	174.0	150.2	190.2
51	11.7	0.0	40.3
65	20.2	0.0	48.6

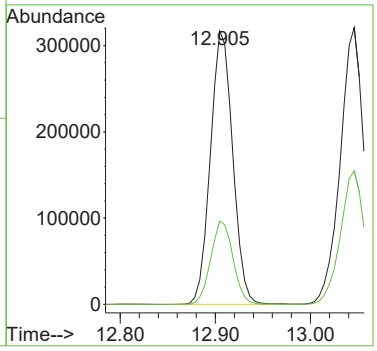


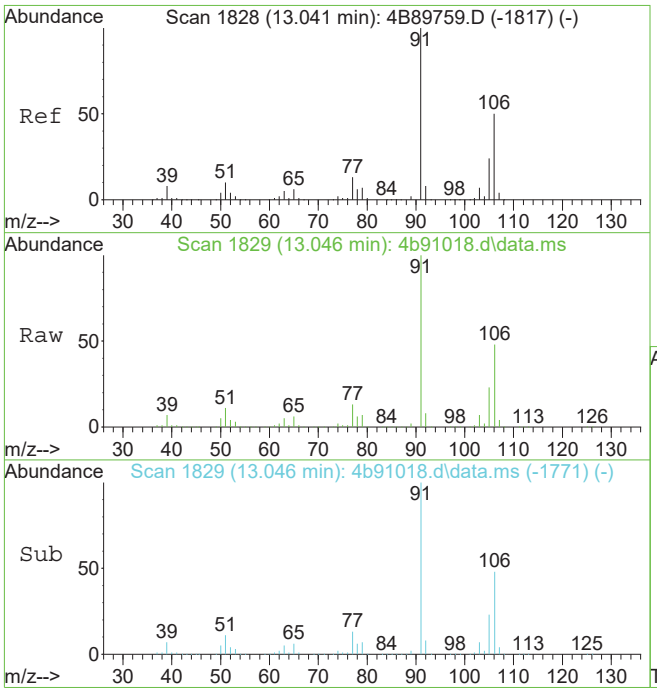


#90
ethylbenzene
Concen: 40.95 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion: 91 Resp: 515759

Ion	Ratio	Lower	Upper
91	100		
106	30.5	1.0	61.0

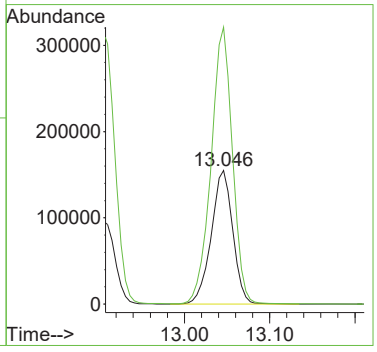


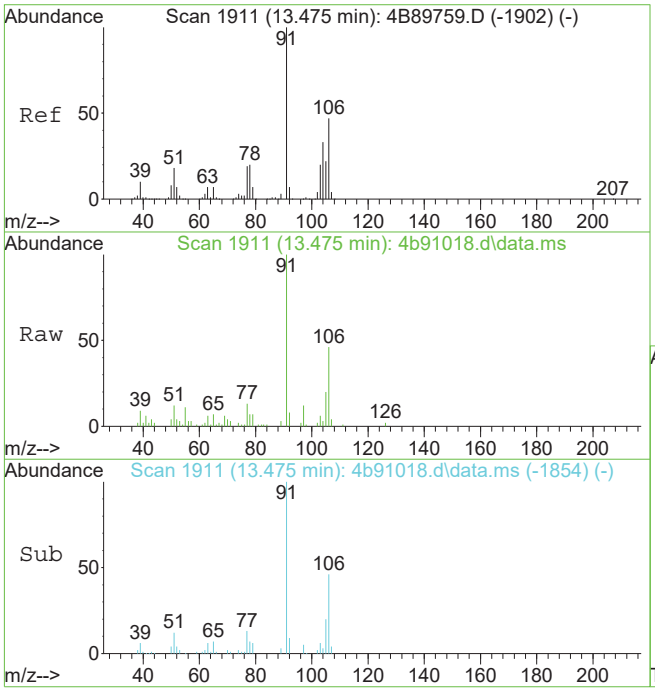


#91
m,p-xylene
Concen: 57.03 ug/L
RT: 13.046 min Scan# 1829
Delta R.T. 0.006 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion:106 Resp: 272743

Ion	Ratio	Lower	Upper
106	100		
91	207.3	169.3	229.3

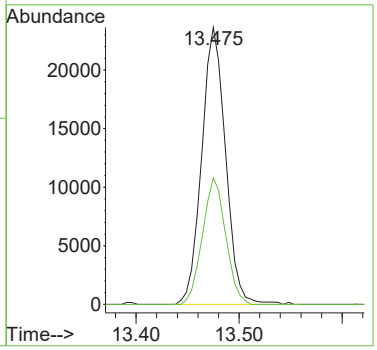


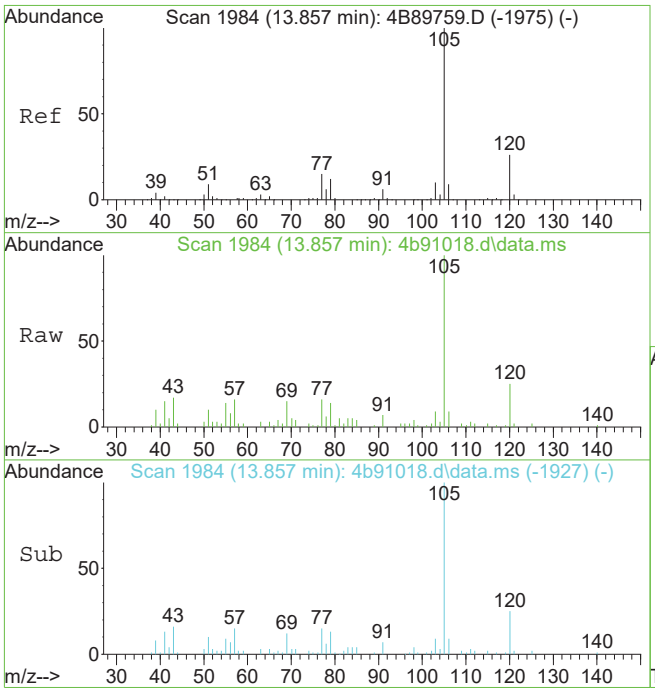


#92
o-xylene
Concen: 3.57 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion: 91 Resp: 38134

Ion	Ratio	Lower	Upper
91	100		
106	45.7	16.9	76.9

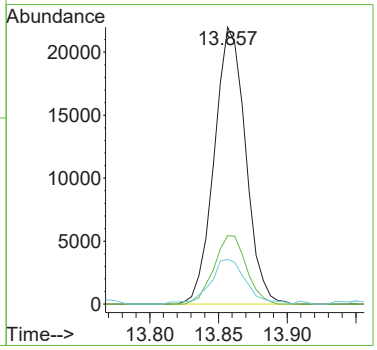


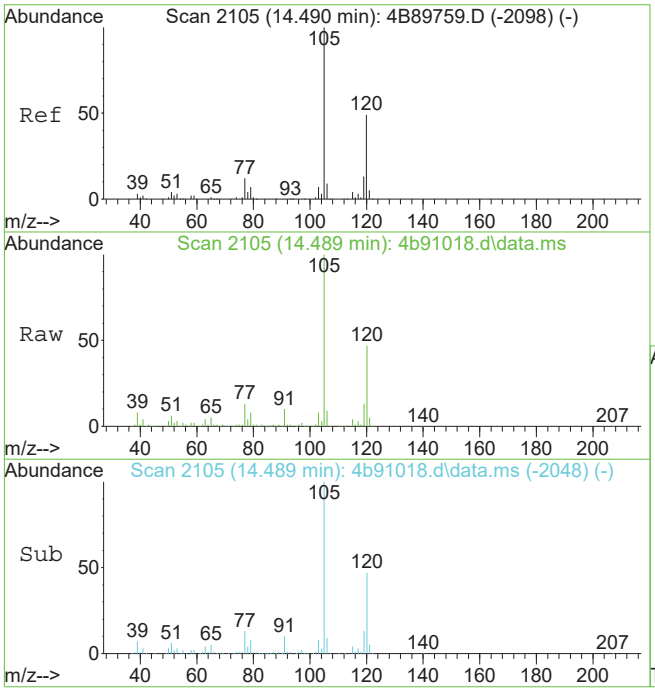


#95
isopropylbenzene
Concen: 2.58 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion:105 Resp: 34937

Ion	Ratio	Lower	Upper
105	100		
120	24.7	5.8	45.8
77	15.4	0.0	34.8

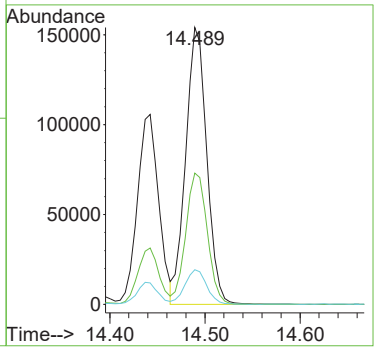


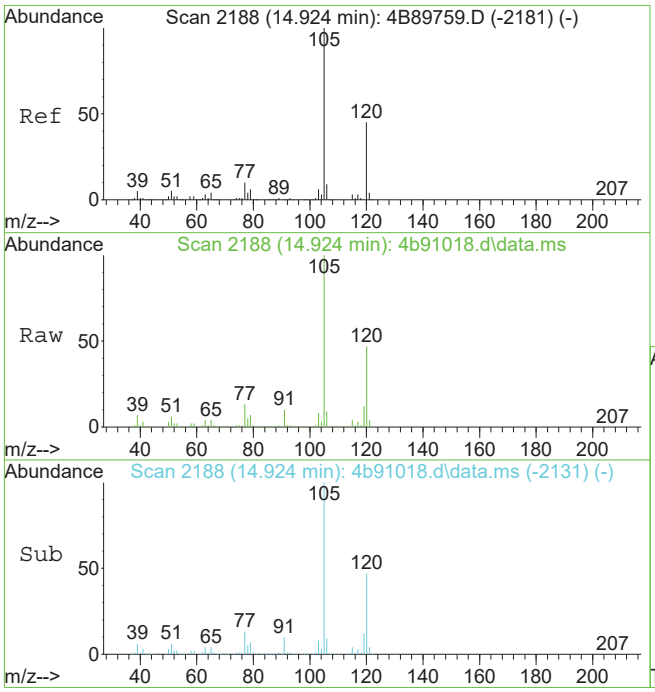


#107
1,3,5-trimethylbenzene
Concen: 20.69 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion:105 Resp: 239067

Ion	Ratio	Lower	Upper
105	100		
120	47.4	19.2	79.2
77	12.6	0.0	42.1

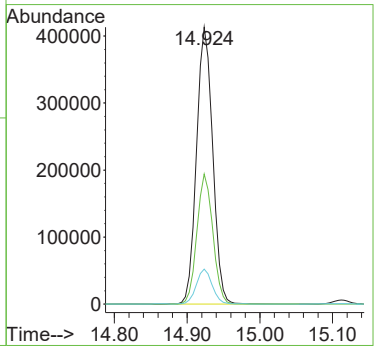


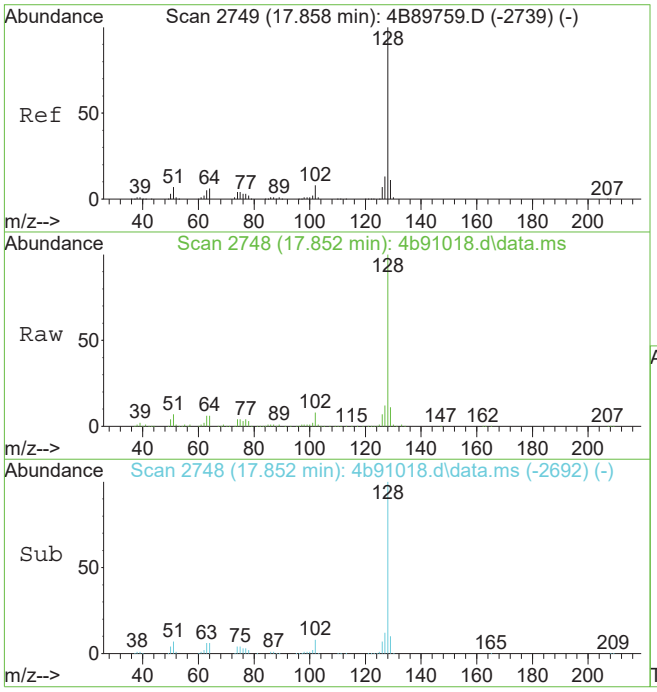


#109
1,2,4-trimethylbenzene
Concen: 55.34 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion:105 Resp: 640776

Ion	Ratio	Lower	Upper
105	100		
120	46.9	16.3	76.3
77	12.5	0.0	41.8

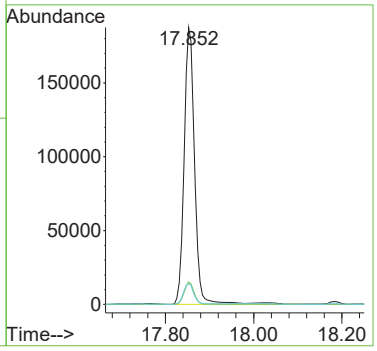




#123
naphthalene
Concen: 26.78 ug/L
RT: 17.852 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b91018.d
Acq: 24 May 2019 5:26 pm

Tgt Ion:128 Resp: 311828

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.6
51	7.4	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : R:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91012.d
Acq On : 24 May 2019 2:17 pm
Operator : CHELSEAS
Sample : jc88209-7
Misc : MS34821,V4B3857,5,,,,20
ALS Vial : 9 Sample Multiplier: 1

Quant Time: May 29 17:47:07 2019
Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units		Dev(Min)
Internal Standards							
1) tert butyl alcohol-d9	6.749	65	138258	500.00	ug/L		0.00
5) pentafluorobenzene	8.752	168	236290	50.00	ug/L		0.00
54) 1,4-difluorobenzene	9.625	114	310352	50.00	ug/L		0.00
75) chlorobenzene-d5	12.811	117	294978	50.00	ug/L		0.00
98) 1,4-dichlorobenzene-d4	15.379	152	184015	50.00	ug/L		0.00
System Monitoring Compounds							
46) dibromofluoromethane (s)	8.804	113	111236	52.06	ug/L		0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 104.12%				
55) 1,2-dichloroethane-d4 (s)	9.191	65	114426	55.91	ug/L		0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 111.82%				
76) toluene-d8 (s)	11.221	98	362749	48.86	ug/L		0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.72%				
99) 4-bromofluorobenzene (s)	14.082	95	158595	52.35	ug/L		0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 104.70%				
Target Compounds							Qvalue
3) tertiary butyl alcohol	6.843	59	10295	26.33	ug/L	#	1
4) 1,4-dioxane	10.243	88	5894	201.88	ug/L		76
20) acetone	6.184	58	1799	7.44	ug/L		90
27) trans-1,2-dichloroethene	7.152	61	991	0.24	ug/L		92
28) hexane	7.450	56	15576	6.99	ug/L		95
48) cyclohexane	8.993	84	75004	17.04	ug/L		93
52) tert-amyl alcohol	9.118	73	19010	104.73	ug/L	#	78
56) n-butyl alcohol	9.657	41	13823	219.91	ug/L		96
57) 2,2,4-trimethylpentane	9.338	57	32359	2.94	ug/L	#	41
58) benzene	9.254	78	2241485	212.68	ug/L		99
60) heptane	9.479	57	10106	5.28	ug/L		91
63) trichloroethene	9.934	95	812	0.32	ug/L		87
66) methylcyclohexane	10.227	83	99482	18.66	ug/L		99
68) dibromomethane	10.316	93	554	0.36	ug/L		82
73) 4-methyl-2-pentanone	10.996	58	3326	3.30	ug/L	#	72
77) toluene	11.294	92	36730	5.97	ug/L		98
81) tetrachloroethene	11.869	164	1477	0.64	ug/L		96
82) 2-hexanone	11.874	58	3020	3.11	ug/L	#	14
88) chlorobenzene	12.847	112	2951	0.43	ug/L		93
90) ethylbenzene	12.905	91	272209	22.56	ug/L		97
91) m,p-xylene	13.046	106	53209	11.61	ug/L		98
92) o-xylene	13.475	91	25341	2.48	ug/L		97
93) styrene	13.491	104	4095	0.55	ug/L		70
95) isopropylbenzene	13.857	105	33583	2.59	ug/L		98
100) 1,1,2,2-tetrachloroethane	14.165	83	2963	0.84	ug/L		86
103) bromobenzene	14.291	156	2271	0.65	ug/L	#	80
104) n-propylbenzene	14.317	91	56148	3.71	ug/L		98
106) 4-chlorotoluene	14.589	91	7322	0.83	ug/L		97
107) 1,3,5-trimethylbenzene	14.490	105	103561	9.11	ug/L		99
108) tert-butylbenzene	14.866	119	8095	0.83	ug/L		90
109) 1,2,4-trimethylbenzene	14.924	105	42560	3.74	ug/L		95
110) sec-butylbenzene	15.112	105	18387	1.24	ug/L		97
111) p-isopropyltoluene	15.258	119	19759	1.57	ug/L		97
112) 1,3-dichlorobenzene	15.305	146	6525	0.98	ug/L		99
113) 1,4-dichlorobenzene	15.410	146	6792	1.02	ug/L		92
114) 1,2-dichlorobenzene	15.823	146	7148	1.04	ug/L		98
116) n-butylbenzene	15.713	92	11929	1.96	ug/L		94
118) 1,2-dibromo-3-chloropr...	16.665	157	654	0.75	ug/L		98
119) 1,3,5-trichlorobenzene	16.869	180	12145	1.91	ug/L		99
120) 1,2,4-trichlorobenzene	17.549	180	14277	2.56	ug/L		94
122) hexachlorobutadiene	17.670	225	9434	3.02	ug/L		92
123) naphthalene	17.858	128	196739	17.18	ug/L		99
124) 1,2,3-trichlorobenzene	18.093	180	16473	3.23	ug/L		99
125) 2-methylnaphthalene	19.139	142	51020	9.04	ug/L		98

Quantitation Report (QT Reviewed)

Data Path : R:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91012.d
Acq On : 24 May 2019 2:17 pm
Operator : CHELSEAS
Sample : jc88209-7
Misc : MS34821,V4B3857,5,,,,20
ALS Vial : 9 Sample Multiplier: 1

Quant Time: May 29 17:47:07 2019
Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : R:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91012.d
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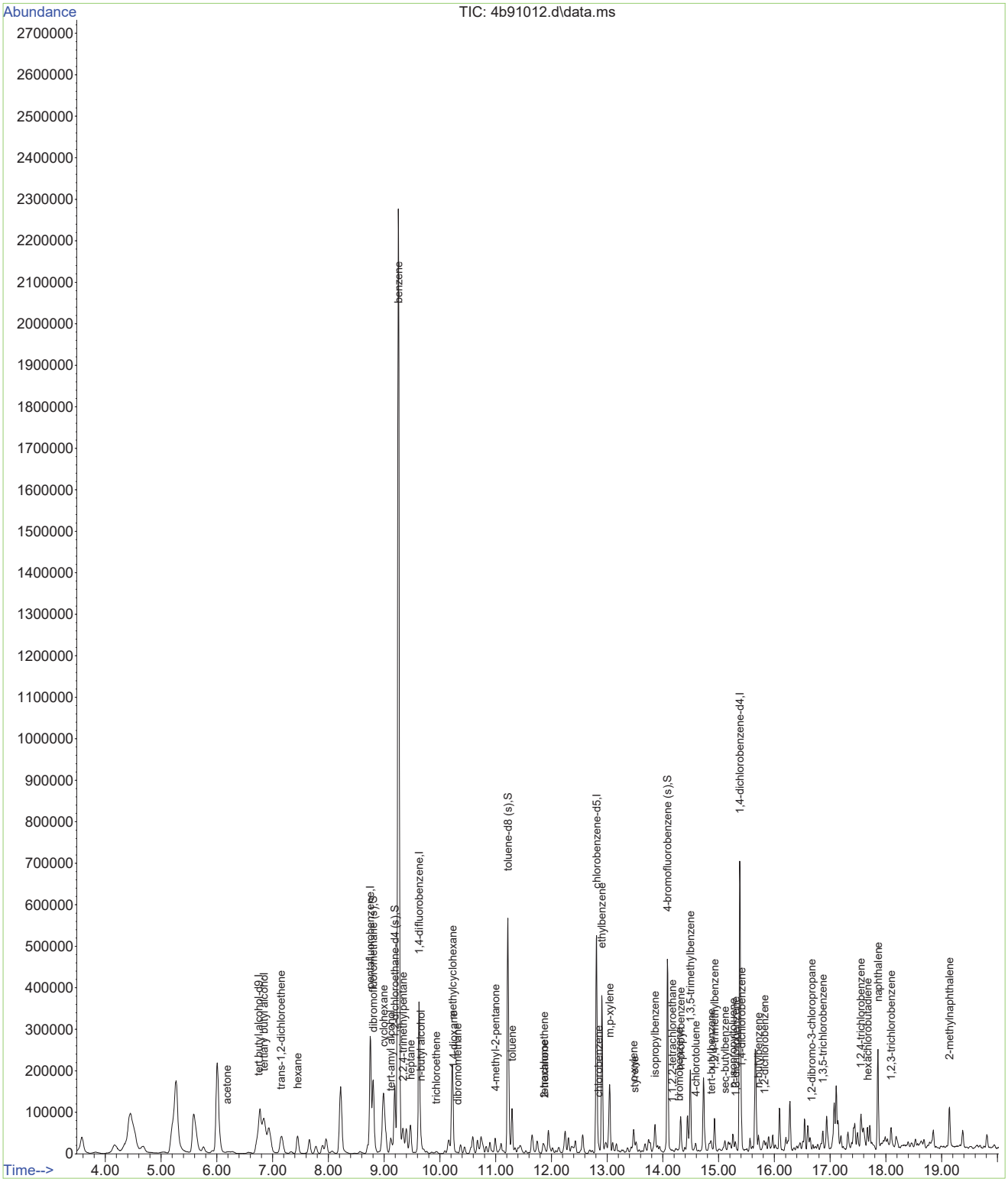
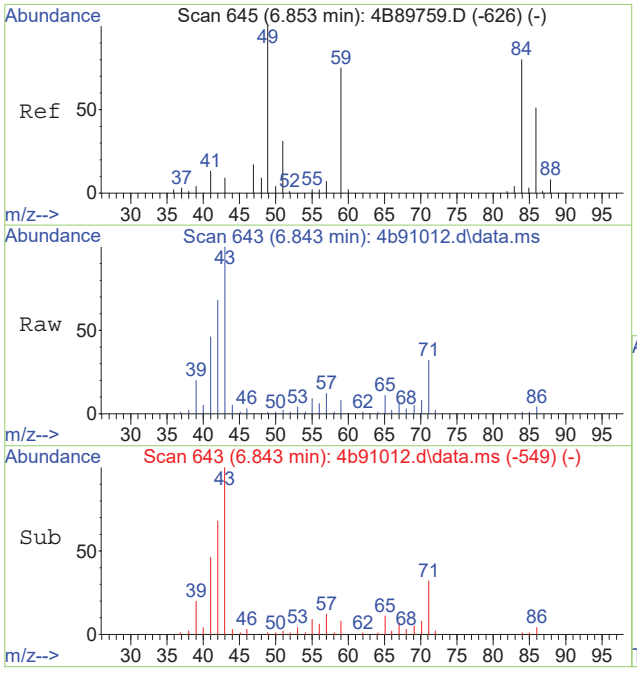
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

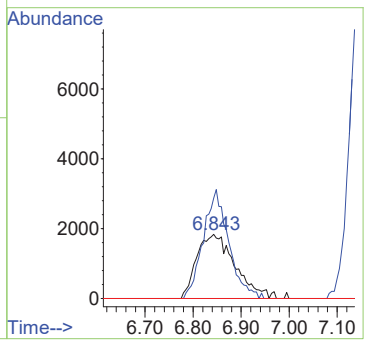


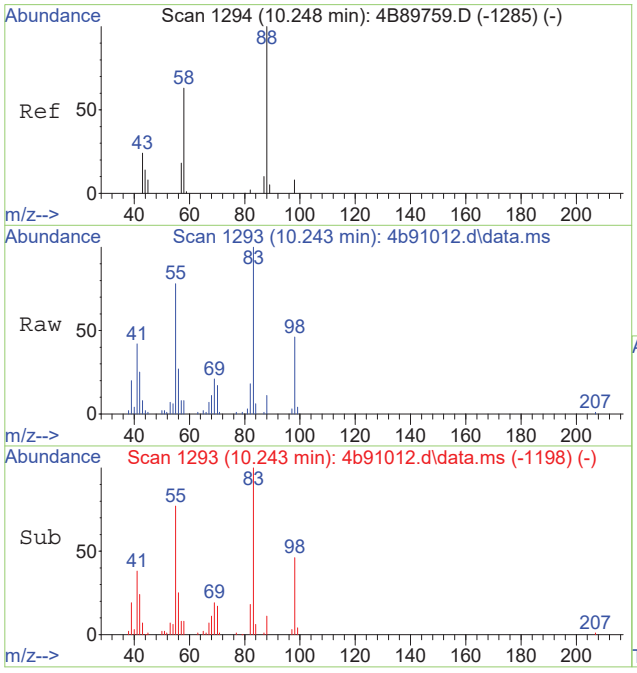


#3
tertiary butyl alcohol
Concen: 26.33 ug/L
RT: 6.843 min Scan# 643
Delta R.T. -0.010 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 59 Resp: 10295

Ion	Ratio	Lower	Upper
59	100		
57	156.0	0.0	39.9#
60	0.0	0.0	33.3

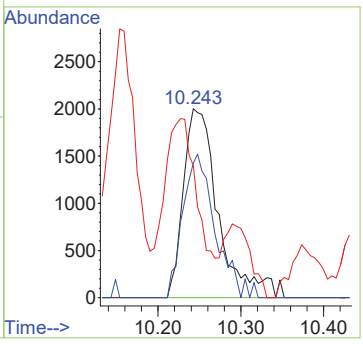


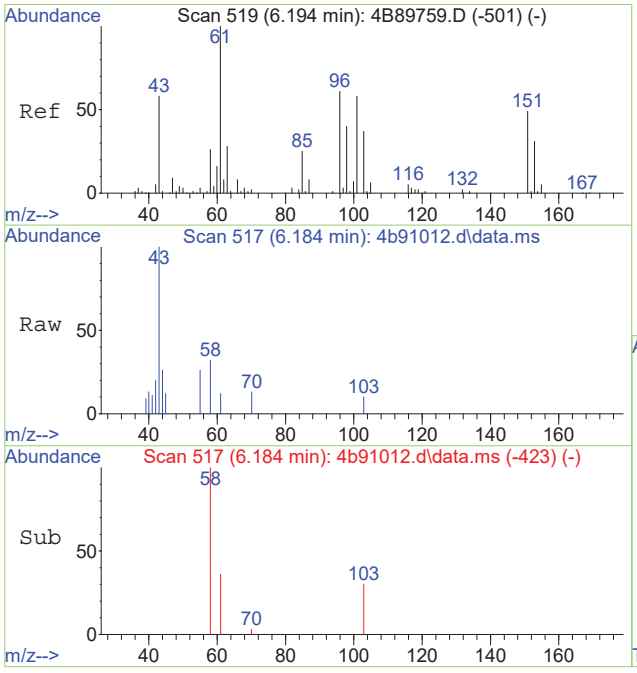


#4
1,4-dioxane
Concen: 201.88 ug/L
RT: 10.243 min Scan# 1293
Delta R.T. -0.004 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 88 Resp: 5894

Ion	Ratio	Lower	Upper
88	100		
58	71.2	33.3	93.3
57	60.6	1.7	61.7

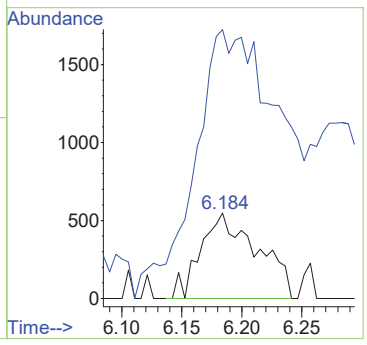


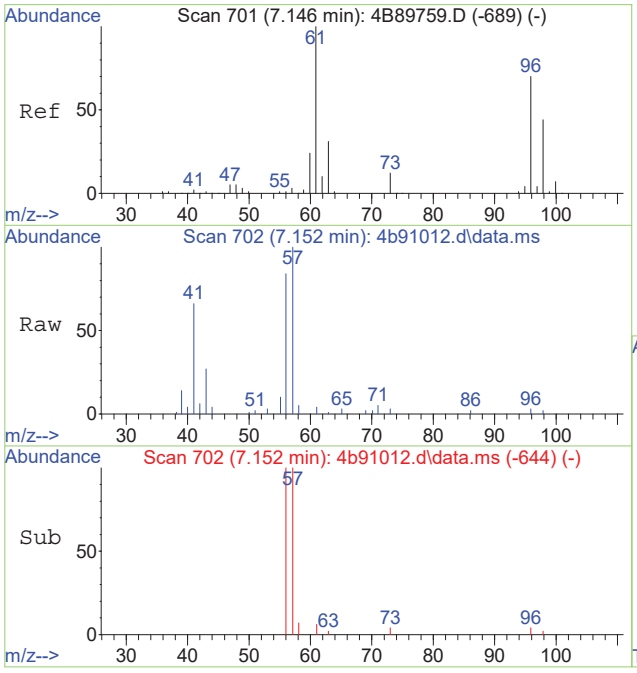


#20
acetone
Concen: 7.44 ug/L
RT: 6.184 min Scan# 517
Delta R.T. -0.010 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 58 Resp: 1799

Ion	Ratio	Lower	Upper
58	100		
43	273.8	263.3	323.3

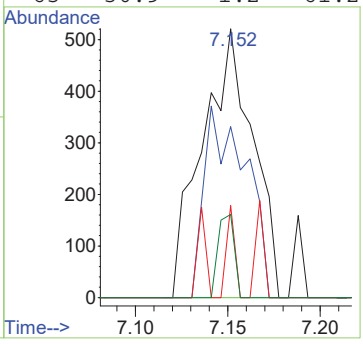


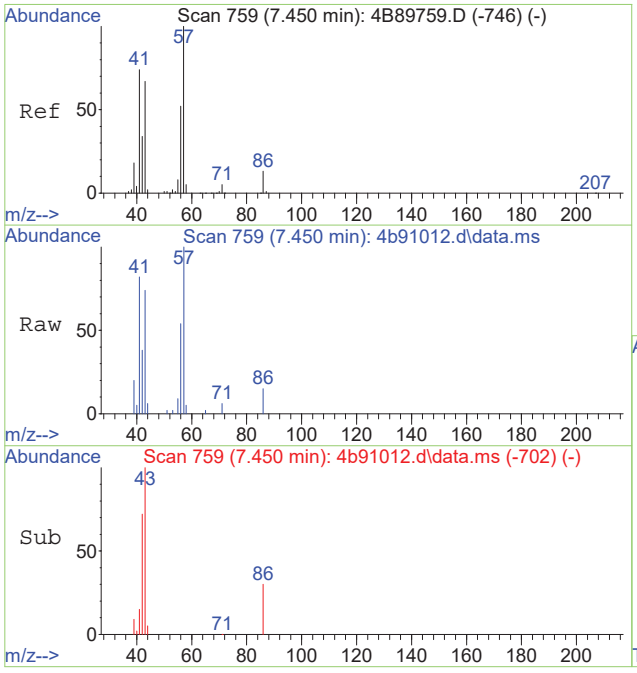


#27
trans-1,2-dichloroethene
Concen: 0.24 ug/L
RT: 7.152 min Scan# 702
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 61 Resp: 991

Ion	Ratio	Lower	Upper
61	100		
96	63.5	39.6	99.6
98	34.2	13.9	73.9
63	30.9	1.2	61.2

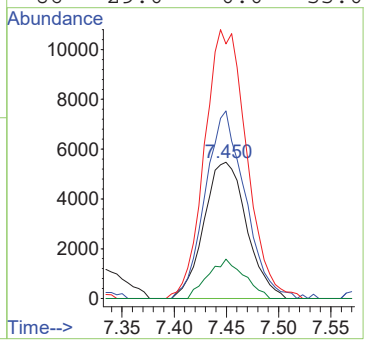


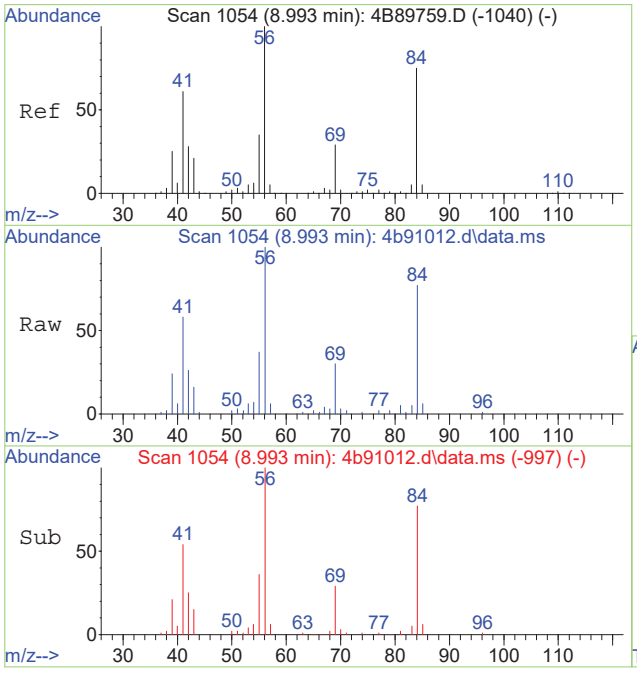


#28
hexane
Concen: 6.99 ug/L
RT: 7.450 min Scan# 759
Delta R.T. 0.001 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 56 Resp: 15576

Ion	Ratio	Lower	Upper
56	100		
43	137.7	98.3	158.3
57	186.8	160.8	220.8
86	29.0	0.0	55.0

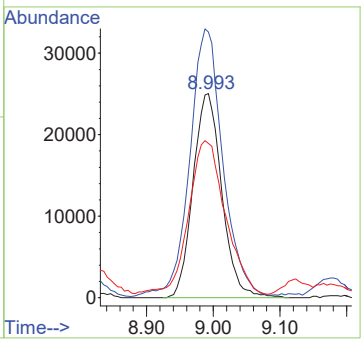


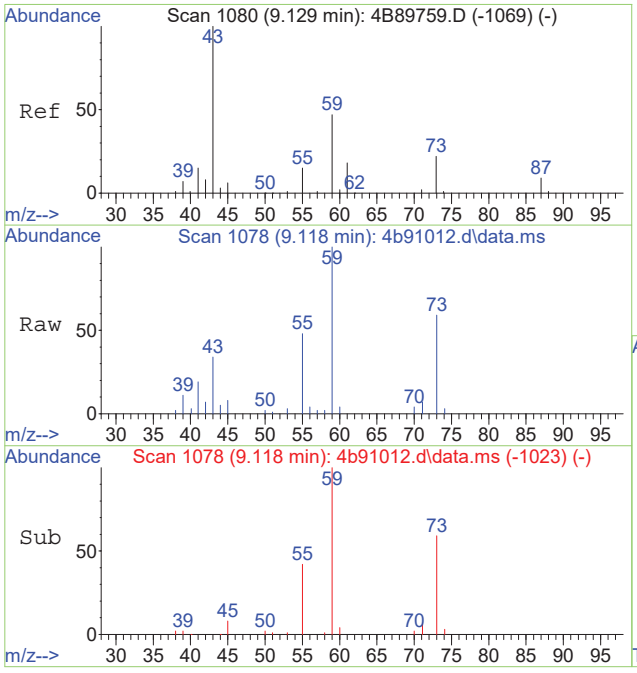


#48
cyclohexane
Concen: 17.04 ug/L
RT: 8.993 min Scan# 1054
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 84 Resp: 75004

Ion	Ratio	Lower	Upper
84	100		
56	128.2	102.8	162.8
41	71.0	51.7	111.7

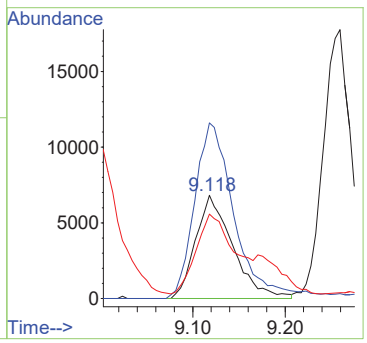


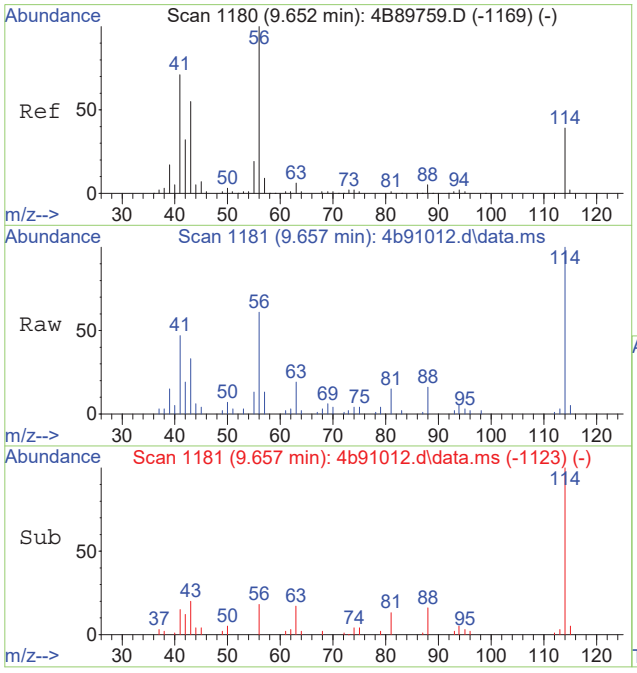


#52
tert-amyl alcohol
Concen: 104.73 ug/L
RT: 9.118 min Scan# 1078
Delta R.T. -0.010 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 73 Resp: 19010

Ion	Ratio	Lower	Upper
73	100		
59	170.0	189.0	229.0#
55	76.5	37.8	97.8

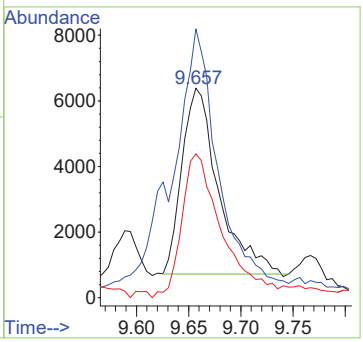


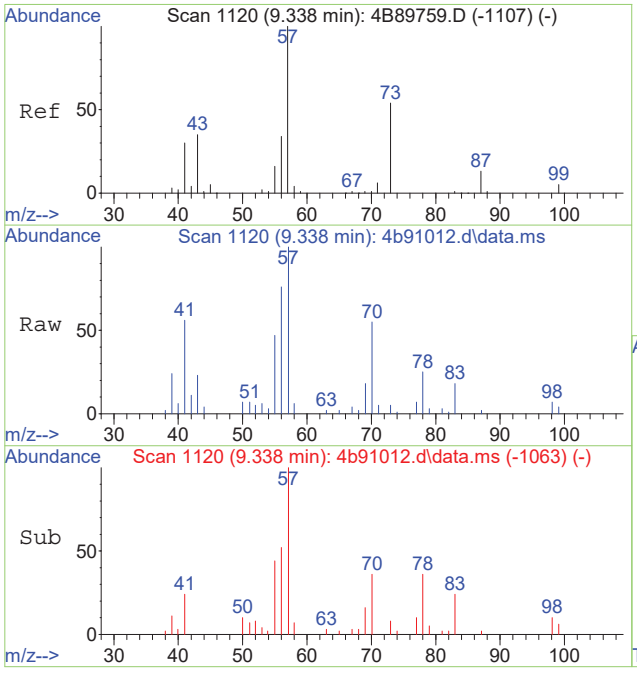


#56
n-butyl alcohol
Concen: 219.91 ug/L
RT: 9.657 min Scan# 1181
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 41 Resp: 13823

Ion	Ratio	Lower	Upper
41	100		
56	137.2	111.8	171.8
43	74.5	48.4	108.4

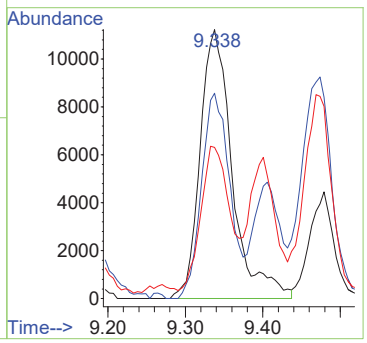


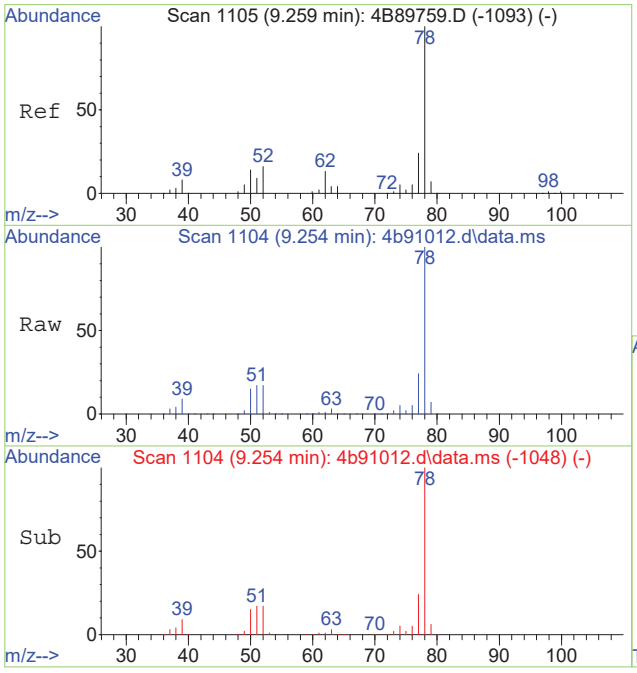


#57
2,2,4-trimethylpentane
Concen: 2.94 ug/L
RT: 9.338 min Scan# 1120
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 57 Resp: 32359

Ion	Ratio	Lower	Upper
57	100		
56	76.3	3.8	63.8#
41	51.9	0.0	59.9

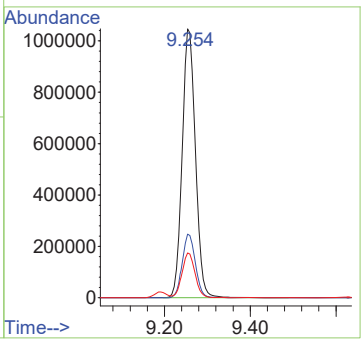


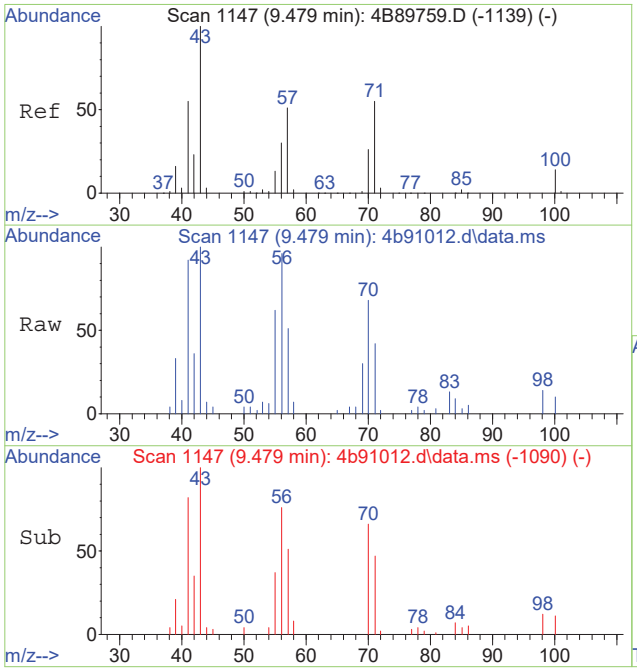


#58
benzene
Concen: 212.68 ug/L
RT: 9.254 min Scan# 1104
Delta R.T. -0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 78 Resp: 2241485

Ion	Ratio	Lower	Upper
78	100		
77	23.6	0.0	53.9
51	16.6	0.0	47.3

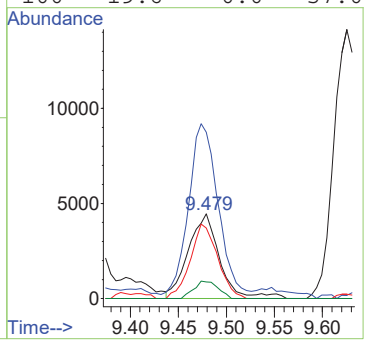


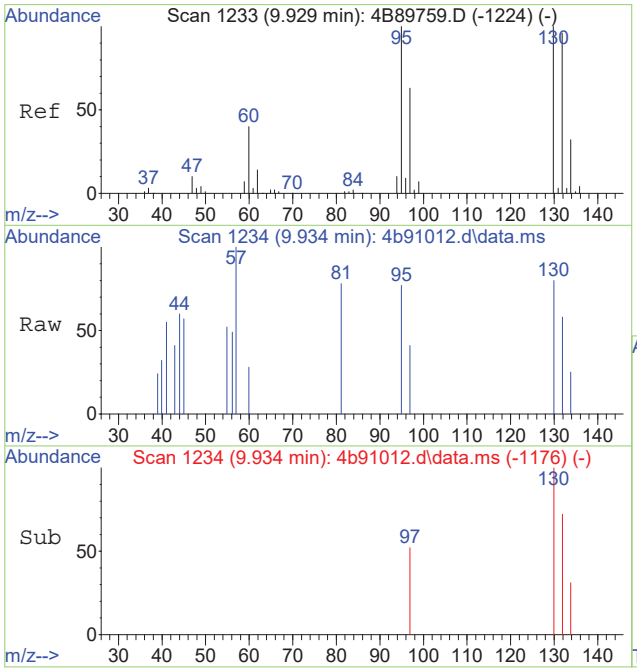


#60
heptane
Concen: 5.28 ug/L
RT: 9.479 min Scan# 1147
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 57 Resp: 10106

Ion	Ratio	Lower	Upper
57	100		
43	188.9	160.7	220.7
71	83.2	75.1	135.1
100	19.6	0.0	57.0

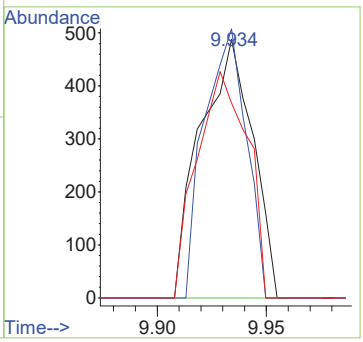


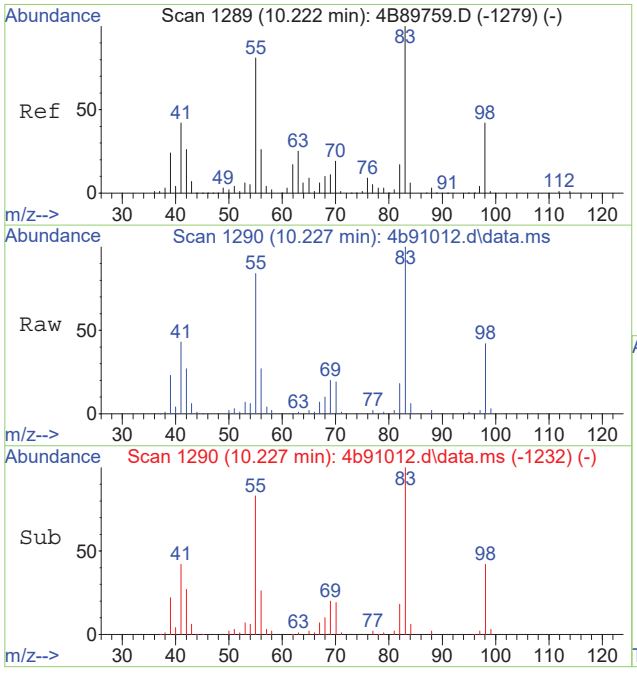


#63
trichloroethene
Concen: 0.32 ug/L
RT: 9.934 min Scan# 1234
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 95 Resp: 812

Ion	Ratio	Lower	Upper
95	100		
130	104.1	70.0	130.0
132	75.4	66.4	126.4

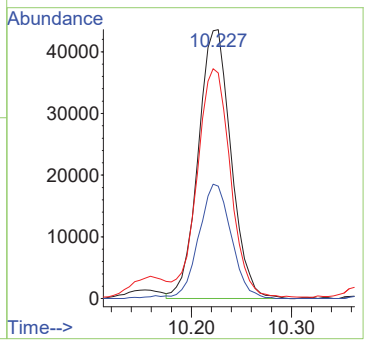


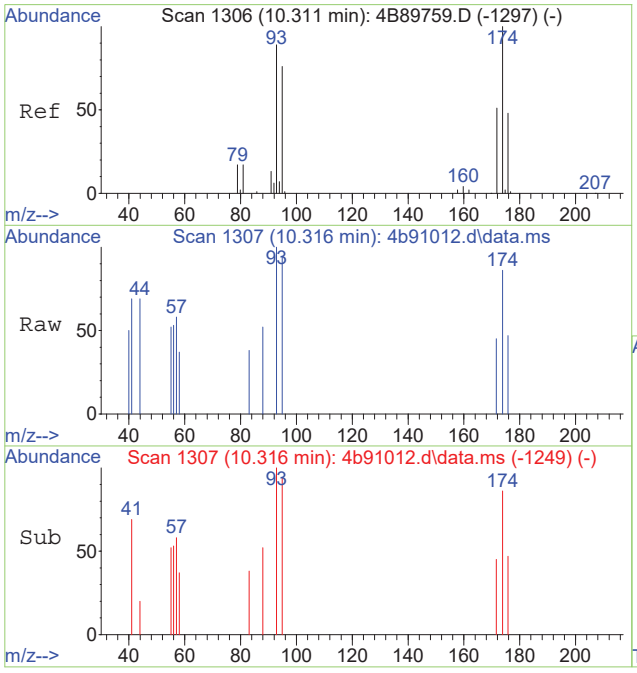


#66
methylcyclohexane
Concen: 18.66 ug/L
RT: 10.227 min Scan# 1290
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 83 Resp: 99482

Ion	Ratio	Lower	Upper
83	100		
98	41.8	22.1	62.1
55	83.2	61.4	101.4

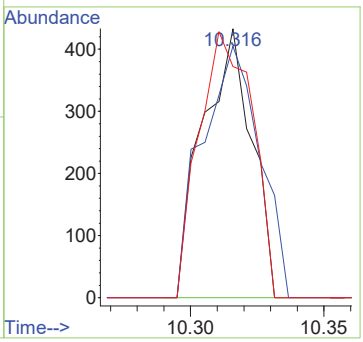


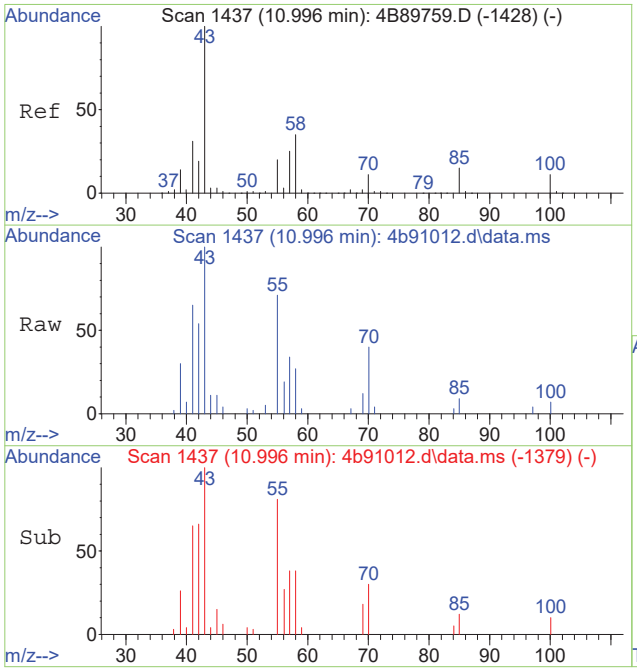


#68
dibromomethane
Concen: 0.36 ug/L
RT: 10.316 min Scan# 1307
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 93 Resp: 554

Ion	Ratio	Lower	Upper
93	100		
95	93.5	56.1	116.1
174	85.9	82.6	142.6

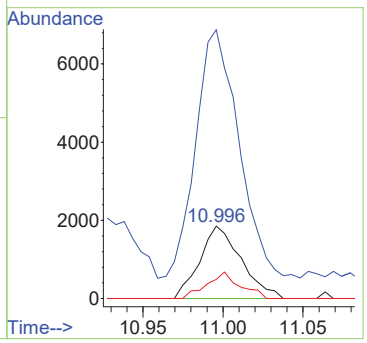


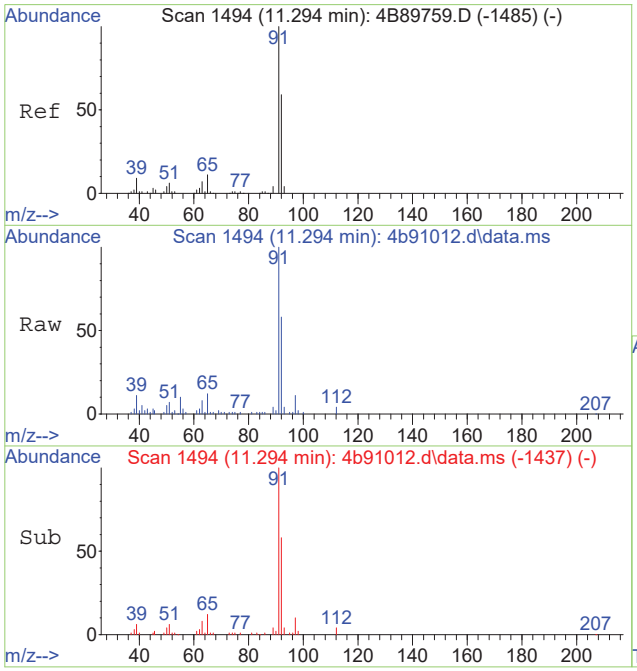


#73
4-methyl-2-pentanone
Concen: 3.30 ug/L
RT: 10.996 min Scan# 1437
Delta R.T. 0.001 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 58 Resp: 3326

Ion	Ratio	Lower	Upper
58	100		
43	340.5	252.9	312.9#
100	26.4	2.3	62.3

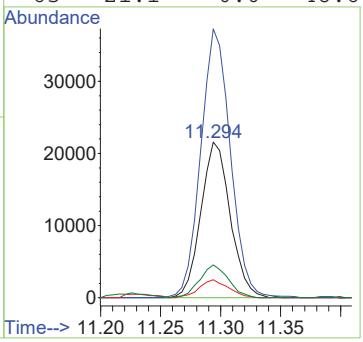


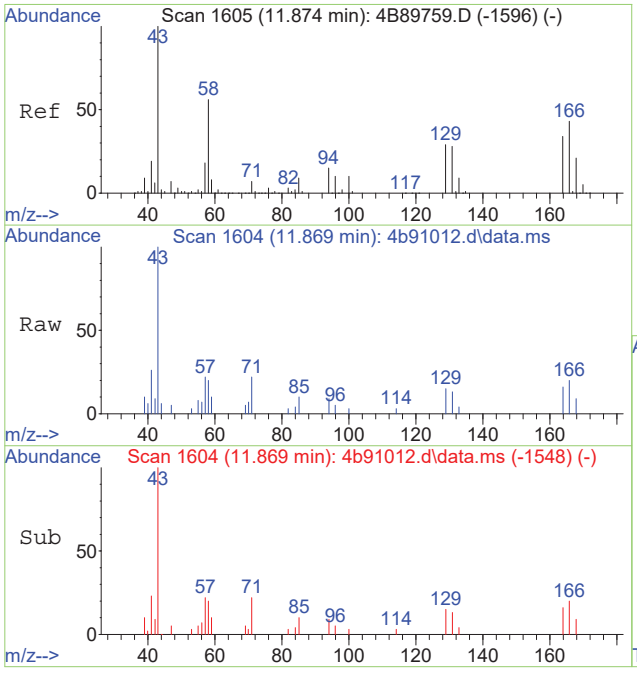


#77
toluene
Concen: 5.97 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 92 Resp: 36730

Ion	Ratio	Lower	Upper
92	100		
91	172.6	150.2	190.2
51	11.5	0.0	40.3
65	21.1	0.0	48.6

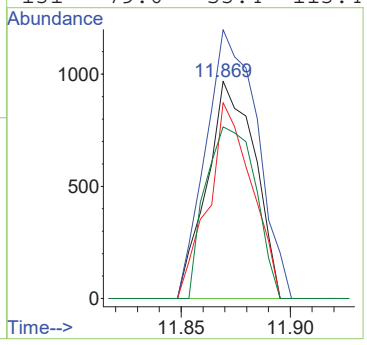


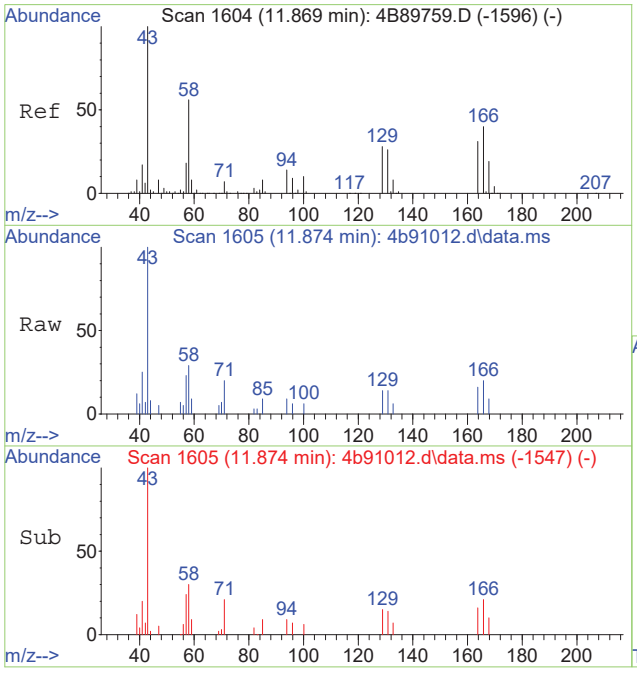


#81
tetrachloroethene
Concen: 0.64 ug/L
RT: 11.869 min Scan# 1604
Delta R.T. -0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:164 Resp: 1477

Ion	Ratio	Lower	Upper
164	100		
166	123.9	97.2	157.2
129	90.2	56.3	116.3
131	79.0	53.4	113.4

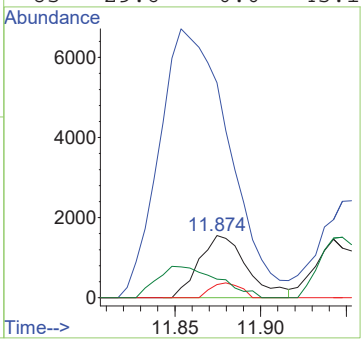


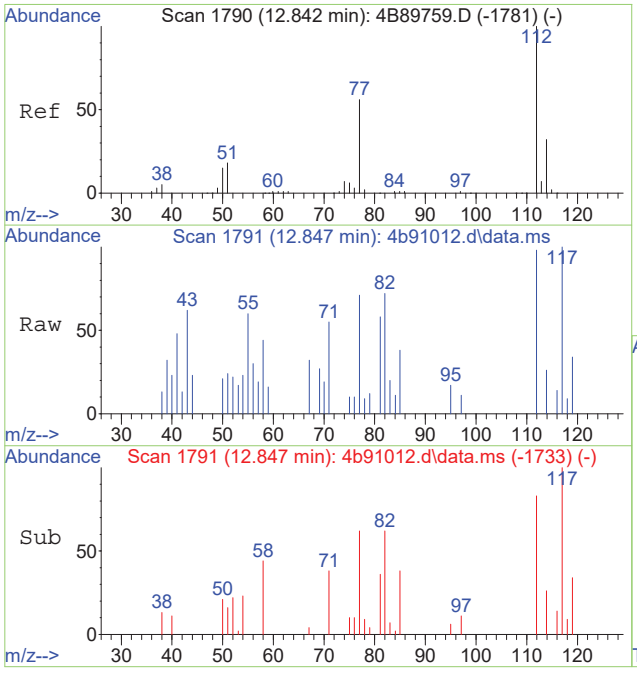


#82
2-hexanone
Concen: 3.11 ug/L
RT: 11.874 min Scan# 1605
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 58 Resp: 3020

Ion	Ratio	Lower	Upper
58	100		
43	317.8	158.4	198.4#
100	20.9	0.0	38.3
85	29.6	0.0	45.1

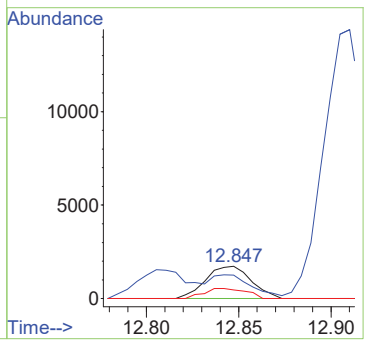


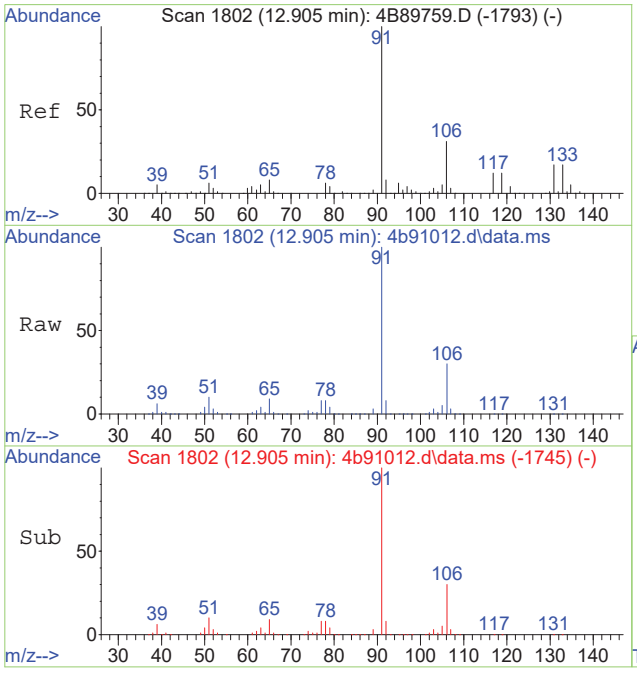


#88
chlorobenzene
Concen: 0.43 ug/L
RT: 12.847 min Scan# 1791
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:112 Resp: 2951

Ion	Ratio	Lower	Upper
112	100		
77	52.6	26.5	86.5
114	27.0	2.1	62.1

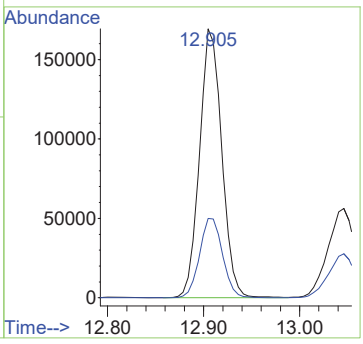


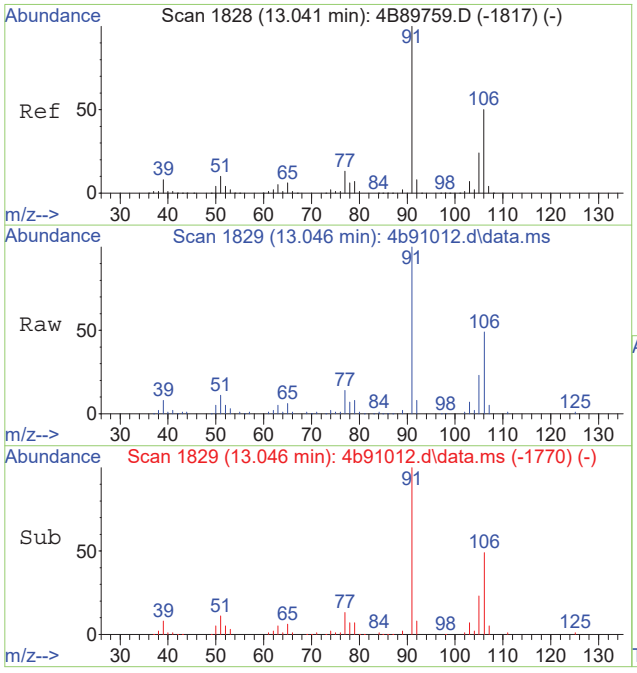


#90
ethylbenzene
Concen: 22.56 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 91 Resp: 272209

Ion	Ratio	Lower	Upper
91	100		
106	29.5	1.0	61.0

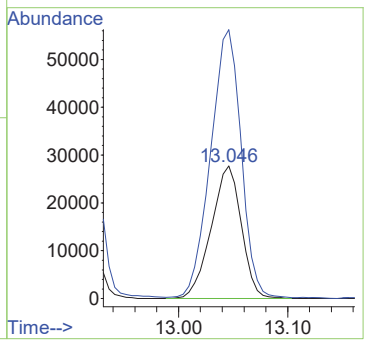


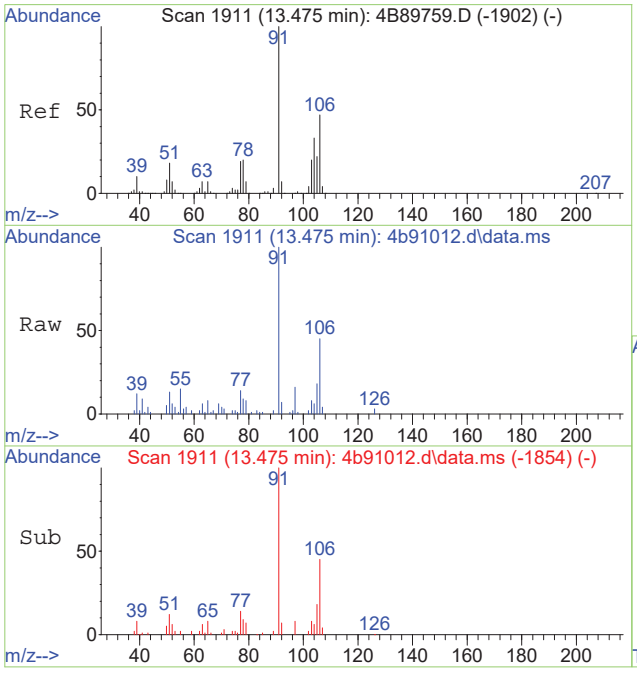


#91
m,p-xylene
Concen: 11.61 ug/L
RT: 13.046 min Scan# 1829
Delta R.T. 0.006 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:106 Resp: 53209

Ion	Ratio	Lower	Upper
106	100		
91	202.0	169.3	229.3

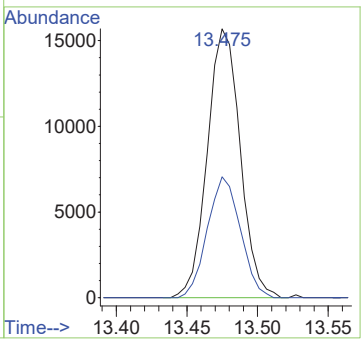


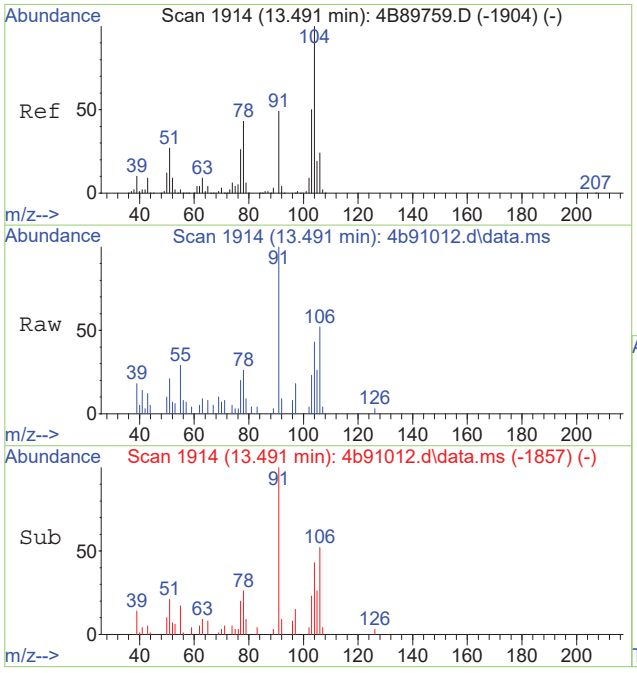


#92
o-xylene
Concen: 2.48 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 91 Resp: 25341

Ion	Ratio	Lower	Upper
91	100		
106	45.0	16.9	76.9

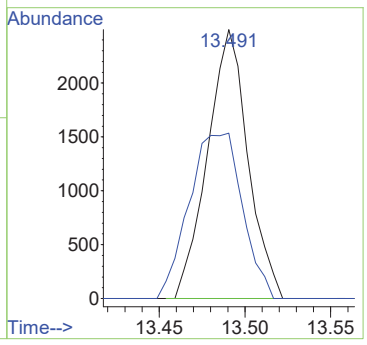


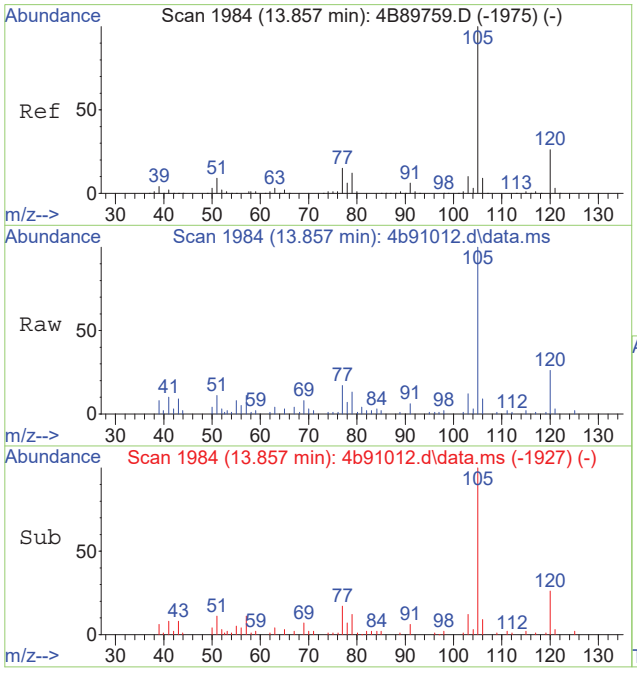


#93
styrene
Concen: 0.55 ug/L
RT: 13.491 min Scan# 1914
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:104 Resp: 4095

Ion	Ratio	Lower	Upper
104	100		
78	61.4	12.5	72.5

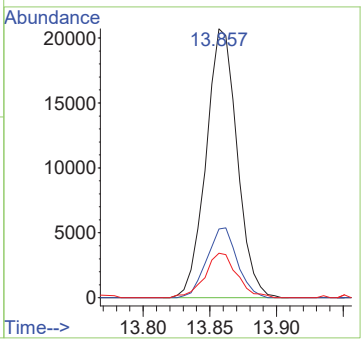


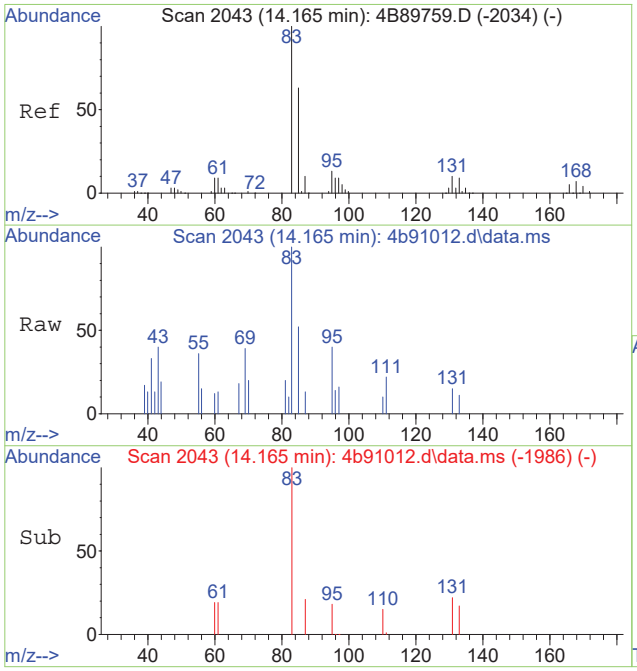


#95
isopropylbenzene
Concen: 2.59 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:105 Resp: 33583

Ion	Ratio	Lower	Upper
105	100		
120	25.6	5.8	45.8
77	16.6	0.0	34.8

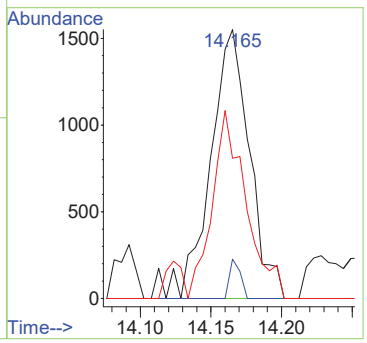


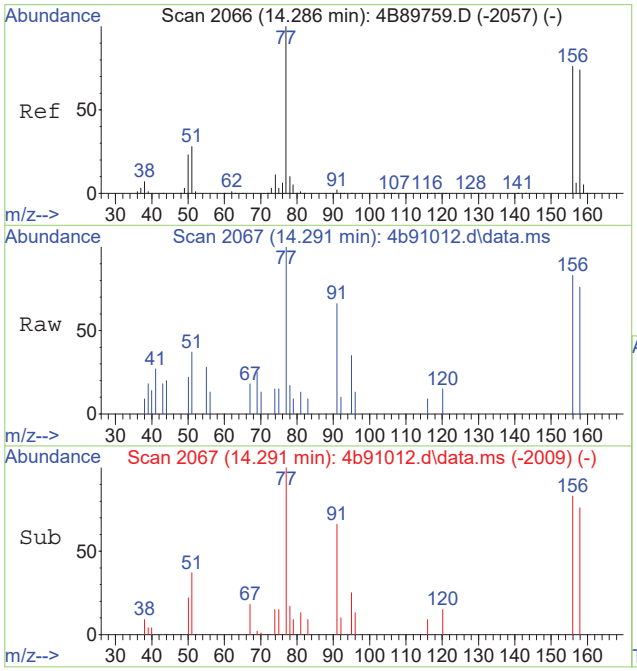


#100
1,1,2,2-tetrachloroethane
Concen: 0.84 ug/L
RT: 14.165 min Scan# 2043
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 83 Resp: 2963

Ion	Ratio	Lower	Upper
83	100		
131	14.6	0.0	39.5
85	52.2	32.6	92.6

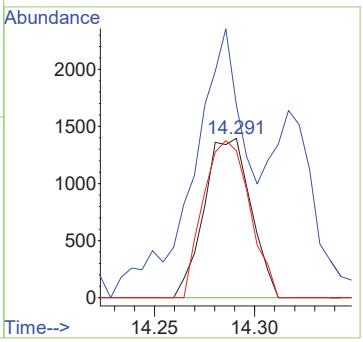


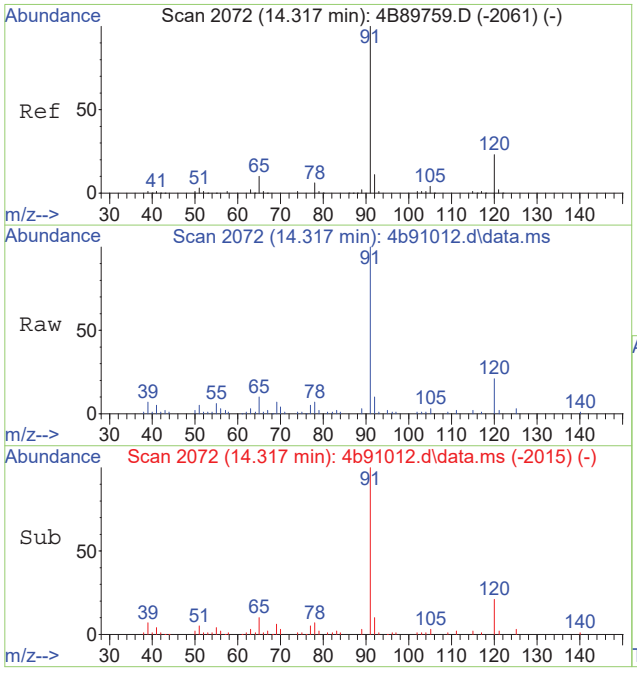


#103
bromobenzene
Concen: 0.65 ug/L
RT: 14.291 min Scan# 2067
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:156 Resp: 2271

Ion	Ratio	Lower	Upper
156	100		
77	98.6	105.2	165.2#
158	92.3	67.2	127.2

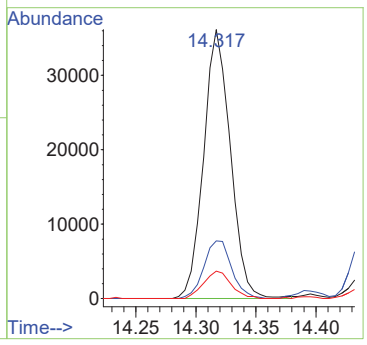


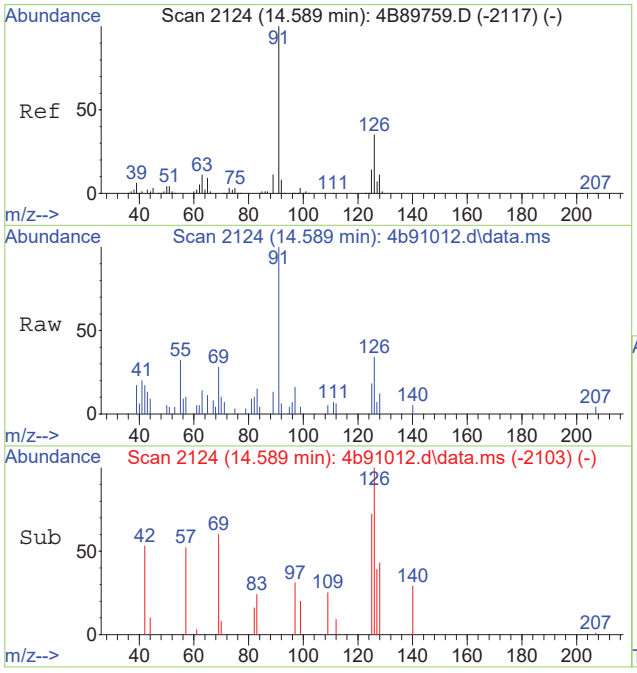


#104
n-propylbenzene
Concen: 3.71 ug/L
RT: 14.317 min Scan# 2072
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 91 Resp: 56148

Ion	Ratio	Lower	Upper
91	100		
120	21.4	0.0	52.7
65	10.2	0.0	39.8

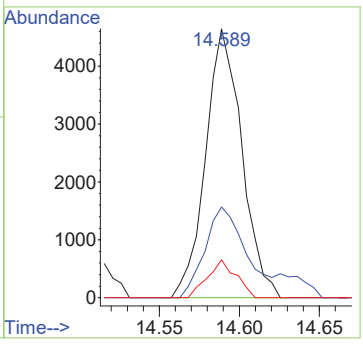


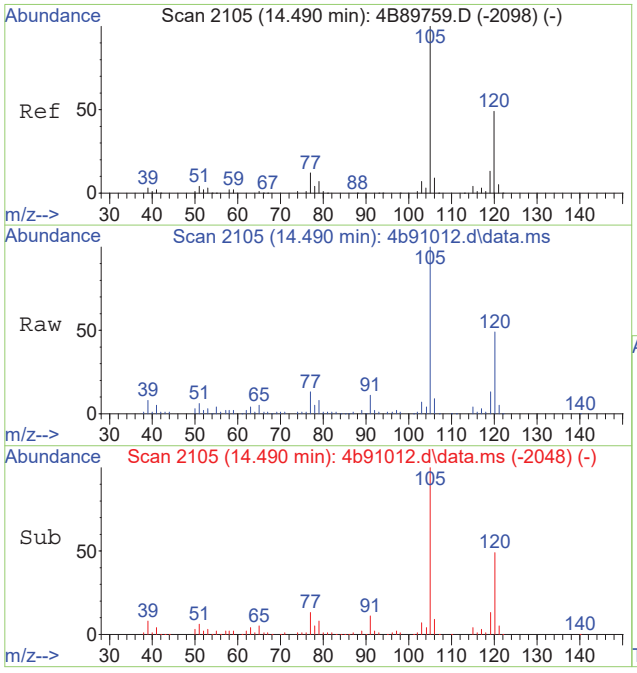


#106
4-chlorotoluene
Concen: 0.83 ug/L
RT: 14.589 min Scan# 2124
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 91 Resp: 7322

Ion	Ratio	Lower	Upper
91	100		
126	33.7	4.9	64.9
63	14.1	0.0	41.2

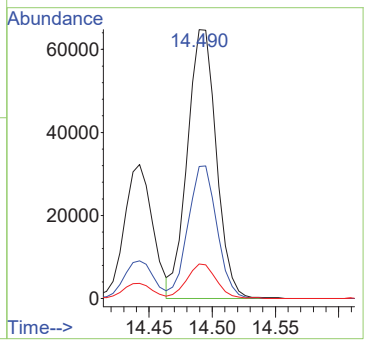


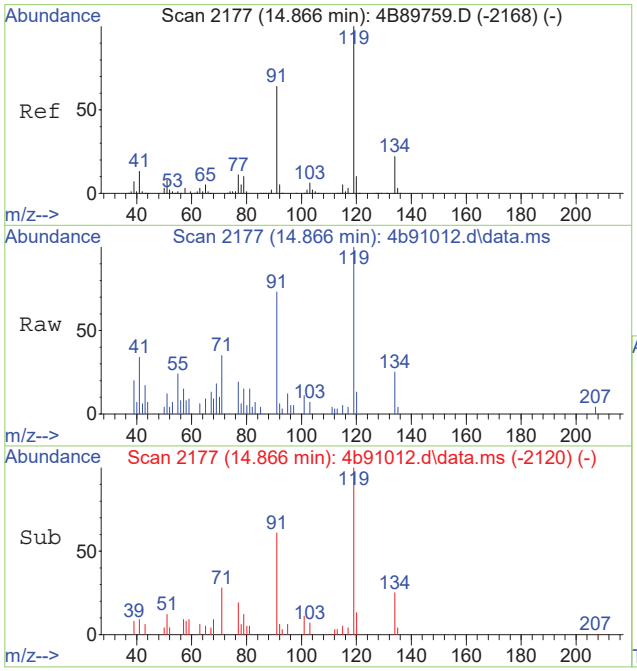


#107
1,3,5-trimethylbenzene
Concen: 9.11 ug/L
RT: 14.490 min Scan# 2105
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:105 Resp: 103561

Ion	Ratio	Lower	Upper
105	100		
120	49.1	19.2	79.2
77	12.9	0.0	42.1

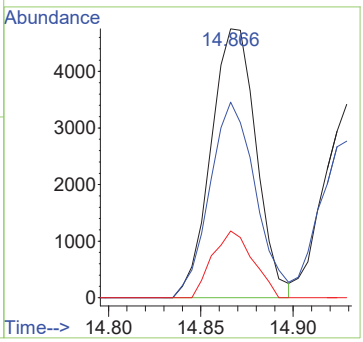


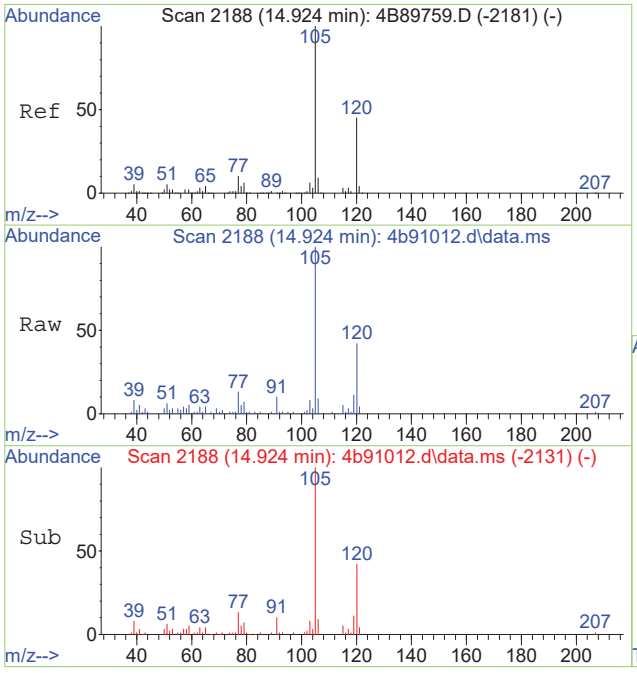


#108
tert-butylbenzene
Concen: 0.83 ug/L
RT: 14.866 min Scan# 2177
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:119 Resp: 8095

Ion	Ratio	Lower	Upper
119	100		
91	72.7	33.7	93.7
134	24.8	0.0	52.4

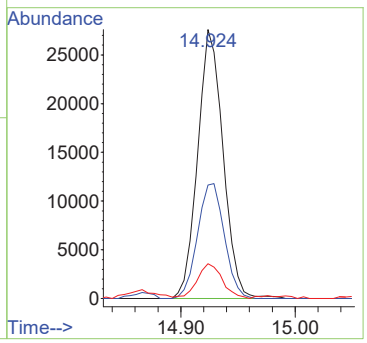


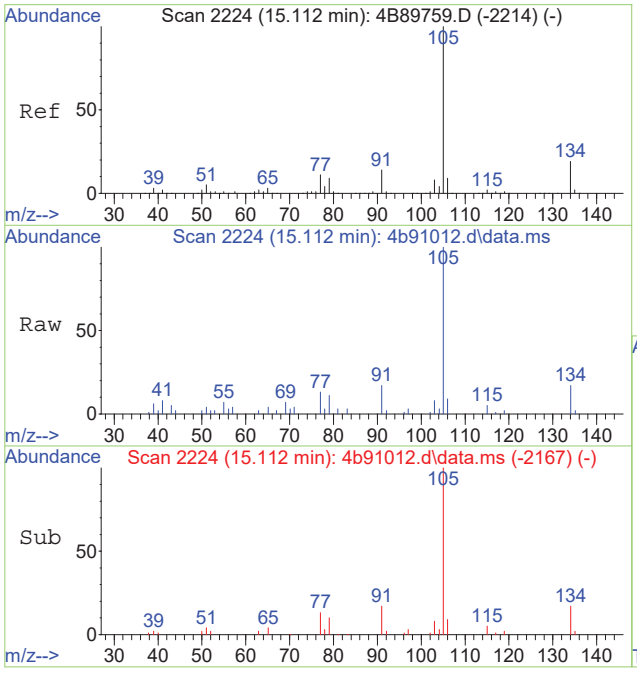


#109
1,2,4-trimethylbenzene
Concen: 3.74 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:105 Resp: 42560

Ion	Ratio	Lower	Upper
105	100		
120	42.2	16.3	76.3
77	12.2	0.0	41.8

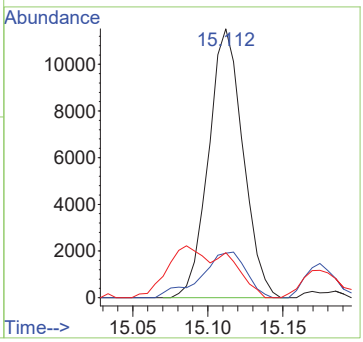


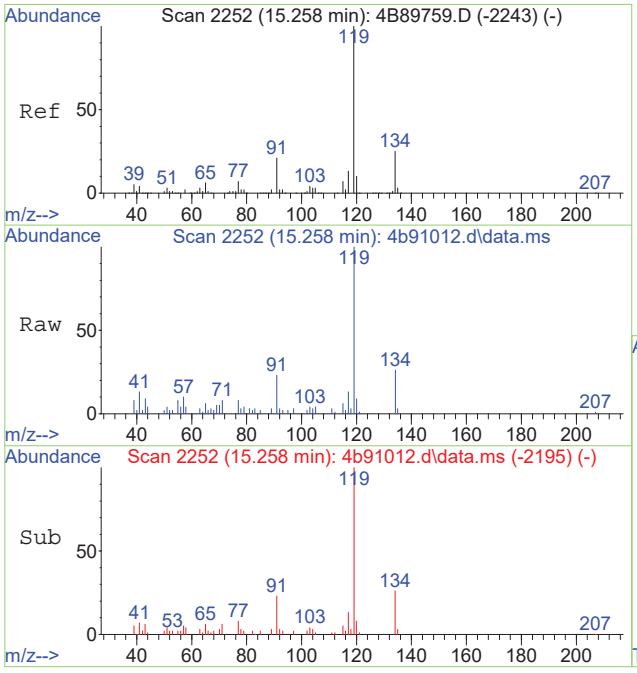


#110
sec-butylbenzene
Concen: 1.24 ug/L
RT: 15.112 min Scan# 2224
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:105 Resp: 18387

Ion	Ratio	Lower	Upper
105	100		
134	16.6	0.0	48.6
91	15.2	0.0	44.5

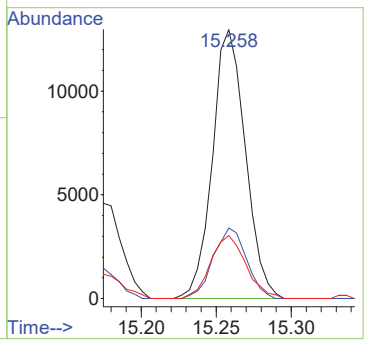


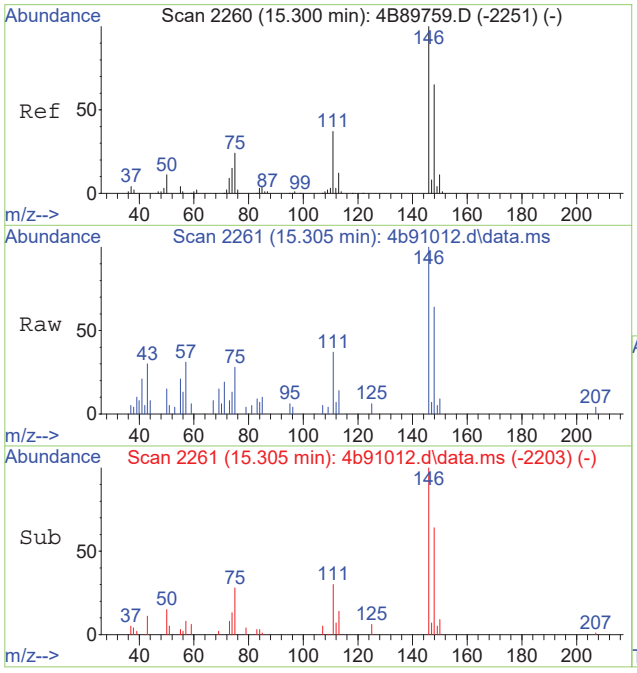


#111
p-isopropyltoluene
Concen: 1.57 ug/L
RT: 15.258 min Scan# 2252
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:119 Resp: 19759

Ion	Ratio	Lower	Upper
119	100		
134	26.2	0.0	55.5
91	23.4	0.0	51.2

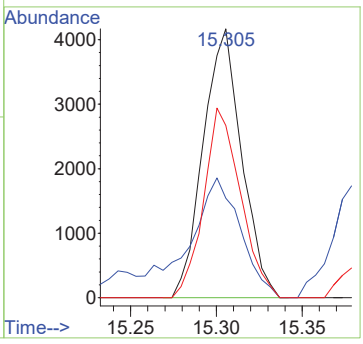


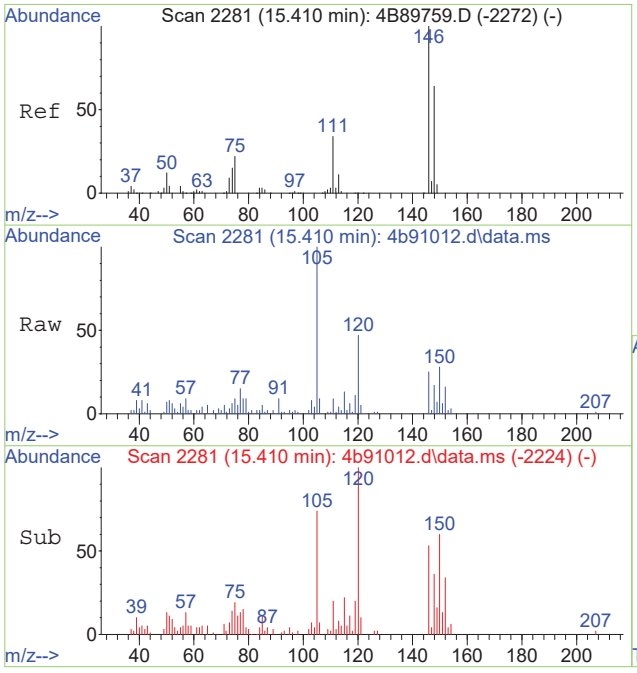


#112
1,3-dichlorobenzene
Concen: 0.98 ug/L
RT: 15.305 min Scan# 2261
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:146 Resp: 6525

Ion	Ratio	Lower	Upper
146	100		
111	37.0	7.0	67.0
148	64.0	35.0	95.0

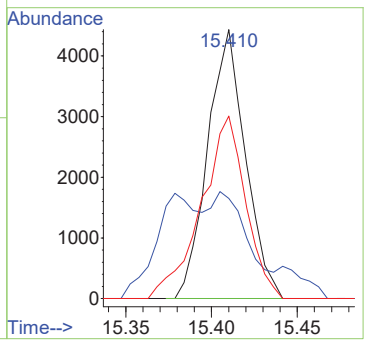


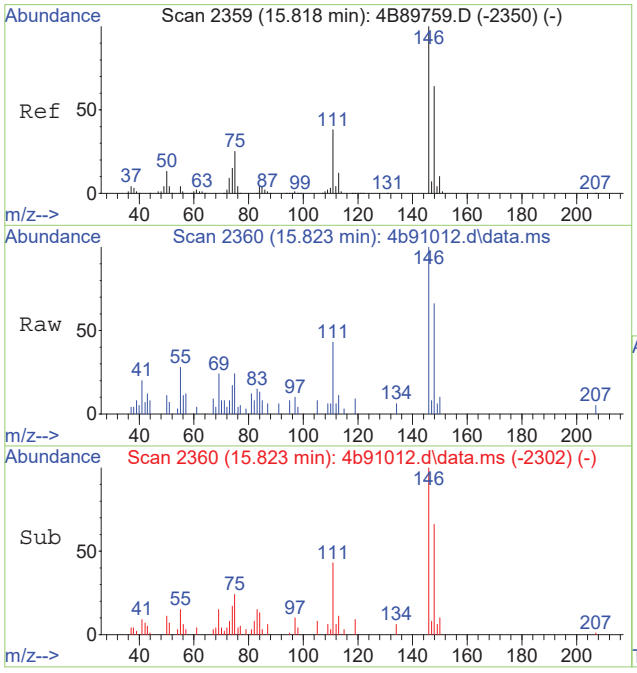


#113
1,4-dichlorobenzene
Concen: 1.02 ug/L
RT: 15.410 min Scan# 2281
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:146 Resp: 6792

Ion	Ratio	Lower	Upper
146	100		
111	26.7	4.7	64.7
148	67.8	34.5	94.5

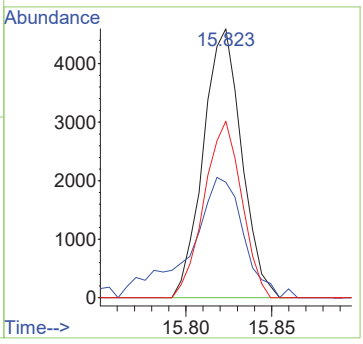


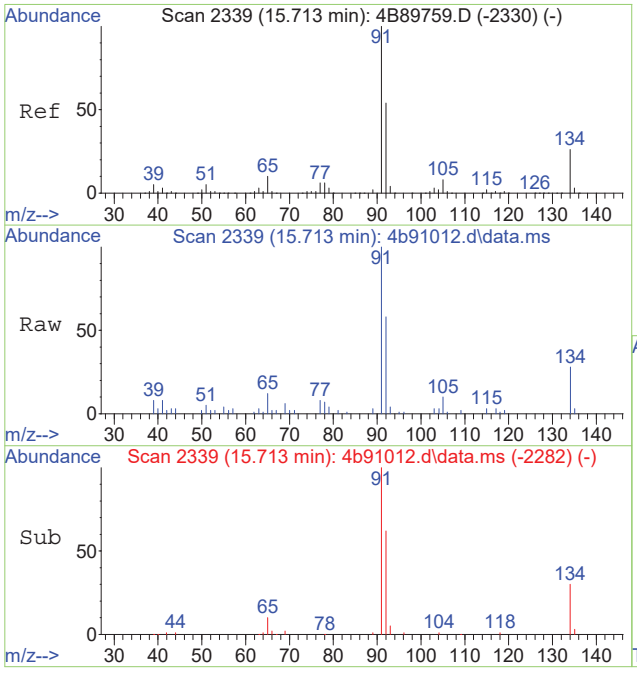


#114
1,2-dichlorobenzene
Concen: 1.04 ug/L
RT: 15.823 min Scan# 2360
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:146 Resp: 7148

Ion	Ratio	Lower	Upper
146	100		
111	39.6	8.5	68.5
148	65.6	33.9	93.9

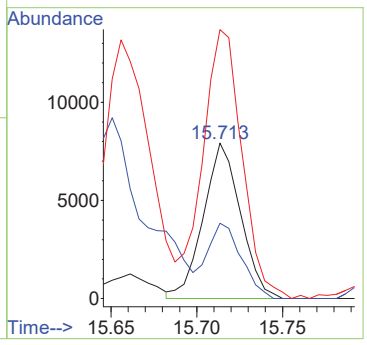


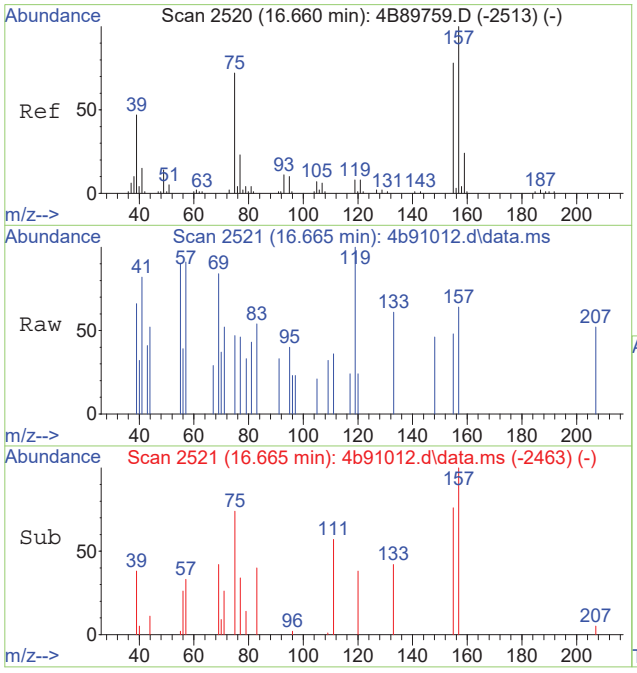


#116
n-butylbenzene
Concen: 1.96 ug/L
RT: 15.713 min Scan# 2339
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion: 92 Resp: 11929

Ion	Ratio	Lower	Upper
92	100		
134	48.3	17.1	77.1
91	173.0	153.6	213.6

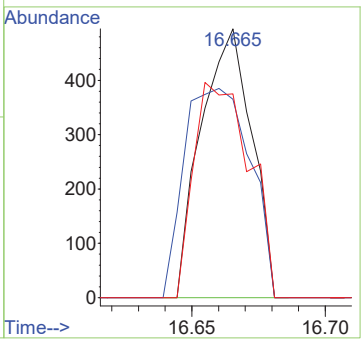


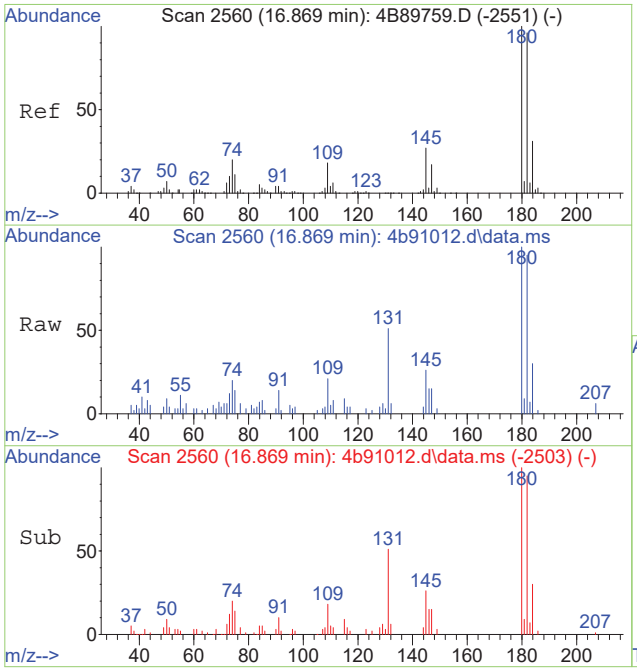


#118
1,2-dibromo-3-chloropropane
Concen: 0.75 ug/L
RT: 16.665 min Scan# 2521
Delta R.T. 0.005 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:157 Resp: 654

Ion	Ratio	Lower	Upper
157	100		
75	73.7	42.2	102.2
155	75.8	47.6	107.6

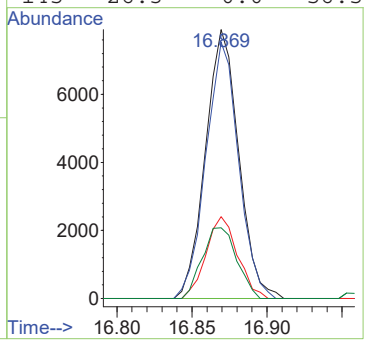


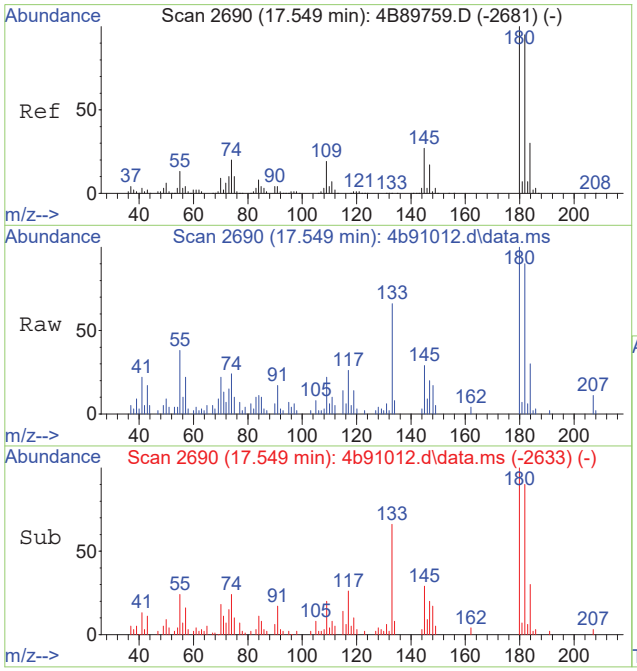


#119
1,3,5-trichlorobenzene
Concen: 1.91 ug/L
RT: 16.869 min Scan# 2560
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:180 Resp: 12145

Ion	Ratio	Lower	Upper
180	100		
182	95.2	65.8	125.8
184	30.5	0.9	60.9
145	26.3	0.0	56.5

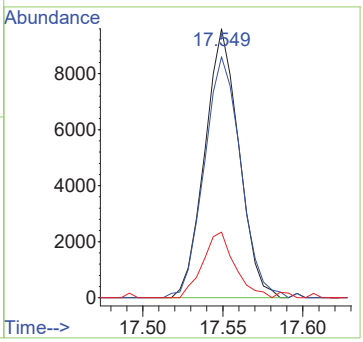


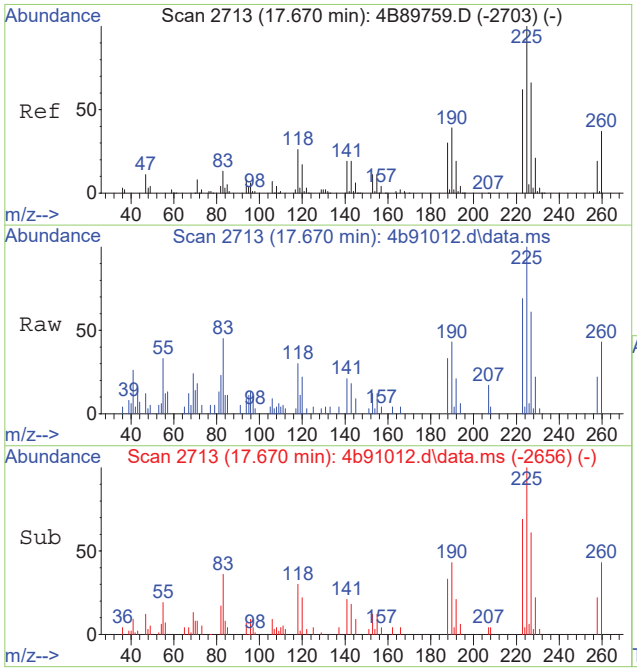


#120
1,2,4-trichlorobenzene
Concen: 2.56 ug/L
RT: 17.549 min Scan# 2690
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:180 Resp: 14277

Ion	Ratio	Lower	Upper
180	100		
182	89.6	65.0	125.0
74	24.4	0.0	49.6

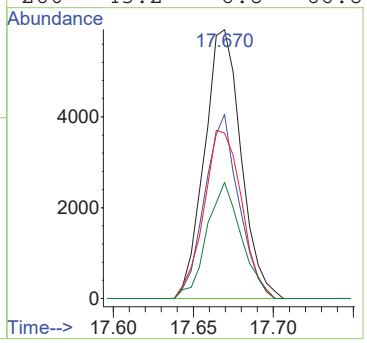


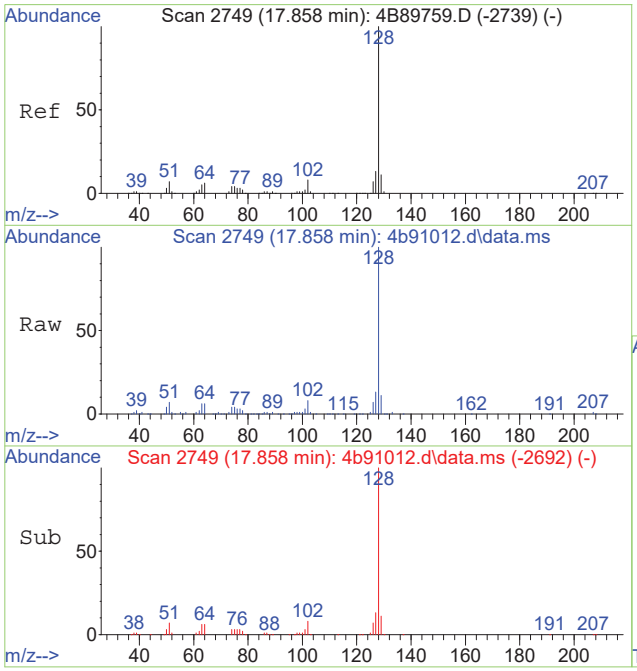


#122
hexachlorobutadiene
Concen: 3.02 ug/L
RT: 17.670 min Scan# 2713
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:225 Resp: 9434

Ion	Ratio	Lower	Upper
225	100		
223	68.5	32.4	92.4
227	61.5	36.1	96.1
260	43.2	6.8	66.8

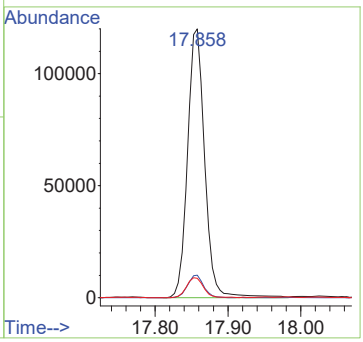


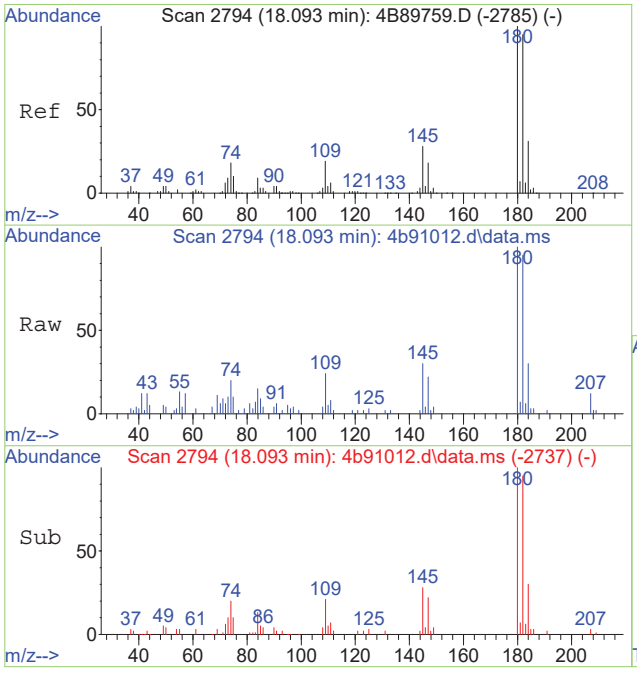


#123
naphthalene
Concen: 17.18 ug/L
RT: 17.858 min Scan# 2749
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:128 Resp: 196739

Ion	Ratio	Lower	Upper
128	100		
102	8.4	0.0	37.6
51	7.2	0.0	37.0

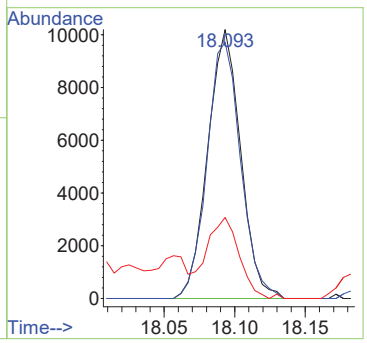


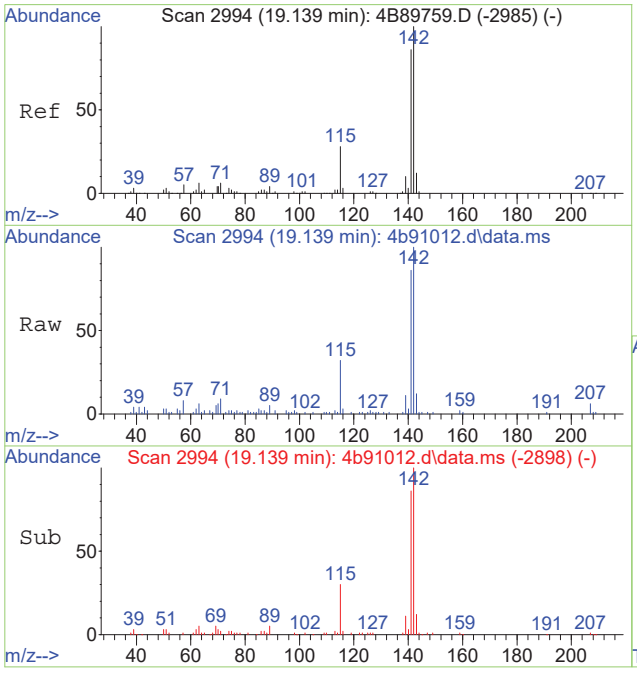


#124
1,2,3-trichlorobenzene
Concen: 3.23 ug/L
RT: 18.093 min Scan# 2794
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:180 Resp: 16473

Ion	Ratio	Lower	Upper
180	100		
182	95.3	65.4	125.4
145	30.1	0.0	57.8

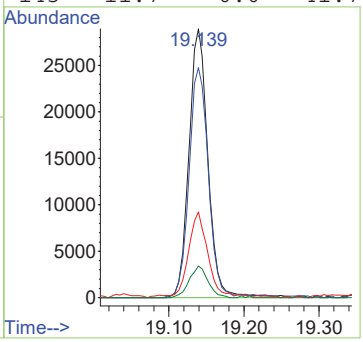




#125
2-methylnaphthalene
Concen: 9.04 ug/L
RT: 19.139 min Scan# 2994
Delta R.T. 0.000 min
Lab File: 4b91012.d
Acq: 24 May 2019 2:17 pm

Tgt Ion:142 Resp: 51020

Ion	Ratio	Lower	Upper
142	100		
141	85.5	65.8	105.8
115	31.3	0.0	58.1
143	11.7	0.0	41.7



Quantitation Report (QT Reviewed)

Data Path : R:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91017.d
Acq On : 24 May 2019 4:58 pm
Operator : CHELSEAS
Sample : jc88209-7
Misc : MS34821,V4B3857,5,,,,200
ALS Vial : 14 Sample Multiplier: 1

Quant Time: May 28 02:49:12 2019
Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

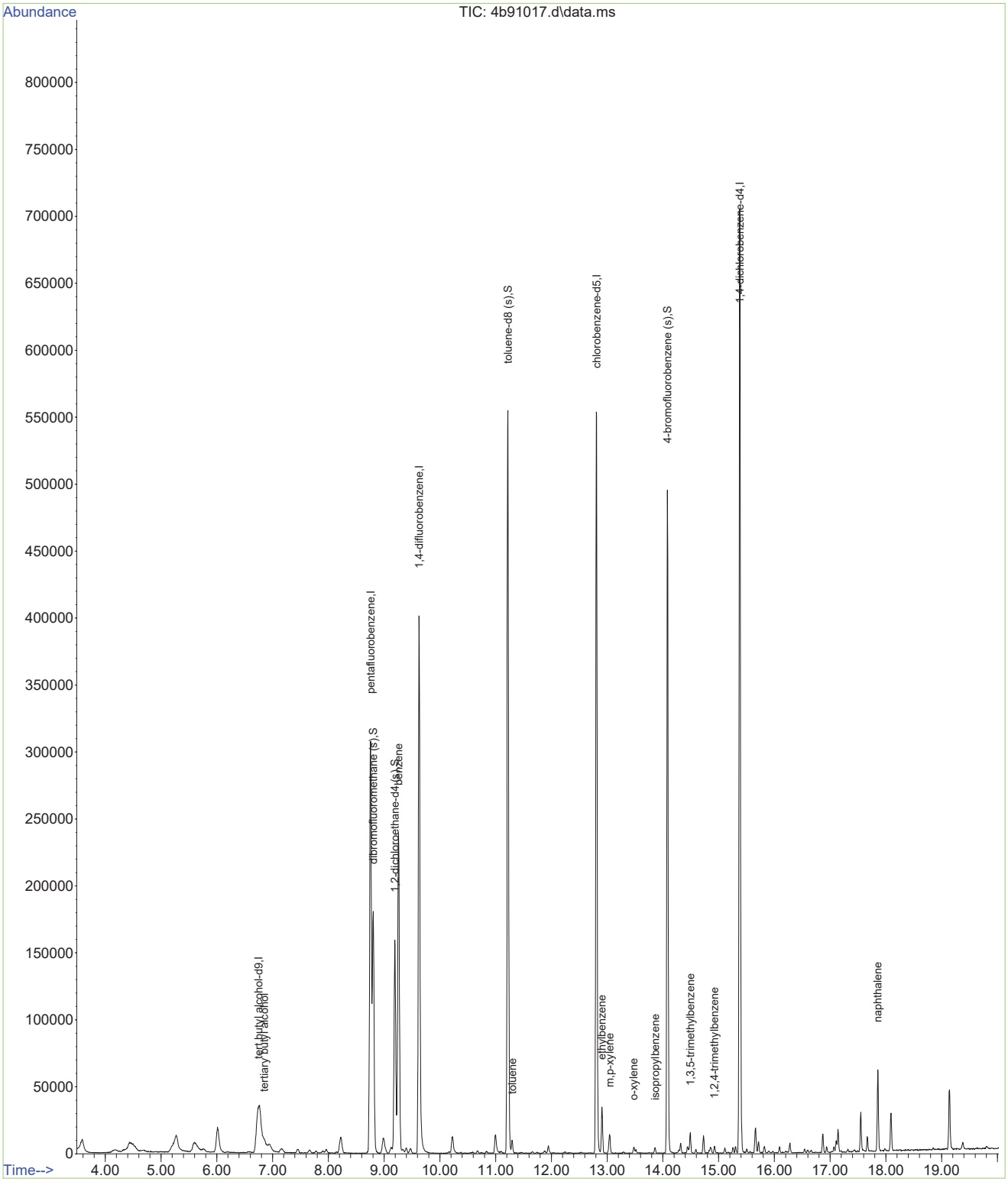
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.749	65	127215	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	258133	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	343105	50.00	ug/L	0.00
75) chlorobenzene-d5	12.811	117	317021	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	192694	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	118497	50.76	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 101.52%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	122533	54.16	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 108.32%			
76) toluene-d8 (s)	11.221	98	386398	48.43	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 96.86%			
99) 4-bromofluorobenzene (s)	14.082	95	162218	51.14	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.28%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	6.848	59	1874	5.21	ug/L #	15
58) benzene	9.259	78	238106	20.44	ug/L	99
77) toluene	11.299	92	3776	0.57	ug/L	100
90) ethylbenzene	12.905	91	25498	1.97	ug/L	98
91) m,p-xylene	13.046	106	5114	1.04	ug/L	90
92) o-xylene	13.475	91	2543	0.23	ug/L	93
95) isopropylbenzene	13.862	105	3431	0.25	ug/L	94
107) 1,3,5-trimethylbenzene	14.490	105	8742	0.73	ug/L	100
109) 1,2,4-trimethylbenzene	14.924	105	3421	0.29	ug/L	96
123) naphthalene	17.853	128	48486	4.04	ug/L	96

(#) = qualifier out of range (m) = manual integration (+) = signals summed

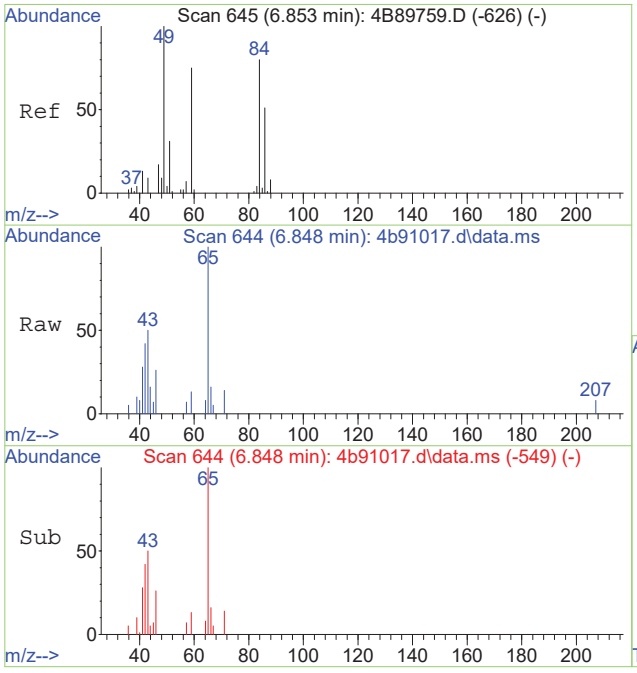
Quantitation Report (QT Reviewed)

Data Path : R:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91017.d
Acq On : 24 May 2019 4:58 pm
Operator : CHELSEAS
Sample : jc88209-7
Misc : MS34821,V4B3857,5,,,,200
ALS Vial : 14 Sample Multiplier: 1

Quant Time: May 28 02:49:12 2019
Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration



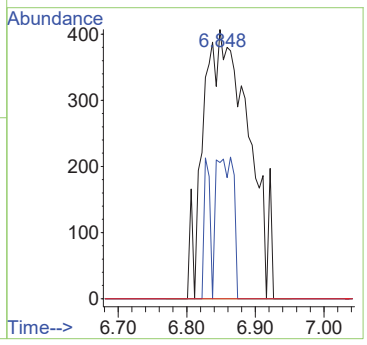
M4B3793.M Wed May 29 18:07:55 2019 Page: 2

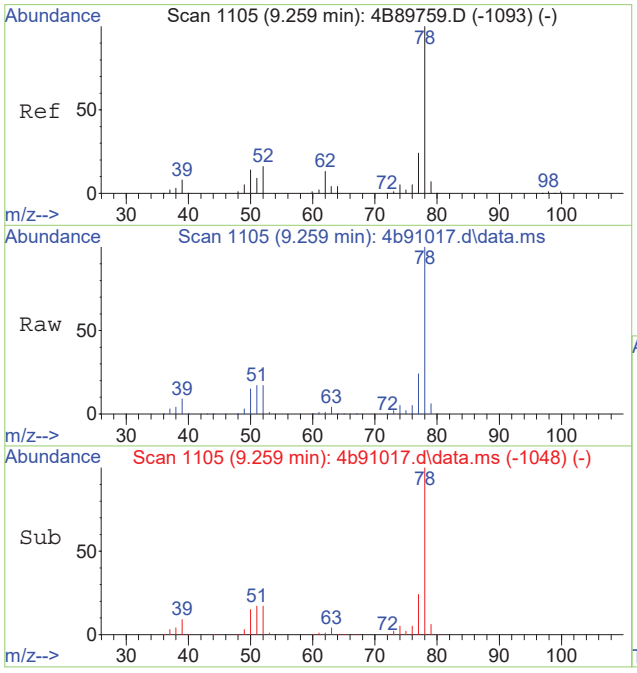


#3
tertiary butyl alcohol
Concen: 5.21 ug/L
RT: 6.848 min Scan# 644
Delta R.T. -0.005 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion: 59 Resp: 1874

Ion	Ratio	Lower	Upper
59	100		
57	50.6	0.0	39.9#
60	0.0	0.0	33.3

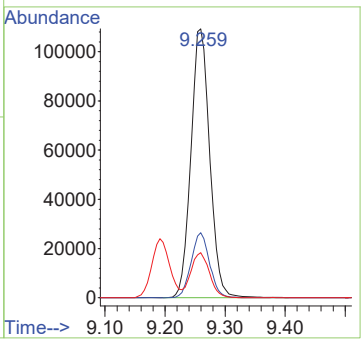


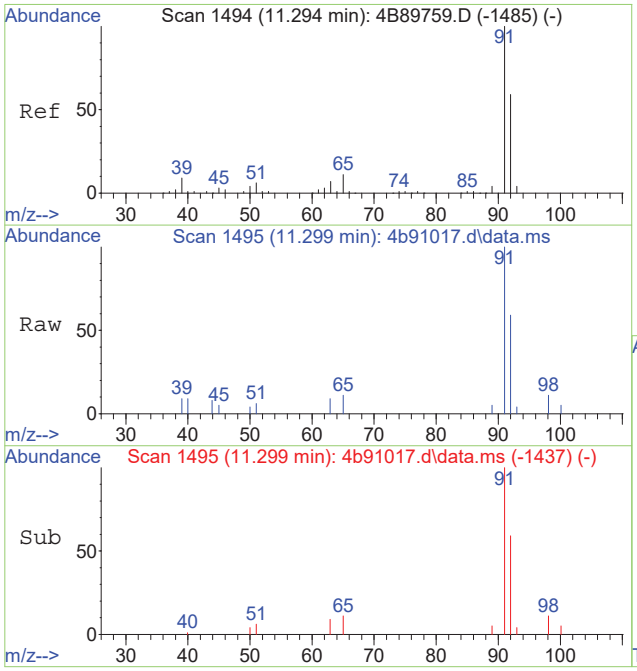


#58
benzene
Concen: 20.44 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. 0.000 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion: 78 Resp: 238106

Ion	Ratio	Lower	Upper
78	100		
77	24.2	0.0	53.9
51	16.8	0.0	47.3

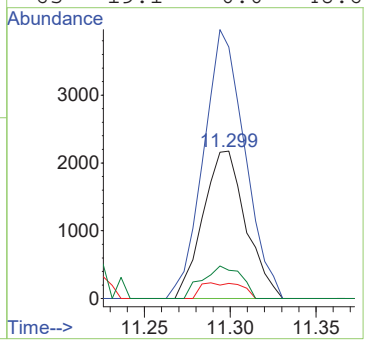


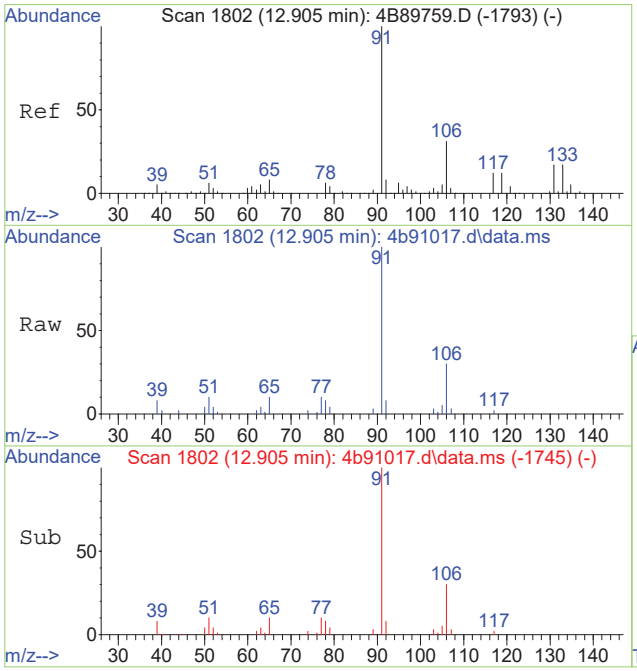


#77
toluene
Concen: 0.57 ug/L
RT: 11.299 min Scan# 1495
Delta R.T. 0.005 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion: 92 Resp: 3776

Ion	Ratio	Lower	Upper
92	100		
91	170.6	150.2	190.2
51	10.3	0.0	40.3
65	19.1	0.0	48.6

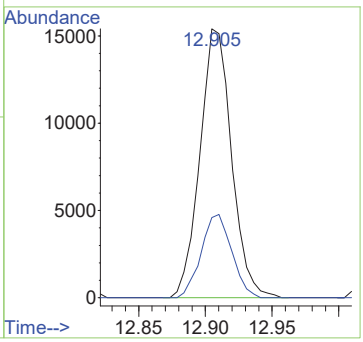


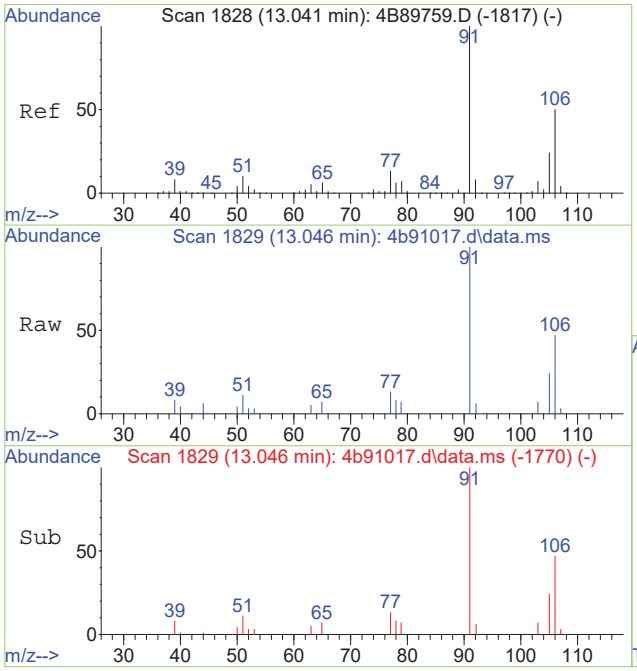


#90
ethylbenzene
Concen: 1.97 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. 0.000 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion: 91 Resp: 25498

Ion	Ratio	Lower	Upper
91	100		
106	29.8	1.0	61.0

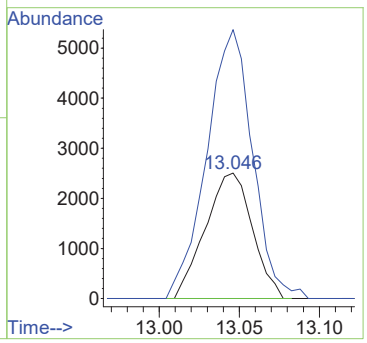


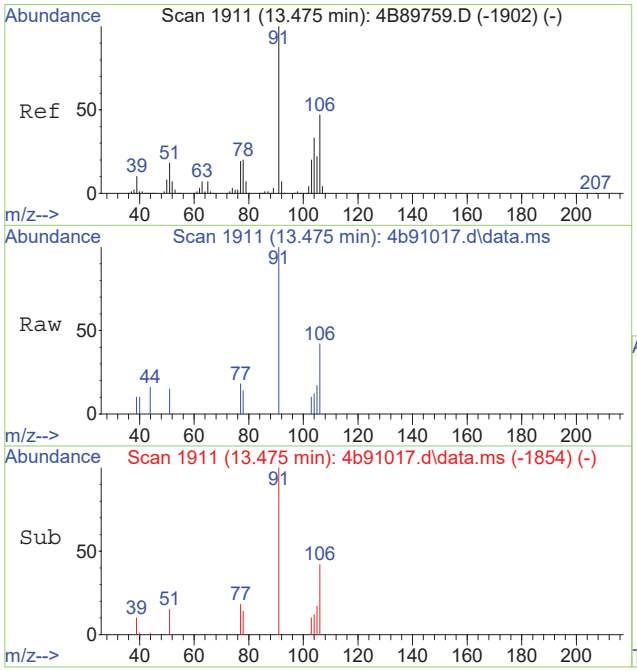


#91
m,p-xylene
Concen: 1.04 ug/L
RT: 13.046 min Scan# 1829
Delta R.T. 0.006 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion:106 Resp: 5114

Ion	Ratio	Lower	Upper
106	100		
91	214.4	169.3	229.3

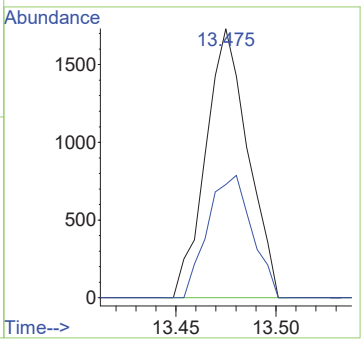


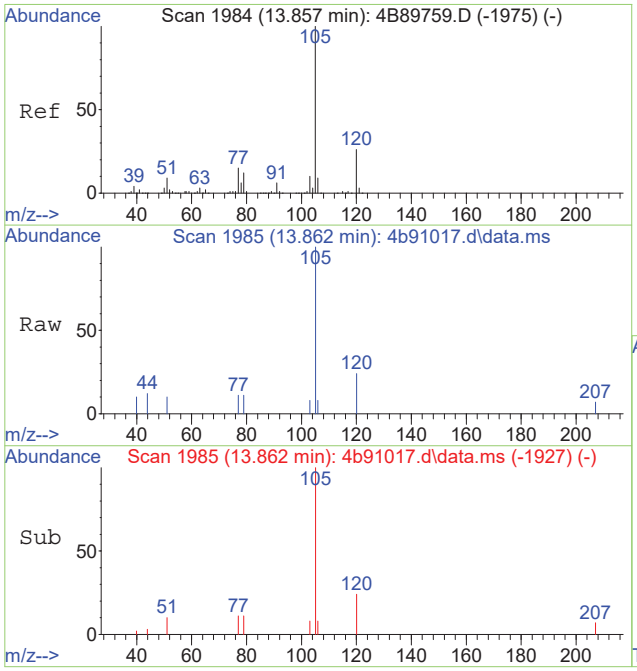


#92
o-xylene
Concen: 0.23 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. 0.000 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion: 91 Resp: 2543

Ion	Ratio	Lower	Upper
91	100		
106	42.1	16.9	76.9

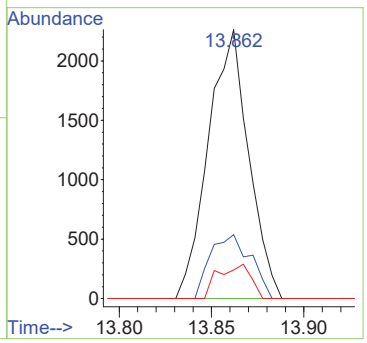


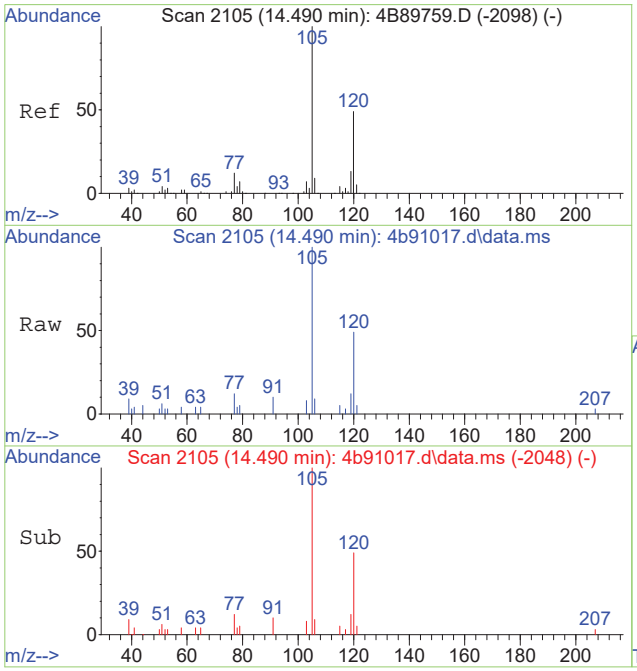


#95
isopropylbenzene
Concen: 0.25 ug/L
RT: 13.862 min Scan# 1985
Delta R.T. 0.005 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion:105 Resp: 3431

Ion	Ratio	Lower	Upper
105	100		
120	23.8	5.8	45.8
77	10.6	0.0	34.8

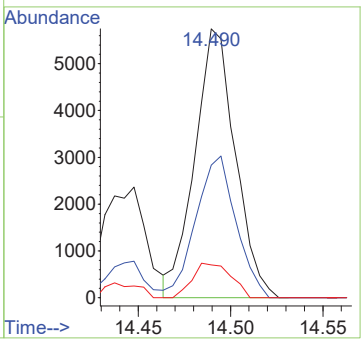


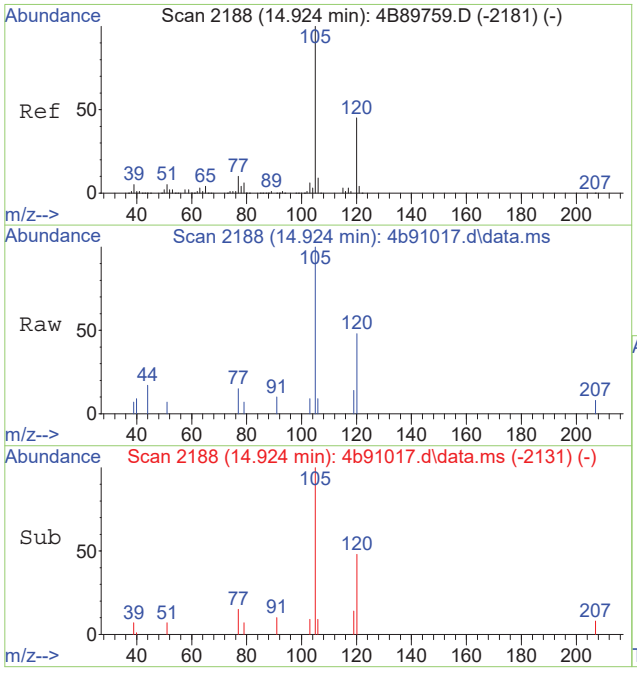


#107
1,3,5-trimethylbenzene
Concen: 0.73 ug/L
RT: 14.490 min Scan# 2105
Delta R.T. 0.000 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion:105 Resp: 8742

Ion	Ratio	Lower	Upper
105	100		
120	49.3	19.2	79.2
77	12.3	0.0	42.1

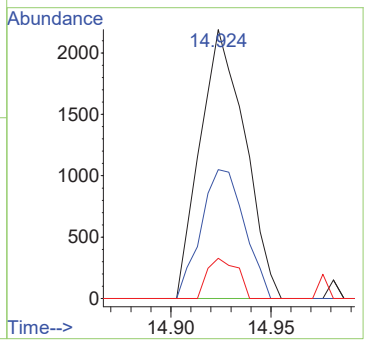


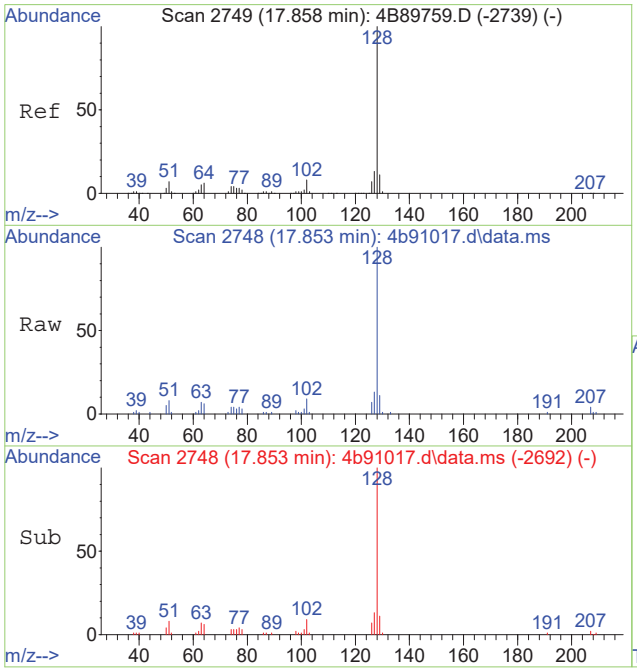


#109
1,2,4-trimethylbenzene
Concen: 0.29 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. 0.000 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion:105 Resp: 3421

Ion	Ratio	Lower	Upper
105	100		
120	47.9	16.3	76.3
77	14.9	0.0	41.8

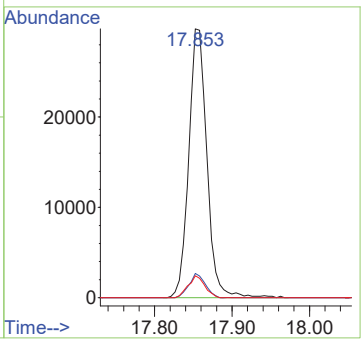




#123
naphthalene
Concen: 4.04 ug/L
RT: 17.853 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b91017.d
Acq: 24 May 2019 4:58 pm

Tgt Ion:128 Resp: 48486

Ion	Ratio	Lower	Upper
128	100		
102	9.1	0.0	37.6
51	8.2	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91023.d
Acq On : 24 May 2019 7:46 pm
Operator : CHELSEAS
Sample : jc88209-8 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,100
ALS Vial : 20 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:48:45 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

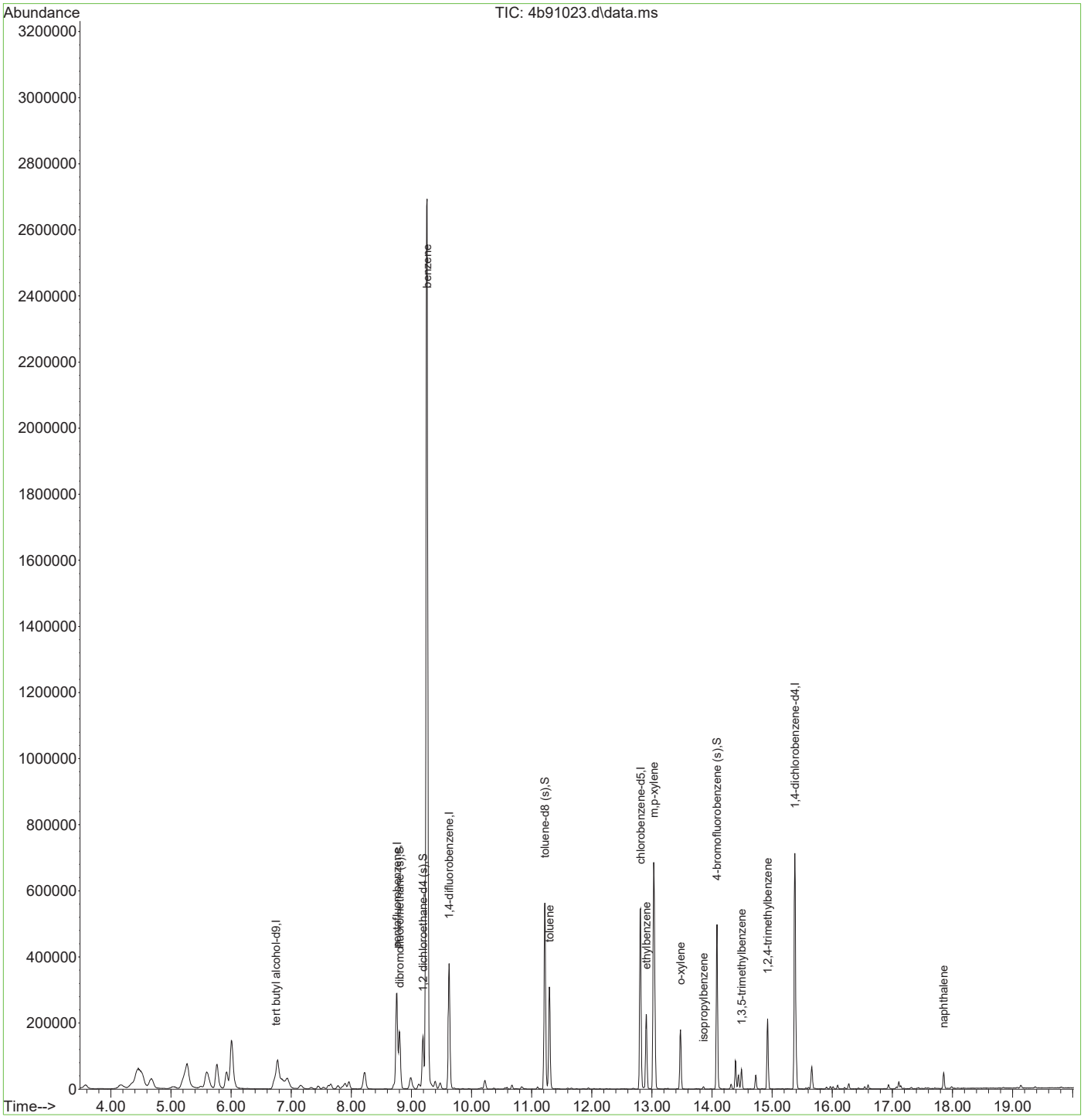
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.749	65	144897	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	246874	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	324967	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	311435	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	190394	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	114556	51.31	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.62%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	119246	55.65	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 111.30%			
76) toluene-d8 (s)	11.220	98	381184	48.63	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.26%			
99) 4-bromofluorobenzene (s)	14.081	95	161228	51.44	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.88%			
Target Compounds						Qvalue
58) benzene	9.259	78	2680194	242.87	ug/L	99
77) toluene	11.294	92	132868	20.47	ug/L	99
90) ethylbenzene	12.905	91	166284	13.05	ug/L	99
91) m,p-xylene	13.030	106	242810	50.20	ug/L	95
92) o-xylene	13.475	91	107792	9.98	ug/L	96
95) isopropylbenzene	13.857	105	4628	0.34	ug/L	95
107) 1,3,5-trimethylbenzene	14.489	105	32761	2.79	ug/L	99
109) 1,2,4-trimethylbenzene	14.923	105	115687	9.82	ug/L	99
123) naphthalene	17.852	128	39258	3.31	ug/L	99

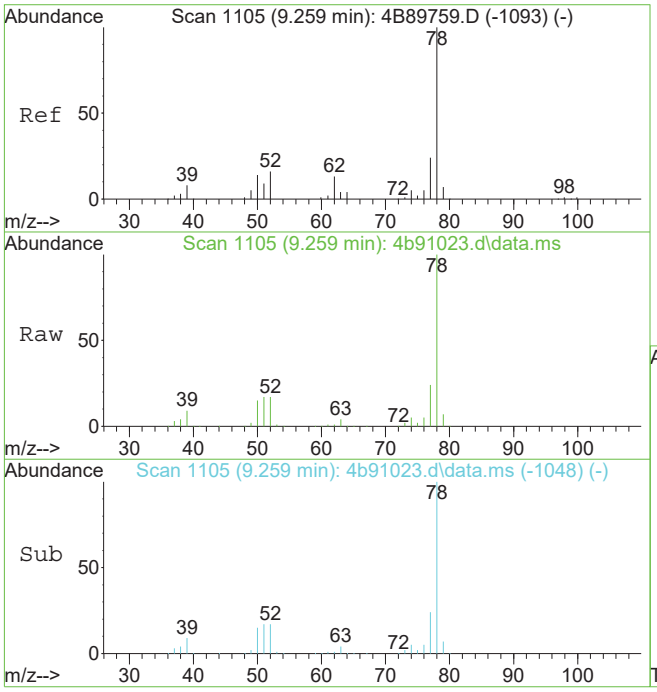
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : X:\voa-gcms\complete\2019\dayton201905\5-28-2019\kenrickb\v4b3857\
Data File : 4b91023.d
Acq On : 24 May 2019 7:46 pm
Operator : CHELSEAS
Sample : jc88209-8 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,100
ALS Vial : 20 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 31 04:48:45 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

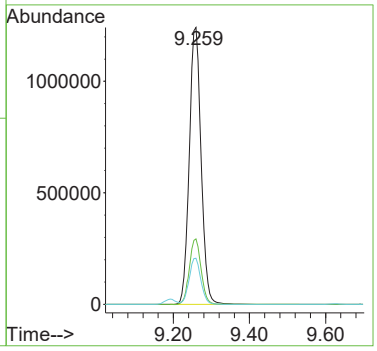


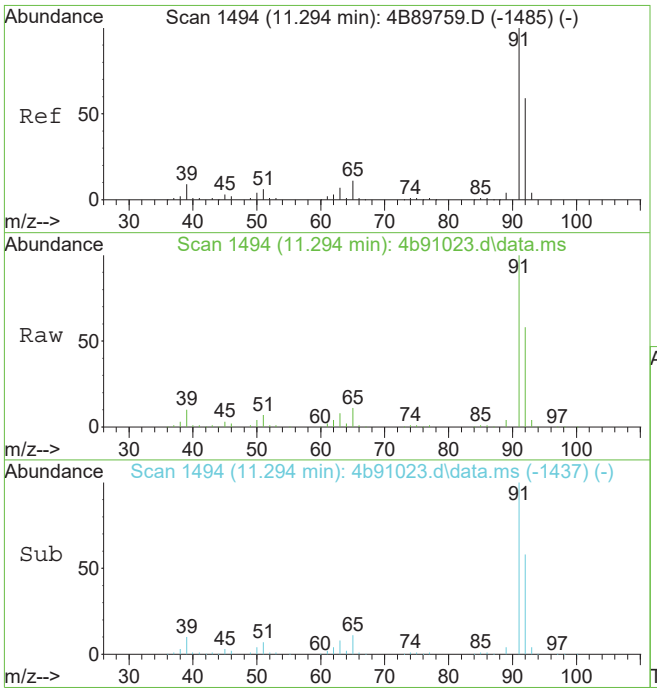


#58
benzene
Concen: 242.87 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion: 78 Resp: 2680194

Ion	Ratio	Lower	Upper
78	100		
77	23.7	0.0	53.9
51	16.6	0.0	47.3

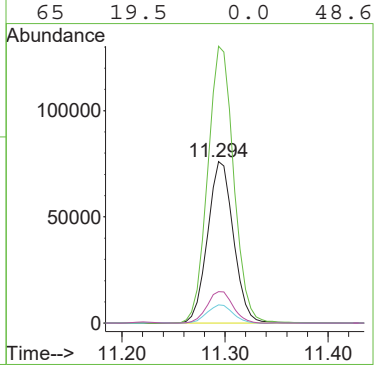


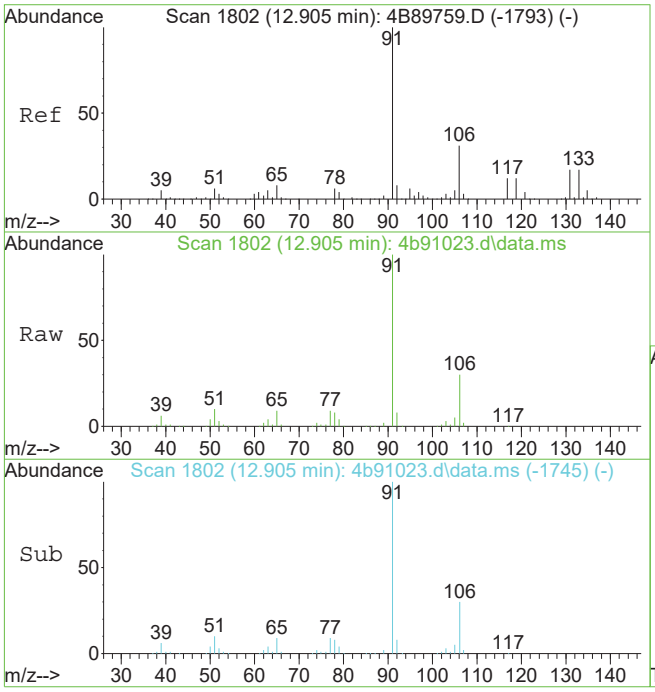


#77
toluene
Concen: 20.47 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion: 92 Resp: 132868

Ion	Ratio	Lower	Upper
92	100		
91	171.4	150.2	190.2
51	11.2	0.0	40.3
65	19.5	0.0	48.6

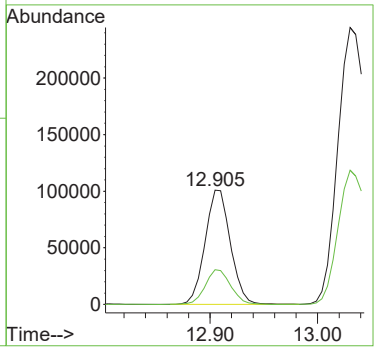


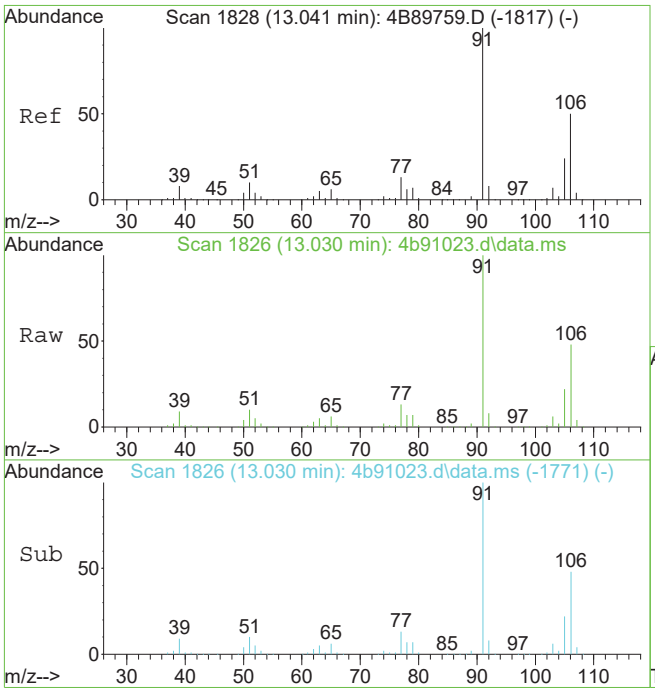


#90
ethylbenzene
Concen: 13.05 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion: 91 Resp: 166284

Ion	Ratio	Lower	Upper
91	100		
106	30.4	1.0	61.0

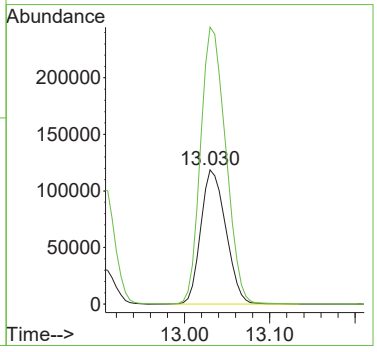


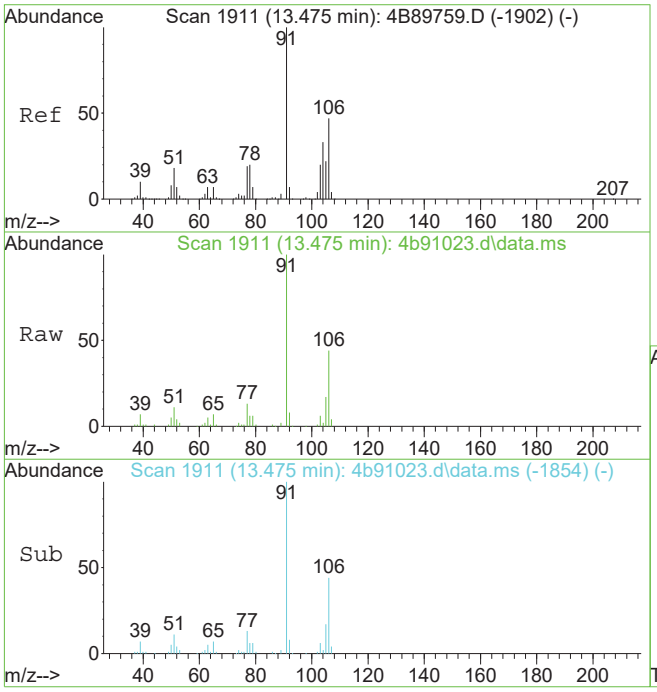


#91
m,p-xylene
Concen: 50.20 ug/L
RT: 13.030 min Scan# 1826
Delta R.T. -0.010 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion:106 Resp: 242810

Ion	Ratio	Lower	Upper
106	100		
91	206.2	169.3	229.3

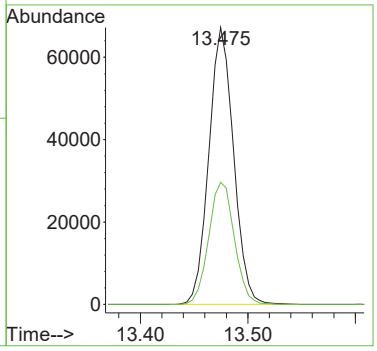


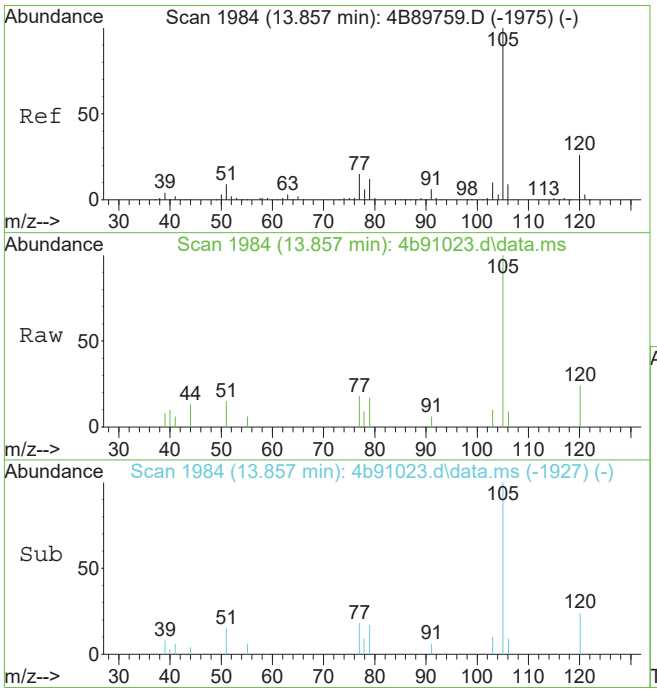


#92
o-xylene
Concen: 9.98 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion: 91 Resp: 107792

Ion	Ratio	Lower	Upper
91	100		
106	44.1	16.9	76.9

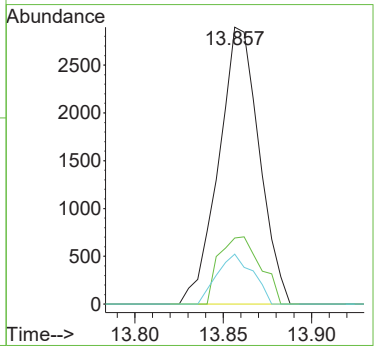


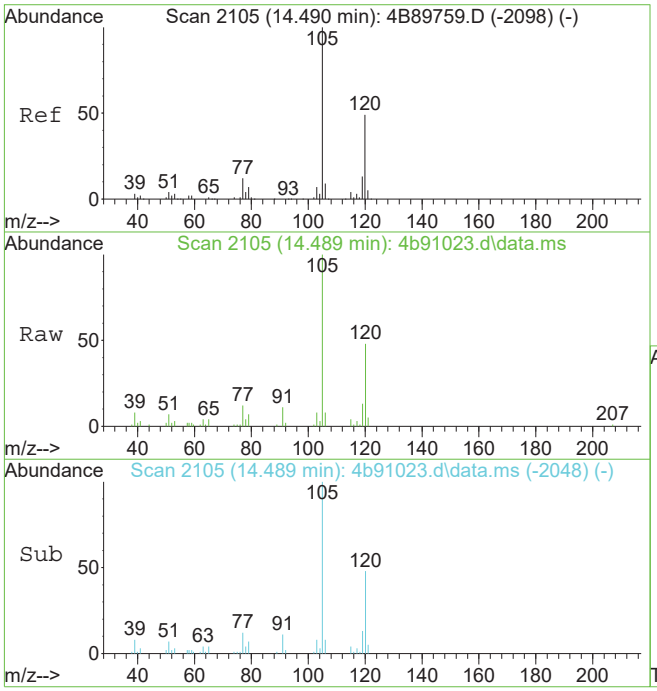


#95
isopropylbenzene
Concen: 0.34 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion:105 Resp: 4628

Ion	Ratio	Lower	Upper
105	100		
120	23.8	5.8	45.8
77	18.1	0.0	34.8

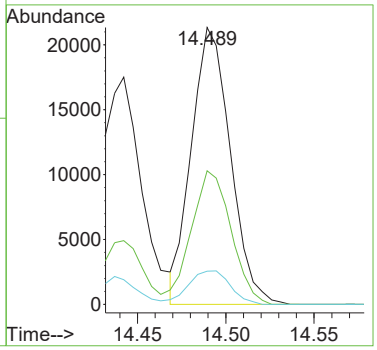


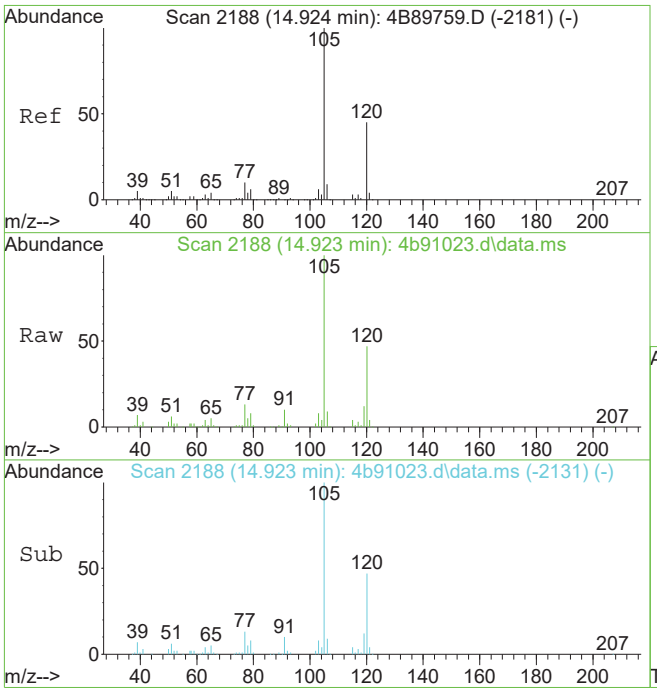


#107
1,3,5-trimethylbenzene
Concen: 2.79 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion:105 Resp: 32761

Ion	Ratio	Lower	Upper
105	100		
120	48.2	19.2	79.2
77	12.0	0.0	42.1

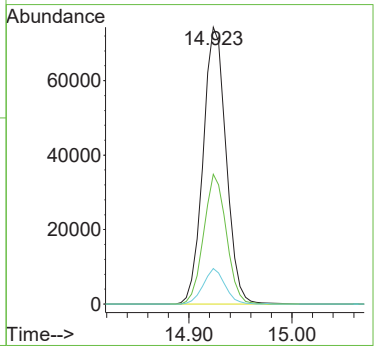


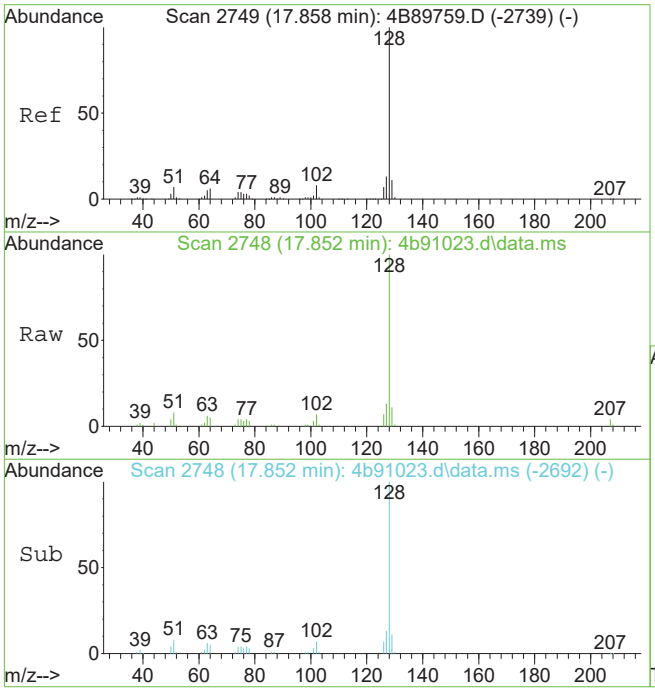


#109
1,2,4-trimethylbenzene
Concen: 9.82 ug/L
RT: 14.923 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion:105 Resp: 115687

Ion	Ratio	Lower	Upper
105	100		
120	46.9	16.3	76.3
77	12.8	0.0	41.8

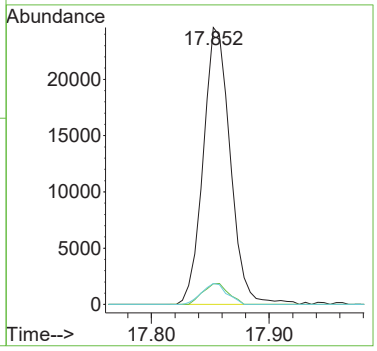




#123
naphthalene
Concen: 3.31 ug/L
RT: 17.852 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b91023.d
Acq: 24 May 2019 7:46 pm

Tgt Ion:128 Resp: 39258

Ion	Ratio	Lower	Upper
128	100		
102	7.5	0.0	37.6
51	7.5	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\May 28\v4b3857\
Data File : 4b91024.d
Acq On : 24 May 2019 8:14 pm
Operator : CHELSEAS
Sample : jc88209-8 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,1000
ALS Vial : 21 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 28 03:00:45 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

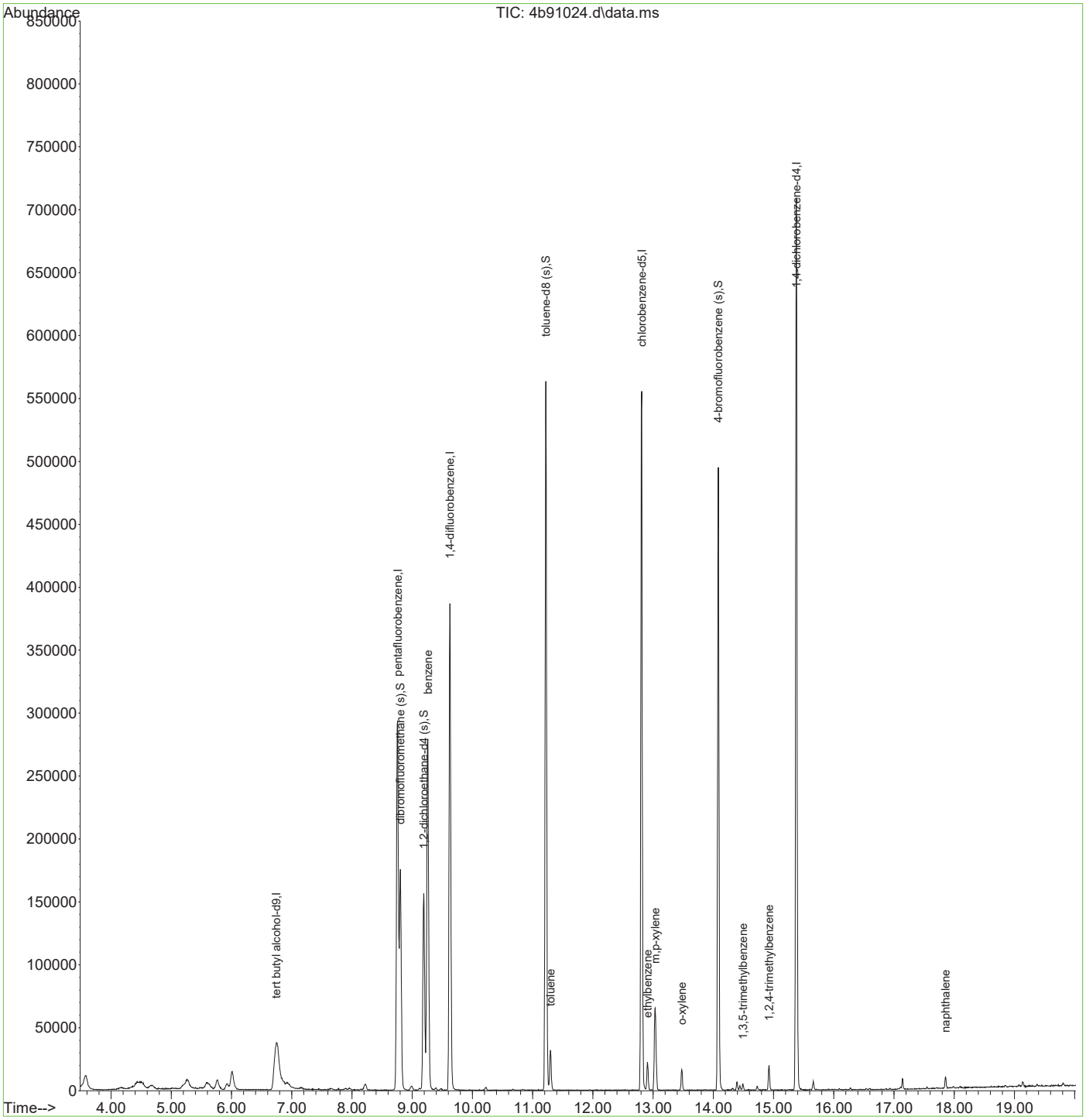
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.743	65	140701	500.00	ug/L	0.00
5) pentafluorobenzene	8.757	168	252912	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	332667	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	313384	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	192234	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	116969	51.14	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 102.28%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	120223	54.81	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 109.62%			
76) toluene-d8 (s)	11.220	98	382681	48.52	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.04%			
99) 4-bromofluorobenzene (s)	14.081	95	163662	51.72	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.44%			
Target Compounds						Qvalue
58) benzene	9.259	78	281823	24.95	ug/L	98
77) toluene	11.299	92	13832	2.12	ug/L	93
90) ethylbenzene	12.905	91	16548	1.29	ug/L	100
91) m,p-xylene	13.035	106	24502	5.03	ug/L	97
92) o-xylene	13.475	91	10109	0.93	ug/L	99
107) 1,3,5-trimethylbenzene	14.495	105	3272	0.28	ug/L	89
109) 1,2,4-trimethylbenzene	14.924	105	11481	0.96	ug/L	98
123) naphthalene	17.858	128	7605	0.64	ug/L	98

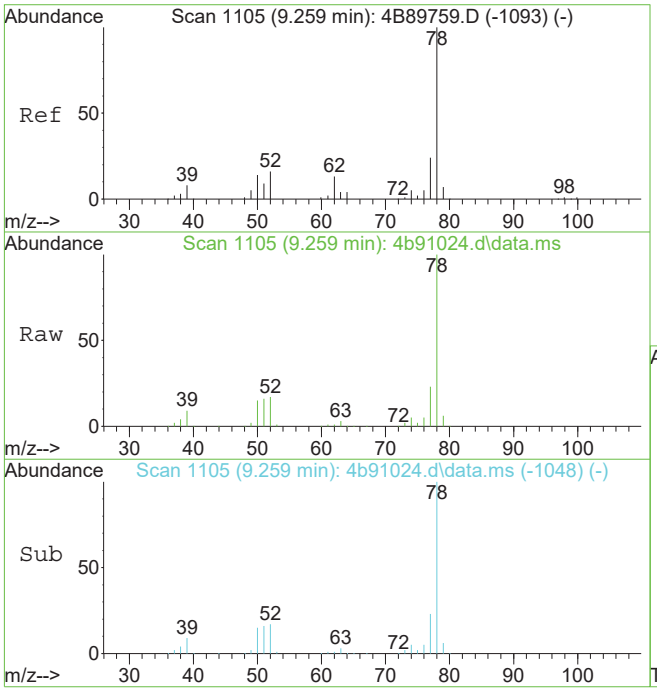
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\May 28\v4b3857\
Data File : 4b91024.d
Acq On : 24 May 2019 8:14 pm
Operator : CHELSEAS
Sample : jc88209-8 Inst : MS4B
Misc : MS34821,V4B3857,5,,,,1000
ALS Vial : 21 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 28 03:00:45 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

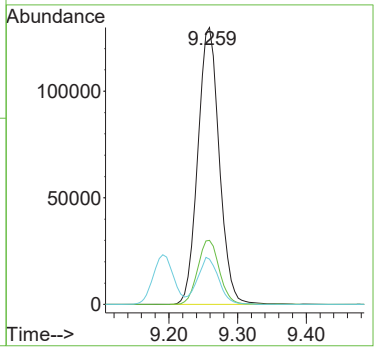


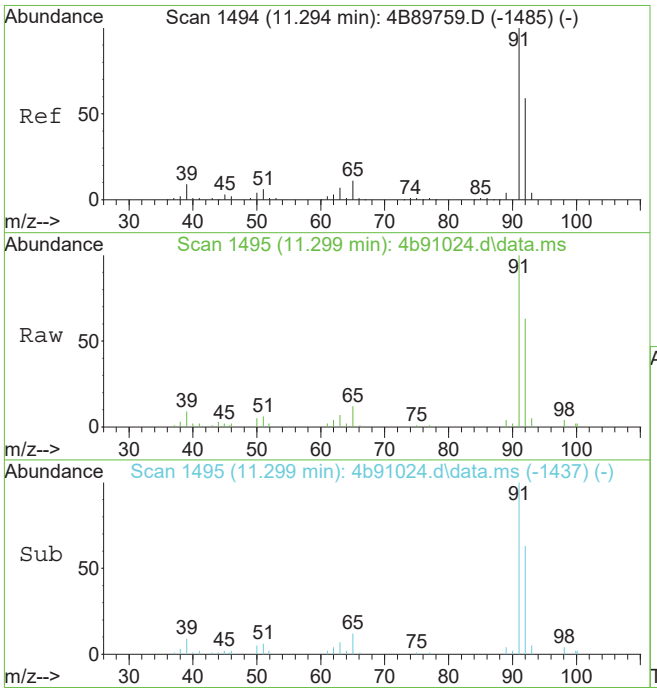


#58
benzene
Concen: 24.95 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion: 78 Resp: 281823

Ion	Ratio	Lower	Upper
78	100		
77	23.1	0.0	53.9
51	16.4	0.0	47.3

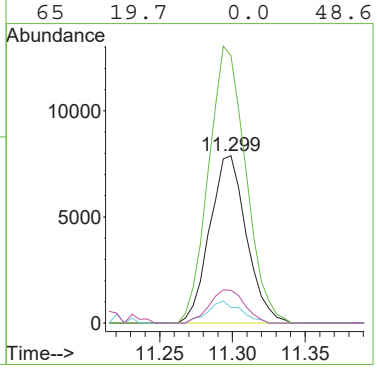


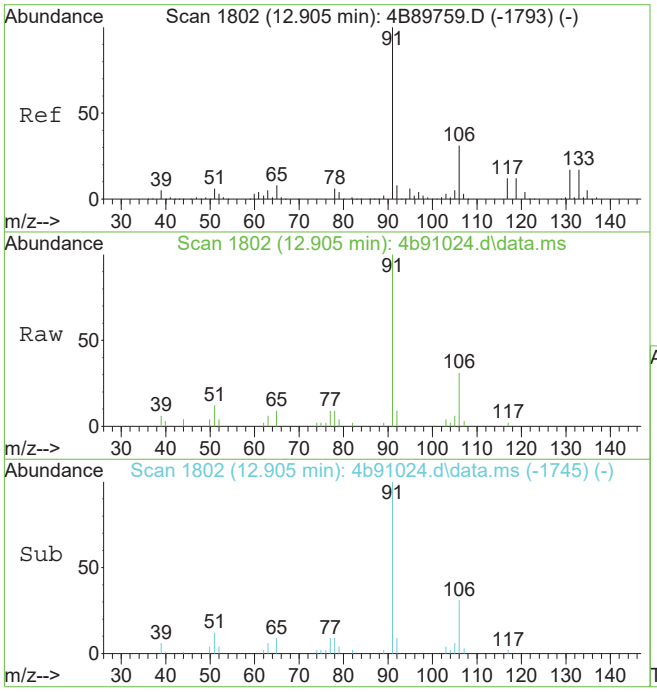


#77
toluene
Concen: 2.12 ug/L
RT: 11.299 min Scan# 1495
Delta R.T. 0.005 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion: 92 Resp: 13832

Ion	Ratio	Lower	Upper
92	100		
91	159.8	150.2	190.2
51	9.4	0.0	40.3
65	19.7	0.0	48.6

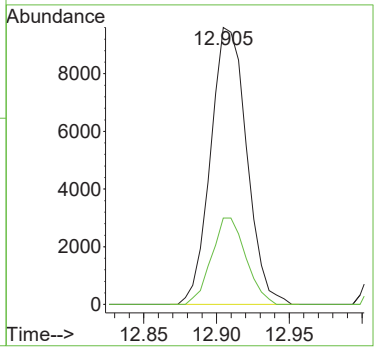


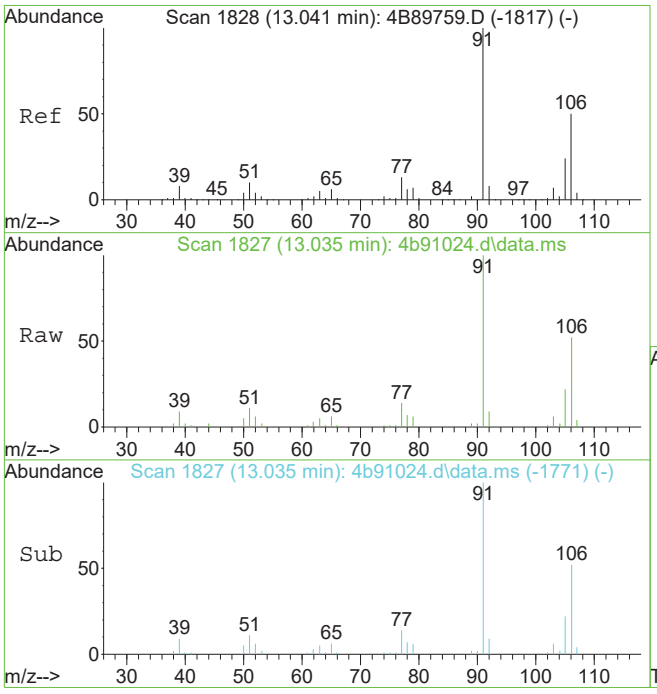


#90
ethylbenzene
Concen: 1.29 ug/L
RT: 12.905 min Scan# 1802
Delta R.T. -0.000 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion: 91 Resp: 16548

Ion	Ratio	Lower	Upper
91	100		
106	31.2	1.0	61.0

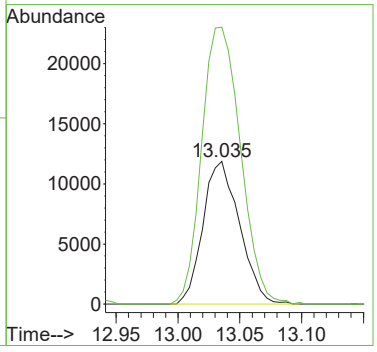


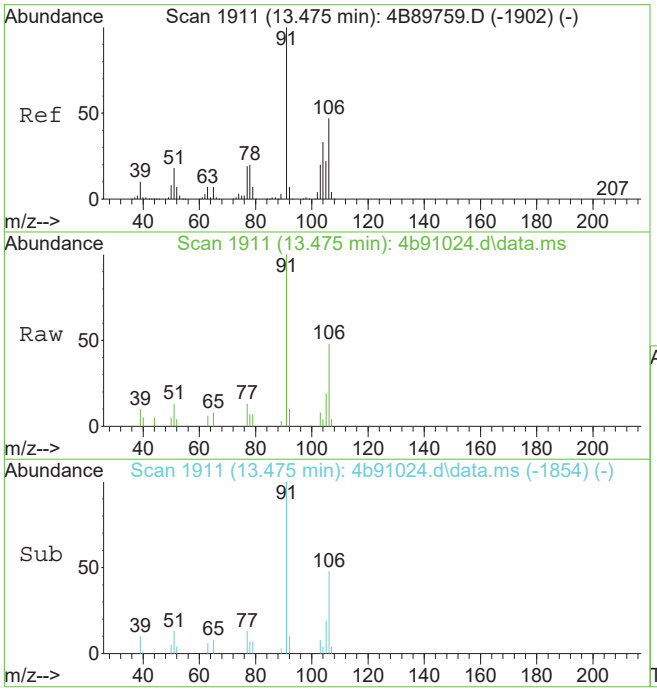


#91
m,p-xylene
Concen: 5.03 ug/L
RT: 13.035 min Scan# 1827
Delta R.T. -0.005 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion:106 Resp: 24502

Ion	Ratio	Lower	Upper
106	100		
91	194.1	169.3	229.3

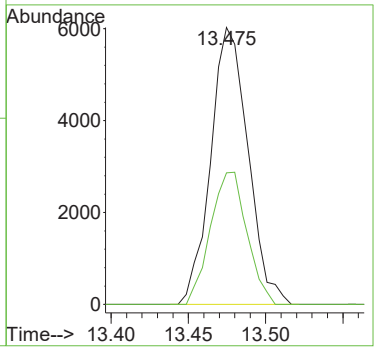


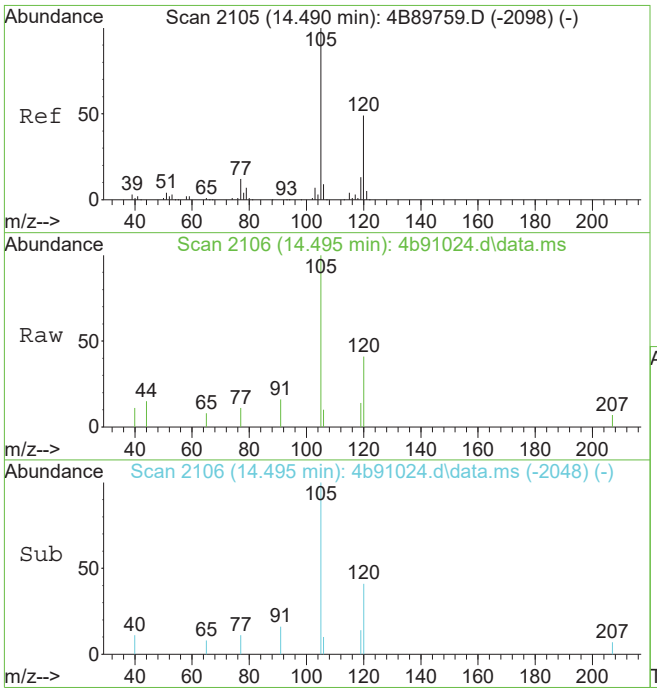


#92
o-xylene
Concen: 0.93 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion: 91 Resp: 10109

Ion	Ratio	Lower	Upper
91	100		
106	47.5	16.9	76.9

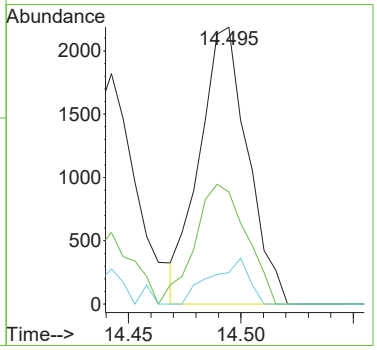


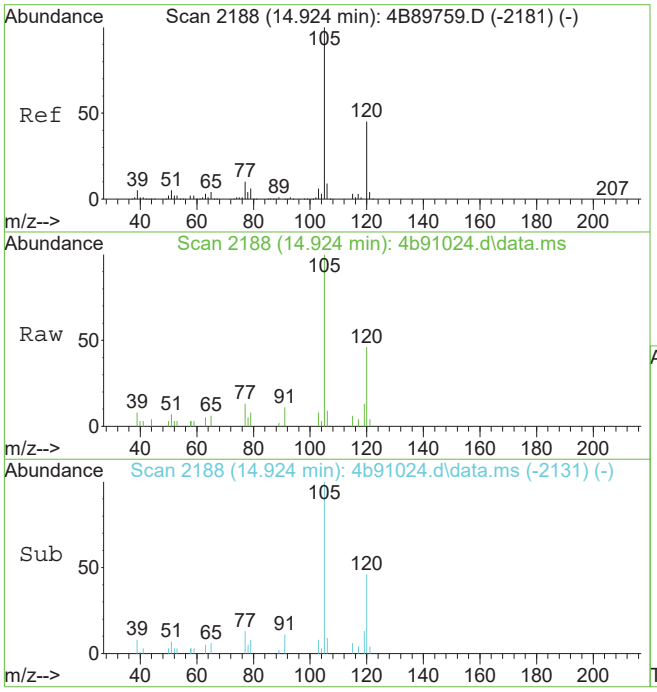


#107
1,3,5-trimethylbenzene
Concen: 0.28 ug/L
RT: 14.495 min Scan# 2106
Delta R.T. 0.005 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion:105 Resp: 3272

Ion	Ratio	Lower	Upper
105	100		
120	40.5	19.2	79.2
77	11.3	0.0	42.1

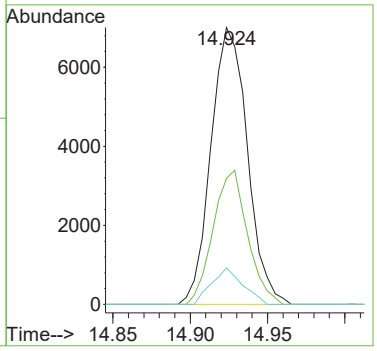


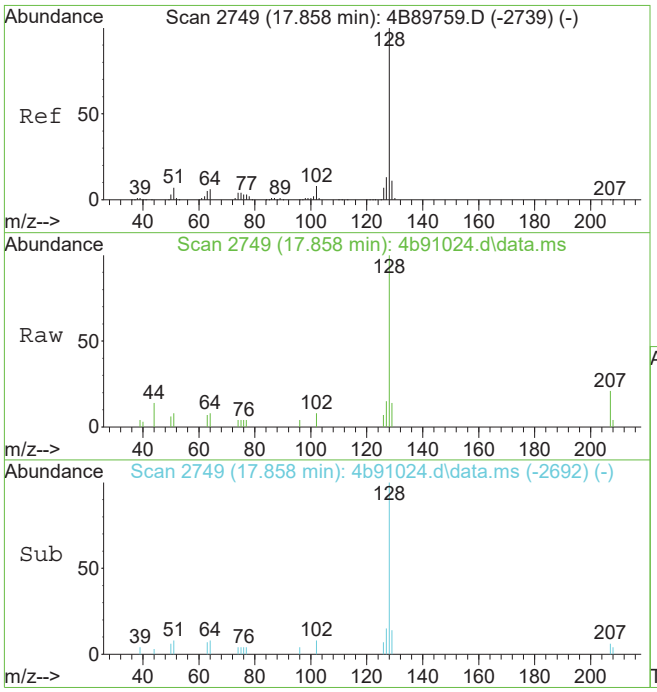


#109
1,2,4-trimethylbenzene
Concen: 0.96 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion:105 Resp: 11481

Ion	Ratio	Lower	Upper
105	100		
120	45.5	16.3	76.3
77	13.1	0.0	41.8

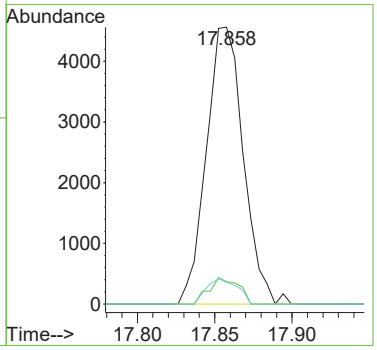




#123
naphthalene
Concen: 0.64 ug/L
RT: 17.858 min Scan# 2749
Delta R.T. -0.000 min
Lab File: 4b91024.d
Acq: 24 May 2019 8:14 pm

Tgt Ion:128 Resp: 7605

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.6
51	7.8	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181603.d
Acq On : 28 May 2019 11:53 am
Operator : jessicap
Sample : JC88209-8 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,50
ALS Vial : 10 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:16:08 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

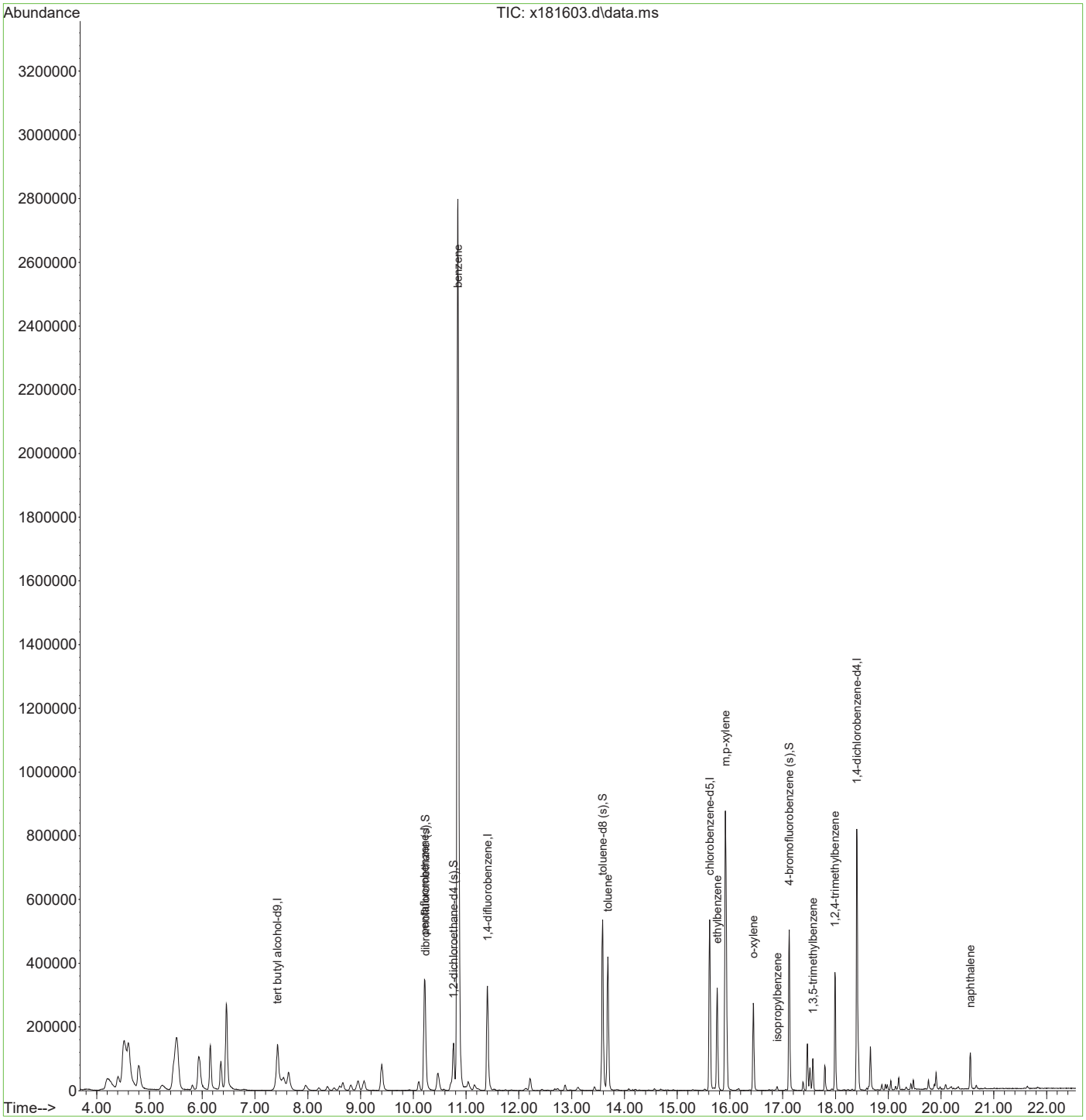
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	7.419	65	195997	500.00	ug/L	0.02
5) pentafluorobenzene	10.212	168	258625	50.00	ug/L	0.02
53) 1,4-difluorobenzene	11.405	114	350558	50.00	ug/L	0.02
74) chlorobenzene-d5	15.615	117	356407	50.00	ug/L	0.01
97) 1,4-dichlorobenzene-d4	18.403	152	218748	50.00	ug/L	0.01
System Monitoring Compounds						
44) dibromofluoromethane (s)	10.228	113	112734	53.57	ug/L	0.02
Spiked Amount 50.000	Range 80 - 120		Recovery = 107.14%			
54) 1,2-dichloroethane-d4 (s)	10.762	65	115928	50.13	ug/L	0.02
Spiked Amount 50.000	Range 81 - 124		Recovery = 100.26%			
75) toluene-d8 (s)	13.586	98	432889	50.67	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 101.34%			
98) 4-bromofluorobenzene (s)	17.122	95	175222	48.90	ug/L	0.01
Spiked Amount 50.000	Range 80 - 120		Recovery = 97.80%			
Target Compounds						Qvalue
58) benzene	10.845	78	3478984	427.68	ug/L	99
76) toluene	13.685	92	217872	41.13	ug/L	100
89) ethylbenzene	15.756	91	268387	27.08	ug/L	98
90) m,p-xylene	15.913	106	379255	95.92	ug/L	99
91) o-xylene	16.442	91	178257	19.63	ug/L	96
95) isopropylbenzene	16.897	105	8660	0.74	ug/L	98
106) 1,3,5-trimethylbenzene	17.571	105	55871	5.56	ug/L	98
108) 1,2,4-trimethylbenzene	17.990	105	198018	18.89	ug/L	99
119) naphthalene	20.553	128	91334	5.71	ug/L	98

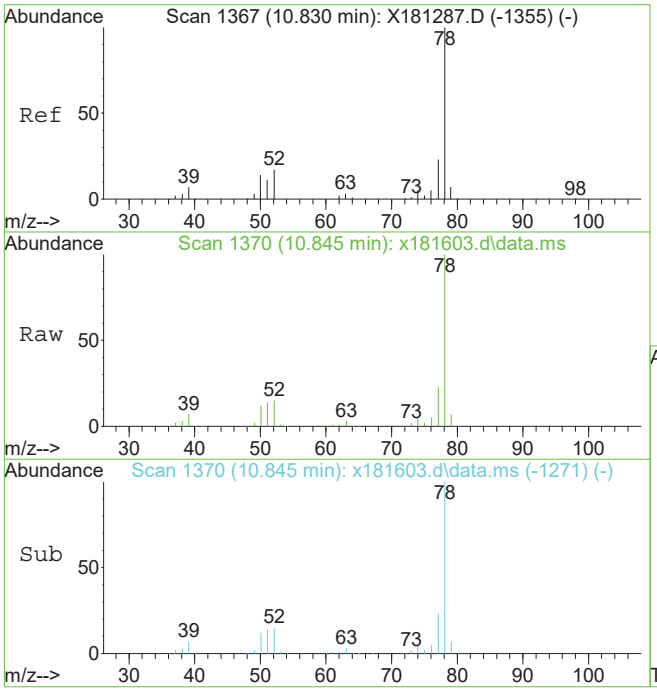
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\kenrickb\may 29\vx7769\
Data File : x181603.d
Acq On : 28 May 2019 11:53 am
Operator : jessicap
Sample : JC88209-8 Inst : ACC-VOA-MSX
Misc : MS34821,VX7769,5,,,,50
ALS Vial : 10 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\MX7749.M
Quant Results File: MX7749.RES
Quant Time: May 28 23:16:08 2019
Quant Title : Method 8260C, Rxi-624 (60m x 0.25mm x 1.4um)
QLast Update : Thu May 09 14:26:25 2019
Response via : Initial Calibration

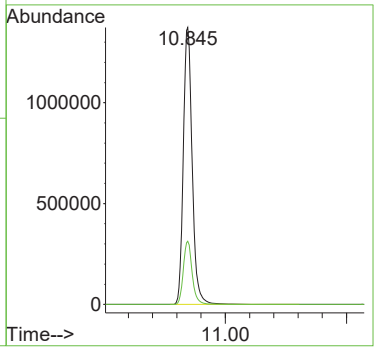


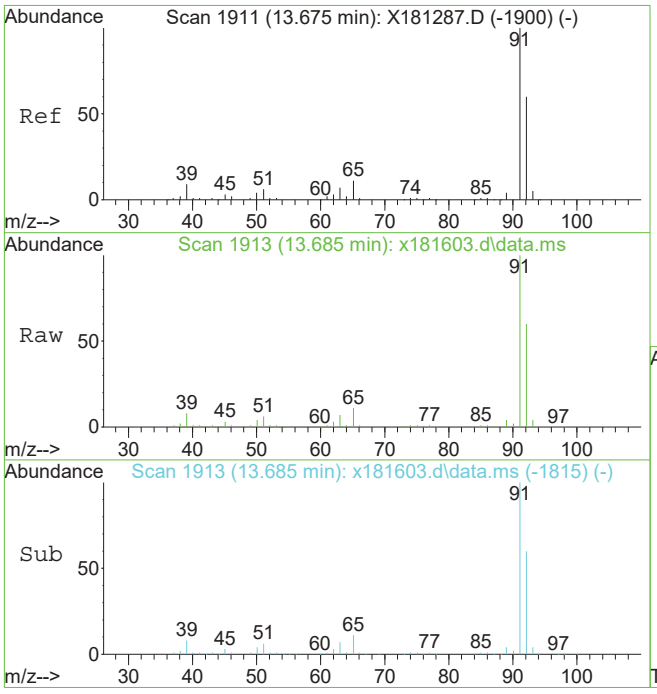


#58
benzene
Concen: 427.68 ug/L
RT: 10.845 min Scan# 1370
Delta R.T. 0.016 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion: 78 Resp: 3478984

Ion	Ratio	Lower	Upper
78	100		
77	22.8	0.0	53.2

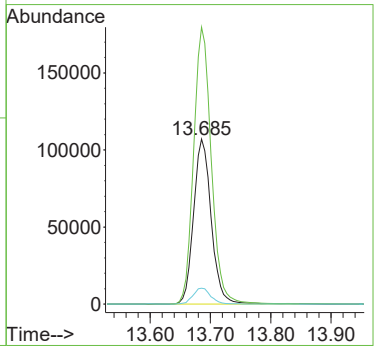


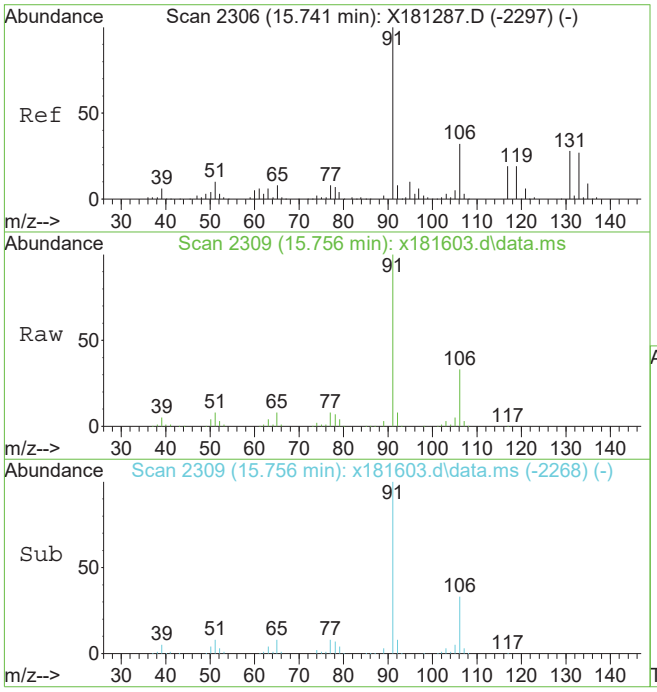


#76
toluene
Concen: 41.13 ug/L
RT: 13.685 min Scan# 1913
Delta R.T. 0.010 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion: 92 Resp: 217872

Ion	Ratio	Lower	Upper
92	100		
91	167.9	147.8	187.8
51	9.7	0.0	30.8

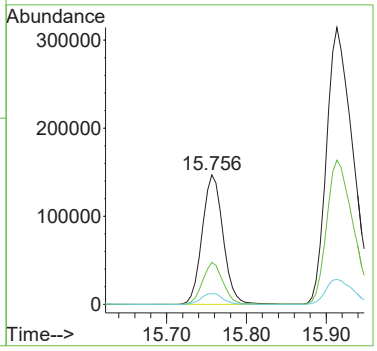


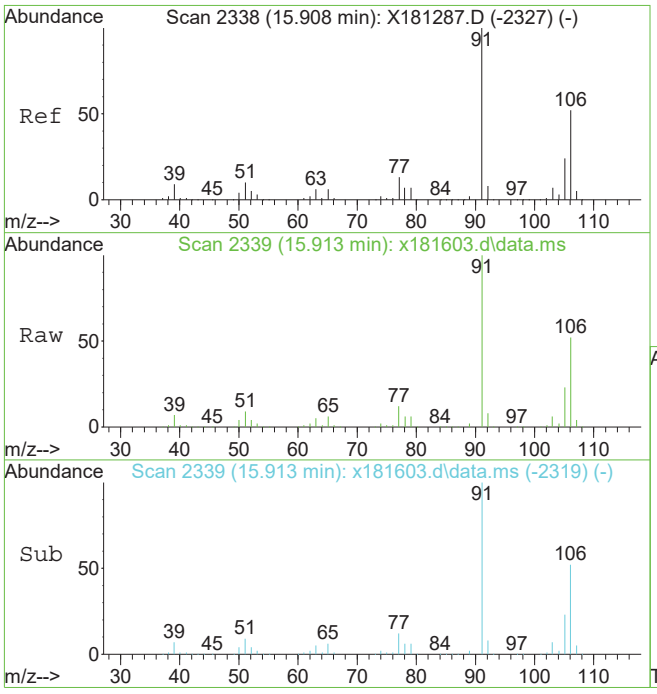


#89
ethylbenzene
Concen: 27.08 ug/L
RT: 15.756 min Scan# 2309
Delta R.T. 0.016 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion: 91 Resp: 268387

Ion	Ratio	Lower	Upper
91	100		
106	32.6	2.2	62.2
51	8.2	0.0	40.0

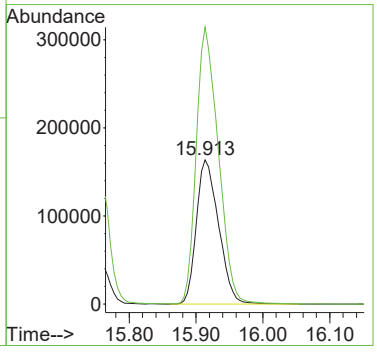


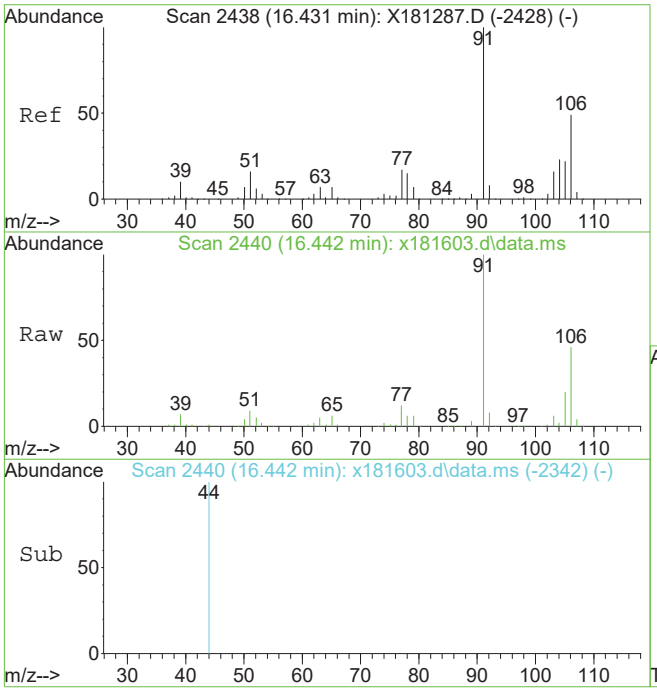


#90
m,p-xylene
Concen: 95.92 ug/L
RT: 15.913 min Scan# 2339
Delta R.T. 0.005 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion:106 Resp: 379255

Ion	Ratio	Lower	Upper
106	100		
91	191.7	163.1	223.1

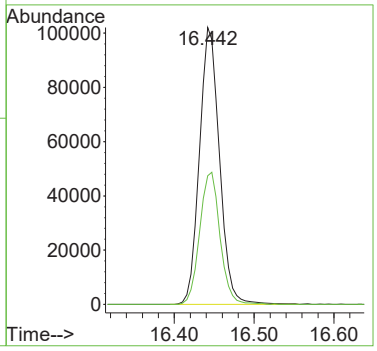


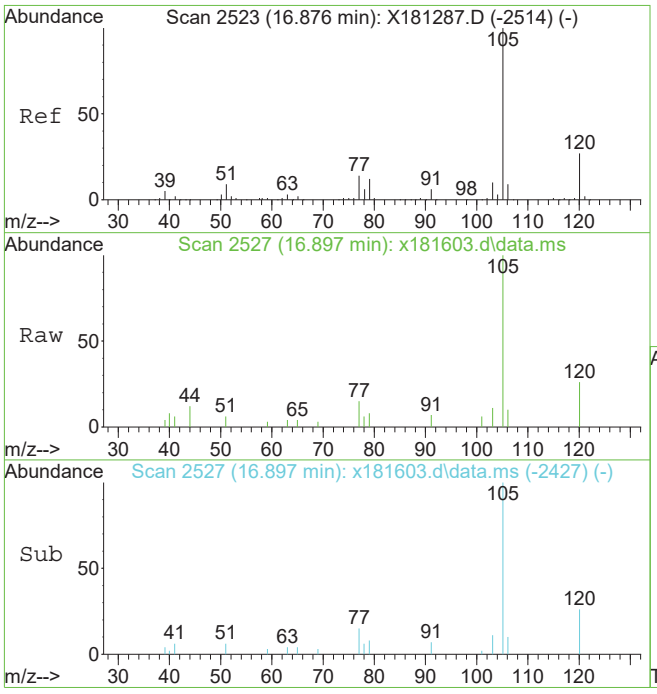


#91
o-xylene
Concen: 19.63 ug/L
RT: 16.442 min Scan# 2440
Delta R.T. 0.011 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion: 91 Resp: 178257

Ion	Ratio	Lower	Upper
91	100		
106	46.4	18.9	78.9

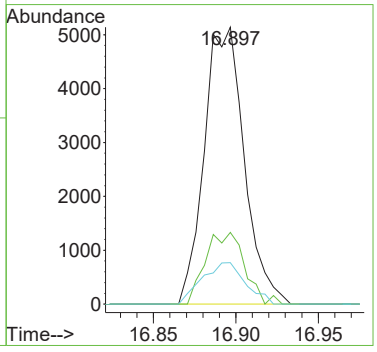


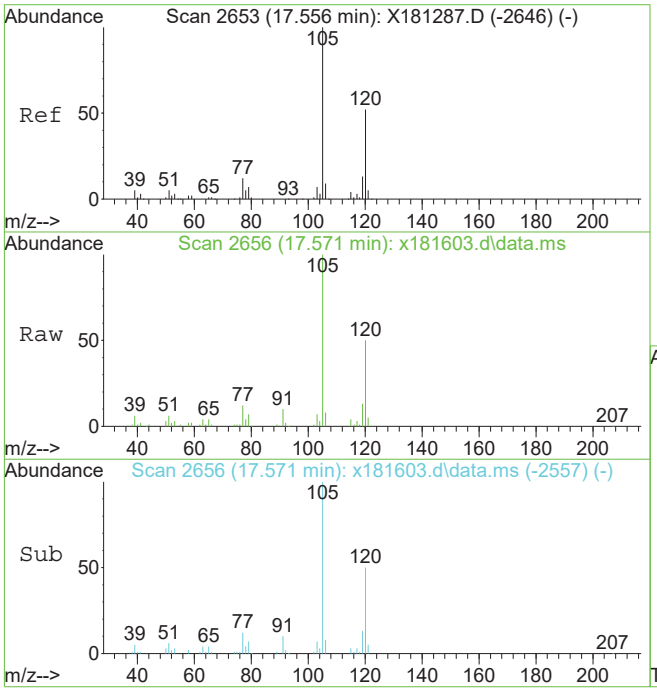


#95
isopropylbenzene
Concen: 0.74 ug/L
RT: 16.897 min Scan# 2527
Delta R.T. 0.022 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion:105 Resp: 8660

Ion	Ratio	Lower	Upper
105	100		
120	25.9	6.9	46.9
77	15.0	0.0	34.4

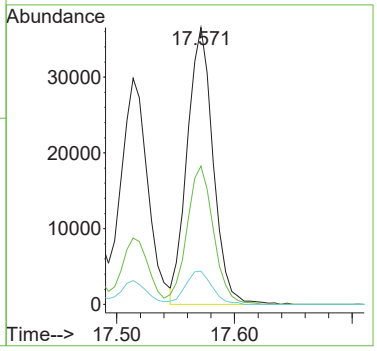


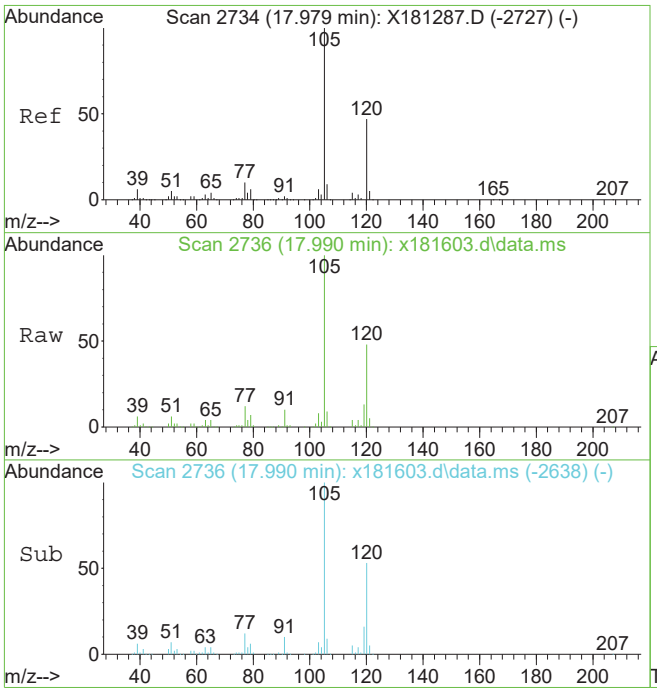


#106
1,3,5-trimethylbenzene
Concen: 5.56 ug/L
RT: 17.571 min Scan# 2656
Delta R.T. 0.016 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion:105 Resp: 55871

Ion	Ratio	Lower	Upper
105	100		
120	50.0	21.7	81.7
77	12.0	0.0	42.1

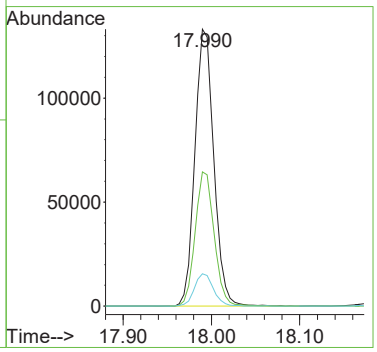


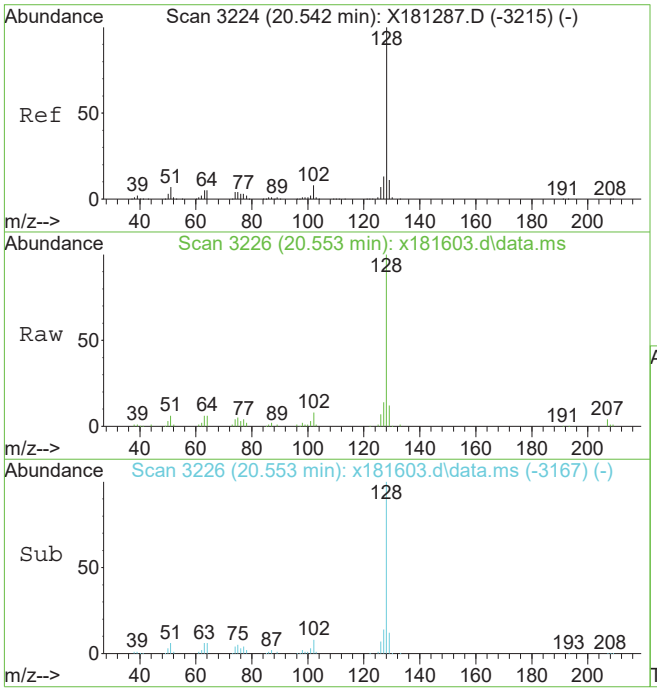


#108
1,2,4-trimethylbenzene
Concen: 18.89 ug/L
RT: 17.990 min Scan# 2736
Delta R.T. 0.011 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion:105 Resp: 198018

Ion	Ratio	Lower	Upper
105	100		
120	48.4	18.0	78.0
77	11.7	0.0	41.6

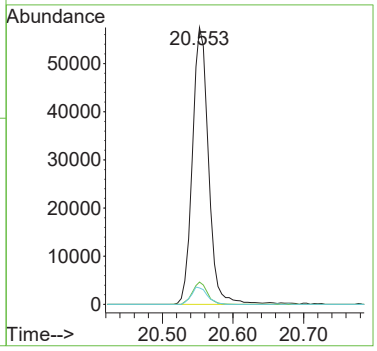




#119
naphthalene
Concen: 5.71 ug/L
RT: 20.553 min Scan# 3226
Delta R.T. 0.011 min
Lab File: x181603.d
Acq: 28 May 2019 11:53 am

Tgt Ion:128 Resp: 91334

Ion	Ratio	Lower	Upper
128	100		
102	8.1	0.0	37.7
51	5.9	0.0	36.7



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90963.d
Acq On : 23 May 2019 12:17 pm
Operator : CHELSEAS
Sample : jc88209-9 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 12 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:15:40 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

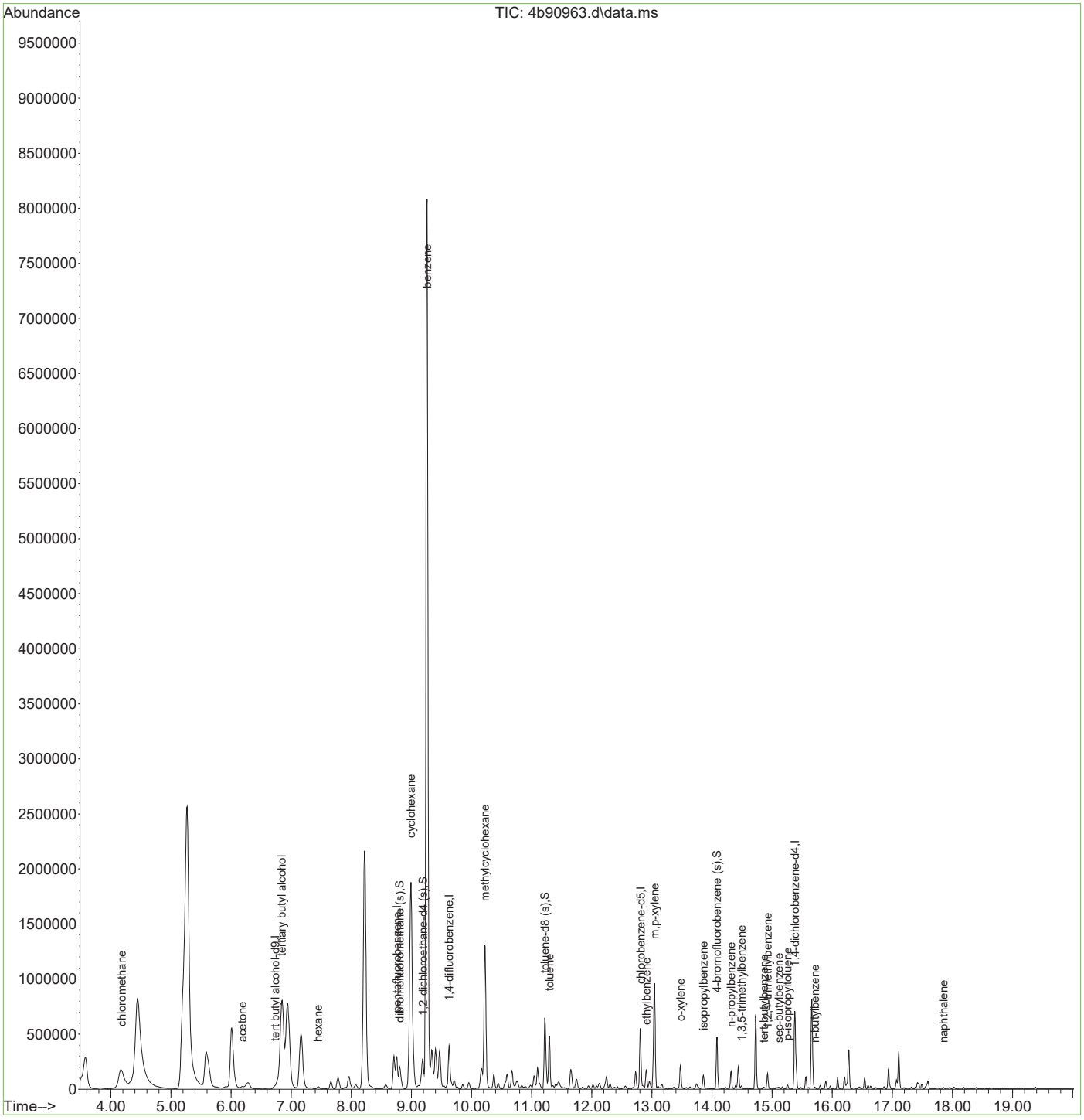
Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.733	65	134390	500.00	ug/L	-0.02
5) pentafluorobenzene	8.757	168	236988	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	323541	50.00	ug/L	0.00
75) chlorobenzene-d5	12.811	117	307320	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	183185	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	114900	53.62	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 107.24%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	117879	55.25	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 110.50%			
76) toluene-d8 (s)	11.221	98	387398	50.09	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 100.18%			
99) 4-bromofluorobenzene (s)	14.081	95	157575	52.25	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 104.50%			
Target Compounds						Qvalue
3) tertiary butyl alcohol	6.843	59	5153	13.56	ug/L	# 1
8) chloromethane	4.181	50	8361	1.53	ug/L	70
20) acetone	6.184	58	18540	76.48	ug/L	93
28) hexane	7.444	56	10715	4.79	ug/L	81
48) cyclohexane	8.992	84	1026429	232.55	ug/L	94
58) benzene	9.259	78	8541703	777.42	ug/L	100
66) methylcyclohexane	10.222	83	621890	111.88	ug/L	98
77) toluene	11.294	92	171608	26.79	ug/L	98
90) ethylbenzene	12.910	91	126120	10.03	ug/L	99
91) m,p-xylene	13.046	106	322194	67.50	ug/L	96
92) o-xylene	13.475	91	119395	11.20	ug/L	99
95) isopropylbenzene	13.857	105	75174	5.57	ug/L	98
104) n-propylbenzene	14.317	91	119319	7.93	ug/L	98
107) 1,3,5-trimethylbenzene	14.489	105	13250	1.17	ug/L	94
108) tert-butylbenzene	14.866	119	6263	0.65	ug/L	97
109) 1,2,4-trimethylbenzene	14.924	105	75656	6.67	ug/L	98
110) sec-butylbenzene	15.112	105	11753	0.80	ug/L	94
111) p-isopropyltoluene	15.258	119	17097	1.37	ug/L	97
116) n-butylbenzene	15.713	92	4609	0.76	ug/L	94
123) naphthalene	17.852	128	10701	0.94	ug/L	98

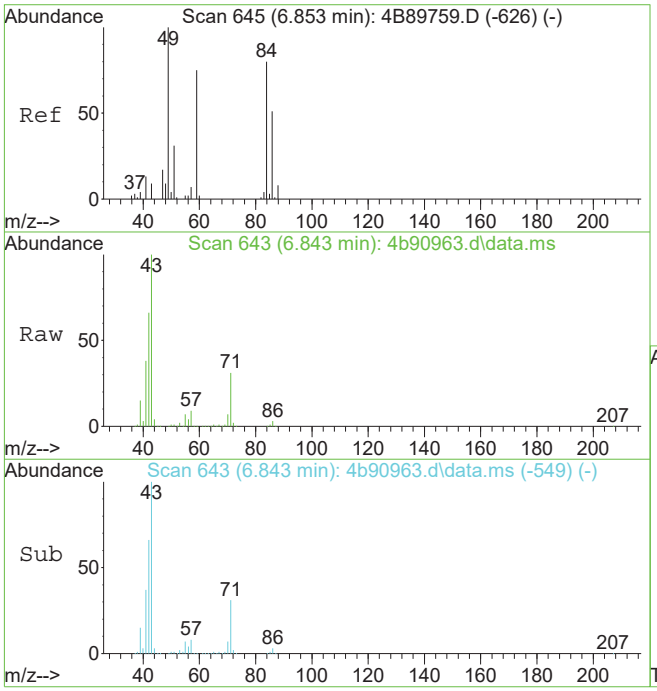
(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90963.d
Acq On : 23 May 2019 12:17 pm
Operator : CHELSEAS
Sample : jc88209-9 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,1
ALS Vial : 12 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:15:40 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

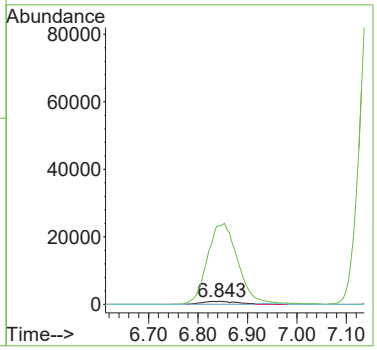


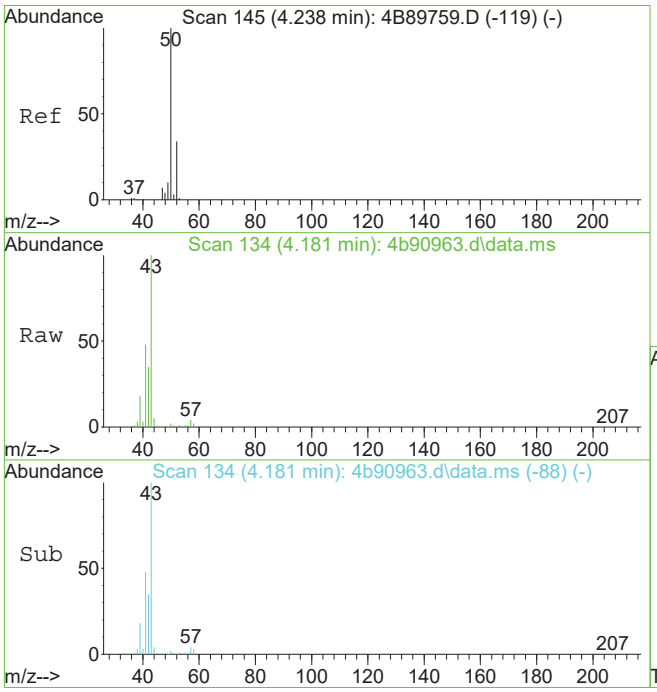


#3
tertiary butyl alcohol
Concen: 13.56 ug/L
RT: 6.843 min Scan# 643
Delta R.T. -0.011 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 59 Resp: 5153

Ion	Ratio	Lower	Upper
59	100		
57	2348.3	0.0	39.9#
60	0.0	0.0	33.3

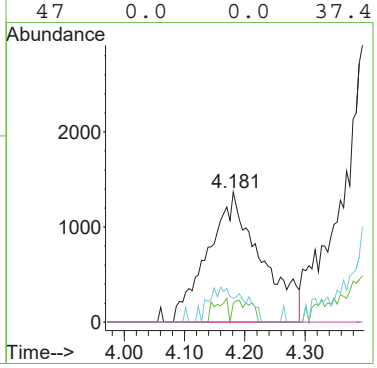


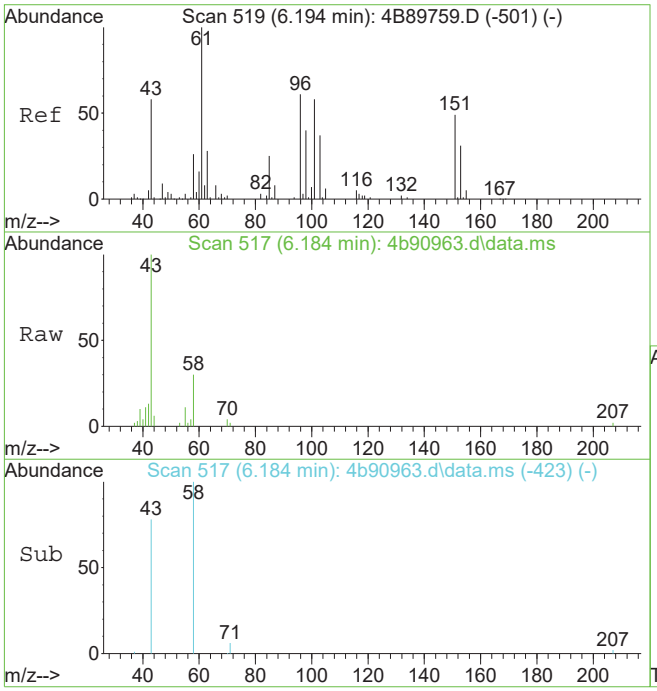


#8
chloromethane
Concen: 1.53 ug/L
RT: 4.181 min Scan# 134
Delta R.T. -0.057 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 50 Resp: 8361

Ion	Ratio	Lower	Upper
50	100		
52	14.3	4.1	64.1
49	18.3	0.0	40.3
47	0.0	0.0	37.4

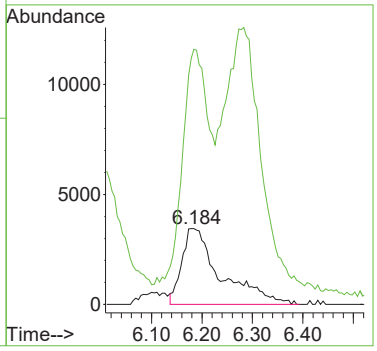


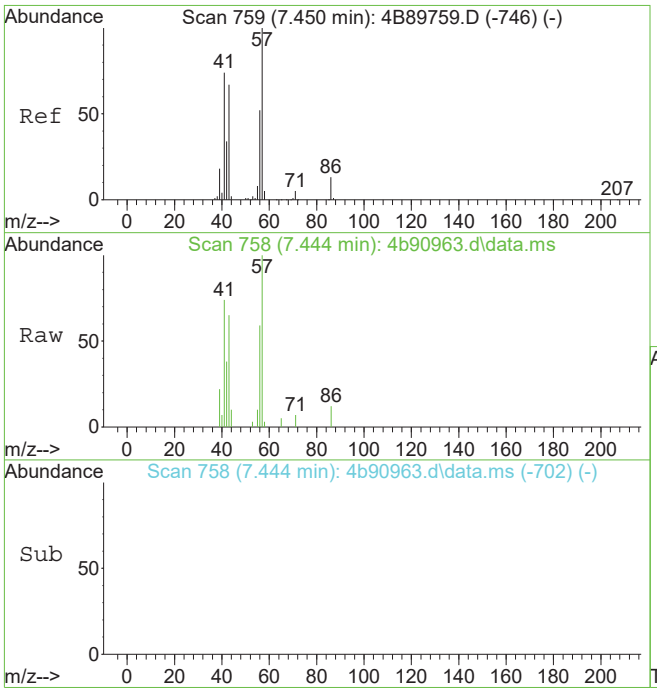


#20
acetone
Concen: 76.48 ug/L
RT: 6.184 min Scan# 517
Delta R.T. -0.010 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 58 Resp: 18540

Ion	Ratio	Lower	Upper
58	100		
43	307.2	263.3	323.3

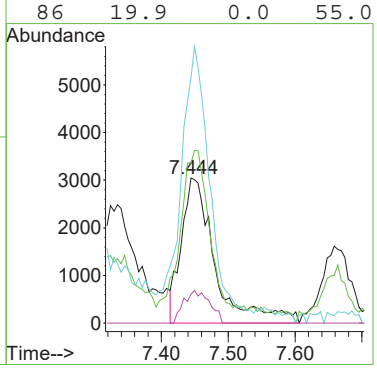


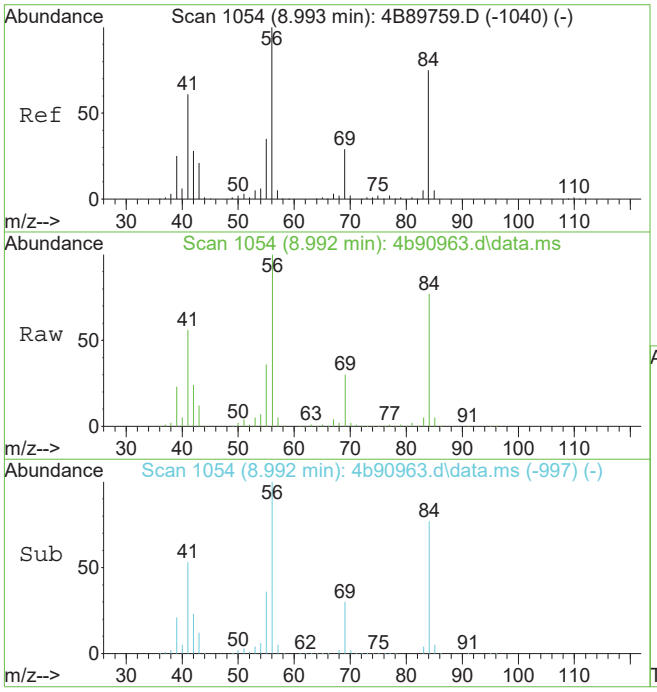


#28
hexane
Concen: 4.79 ug/L
RT: 7.444 min Scan# 758
Delta R.T. -0.005 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 56 Resp: 10715

Ion	Ratio	Lower	Upper
56	100		
43	102.2	98.3	158.3
57	163.9	160.8	220.8
86	19.9	0.0	55.0

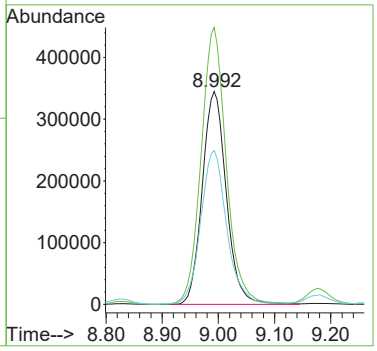


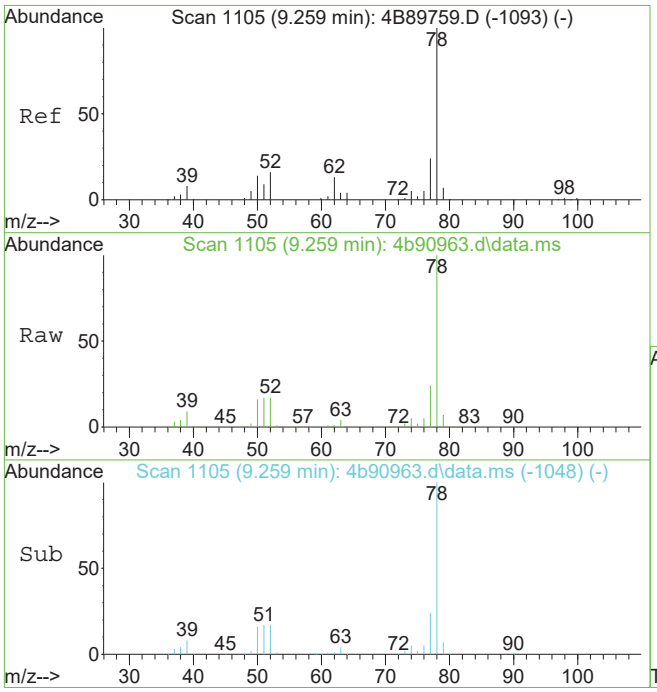


#48
cyclohexane
Concen: 232.55 ug/L
RT: 8.992 min Scan# 1054
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 84 Resp: 1026429

Ion	Ratio	Lower	Upper
84	100		
56	129.9	102.8	162.8
41	71.9	51.7	111.7

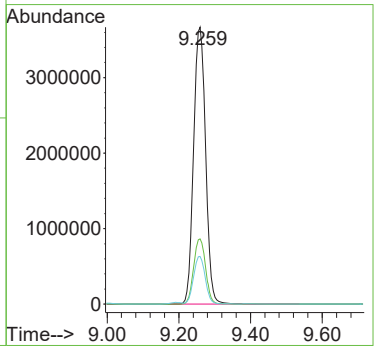


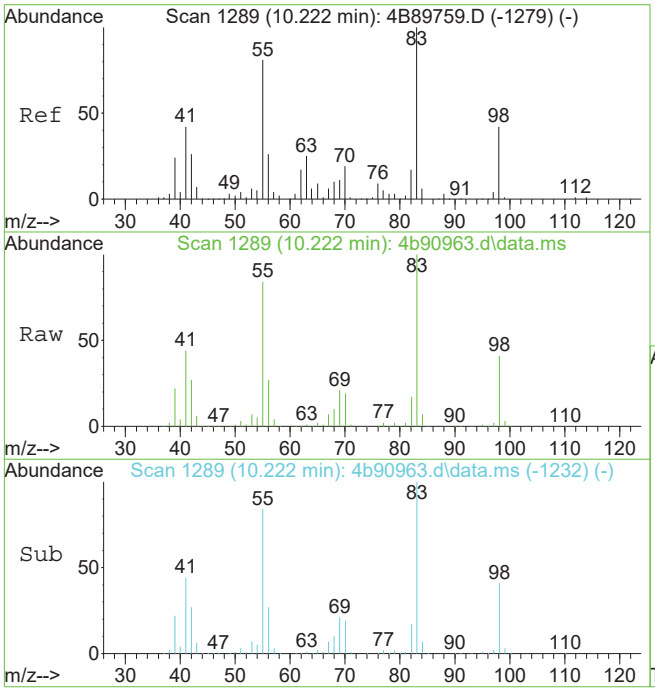


#58
benzene
Concen: 777.42 ug/L
RT: 9.259 min Scan# 1105
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 78 Resp: 8541703

Ion	Ratio	Lower	Upper
78	100		
77	23.6	0.0	53.9
51	17.2	0.0	47.3

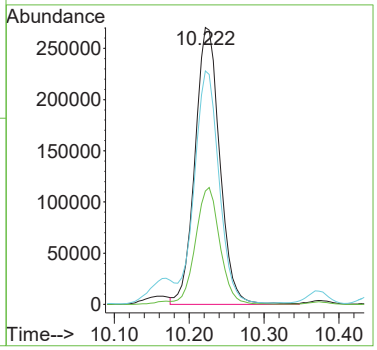


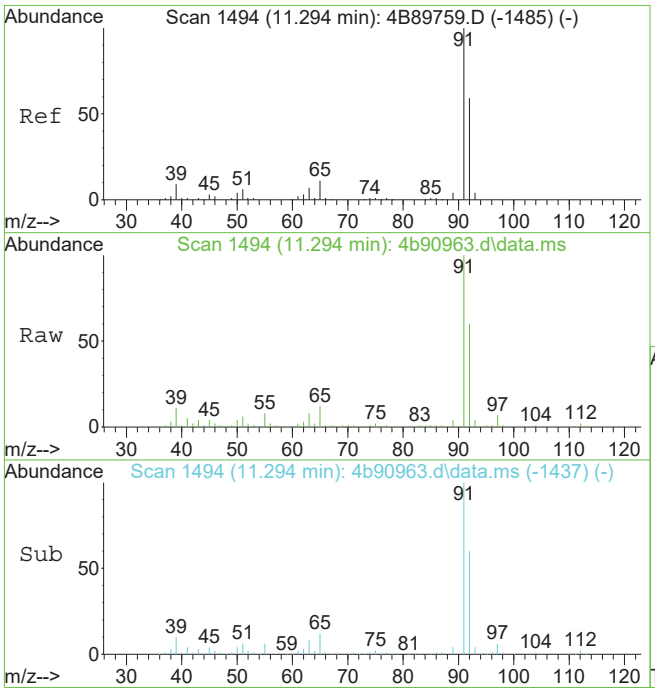


#66
methylcyclohexane
Concen: 111.88 ug/L
RT: 10.222 min Scan# 1289
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 83 Resp: 621890

Ion	Ratio	Lower	Upper
83	100		
98	40.9	22.1	62.1
55	83.4	61.4	101.4

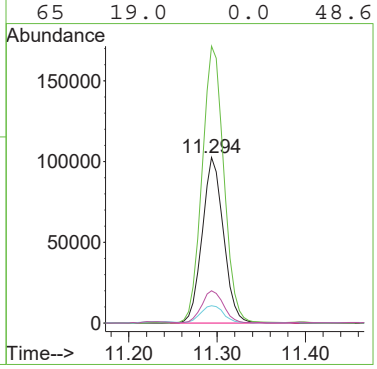


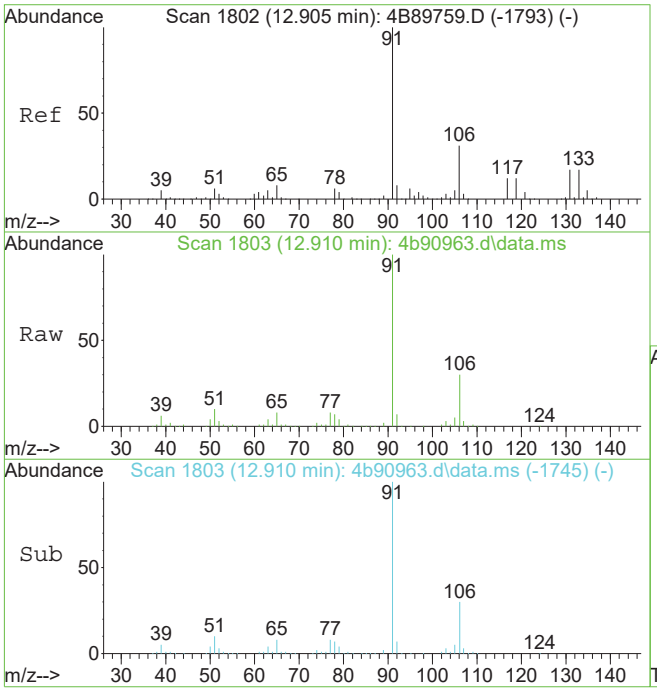


#77
toluene
Concen: 26.79 ug/L
RT: 11.294 min Scan# 1494
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 92 Resp: 171608

Ion	Ratio	Lower	Upper
92	100		
91	167.0	150.2	190.2
51	10.2	0.0	40.3
65	19.0	0.0	48.6

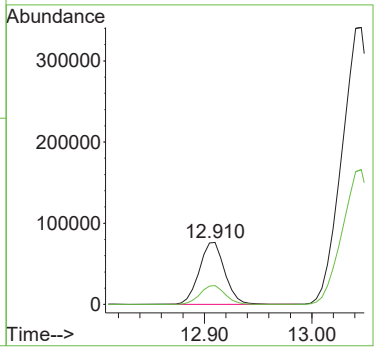


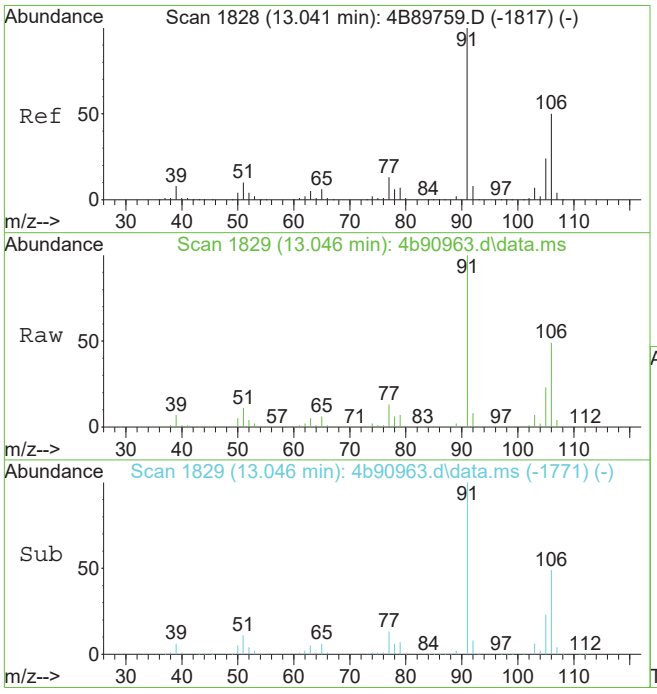


#90
ethylbenzene
Concen: 10.03 ug/L
RT: 12.910 min Scan# 1803
Delta R.T. 0.005 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 91 Resp: 126120

Ion	Ratio	Lower	Upper
91	100		
106	30.5	1.0	61.0

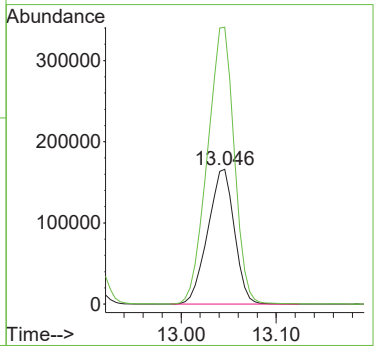


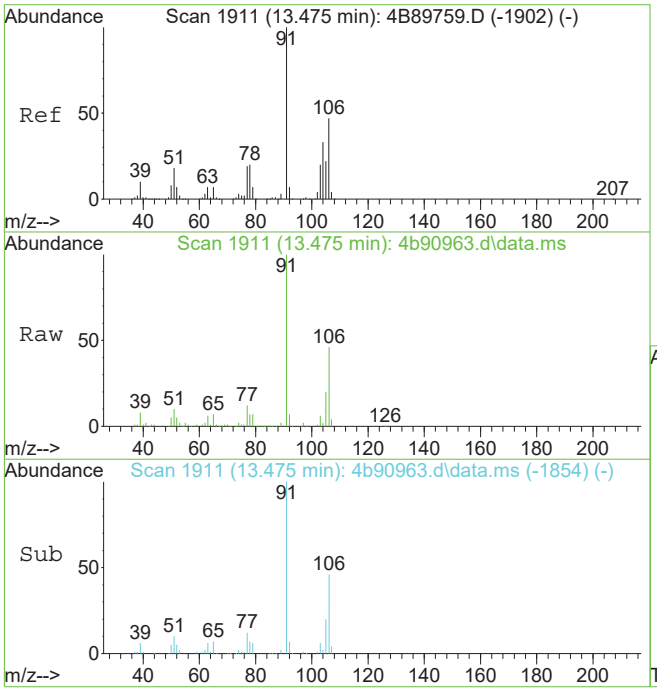


#91
m,p-xylene
Concen: 67.50 ug/L
RT: 13.046 min Scan# 1829
Delta R.T. 0.006 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:106 Resp: 322194

Ion	Ratio	Lower	Upper
106	100		
91	205.6	169.3	229.3

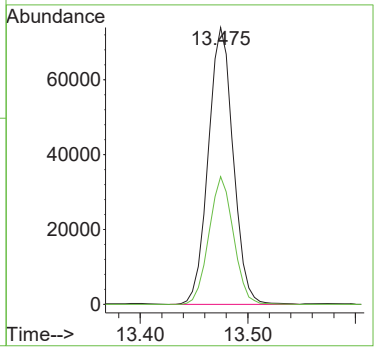


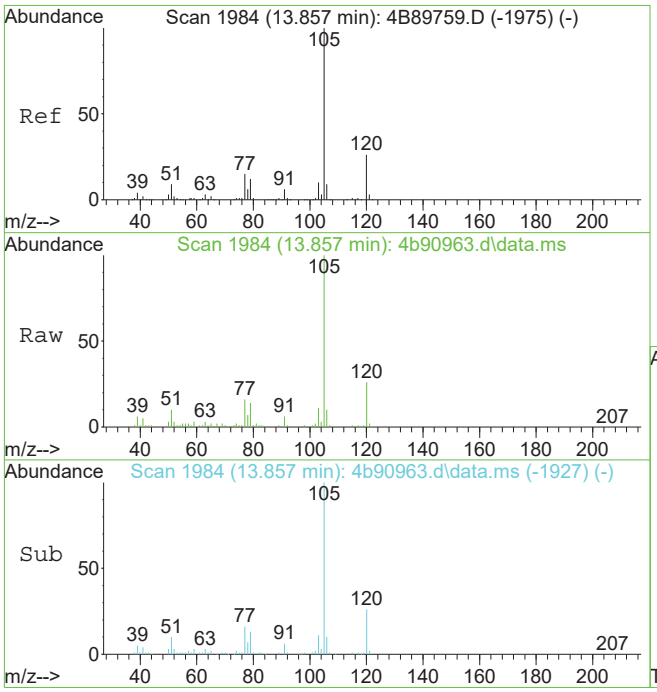


#92
o-xylene
Concen: 11.20 ug/L
RT: 13.475 min Scan# 1911
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 91 Resp: 119395

Ion	Ratio	Lower	Upper
91	100		
106	46.1	16.9	76.9

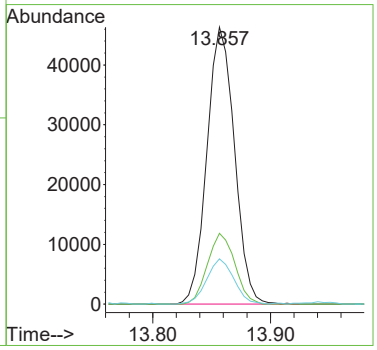


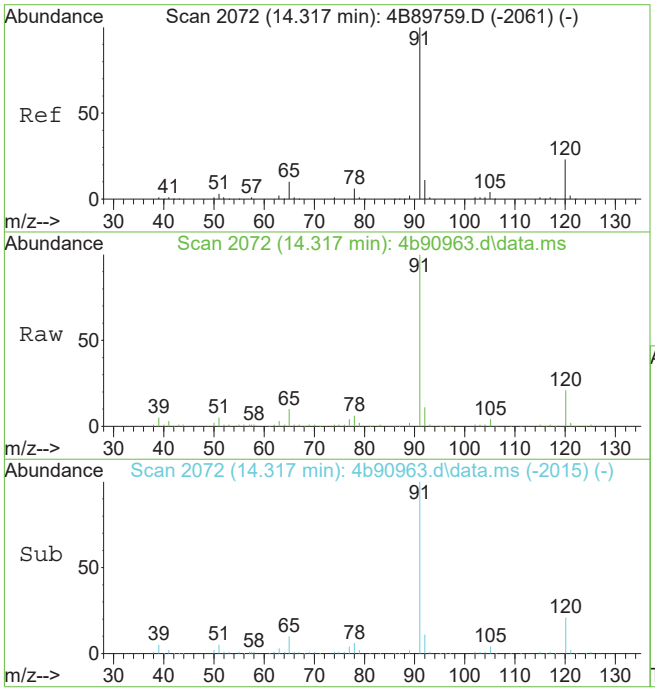


#95
isopropylbenzene
Concen: 5.57 ug/L
RT: 13.857 min Scan# 1984
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:105 Resp: 75174

Ion	Ratio	Lower	Upper
105	100		
120	25.5	5.8	45.8
77	16.3	0.0	34.8

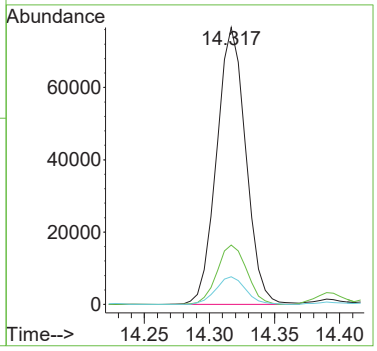


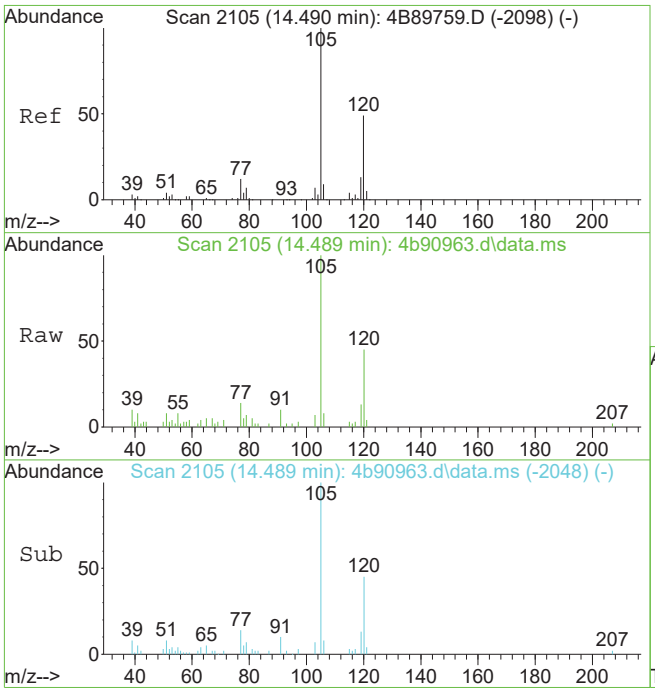


#104
n-propylbenzene
Concen: 7.93 ug/L
RT: 14.317 min Scan# 2072
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 91 Resp: 119319

Ion	Ratio	Lower	Upper
91	100		
120	21.4	0.0	52.7
65	10.0	0.0	39.8

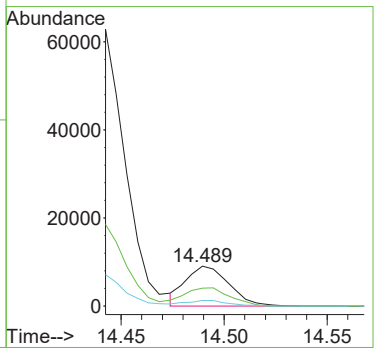


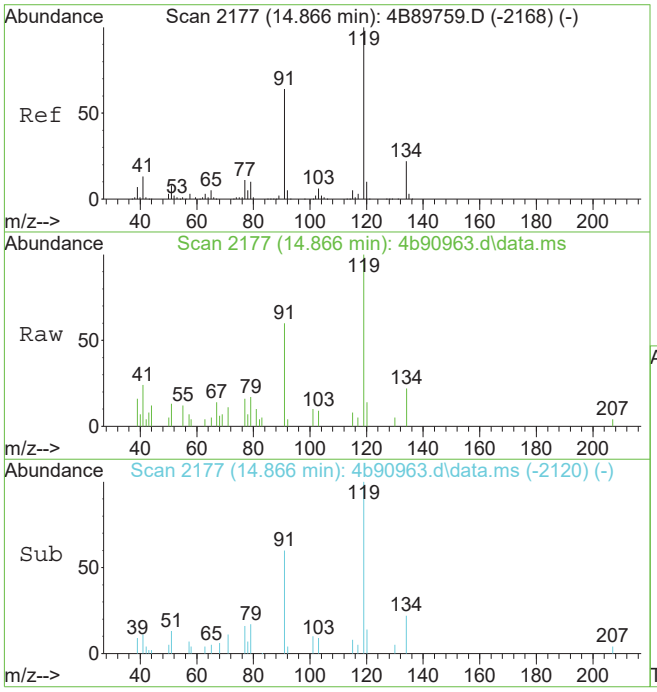


#107
1,3,5-trimethylbenzene
Concen: 1.17 ug/L
RT: 14.489 min Scan# 2105
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:105 Resp: 13250

Ion	Ratio	Lower	Upper
105	100		
120	44.8	19.2	79.2
77	14.0	0.0	42.1

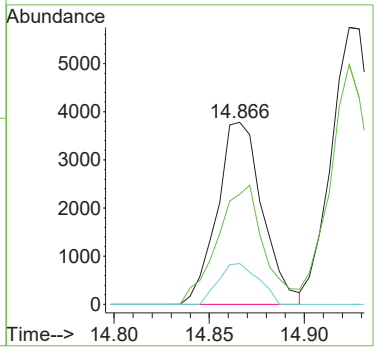


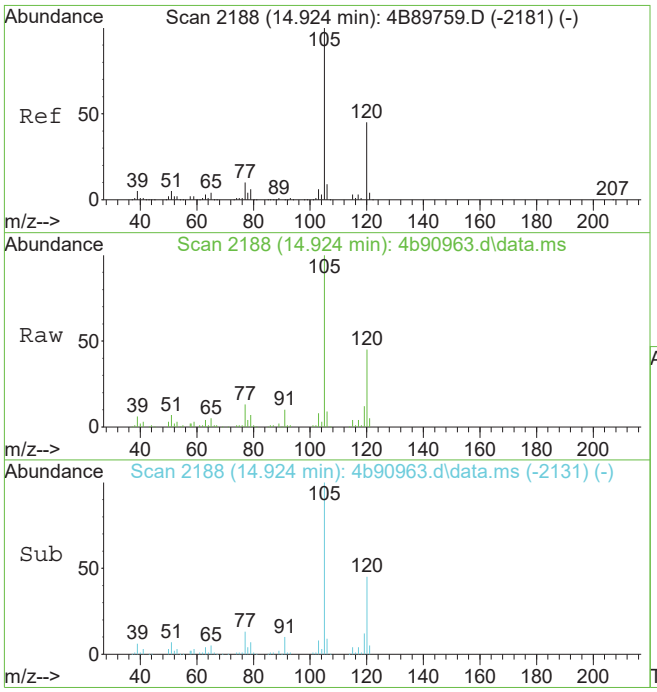


#108
tert-butylbenzene
Concen: 0.65 ug/L
RT: 14.866 min Scan# 2177
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:119 Resp: 6263

Ion	Ratio	Lower	Upper
119	100		
91	60.5	33.7	93.7
134	22.4	0.0	52.4

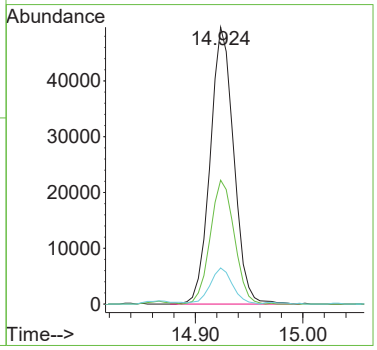


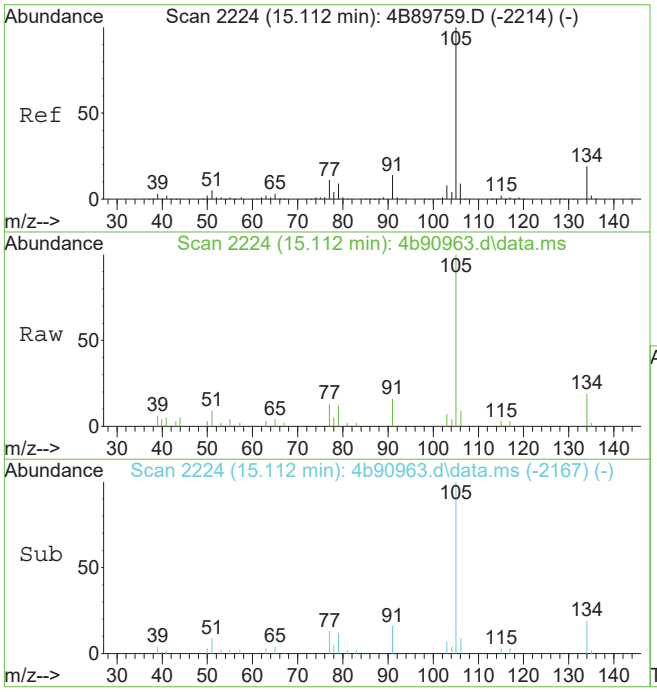


#109
1,2,4-trimethylbenzene
Concen: 6.67 ug/L
RT: 14.924 min Scan# 2188
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:105 Resp: 75656

Ion	Ratio	Lower	Upper
105	100		
120	44.8	16.3	76.3
77	12.7	0.0	41.8

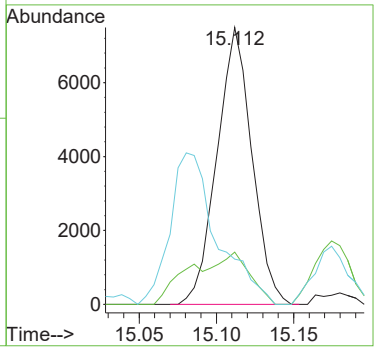


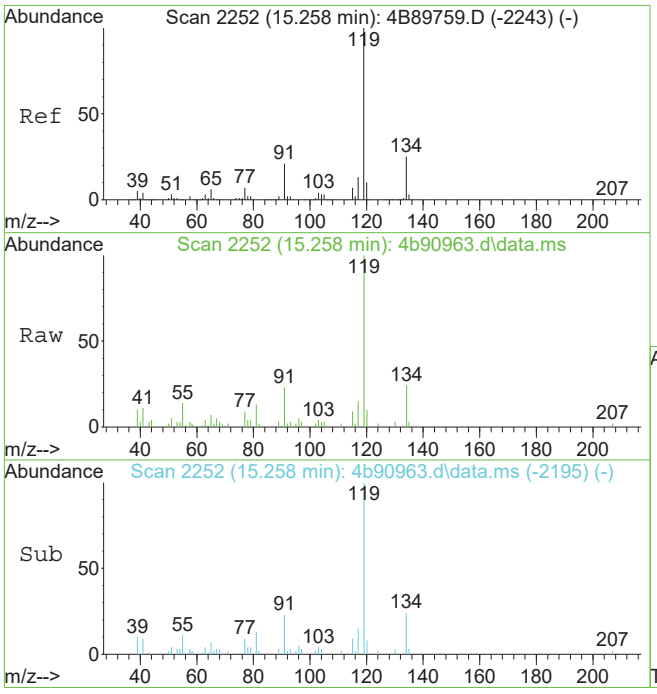


#110
sec-butylbenzene
Concen: 0.80 ug/L
RT: 15.112 min Scan# 2224
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:105 Resp: 11753

Ion	Ratio	Lower	Upper
105	100		
134	15.4	0.0	48.6
91	12.7	0.0	44.5

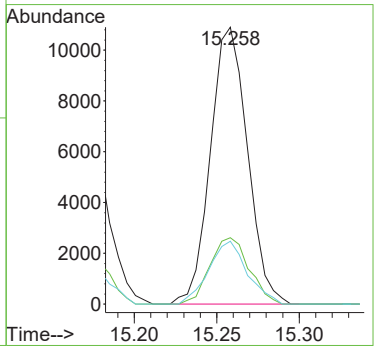


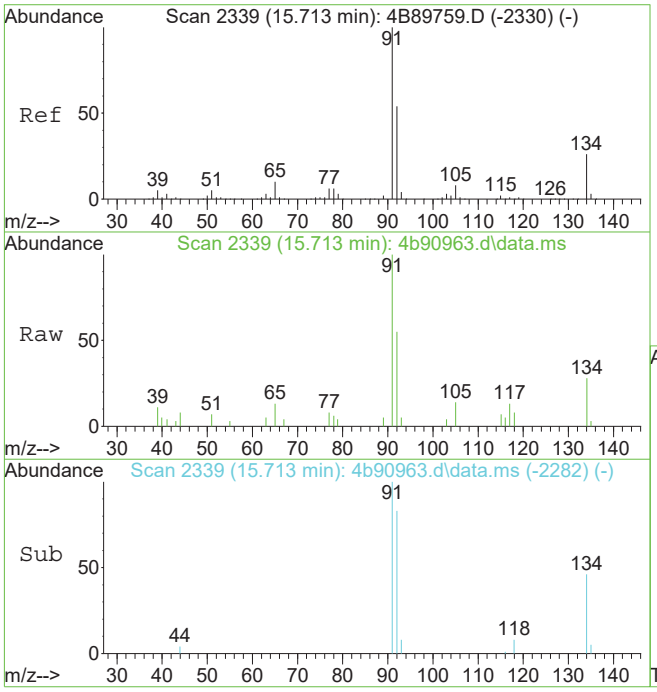


#111
p-isopropyltoluene
Concen: 1.37 ug/L
RT: 15.258 min Scan# 2252
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:119 Resp: 17097

Ion	Ratio	Lower	Upper
119	100		
134	23.9	0.0	55.5
91	22.7	0.0	51.2

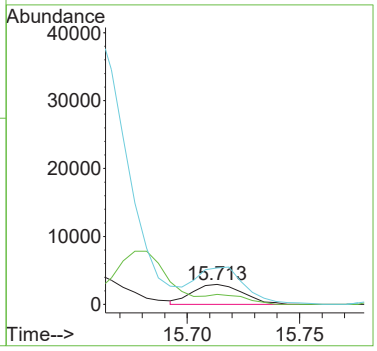


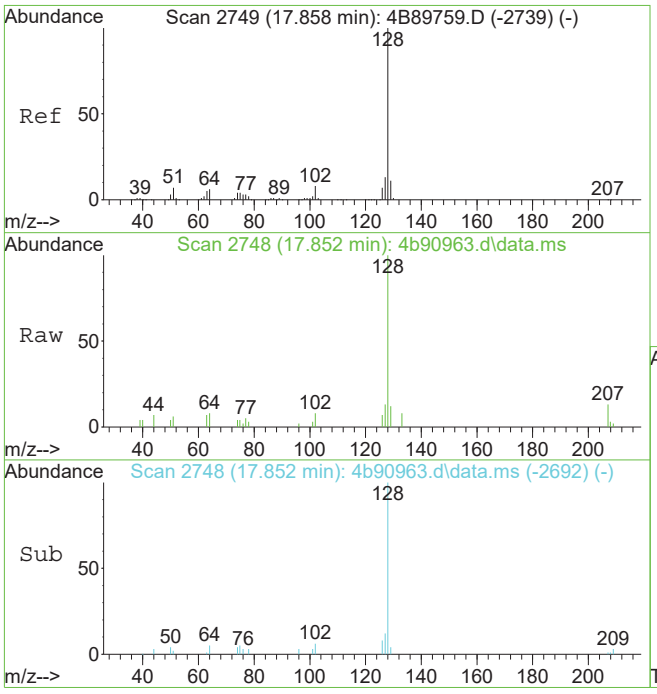


#116
n-butylbenzene
Concen: 0.76 ug/L
RT: 15.713 min Scan# 2339
Delta R.T. -0.000 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion: 92 Resp: 4609

Ion	Ratio	Lower	Upper
92	100		
134	50.6	17.1	77.1
91	175.2	153.6	213.6

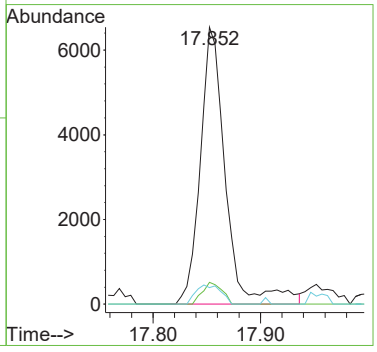




#123
naphthalene
Concen: 0.94 ug/L
RT: 17.852 min Scan# 2748
Delta R.T. -0.005 min
Lab File: 4b90963.d
Acq: 23 May 2019 12:17 pm

Tgt Ion:128 Resp: 10701

Ion	Ratio	Lower	Upper
128	100		
102	7.9	0.0	37.6
51	5.9	0.0	37.0



Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90964.d
Acq On : 23 May 2019 12:45 pm
Operator : CHELSEAS
Sample : jc88209-9 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,20
ALS Vial : 13 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:18:01 2019
Quant Title : SW846 8260C, Rxi624Sil MS 60m x 0.25mm x 1.4um
QLast Update : Wed Apr 24 12:09:29 2019
Response via : Initial Calibration

Compound	R.T.	QIon	Response	Conc	Units	Dev(Min)
Internal Standards						
1) tert butyl alcohol-d9	6.733	65	112472	500.00	ug/L	-0.02
5) pentafluorobenzene	8.757	168	246764	50.00	ug/L	0.00
54) 1,4-difluorobenzene	9.625	114	341660	50.00	ug/L	0.00
75) chlorobenzene-d5	12.810	117	312879	50.00	ug/L	0.00
98) 1,4-dichlorobenzene-d4	15.379	152	185432	50.00	ug/L	0.00
System Monitoring Compounds						
46) dibromofluoromethane (s)	8.804	113	121364	54.39	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 108.78%			
55) 1,2-dichloroethane-d4 (s)	9.191	65	124537	55.28	ug/L	0.00
Spiked Amount 50.000	Range 81 - 124		Recovery = 110.56%			
76) toluene-d8 (s)	11.220	98	387446	49.20	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 98.40%			
99) 4-bromofluorobenzene (s)	14.081	95	157399	51.56	ug/L	0.00
Spiked Amount 50.000	Range 80 - 120		Recovery = 103.12%			
Target Compounds						Qvalue
58) benzene	9.259	78	493516	42.54	ug/L	99
77) toluene	11.294	92	8232	1.26	ug/L	96
90) ethylbenzene	12.910	91	5637	0.44	ug/L	98
91) m,p-xylene	13.046	106	14612	3.01	ug/L	99
92) o-xylene	13.475	91	5063	0.47	ug/L	91
95) isopropylbenzene	13.862	105	3290	0.24	ug/L	96
109) 1,2,4-trimethylbenzene	14.929	105	3265	0.28	ug/L	99

(#) = qualifier out of range (m) = manual integration (+) = signals summed

Quantitation Report (QT Reviewed)

Data Path : C:\msdchem\1\data\janellac\05-24-19\v4b3854\
Data File : 4b90964.d
Acq On : 23 May 2019 12:45 pm
Operator : CHELSEAS
Sample : jc88209-9 Inst : MS4B
Misc : MS34821,V4B3854,5,,,,20
ALS Vial : 13 Sample Multiplier: 1

Quant Method : C:\MSDCHEM\1\METHODS\M4B3793.M
Quant Results File: M4B3793.RES
Quant Time: May 23 20:18:01 2019
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