



Internal Operating Procedure
ISO 9001:2015 SOC NEVADA LLC

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FES.IOP.FFO.0019
REV. 6
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TITLE:

MERCURY MONITORING & RESPONSE

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APPROVAL SIGNATURES		
PREPARED/REVIEWED BY <i>Christina Holloway</i>	CHRISTINA HOLLOWAY, EXECUTIVE ASSISTANT BASE OPERATIONS	DATE <i>3-27-18</i>
APPROVED BY <i>[Signature]</i>	TIM RUTHERFORD, CHIEF FIRE & EMERGENCY SERVICES	DATE <i>3/20/18</i>
APPROVED BY <i>[Signature]</i>	DOUG HOMESTEAD, ASSISTANT CHIEF	DATE <i>3/21/2018</i>
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APPROVED BY <i>Burton Packard</i>	BURTON PACKARD, DIRECTOR BASE OPERATIONS	DATE <i>3/27/18</i>

INITIAL RELEASE ANNUAL REVIEW, NO REVISION REQUIRED ANNUAL REVIEW, REVISION REQUIRED (SEE HISTORY BELOW)

REVISION HISTORY			
REV	CHANGE DESCRIPTION	AUTHOR	DATE
6	ANNUAL REVIEW: UPDATED SIGNATORY AUTHORITY TO REFLECT CURRENT REQUIRED SIGNATURES. CHANGED DOCUMENT TO ISO9001:2015 FORMAT. CHANGED TMX TO MX6 IN PROCEDURE IV STEP 1(E) AND STEP 2 (F). CHANGED TWO FF'S TO ONE FF AND ONE OFFICER IN PROCEDURE II STEP 2 ©, III STEP 1 (F), IV STEP 1 (A), AND STEP 2 (B). REMOVED "II" FROM HAZARDOUS MATERIALS TECHNICIAN IN RESPONSIBILITIES.	CHRISTINA HOLLOWAY	03/2018
5	ANNUAL REVIEW, UPDATED SIGNATORY AUTHORITY TO REFLECT CURRENT REQUIRED SIGNATURES.	CHRISTINA HOLLOWAY	05/2017
4	Updated signatory authority to reflect current required signatures.	Karli Wilbur	05/2016

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REFERENCE DOCUMENTS

DOCUMENT NUMBER	DOCUMENT TITLE
DLA Pre and Post Hg Over pack Verification Procedure	<i>Shipping Container and Mercury Flask Over pack Drum Verification Procedures Part II. HWAD Receipt Location Addendum1</i>
SOC.HWAD.FES.0005	<i>Emergency Response Plan Annex C Section 3. Hazardous Material Response</i>
DPD.IOP.FES.0017	<i>110 Hg Storage Warehouse with CO₂Suppression Response & Activation of System</i>
ORNL/MSSP-13	<i>Review of Spill Clean Up Methods and Waste Disposal ; August 2009</i>
SOC.QP.QAD.0002	<i>Inspection of Mercury Storage Sites</i>
QP.QMS.0001	<i>Control of Documents</i>
QP.QMS.0002	<i>Control of Quality Records</i>
SOC.OHS.SP.0002	<i>Lockout/Tagout</i>
N/A	<i>Process Hazards Analysis for the Receipt and Storage of Mercury at Hawthorne Army Depot, Hawthorne, Nevada. April 27, 2007. Addendum February 1, 2010</i> <i>Supplemental Process Hazard Analysis for the Receipt and Storage of Mercury at, Hawthorne Army Depot, June 2009. Addendum February 23, 2010</i>
MSSP-03	<i>Interpreting Mercury Concentrations in Drum Head Spaces (L. N. McCold), July 2009</i>
ORNL/TM-2009/131	<i>Analysis of Storage Options for the Mercury Stockpile Stewardship Program (A. J. Carroll et al.); November 2009</i>
MSSP-04	<i>Cost Estimation for HWAD Layout Options Upon Receipt at Dock (A. J. Carroll); March 2009</i>
MSSP-08	<i>Review of Real Time Radiography as a Drum Inspection Method (A. M. Aaron et al.); August 2009</i>
MSSP-09	<i>DLA/DNSC Mercury Container Specifications (A. J. Carroll et al.); August 2009</i>
MSSP-10	<i>Guidance for Container Handling and Mercury Transfer in a Laboratory Setting (P. T. Spampinato et al.); August 2009</i>
MSSP-12	<i>Analyzer Assessment (T. D. Hylton) (Appendix B to MSSP-15); October 2009</i>
MSSP-14	<i>Review of Double Stacking Pallets as a Mercury Storage Method (A. M. Aaron); August 2009</i>
MSSP-18	<i>Evaluation of Mercury Flasks Being Used as a Non-Specification Packaging (Mark Hawk et al.); September 2009</i>
MSSP-19	<i>DLA/DNSC Mercury Stockpile Stewardship Project – Phase 2 Closure: Final Drum Closure, Waste Disposal, and Equipment Shipment to HWAD (P. T. Spampinato et al.); September 2009</i>
MSSP-21	<i>Elemental Mercury Simplified Vapor Pressure and Storage Emission Models (T. D. Hylton, W. H. Hermes, and J. W. Terry); September 2009</i>
MSSP-22	<i>Mercury Transfer Options – Design Methodology and Scale Considerations (A. J. Carroll et al.); November 2009</i>

DOCUMENTS REFERENCED IN THIS PROCEDURE ARE APPLICABLE TO THE EXTENT SPECIFIED HEREIN.

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1. PURPOSE

1.1 The purpose of this IOP and Addendum 1 is to provide procedures to increase safety during monitoring operations and/or at an incident involving Mercury transportation and storage.

Health & Safety Requirements:

- 1) Avoid direct contact with drums, pallets, and catch pans due to the potential presence of mercury surface contamination;
- 2) Avoid placing equipment (mercury monitors, tools, clip boards, etc) on drums, in catch pans, or on floors and avoid storing equipment / tools in the warehouses;
- 3) Avoid agitation of drums / pallets and unnecessary movement of drums / pallets;
- 4) If work involves any direct contact with surfaces other than identified in the utilized procedure personnel will be notified to contact the SOC Safety and Health representative to determine levels of PPE required. Personnel will be required to contact their Supervisor to evaluate if the management of change process must be implemented for the proposed work.
- 5) Do not eat, drink, smoke or chew tobacco in dock, warehouse, or incident area. Wash hands thoroughly before eating, drinking, or smoking.
- 6) FES or Senior Lead Person will provide safety / hazcom training for all visitors to the mercury warehouse sites.
- 7) The official break area for the workers will be the FES Haz-Mat trailer.

PPE Requirements:

All FES personnel engaged in emergency response, for mercury incidents will be required to wear PPE consisting of Tyvek coveralls, nitrile gloves, booties and respiratory protection (e.g. ½ face respirators with mercury cartridge or SCBA available).

Safe Work Practices for forklift and lifting devices:

- Hard hat, safety glasses, gloves when conducting lifting operations.
- Inspect equipment to ensure sound working condition and weight test has been conducted.
- Keep hands clear of pinch points when attaching barrel lift device and lowering into over pack.
- Keep all personnel clear when lifting barrel into 55 gallon over pack to avoid personnel from injury if lifting device fails.
- Forklift operator and lifting operations will have a spotter to avoid injury to personnel and damage to property.
- All personnel assigned to forklift operations and lifting operations shall be certified in forklift operations and trained on the lifting equipment used for this operation.

2. SCOPE

2.1 All members involved in rescue, fire suppression, emergency medical services, hazardous materials operations, monitoring operations, and related activities will use this IOP. Following this IOP and Addendum 1 will help protect personnel and the environment.

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3. DEFINITIONS AND ACRONYMS

- 3.1 **CO₂** – carbon dioxide
- 3.2 **Decon** - Decontamination
- 3.3 **SOC**- Day & Zimmermann Hawthorne Corporation
- 3.3 **ERC** – Emergency Response Coordinator
- 3.4 **FD** – Fire Department
- 3.5 **FF** – Firefighter
- 3.6 **GOC**- Guard Operations Center
- 3.7 **Hg** – Mercury
- 3.8 **LOTO** – Lockout/Tagout
- 3.9 **NFIRS** - National Fire Incident Reporting System
- 3.10 **NIMS**- National Incident Management System
- 3.11 **ng/m³** – nanograms per cubic meter
- 3.12 **PPE** – personal protective equipment
- 3.13 **QC**– Quality Control
- 3.14 **SCBA** - Self Contained Breathing Apparatus
- 3.15 **TBSP** - Tablespoon
- 3.16 **TIL** –Truck Inspection Lot

4. FLOWCHART

- 4.1 This document does not have a flow chart.

5. RESPONSIBILITIES

- 5.1 This response guideline is the responsibility of all members of the Fire Department to follow during Mercury monitoring and response to minimize the risk to themselves and the environment. For any reportable spill during transportation, the Incident Commander will request that the ERC contact the National Emergency Response Center (800-424-8802). A reportable spill is any spill over 1 pound of mercury that is introduced into the environment.

The Fire Chief is responsible for ensuring all personnel are trained to respond and mitigate hazardous material incidents.

Level of Training:

NIMS 300 & 400 Incident Command: Officers

NIMS 100, 200, 700: Firefighters

Hazardous Material Technician
- 5.2 The Training Officer is responsible for implementing training requirements into the Firehouse software database and retaining copies of all certificates of fire department personnel.

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6. PROCEDURE

NOTE: Lumex Mercury monitoring and testing: Only personnel that have been trained to use the Lumex mercury vapor instrument shall operate the instrument. Operator will refer to laminated instruction sheet to operate the Lumex (**provided in the pelican case**). The Operator must perform an internal test of the Lumex on the “Test” mode/command of the unit prior to its use in the field. The relative deviation or “R” value must be equal to or less than 25% before you can proceed with the inspection. When taking readings, the operator will use the real time readings of the Lumex. The maximum measurement range of the Lumex mercury vapor analyzer is 50,000 ng/m³.

I. Mercury response during after hours when Truck Inspection Lot (TIL) is closed.

The mercury truck is directed to the TIL. The fire department would only be called out to the TIL if the security guard noticed anything leaking from the trailer or damage to the trailer.

1. If something is noticed, the guard would contact Guard Operations Center (GOC) and alert the fire department to respond and investigate.
2. At the conclusion of the investigation, if mercury is found leaking or damage is significant, the Fire Department will activate the Emergency Response Plan and conduct operations in accordance section II.1.b - m; below.

II. Mercury response during normal business hours.

1. Mercury truck arrives at the TIL
 - a. TIL personnel will notify GOC to have the fire department respond to the 110 group for transfer of conveyance at the designated 110 group Hg storage warehouse.
 - b. Two firefighters (FF) will obtain a calibrated Lumex mercury vapor monitor and perform test with the mercury vapor monitor and respond to the designated site.
 - c. Arriving FD vehicle will try and park upwind if possible from the trailer.
 - d. FES will collect the shipping papers from the truck driver and perform readings and will hand off papers to storage after truck is cleared.
 - e. Firefighters will conduct a walk around visual inspection of the truck and start monitoring for Hg vapors around the trailer and at the vents, if accessible, while looking for any free (leaking or puddles) Hg or damage with penetration into the trailer. If any Hg is observed outside of the trailer, move down to step # 3.
 - f. FES will remove the seal off of the trailer.
 - g. One FF will approach the trailer doors and take a reading with the Hg monitor. If reading is below 25,000 ng/m³, the other FF will open the trailer doors and move the rolling stairway into place. The FF with the monitor will enter the trailer and start monitoring.

Note: FES will have to place portable steps at the rear of the conveyance and the other side of conveyance, inside the trailer for a means of accessing the middle and nose of trailer. Also plywood will be placed on top of rear conveyance for footing purposes.

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6. PROCEDURE (CONTINUED)

- (1) Monitor the shipping container for mercury vapor by sweeping it with the Lumex mercury monitor from front to rear at a height of 4' from the floor of the shipping container.
- (2) Record the highest mercury concentration reading and its location.
- (3) Inspect the shipping container interior for any sign of mercury leakage or spill during transit.
- (4) Be on the lookout for any visible mercury on drum over packs, in drip pans, or on pallets.
- h. If all of these readings are **below** 25,000 ng/m³, the FF may proceed to step h. If readings are **above** 25,000 ng/m³, proceed to Section 2 below.
- i. The FF will take a total of nine readings in each trailer, some at the breathing height (4' level) and some at the floor level (1' level) of the trailer. The readings taken by the FF will be recorded on Commodity Inspection Form DLAH32.
- j. Upon leaving the trailer, the FF with the monitor will exit onto the portable stairway and carefully walk down the stairs.
- k. If the readings are **above** 25,000 ng/m³, proceed to Section II. 2. If the readings are below 25,000 ng/m³, the Hg trailer and load would then be turned over to Storage personnel for unloading of the conveyance. QA will continue mercury vapor monitoring during the unloading of conveyance.
- l. After trailer has been unloaded, QA will don Tyvek coveralls, booties, nitrile gloves and enter trailer and take 9 air samples for Hg vapors to ensure the trailer's air is below the 25,000 ng/m³. The readings will be recorded on a Commodity Inspection Form DLAH 32 .
 - Re-inspect the empty shipping container. If free mercury was evident, evacuate 150 ft. upwind and activate the Emergency Response Team. The FD will clean and decontaminate the shipping container regardless of the mercury vapor concentration reading.
- m. If the trailer has readings **above 25,000 ng/m³**, the **trailer cannot leave the depot** until Hg vapors have been reduced **below 25,000 ng/m³**. **Note: Mitigation will include holding the trailer for a 24 hour period to take final confirmation measurements of Hg vapor concentrations.**
- n. If readings are not **below** 25,000 ng/m³, perform the following below.
 - (A) General: For decontamination of shipping containers (tractor –trailer), wear all proper protective clothing and a mercury vapor respirator. It is absolutely essential to properly evaluate the extent of the mercury contamination problem and to assess the quality of the clean-up process. Monitoring should be carried out with a calibrated mercury monitor as needed.
 - (1) Remove unauthorized persons in the vicinity of the shipping container to be decontaminated.
 - (2) Mark off the area by placing signs or border tape to warn other personnel of potential mercury hazard.
 - (3) Wear appropriate personal protective equipment.

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6. PROCEDURE (CONTINUED)

- (4) Monitoring mercury vapor levels and visual observation should determine if there is any spilled mercury, which can be reclaimed without immediately applying a mercury vapor chemical absorbent/depressant.
 - (5) Remove any visible mercury with a mercury vacuum or an aspirator bulb.
 - (6) If it appears that mercury vapors are continuing to be generated from the spill, and further reclamation is not feasible, apply an absorbent/depressant HgX or any other approved chemical absorbent/depressant according to the manufacturer's recommendations.
 - (7) After the majority of the spilled mercury has been cleaned up, re-treat the surface area of the spill thoroughly using approved chemical absorbent/depressant.
 - (8) Upon completion of the initial cleanup and decontamination, apply a mercury-indicating powder to the area or location to determine if additional decontamination is required.
 - (9) Residual mercury is generally the result of "micro-droplets" in the cracks and crevices of the floors, walls, storage containers and storage aids (i.e. pallets, trays, etc.). The use of a mercury-indicating chemical will help detect if there is any hidden mercury left behind. This will provide a good indication if further decontamination is necessary because the indicating chemical will change from a bone-white color to a pink or black color on contact with actual mercury or mercury vapors.
 - (10) Apply the indicating chemical by sprinkling a thin layer of powder over the decontaminated area or the area in question.
 - (11) Treat vertical surfaces by preparing a thin paste with water and painting it over the area in question.
 - (12) After it has been applied, leave the indicating chemical layer undisturbed for 24 hours. The presence of mercury or mercury vapor will be indicated by individual or numerous pink or black spots. Each spot pinpoints a source of mercury or mercury vapor.
 - (13) Using a mercury vacuum, sweep up the complexing agent residues.
 Note: Keep in mind that mercury vapor build-up will vary with temperature, atmospheric pressure (altitude), air circulation, type of surface involved, and the effects of other contaminants. Heavily contaminated surfaces may require more decontaminant.
 - (14) Re-Monitoring/Verification: Re-monitor the shipping container to ensure that all sources of mercury contamination have been identified, cleaned, or removed.
 - (15) Keep accurate records as to time, place and levels of all mercury monitoring results using the Mercury Monitoring Sheet in the DLAH Form 32.
2. If readings are **above** 25,000 ng/m³ and/or free Hg is seen outside its shipping container or on the ground, the FF with the mercury vapor monitor will move upwind and away from the vehicle and contact GOC to have the FD respond with additional manpower and equipment.

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6. PROCEDURE (CONTINUED)

- a. Have all personnel evacuate 1/3 mile in all directions and all FD response personnel stage upwind and a minimum of 150 feet away from the vehicle.
- b. Response personnel will set up a decon area before re-entry occurs.
- c. One FF and one Officer (Entry team) will put on Tyvek coveralls, booties, nitrile gloves and respiratory protection (e.g., air-purifying respirators with mercury cartridge, SCBA). Two other FF'S will dress in Tyvek coveralls, PPE, except for respiratory protection equipment. They will have their respiratory equipment out and ready if needed to assist entry team or help if entry team gets injured.
- d. The Entry team will gather their Hg Lumex mercury vapor monitor and approach the trailer and move in the rolling stairway.
The entry team will enter the trailer and take samples with the monitor of each pallet. Go completely around the entire pallet of drums with mercury sampler inlet 6 inches from the side surfaces of the drums and approximately 6 inches above the *bottom edge* of the drums on the pallet.
Go completely around the drum lids and at the bung by holding the mercury sampler inlet 6 inches above the drum lid. Record the highest mercury concentration readings and locations obtained on the DLAH32 form.
- e. The Entry team will look for any free Hg on the trailer floor or in the pallet containment pan, damage to containers or loose drum bungs. If any of these conditions are found, make note of it and return to the decon area to report the findings.
- f. Gather appropriate equipment and tools to take care of the problem found; i.e.: wrenches to tighten drum lid ring or bung, monitoring equipment, Hg vacuum, Hg absorbent pads, etc.
- g. Make re-entry into trailer and mitigate problem. The Entry team will take new air samples with monitor in all locations of the trailer. If the mercury vapor concentration has been reduced below 25,000 ng/m³, then the trailer can be unloaded by the Storage personnel.
- h. If new readings throughout the trailer are still **above** 25,000 ng/m³, remove all PPE upon exiting the trailer, wipe booties on absorbent pad and place PPE in waste barrel. Go to decon area for monitoring and decontamination of entry team if needed.
- i. Further mitigation of the pallets will consist of the Fire Department unloading each pallet on the portable loading dock for mercury vapor monitoring to determine which pallet is the source of the 25,000 ng/m³ or higher. **Note: (Mercury vapor monitoring needs to occur under ambient conditions to get an accurate measurement)**. Once the source is identified the pallet will have to be decontaminated and mitigated. This will take place on the portable dock with a plastic sheeting layed on the surface to prevent environmental contamination of surrounding soils, prevent migration into water bodies and provide additional levels of containment.
 - (1) General: Disassemble and remove the over pack drums from the drip pan and the pallet if flagged and rejected per steps below. This will allow mercury monitoring to be conducted on individual drum, drip pan, and the pallet and allow the source of contamination to be determined.
 - (2) Monitoring of Drum Over packs (as individually separated)
 - a. Move the individual drum over pack to be monitored away from the rest of the disassembled components.

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6. PROCEDURE (CONTINUED)

- b. Monitor the drum that was in the flagged/rejected pallet of drum over packs for mercury with mercury monitor as follows:
 - i. Go completely around the separated drum holding the mercury sampler inlet 6 inches from the side surfaces while sweeping the side surfaces.
 - ii. Go completely around the drum lid bung seal and drum lid seal holding the sampler inlet 2 inches from the seals.
 - iii. Record the highest mercury concentration readings and their locations in items (i) and (ii) above.
 - iv. If mercury readings obtained through monitoring in 2(b)(i) and (ii) are at or in excess of 25,000 ng/m³ on the separated drum over pack, re-seal the drum lid or the bung, as the case may be, and/or proceed to rehabilitation of drum over pack(s) through cleaning/decontamination of the drum before considering its over pack into a 55 gallon drum.
 - v. If mercury readings obtained through monitoring in 2(b)(i) and (ii) are below 25,000 ng/m³, mark and release these drum over packs for reassembly for transfer to the warehouse pending verification of the drip pan and the pallet.
 - vi. Proceed to rehabilitation of drum over pack(s) measuring in excess of 25,000 ng/m³.

(3) Rehabilitation of Drum Over pack

- a. For cleaning/decontaminating a drum over pack , use the procedure as outlined in Section II.m.1-15.
- b. For tightening of the lid or bung seals, follow the drum manufacturer's seal setting procedure outlined in Attachment 3 of Addendum 1 if required.

(4) Verification of Drum Over pack

- a. Re-monitor the drum over pack once rehabilitated and record the data.
- b. Proceed to monitor the drip pan.

(5) Monitoring of Drip Pans

- a. Monitor each drum drip pan associated with a flagged/rejected pallet of drum over packs for mercury with mercury monitor as follows:
 - i. Make one complete pass over the entire *top* surface of drip pan and the *inside* of folded edge with mercury sampler inlet 6 inches from the top surface.
 - ii. Make one complete pass over the entire *bottom* surface of drip pan and the *outside* of folded edge with mercury sampler inlet 6 inches from the bottom surface.

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6. PROCEDURE (CONTINUED)

- b. Record the highest mercury concentration readings and locations in items (i) and (ii) above.
 - c. If mercury readings obtained through monitoring in 5(a)(i) and (ii) are at or in excess of 25,000 ng/m³, proceed to rehabilitation (cleaning/decontamination) of the drip pan.
 - d. If mercury readings obtained through monitoring in 5(a)(i) and (ii) are below 25,000 ng/m³, mark and release the drip pan for use with the associated drum over packs pending verification of the pallet.
- (6) Rehabilitation of Drip Pans For cleaning/decontaminating a drip pan, use the procedure outlined in Attachment 2 of Addendum 1 if required.
- (7) Verification of Drip Pans
- a. Re-monitor the drip pan once rehabilitated and record the data.
 - b. Proceed to monitor the pallet.
- (8) Monitoring of Pallets
- a. Monitor each pallet associated with a flagged/rejected pallet of drum over packs for mercury with mercury monitor as follows:
 - i. Make one complete pass over the entire *top* surface and the *side* surface of the pallet with mercury sampler inlet 6 inches from the top surface. If pallet is contaminated, pallet will be prepared for hazardous waste disposal.
 - j. The Decon team will decontaminate each drum and pallet that has elevated Hg readings or presents a problem. If the problem cannot be mitigated, the Fire Department will place the 30-gallon steel drum into a 55-gallon steel drum using a forklift with a barrel lift attachment to lift the 30-gallon over pack into the 55-gallon steel drum. **Note: (Do not open 30-gallon drums).** On completion of over packing, conduct monitoring to ensure Hg levels are **below 25,000** ng/m³. The 55-gallon drum will be segregated and turned over to Environmental Services to be moved to 110 @ 97 as the designated area and held for future mitigation (e.g., sending the drums to a commercial mercury-handling facility for reflasking).
 - k. All personnel will be decontaminated if necessary and all PPE will be put into plastic bags and sealed in a drum. The tools and equipment will be tested to see if they have a reading above 25,000 ng/m³ and will be decontaminated in accordance with Section II. m.1-15. If the reading is in the proper range, the tools and equipment can be put back in service.
 - l. Clean up and waste processing will be in accordance with HWAD Emergency Response Plan Annex C Section 3 Hazardous Materials page 55 Facilities Clean-Up and Disposal and Hazardous Materials/ Waste Contingency Plan.
 - m. Have FF log new readings taken by the Entry team on the Commodity Inspection Form DLAH 32.
 - n. Release trailer to Storage personnel for unloading of conveyance.

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6. PROCEDURE (CONTINUED)

3. Finding Hg outside of containment on the ground:

- a. A pound or more (**2.25 TBSP**) of Hg introduced to the environment is a reportable spill. The spill shall be reported to National Response Center and other appropriate agencies.
- b. The Entry team will clean up the spill using methods described in Section II. m. 1-15. Apply Sulfur T to the ground to ensure all mercury has been picked up. Place contaminated waste in a 55 gallon drum for hazardous waste disposal.
- c. After spill has been cleaned up, the Entry team will take air sample measurements to ensure all the Hg was picked up.

III. Fire response involving the transportation or storage of Mercury

1. FD will respond according to existing fire response procedures.
 - a. Ensure the responding units are upwind of the incident.
 - b. Evacuate all personnel 1/3 mile downwind.
 - c. All FD personnel on attack lines will wear proper PPE, which includes full turnouts and SCBA.
 - d. Send a monitoring team downwind 1/3 mile to check the air for Hg vapors. If monitoring shows levels above 25,000 ng/m³, increase the evacuation perimeter.
 - e. After the fire has been extinguished, the evacuation distance can be reduced to 330 feet in all directions. FD personnel not wearing full PPE w/ SCBA will stay 150 feet from the incident.
 - f. After fire has cooled, one FF and one Officer w/SCBA, Tyvek coveralls, and PPE will enter the scene with the Hg monitor and check for Hg vapors and for leaking Hg.
 - g. If readings are **below** 25,000 ng/m³ and no free Hg is found, cleanup and recovery operations can begin. FD will stand by and check atmosphere frequently for the presence of Hg vapors.
 - h. If readings are **above** 25,000 ng/m³ and/or free Hg is present, the FD will follow the procedure outlined in Section II.3 above.

IV. Isolation of CO₂ suppression system and mercury vapor monitoring of storage warehouses empty or containing mercury

1. **If any storage warehouse requires entry and is going to be open so workers can work in it, the FD needs to disable the CO₂ fire suppression system and apply LOTO and check the atmosphere in the warehouse for the presence of Hg and sufficient oxygen (19.5%) during entry,.**
 - a. One FF and one Captain will respond and close the main discharge valve (labeled # 5) on the CO₂ fire suppression system and apply LOTO and will test the mercury vapor monitor.
 - b. PPE will consist of SCBA respiratory protection.
 - c. One FF with Hg monitor will start monitoring of Hg vapors at the West entry door prior to opening of the doors. If vapors are **below 25,000** ng/m³, the FF can unlock the entry door and enter the warehouse and disable the CO₂ system by turning the key switch to disable on the right hand side of the entry door.

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6. PROCEDURE (CONTINUED)

- d. With the Hg monitor, one FF will take a total of four air samples in each inspection aisle, two at the breathing zone and two at the floor level. The samples will be taken in random locations in the inspection aisle. If the concentration is **above** 25,000 ng/m³, the FF will not allow entry into the warehouse and contact GOC to have the FD respond to that location.
- e. One FF with the MX6 gas monitor will monitor the building for oxygen levels. If levels are below 19.5 % oxygen, entry will be denied until situation is mitigated.
- f. If levels are **below** 25,000 ng/m³, the warehouse can be released to Storage personnel.
- g. FF'S will instruct storage personnel on the evacuation plan that is posted in the warehouse and review the following evacuation instructions.

Note: FD will verify all required personnel have their Emergency Escape Breathing Device (EEBD) and have conducted Pre- Inspection on the EEBD.

Evacuation Instructions:

- **Notify all occupants there is an emergency**
 - **Exit at the nearest designated Exit**
 - **Ensure everyone has evacuated**
 - **Evacuate from warehouse upwind (check wind sock for direction of wind)**
 - **Ensure all occupants are accounted for**
 - **Meet senior fire official to relay information regarding incident**
- h. After work is completed, the storage personnel are to request the Fire Department to respond to location and enable the CO₂ fire suppression system.
 - i. If the warehouse is closed for any reason and needs to be re-opened for workers to enter, the fire department will disable the CO₂ suppression system and monitor the building for mercury vapors before allowing those workers to enter.

2. Routine monitoring of Mercury storage buildings:

- a. Each storage warehouse that has Hg in it will be inspected monthly.
- b. One FF and one Officer will respond and close the main discharge valve (labeled # 5) on the CO₂ fire suppression system and will apply LOTO and test the mercury vapor monitor and monitor for vapors at the West entry door.PPE will consist of SCBA respiratory protection.
- c. FF will unlock the storage warehouse.
- d. One FF with Hg monitor will enter warehouse and disable the CO₂ system by turning the key switch to disable on the right hand side of the entry door.
- e. With the Hg vapor monitor, one FF will take a total of two air samples in each inspection aisle, one at the breathing zone and one at the floor level. The samples will be taken in random locations in the inspection aisle.
- f. One FF with the MX6 gas monitor will monitor the building for oxygen levels. If levels are below 19.5 % oxygen, entry will be denied until situation is mitigated.
- g. If level is **above** 25,000 ng/m³, the warehouse cannot be released and the FD will follow the procedures outlined in section VIII below.

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6. PROCEDURE (CONTINUED)

- h. If levels are **below** 25,000 ng/m³, the warehouse can be released to QA personnel that require entry into the warehouse and FF'S will instruct QA personnel on the evacuation plan that is posted in the warehouse and review the following evacuation instructions.
Note: FD will verify all required personnel have their Emergency Escape Breathing Device (EEBD) and have conducted Pre- Inspection on the EEBD.

Evacuation Instructions:

- **Notify all occupants there is an emergency**
- **Exit at the nearest designated Exit**
- **Ensure everyone has evacuated**
- **Evacuate from warehouse upwind (check wind sock for direction of wind)**
- **Ensure all occupants are accounted for**
- **Meet senior fire official to relay information regarding incident**

- i. After work is completed QA personnel will request the Fire Department to respond to the location and enable the CO₂ fire suppression system.

V. Response to a wreck involving Hg transport truck

1. Wreck or overturned transport truck and trailer with fire involved
 - a. Refer to Section III above.
 - b. After fire has been extinguished and contents have cooled down, check inventory to ensure all mercury containers are accounted for.
 - c. Have SOC Security standby to secure scene and accountability of mercury containers.
2. Wreck or overturned transport truck and trailer with no fire
 - a. Firefighters with w/SCBA, tyvek coveralls, and PPE will enter the scene with the Hg monitor and check for Hg vapors and for leaking Hg.
 - b. If mercury vapor concentrations are **above** 25,000 ng/m³, the FF can use half-face air-purifying respirator. If the concentrations are **below** 25,000 ng/m³, the FF can remove their respiratory equipment.
 - c. The FF will locate and check the inventory to ensure all containers of mercury are accounted for.
 - d. SOC Security will standby to secure scene and accountability of mercury containers.

VI. Responses off of the Depot

1. The SOC Fire Department will respond, if requested, to an accident/incident involving Mercury within a 40 mile radius. This includes responding to the Walker River Paiute Tribe Reservation. Depending on the information received, the senior fire officer will respond with the appropriate vehicles and equipment.

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6. PROCEDURE (CONTINUED)

- If on the highway right-of-way, the fire department will notify the Nevada Department of Transportation (NDOT) of the incident.

VII. Notification of other agencies

- If the fire department is tied up with other responses on the depot or in need of more assistance and resources, the NAS Fallon Fire Department will be notified to respond with their resources for mutual aid.
- If fire or large spill should occur anywhere on the depot where it could affect the community, the fire department would notify the Mineral County Sheriff's Office and advise them if an evacuation or shelter in place order should be given.
- The Commander and Plant Manager of the Depot would be kept advised of all situations involving the release of mercury to the environment. In turn, they would contact the appropriate agencies as needed. They would also be in charge of approving any press releases to the news media.
- If required by the size of the spill, Environmental Services will contact Nevada Division of Environmental Protection (NDEP) and the National Response Center.

VIII. Responding to mercury leak in the warehouse

- FD personnel respond to the warehouse with properly calibrated and tested mercury vapor instrument, upon notification that a mercury leak has been located in the warehouse.
- PPE will consist of Tyvek coveralls, booties, nitrile gloves, air-purifying respirators with mercury cartridge, or SCBA respiratory protection.
- FD personnel evaluate the situation (e.g., is it mercury? how big is the leak? how far has the leak spread? which drum leaked?).
- FD personnel will mark the drum (or record the drum ID) that is suspected to be leaking.
- FD personnel will develop a plan to move pallets to temporary storage locations so that they can gain access to the pallet where the mercury leak has occurred. Temporary storage locations are to be defined by the FES Fire Chief or his designee. Some options include moving pallets to the dock, double stacking pallets, and storing pallets in a milvan container.
- Forklift operators move the designated pallets per the Incident Action Plan.
- The mercury vapor concentration is periodically measured to ensure that personnel are not exposed to mercury vapor concentrations above 25,000 ng/m³.
- FD personnel will remove the bulk of the accessible mercury prior to moving the pallet with the identified leak. Mercury that is under a drum will be inaccessible until after the drum has been removed from the pallet in a later step.
- If necessary, move the pallet to the portable dock to proceed with the resolution of the mercury leak (e.g., over pack the drum).
- Should the impervious floor become contaminated and not cleanable to 25,000 ng/m³ that section of the floor will be replaced in accordance with the manufacturer recommended procedures. The removed section of floor and also pallets will be treated as mercury contaminated waste.

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6. PROCEDURE (CONTINUED)

IX. Over packing a drum

1. FD personnel will set up the portable dock in which to perform the over packing operation (e.g., place protective covering on floor, obtain appropriate 55-gallon drum for the over pack, obtain appropriate lifting equipment, tools (band breaking, ratchet with socket, mercury decontamination solution, etc.)
2. PPE will consist of Tyvek coveralls, booties, nitrile gloves, air-purifying respirators with mercury cartridge, or SCBA respiratory protection
3. Personnel will periodically monitor the breathing air in the work area to ensure that personnel are not exposed to mercury vapor concentrations above 25,000 ng/m³
4. Move the affected pallet to the portable dock.
5. Remove the banding from the pallet.
6. Set up the 55-gallon drum on a pallet to receive the leaking drum.
7. Determine the leaking drum's identification and transfer that information to the 55-gallon drum.
8. Use the forklift and the barrel lifting device to lift the leaking drum from the pallet. FD personnel should place a plastic bag on the drum while it is still over the drip pan to catch drips that may occur while moving the drum.
9. Carefully lower the 30-gallon drum into the 55-gallon drum.
10. Visually inspect the drip pan on the pallet. Clean up any free mercury that was made accessible when the drum was removed from the pallet. Use mercury decontamination solution to clean the pan as necessary.
11. Inspect the rest of the drip pan (e.g., temporarily lifting the drums) for the presence of free mercury. Remove any mercury that is observed and decontaminate the pan and drums as necessary.
12. Place the lid and locking ring on the 55-gallon drum; secure the locking ring according to manufacturer's specifications.
13. Move the 55-gallon drum to a designated area for mercury over packs.
14. Provide the drum identification, and the new storage location of the drum to the mercury inventory database manager to update the inventory database.
15. When the situation is resolved, clean up the setup area and return the pallets to their storage locations. Mercury spill clean-up procedure MSSP-13 will be utilized.

+ NOTE: The 55-ga drum(s) will be placed at 110@97 for future shipment to a mercury recycler. The recycler will replace the old 30-gallon drum with a new 30-gallon drum, with all component packaging replaced, and utilize new flasks per the ORNL specification for commercial 3-L flasks. Each of the six (6) flasks will be replaced with the DNSC mercury transferred into new flasks. The recycler will manage all waste disposal. Recycler contact information is available in MSSP-13.

7. METRICS

- 7.1 None required for this document.

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8. QUALITY RECORDS

8.1 The following Quality Records shall be generated and managed in accordance with SOC.QP.QMS.0002

QUALITY RECORDS			
RECORD REQUIRED	CUSTODIAN	RETENTION	DISPOSITION
Training Report	Firehouse Software	Length of employment	Database
Commodity Inspection Form	Storage Planner	Indefinite	File Cabinet
NFIRS	Firehouse Software	5 Years	Database
Incident Critique	Fire Chief	5 Years	File Cabinet

9. FORMS

9.1 The following forms are applicable to this document.

APPLICABLE FORMS	
FORM NUMBER	TITLE
DLAH 32	Commodity Inspection Report
Firehouse Database	Training Report
Firehouse Database	NFIRS Incident Report
SOC 590-E	Incident Critique



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10. Addendum – Shipping Container and Mercury Flask Over pack Drum Verification Process

DLA Pre and Post Hg Overpack
Shipment Procedures
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**ADDENDUM 1
SHIPPING CONTAINER AND
MERCURY FLASK OVERPACK DRUM
VERIFICATION PROCEDURES**

PART II. HWAD RECEIPT LOCATION

Responsibility	Procedure
Quality Assurance (QA)	<p>A. General Inspection</p> <p>Before unloading the palletized drum overpacks from a shipping container, (HWAD)¹ will verify the shipping container and its inventory using the shipment documentation.</p>
Fire & Emergency Services (FES)	<p>B. Monitoring, Cleaning/Decontamination, and Verification of Shipping Containers</p> <p>1. <u>General</u>: Prior to off-loading the pallets of overpack drums from each shipping container, HWAD will monitor shipping containers arriving at HWAD for presence of mercury metal leakage or its vapor release. HWAD will use a properly calibrated Lumex RA-915+ mercury monitor for mercury monitoring of the shipping containers.</p> <p>2. <u>Monitoring of Shipping Containers</u>²</p>
FES	a. Open the arriving shipping container and let it air out thoroughly ³ .
FES	b. Monitor the shipping container for mercury vapor by sweeping it with the Lumex mercury monitor from front to rear at a height of 4' from the floor of the shipping container.
FES	c. Record the highest mercury concentration reading and its location.
FES	d. Inspect the shipping container interior for any sign of mercury leakage or spill during transit.
FES	e. Be on the lookout for any visible mercury on drum overpacks, in drip pans, or on pallets.
Receipt, Storage &	f. Off-load the palletized drum overpacks to the assigned staging area.

¹ Hawthorne Army Depot (HWAD) personnel will be directing the off-loading operations as HWAD will assume the charge for safeguarding the mercury storage and storage related operations. DNSC will provide all assistance HWAD requires in meeting its charge. It is important to remember that HWAD will be in command and charge of the mercury metal at the receipt location.

² HWAD Fire Department is in charge of the initial inspection of the trailer interior for mercury metal or vapor losses. The Fire Department has a standard operating procedure for the initial inspection of the arriving trailers. The instructions here are general in nature and are not intended to circumvent HWAD Fire Department's procedure. HWAD Fire Department uses proper personal protective equipment during the initial inspection in line with its practice of responding to emergencies with presence of unknown chemicals, fumes, or vapors.

³ Previous reviews by CAPP auditors have not allowed this step to be performed.



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Issue (RS&I)	
FES	g. Re-inspect the empty shipping container. If free mercury was evident, proceed to cleaning and decontamination of the shipping container regardless of the mercury vapor concentration reading.
QA	h. If free mercury was not evident, sweep the empty shipping container for mercury vapor concentration with Lumex mercury monitor from front to rear at a height of 4' from the floor of the shipping container.
QA/FES	i. If the shipping container exhibits mercury vapor concentration reading at or in excess of 25 ug/m ³ , proceed to cleaning/decontamination of the shipping container.
FES	<p>3. <u>Cleaning/Decontamination of Shipping Container</u></p> <p>a. If free mercury was not evident, thoroughly air out the shipping container using a high velocity air fan. Generally, airing out will remedy the situation. In a persisting situation, proceed to step "c" below⁴.</p> <p>b. If free mercury was evident, promptly recover or contain mercury in the shipping container using suitable recovery methods or by using absorbent material as necessary.</p> <p>c. Use the shipping container cleaning/decontamination procedure outlined in <u>Attachment 1</u>.</p>
FES	<p>4. <u>Verification</u></p> <p>a. Before releasing the decontaminated shipping container, sweep it with the mercury monitor from front to rear.</p> <p>b. Record the data.</p> <p>c. Release shipping container.</p>

⁴ Previous reviews by CAPP auditors have not allowed this step to be performed.



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	<p>C. Monitoring and Verification of Drum Overpacks after Off-Loading</p>
RS&I	<p>1. <u>General</u>: HWAD personnel will off-load the pallets with drum overpacks and move them to the warehouse if spillage or leaks of mercury was not observed in the shipping containers and the mercury vapor readings in the shipping container with the pallets were compatible with the shipping point mercury vapor data before the container was closed and sealed.</p>
FES	<p>If spillage or leakage of mercury metal was present/suspected or there was mercury vapor reading in excess of 25 ug/m³ in the shipping container, HWAD personnel will move the pallets with drum overpacks to the assigned staging area for additional monitoring and remedying the situation.</p>
	<p>2. <u>Pre-Monitoring Activities for the Drum Overpack Assemblies (overpacks, drip pans, and pallets as assembled) are as follows:</u></p>
QA/RS&I	<p>a. Establish a staging area such that a pallet of off-loaded drum overpacks can be sampled away from the surrounding mercury storage.</p>
RS&I	<p>b. Bring palletized drum overpacks from the shipping container to the staging area for monitoring and verification.</p>
QA	<p>c. Visually inspect the palletized drum overpacks for mercury metal leaks.</p>
QA/FES	<p>d. If free mercury was observed, proceed to cleaning/decontamination of palletized drum overpacks without waiting for vapor monitoring.</p>
QA	<p>e. If free mercury was not observed, proceed to monitoring and verification of overpack assembly(ies).</p>
	<p>3. <u>Monitoring and Verification of the Drum Overpacks assemblies (overpacks, drip pans, and pallets as assembled)</u></p>
QA	<p>a. Monitor the drum overpacks on each pallet for mercury with the Lumex mercury monitor as follows:</p>
QA	<p>i. Go completely around the entire pallet of drums with mercury sampler inlet 6 inches from the side surfaces of the drums and approximately 6 inches above the <i>bottom edge</i> of the drums on the pallet.</p>
QA	<p>ii. Go completely around the drum lids and at the bung by holding the mercury sampler inlet 6 inches above the drum lid.</p>
QA	<p>b. Record the highest mercury concentration readings and locations obtained in items 3(a)(i) and (ii), above.</p>

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QA/FES	<p>4. <u>Mercury Drum Overpack Decision</u></p> <p>Mercury drum overpack decision will be made as follows:</p> <p>a. If mercury measurements on drum overpacks on a pallet obtained through monitoring procedures in 3(a)(i) and (ii) are at or in excess of 25 ug/m³, flag, reject, and move the particular pallet of drum overpacks to a secondary holding area for further evaluation as described in Section D.</p>
QA/RS&I	<p>b. If mercury measurements on drum overpacks on a pallet obtained through monitoring procedures in 3(a)(i) and (ii) are less than 25 ug/m³, move the pallet of drum overpacks to the destination warehouse.</p>



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	<p>D. Rehabilitation of Drum Overpack Assemblies <u>if Flagged/Rejected</u> and Verification of Rehabilitation</p>
FES	<p>1. <u>General</u>. Disassemble and remove the overpack drums from the drip pan and the pallet if flagged and rejected per procedure in Section C. This will allow mercury monitoring to be conducted on individual drum, drip pan, and the pallet and allow the source of contamination to be determined.</p>
FES	<p>2. <u>Monitoring of Drum Overpacks (as individually separated)</u></p> <p>a. Move the individual drum overpack to be monitored away from the rest of the disassembled components.</p> <p>b. Monitor the drum that was in the <u>flagged/rejected</u> pallet of drum overpacks for mercury with mercury monitor as follows:</p> <p>i. Go completely around the separated drum holding the mercury sampler inlet 6 inches from the side surfaces while sweeping the side surfaces.</p> <p>ii. Go completely around the drum lid bung seal and drum lid seal holding the sampler inlet 2 inches from the seals.</p> <p>iii. Record the highest mercury concentration readings and their locations in items (i) and (ii) above.</p> <p>iv. If mercury readings obtained through monitoring in 2(b)(i) and (ii) are at or in excess of 25 ug/m³ on the separated drum overpack, re-seal the drum lid or the bung, as the case may be, and/or proceed to rehabilitation of drum overpack(s) through cleaning/decontamination of the drum before considering its replacement⁵.</p> <p>v. If mercury readings obtained through monitoring in 2(b)(i) and (ii) are below 25 ug/m³, mark and release these drum overpacks for reassembly for transfer to the warehouse pending verification of the drip pan and the pallet.</p> <p>vii. Proceed to rehabilitation of drum overpack(s) measuring in excess of 25 ug/m³.</p>
FES	<p>3. <u>Rehabilitation of Drum Overpack</u></p> <p>a. For cleaning/decontaminating a drum overpack, use the procedure outlined in <u>Attachment 2</u> if required.</p>

⁵ HWAD has been instructed by ORNL to not replace 30 gallon drums, which would entail handling individual flasks. Should a drum continue to have readings greater than 25,000 ng/m³ they will be overpacked in a 55 gallon drum and shipped to a Mercury Recycling Facility.



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	b. For re-setting the lid or bung seals, follow the drum manufacturer's seal setting procedure outlined in <u>Attachment 3</u> if required.
FES	4. <u>Verification of Drum Overpack</u> a. Re-monitor the drum overpack once rehabilitated and record the data. b. Proceed to monitor the drip pan.
FES	5. <u>Monitoring of Drip Pans</u> a. Monitor each drum drip pan associated with a flagged/rejected pallet of drum overpacks in Section C for mercury with mercury monitor as follows: i. Make one complete pass over the entire <i>top</i> surface of drip pan and the <i>inside</i> of folded edge with mercury sampler inlet 6 inches from the top surface. ii. Make one complete pass over the entire <i>bottom</i> surface of drip pan and the <i>outside</i> of folded edge with mercury sampler inlet 6 inches from the bottom surface. b. Record the highest mercury concentration readings and locations in items (i) and (ii) above. c. If mercury readings obtained through monitoring in 5(a)(i) and (ii) are at or in excess of 25 ug/m ³ , proceed to rehabilitation (cleaning/decontamination) of the drip pan. d. If mercury readings obtained through monitoring in 5(a)(i) and (ii) are below 25 ug/m ³ , mark and release the drip pan for use with the associated drum overpacks pending verification of the pallet.
FES	6. <u>Rehabilitation of Drip Pans</u> For cleaning/decontaminating a drip pan, use the procedure outlined in <u>Attachment 2</u> if required.
FES	7. <u>Verification of Drip Pans</u> a. Re-monitor the drip pan once rehabilitated and record the data. b. Proceed to monitor the pallet.
FES	8. <u>Monitoring of Pallets</u> a. Monitor each pallet associated with a <u>flagged/rejected</u> pallet of drum overpacks in Section C for mercury with mercury monitor as follows:



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	<p>i. Make one complete pass over the entire <i>top</i> surface and the <i>side</i> surface of the pallet with mercury sampler inlet 6 inches from the top surface.</p>
	<p>ii. Make one complete pass over the entire <i>bottom</i> surface of pallet with mercury sampler inlet 6 inches from the bottom surface.</p> <p>b. Record the highest mercury concentration readings and their locations 8(a)(i) and (ii) above.</p> <p>c. If mercury readings obtained through monitoring in 8(a)(i) and (ii) are at or in excess of 25 ug/m³, proceed to cleaning/decontamination of the pallet.</p> <p>d. If mercury readings obtained through monitoring in 8(a)(i) and (ii) are below 25 ug/m³, mark and release the pallet for use with the associated drum overpacks.</p>
FES	9. <u>Rehabilitation of Pallets</u> . For cleaning/decontaminating a pallet, use the procedure outlined in <u>Attachment 2</u> if required.
FES	10. <u>Verification of Pallets</u> Re-monitor the pallet and record the data.
FES	11. <u>Re-assembly</u> : Re-assemble the drum overpacks, drip pan, and the pallet for transfer to the destination warehouse.



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FES	<p><u>Attachment 1</u></p> <p>Shipping Container Decontamination Procedure</p> <p>Parties recognize these may be shipping containers that would have transported in commerce mercury metal, mercury-bearing articles, or mercury-bearing wastes destined for recycling or disposal. As DLA has no control over the choice of arriving commercial shipping containers by the commercial contractor, empty contaminated commercial shipping containers arriving at DNSC Depots will be REJECTED.</p> <p>Cleaning and decontamination procedures described in this Attachment will be used for cleaning and decontamination of shipping containers with mercury shipments at the destination location at Hawthorne Army Depot (HWAD) in Hawthorne, NV.</p>
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FES	<p>Mercury Cleaning and Decontamination of Shipping Containers</p> <p>A. <u>General</u>: For decontamination of shipping containers, wear all proper protective clothing and a mercury vapor respirator. It is absolutely essential to properly evaluate the extent of the mercury contamination problem and to assess the quality of the clean-up process. Monitoring should be carried out with a calibrated mercury monitor as needed.</p> <p>Open the shipping container and let it air out naturally⁶.</p> <p>B. <u>Cleaning/Decontamination</u></p> <ol style="list-style-type: none"> 1. Remove unauthorized persons in the vicinity of the shipping container to be decontaminated. 2. Mark off the area by placing signs or border tape to warn other personnel of potential mercury hazard. 3. Wear appropriate personal protective equipment. 4. Monitoring mercury vapor levels and visual observation should determine if there is any spilled mercury, which can be reclaimed without immediately applying a mercury vapor chemical absorbent/depressant. 5. Remove any visible mercury with a mercury vacuum or an aspirator bulb. 6. If it appears that mercury vapors are continuing to be generated from the spill, and further reclamation is not feasible, apply an absorbent/depressant HgX or any other approved chemical absorbent/depressant according to the manufacturer's recommendations. 7. After the majority of the spilled mercury has been cleaned up, re-treat the surface area of the spill thoroughly using approved chemical absorbent/depressant. 8. Upon completion of the initial cleanup and decontamination, apply a mercury-indicating powder to the area or location to determine if additional decontamination is required. 9. Residual mercury is generally the result of "micro-droplets" in the cracks and crevices of the floors, walls, storage containers and storage aids (i.e. pallets, trays, etc.). The use of a mercury-indicating chemical will help detect if there is any hidden mercury left behind. This will provide a good indication if further decontamination is necessary because the indicating chemical will change from a bone-white color to a pink or black color on contact with actual mercury or mercury vapors.
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⁶ Previous reviews by CAPP auditors have not allowed this step to be performed.
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	10. Apply the indicating chemical by sprinkling a thin layer of powder over the decontaminated area or the area in question.
FES	<p>11. Treat vertical surfaces by preparing a thin paste with water and painting it over the area in question.</p> <p>12. After it has been applied, leave the indicating chemical layer undisturbed for 24 hours. The presence of mercury or mercury vapor will be indicated by individual or numerous pink or black spots. Each spot pinpoints a source of mercury or mercury vapor.</p> <p>13. Using a mercury vacuum, sweep up the complexing agent residues.</p> <p>C. Keep in mind that mercury vapor build-up will vary with temperature, atmospheric pressure (altitude), air circulation, type of surface involved, and the effects of other contaminants. Heavily contaminated surfaces may require more decontaminant.</p> <p>D. Re-Monitoring/Verification: Re-monitor the shipping container to ensure that all sources of mercury contamination have been identified, cleaned, or removed.</p> <p>E. Keep accurate records as to time, place and levels of all mercury monitoring results using the Mercury Monitoring Sheet in the DLA Form 32.</p>



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FES	<p><u>Attachment 2</u></p> <p>Cleaning and Decontamination Procedure</p> <p>For</p> <p>Overpack Assemblies, Handling Equipment, and Vehicles</p>
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FES	Mercury Cleaning and Decontamination
	<p>A. <u>General</u>: For decontamination of affected overpack assemblies, handling equipment and vehicles, wear all proper protective clothing and a mercury vapor respirator. It is absolutely essential to properly evaluate the extent of the mercury contamination problem and to assess the quality of the clean-up process. Monitoring will be carried out with a properly calibrated Lumex mercury monitor.</p> <p>Move the overpack assemblies, handling equipment and vehicles to the staging area as appropriate away from the mercury storage areas. This action will eliminate or greatly reduce the potential interference by any mercury present in the storage areas</p> <p>B. <u>Cleaning/Decontamination</u></p> <p>Follow directions in B.1. through B.12. in Attachment 1.</p> <p>C. Keep in mind that mercury vapor build-up will vary with temperature, atmospheric pressure (altitude), air circulation, type of surface involved, and the effects of other contaminants. Heavily contaminated surfaces may require more decontaminant.</p> <p>D. <u>Re-Monitoring/Verification</u>: Re-monitor the shipping container to ensure that all sources of mercury contamination have been identified, cleaned, or removed.</p> <p>E. Keep accurate records as to time, place and levels of all mercury monitoring results using the Mercury Monitoring Sheet in the DLA Form 32.</p>

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Attachment 3

Drum Manufacturer's
 Seal Setting and Tightening
 Procedure



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SKOLNIK

STEEL CONTAINERS + PACKAGING

GAP / PQ 080

CLOSURE INSTRUCTIONS In compliance with DOT 49 CFR §178.2 (c), persons shipping Skolnik drums must comply with the following closure instructions.

BOLT RING CLOSURE FOR OPEN HEAD DRUMS

- CHECK GASKET** – to ensure cover gasket is properly fitted into cover groove (see Fig. 1 or 2).
- PLACE COVER ON DRUM** – being careful to properly seat gasket all around curl (see Fig. 3).
- POSITION & SEAT RING** – with lugs downward. Ensure the inner channel of the closure ring engages entire drum curl and cover (see Fig. 4). Apply downward pressure on cover. Use a non-sparking dead-blow mallet to further seat cover and drum curl into the inner channel of the ring.
- INSERT BOLT** – through the unthreaded lug of the ring. Assemble the locking hex nut onto the threaded end of the bolt and tighten into the threaded lug (see Fig. 5). Close the ring to an initial gap of about 1/2".
- TIGHTEN THE BOLT** – with a calibrated torque wrench while using downward pressure on the cover and hammering the outside of the ring with a non-sparking dead-blow mallet to further seat the ring. Continue tightening and hammering the ring until the torque stabilizes at 55 - 60 ft. lbs. and does not decrease when further hammering on the ring circumference is performed. Ring ends must not touch. (Effective 25 September, 2006 and in accordance with CFR 178.2(c), we have revised this procedure to use torque as the most effective closure requirement.)
- LOCK RING** – by tightening the nut against the unthreaded lug (see Fig. 6).

OPEN HEAD DRUM - LEVERLOCK CLOSURE

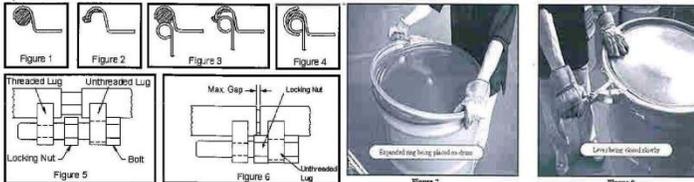
- CHECK GASKET** – to ensure cover gasket is properly fitted into cover groove (see Fig. 1 or 2).
- PLACE COVER ON DRUM** – being careful to properly seat gasket around curl (see Fig. 3).
- OPEN LEVERLOCK** – and place expanded ring on to the drum cover with the vertical-skirt hugging the drum body (see Fig. 7).
- CLOSE LEVERLOCK** – by slowly and cautiously pulling the LEVERLOCK so that the outer ring engages the cover / body juncture. Downward pressure along with tapping the outside of the ring may assist in an even closure (see Fig. 8).
- ENGAGE LOCK** – to complete closure.

DRUMS WITH FITTINGS

- CHECK GASKETS** – and ensure gasket is properly seated on plug.
- TIGHTEN** – to specifications listed below, and do not cross thread.

PLUG TYPE	Tri-Sure		Rieke (plastic)		Rieke (steel)		Nuc-Fit fillers
	Buna	Poly or Teflon	PE/PP (composite drums)	—	poly	all other	
3/4" plug	12 ft-lbs	20 ft-lbs	—	9 ft-lbs	20 ft-lbs	15 ft-lbs	8 - 12 ft-lbs
2" plug	20 ft-lbs	30 ft-lbs	10 ft-lbs	20 ft-lbs	40 ft-lbs	30 ft-lbs	—

IMPORTANT:
A drum is properly closed only when all steps are completed in the manner and sequence indicated.
If difficulties are encountered, do not stop the drum and call Skolnik for further instruction.



IMPORTANT:

- Under the applicable DOT regulations, any changes made to the method of closure or a closure component constitutes a change in the design type of this packaging, and invalidates the certification.
- After filling and prior to transport, the shipper should verify the torque of all closures to determine if the effects of heating and cooling or gasket relaxation have resulted in the need to re-tighten the closure.
- Drums (other than this composite) are tested at room temperature.
- Calibrated plug torque wrenches can be purchased from Skolnik.

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Retired Closure Instructions