

12 - EMERGENCY RESPONSE AND SPILL CLEANUP

Title: Emergency Response and Spill Cleanup

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Approval Signatures and Date

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NOTE: This document will be reviewed at least annually to ensure its suitability.

Revision History

Rev. No.	Change description	Author
1	Change description Crosswalk Between NDEP CAPP Review Comments (dated 2014-12-09, 2015-01-30 and 2015-02-26) and Mercury Storage and Transfer Program Document Contents March 10, 2015	Burton Packard and Renee Rodriguez

NOTE: Hard copies of this document may not be the current version. Refer to the "IAmTheKey" to verify the current version.

Reference Documents

Document number	Document title
Procedure 2015-MMTS-2	Metric Ton Container Setup
Procedure 2015-MMTS-6	Fume Hood 1 – Mercury Access
Procedure 2015-MMTS-7	Fume Hood 2 – Mercury Transfer
Procedure 2015-MMTS-13	Data Acquisition and Inventory Management
ORNL MSSP-13	Review of Spill Cleanup Methods and Waste Disposal
	HWAD RCRA Contingency Plan
DZHC-EOP Annex C	Emergency Response
	HgX [®] MSDS http://www.actontech.com/hgx6.htm

PURPOSE

This procedure describes how the Mobile Mercury Transfer System (MMTS) staff should respond to emergencies, including medical emergencies and non-emergency (off-normal) situations: (1) What to do in the event of small mercury spills, (2) How to deal with a leaked or leaking mercury flask, and (3) What to do if there is a power outage.

NOTE: This procedure should be read in conjunction with: (1) 2015-MMTS-5, "Metric Ton Container Setup and Removal;" (2) 2015-MMTS-8, "Flask Handling Operations;" and (3) 2015-MMTS-9, "Mercury Transfer Operations." In addition, an earlier document, MSSP-13, "Review of Spill Cleanup Methods and Waste Disposal," prepared for the Defense Logistics Agency by Oak Ridge National Laboratory (ORNL) in August 2009, must be part of the training for Emergency Response and Spill Cleanup procedures. This procedure works in concert with the Hawthorne Army Depot (HWAD) Resource Conservation and Recovery Act (RCRA) Contingency Plan and DZHC-EOP Annex C Emergency Response Plan.

12.1 SCOPE

This procedure covers the following possible emergency and other non-emergency events that could occur in the MMTS:

- Medical emergencies during operations.
- Non-emergency discovery of leaked or leaking flasks during drum or flask handling operations.
- Non-emergency loss of mercury (i.e., drips or spills during flask handling and/or transfer operations).
- Non-emergency loss of power to the MMTS during daytime operations, or at night when the building is unoccupied.

12.2 PROCEDURES

12.3.1 Required Equipment and Supplies (PPE as specified on page XI of the Executive Summary under General Safety and Health)

Workers need the following specific equipment and supplies to perform the actions specified in this procedure:

- HgX solution (refer to Material Safety Data Sheet at <http://www.actontech.com/hgx6.htm>)
- Mercury high efficiency vacuum (stored in Building 110-66)
- Respirators rated for mercury service
- Drum markers

12.3.2 Emergency and Non-emergency Responses

Table 12.1 below summarizes emergencies and non-emergency events that could be encountered by workers during operations, or off-normal events that could occur when the MMTS is vacant of operating personnel (i.e., nighttime, weekends, and holidays).

A broken fluorescent bulb will be cleaned up following Table 12.1 directions based on location: within a fume hood or outside the fume hoods. Broken fluorescent bulb components will be treated as RCRA waste.

Table 12.1 Summary of responses to medical emergencies, leaky flasks, loss of mercury, or loss of power

Medical emergency	Response	Notes
Drum Handling Worker feels ill (e.g., dizzy, nauseous, and disoriented)	<ul style="list-style-type: none"> • Stop work in the Drum Handling Area. • Contact HWAD Fire and Emergency Services (FES) and describe nature of emergency. 	1
Drum Handling Worker collapses, may be conscious or unconscious	<ul style="list-style-type: none"> • Contact HWAD FES and describe nature of emergency. • Stop all work in the MMTS. 	
Flask Handling Worker feels ill (e.g., dizzy, nauseous, and disoriented)	<ul style="list-style-type: none"> • Facility Manager or any worker observing this condition presses E-stop to turn off the mercury transfer pump if operator is incapable of doing so. • Stop flask handling operations at the fume hood. • Contact HWAD FES and describe nature of emergency. 	2
Flask Handling Worker collapses, may be conscious or unconscious	<ul style="list-style-type: none"> • Supervisor or any worker observing this condition presses E-stop to turn off the mercury transfer pump. • Contact HWAD Fire and Emergency Services: describe nature of emergency. • Stop all work in the MMTS. 	3
Worker has mercury contaminated puncture wound	<ul style="list-style-type: none"> • Cease operations and safely shutdown equipment • Notify supervisor and rinse wound at eye wash station • Facility Manager or designee contacts FES 	

Leaky flasks	Response	Notes
Leaky flask in drum	<ul style="list-style-type: none"> • Drum handling worker replaces drum lid. • Tightens lid band to drum manufacturer's specification. • Marks drum and lid to identify that loose mercury is contained therein. • Notifies Facility Manager. • Follows the procedure referenced in Note 4. 	4
Leaky flask observed while lifting from a drum onto the conveyer table	<ul style="list-style-type: none"> • Drum handling worker lowers the flask back into the drum. • Removes the lift fixture. • Replaces drum lid. • Tightens lid band to drum manufacturer's specification. • Marks drum and lid to identify that loose mercury is contained therein. • Notifies Facility Manager or designee. The Facility Manager or designee alerts HWAD FES and advises that the situation is under control. • Upon instruction by Facility Manager, don appropriate personal protective equipment and perform cleanup of any loose mercury. Use high efficiency mercury vacuum as needed; follow manufacturer's recommendations. • Follows procedure referenced in Note 4. 	4
Leaky flask observed in the flask tray on the roller conveyer table	<ul style="list-style-type: none"> • Drum handling worker ceases placing additional flasks into the flask tray. • Worker notifies the MMTS Facility Manager. The Facility Manager or designee alerts HWAD FES and advises that the situation is under control. • With Facility Manager or designee's permission, mercury transfer operator continues mercury transfer operations under the Fume Hood 2 until only empty flask trays remain. • Mercury transfer operator moves empty flask trays out of Fume Hood 2 and moves only the flask tray with a leaky flask into Fume Hood 2. • Mercury transfer operator transfers mercury remaining in the leaky flask per Procedure 2015-MMTS-9, "Fume Hood 2 – Mercury Transfer." • Mercury transfer operator removes the leaky flask from the flask tray and wipes the flask exterior with HgX® solution* 	5

* HgX® solution in spray bottles (To prepare: add 1.5 pounds of HgX® slowly or sift into 5 gallons of water - do not dump. Use cold tap water to make up solutions. If the water, after adding the recommended quantity of HgX®, does

	<p>(or equivalent) using a gauze wipe before placing the leaky flask into the shaker tray.</p> <ul style="list-style-type: none"> • Mercury transfer operator transfers the loose mercury in the flask tray tube (i.e. the 6-pack) using the peristaltic pump and siphon tube. • Mercury transfer operator wipes the interior surface of the flask tray with HgX[®] solution (or equivalent) using a gauze wipe before placing the flask tray in a sealable bag for subsequent vapor monitoring tests before reusing that flask tray. • Mercury transfer operator places used gauze wipes into sealable bag for disposal as hazardous waste. 	
Leaky flask observed in the flask tray under the fume hood	<ul style="list-style-type: none"> • Mercury transfer operator notifies Facility Manager of leak in flask tray. Then Facility Manager alerts HWAD FES and advises that situation is under control. • With Facility Manager's permission, mercury transfer operator continues mercury transfer operations under the fume hood for that tray. • Mercury transfer operator transfers mercury remaining in flask per Procedure 2015-MMTS-9, "Fume Hood 2 – Mercury Transfer." • Mercury transfer operator removes the flask from the flask tray and wipes the exterior surface of the flask with HgX[®] solution (or equivalent) on gauze wipe before being placed into shaker tray. • Mercury transfer operator transfers the loose mercury in the tray tube using peristaltic pump and siphon tube. • Mercury transfer operator wipes interior tube surface with HgX[®] solution (or equivalent) before placing tray in sealable bag for subsequent vapor monitoring tests before reusing that tray. • Mercury transfer operator places gauze wipes into sealable bag for disposal as hazardous waste. 	5
Loose mercury outside the fume hood	<ul style="list-style-type: none"> • Mercury transfer operator stops pumping, presses E-stop to turn off peristaltic pump and turns off power switch on the pump motor-controller. • Mercury transfer operator advises Facility Manager and alerts others in the vicinity to exit the Flask Handling Area. Then 	6

not turn milky (white) within 15 minutes or half hour, add additional HgX[®] until it does. The solution upon standing several hours (overnight) will turn clear but retain its efficacy. The precipitation on the bottom of the container is merely the excess above saturation.)

NOTE: There is no water source in the MMTS nor is there water in the mercury storage warehouses. Therefore, the HgX[®] solution will be prepared and stored at another HWAD location until it is needed for cleaning operation.

	<p>Facility Manager alerts HWAD FES and advises that situation is under control.</p> <ul style="list-style-type: none"> • If it is safe to do so, worker contains spill to minimize spread of contamination outside the fume hood. • Under the guidance of the Facility Manager or designee, workers don the required personal protective equipment, including a respirator, and follow the cleanup procedures given in <i>MSSP-13, "Review of Spill Cleanup Methods and Waste Disposal," prepared for the Defense Logistics Agency by Oak Ridge National Laboratory.</i> • Use high efficiency mercury vacuum as needed; follow manufacturer's recommendations. 	
Leaking transfer QD fitting to MT container	<ul style="list-style-type: none"> • Mercury transfer operator immediately ceases mercury transfer operations by turning off peristaltic pump. • Since this is "loose mercury outside the fume hood," the steps outlined above are to be followed. • It is likely that the MT container, the scale, and the drip tray under the scale are contaminated. Cleanup procedures outlined in the document referenced in Note 6 are to be followed. • Upon instruction by Facility Manager, don appropriate personal protective equipment and perform cleanup of any loose mercury. Use high efficiency mercury vacuum as needed; follow manufacturer's recommendations. 	6

Loss of power	Response	Notes
Loss of electrical power during daytime operations	<ul style="list-style-type: none"> • Worker in the Flask Handling Area turns off the main power switch to the peristaltic pump and presses the E-stop button. • Facility Manager contacts Security and FES and notifies them of the power outage. • Facility Manager ensures that all affected operations are in safe standby (i.e., that a flask in the Drum Handling Area that was partially lifted out of a drum has been manually placed back into the drum, and that the fume hood doors are closed). • Facility Manager oversees orderly exit of workers from the MMTS (some workers will have to remove PPE first). 	7
Loss of electrical power at night	<ul style="list-style-type: none"> • Upon arrival for morning activities, the Facility Manager notices a visual signal that either power is not available or that power was lost sometime during the night. • Facility Manager or designee contacts Security and FES and notifies them of the power outage. • Facility Manager or designee does not allow workers into the building until an “all clear” is received from Security and/or FES. • Facility Manager or designee reschedules operations accordingly. 	7
Loss of mercury outside the MMTS	Response	Notes
	<ul style="list-style-type: none"> • Facility Manager or designee contacts HWAD FES and notifies them of the quantity and location of loose mercury • FES responds and performs the appropriate cleanup activities 	8

Notes.

1. Operations in the Flask Handling Area may continue unless the Facility Manager “stops work.”
2. Even if the mercury transfer operator has stopped operating the transfer pump, the E-stop must be pressed to render the transfer pump inactive since the operator may have only released the foot-operated on/off switch, and the main power switch to the transfer pump may be in the “on” position. The main transfer pump toggle switch is located at the back of the transfer pump must also be turned off. The E-stop remains “pressed” until the work Facility Manager determines that the transfer pump has been properly de-energized.
3. Facility Manager determines when it is safe to release the E-stop and turn on the main power switch to the transfer pump.
4. Document 2015-MMTS-5, “Drum Handling.”
5. The 6-in. ID by 7-in. high tube in the flask tray is designed to contain up to 0.9 L of mercury from a flask having a 5-in. OD. Flasks contain 2.5 L of mercury.
6. MSSP-13, “Review of Spill Cleanup Methods and Waste Disposal,” is a detailed treatise of proper cleanup and waste disposal methods that also identifies numerous procedures, equipment, and materials needed for mercury cleanup. It was prepared for the Defense Logistics Agency by Oak Ridge National Laboratory in August 2009, and made available to the HWAD.
7. The Mercury Monitoring System is equipped with a back-up power supply sufficient to continue monitoring the concentration of mercury in the air for about eighty minutes after electrical power is lost to the MMTS.
8. The HWAD FES staff members respond to and perform cleanup of all loose mercury outside the MMTS.

NOTE: *Because of the potentially serious nature of these events as they relate to the health and safety of the workers and the environment, a worker must never be alone in the MMTS (i.e., use of the “buddy system” should be enforced.) If there is a valid reason for not having a co-worker also present, the worker must notify the Guard Operations Center at 775.945.7911 and state when he/she will enter the MMTS and what time the worker expects to leave MMTS. The worker must notify the Guard Operations Center again after he/she leaves the MMTS.*

12.3.3 Restoring Power after a Loss-of-Power Event

The Facility Manager or designee must restart the PCDAS and MMS systems following a Loss-of-Power event that lasts longer than the capacity of the UPSs (nominally 80 minutes). After restoring power to the MMTS, power must be restored to the PCDAS and MMS systems and the PCDAS and MMS computers must be turned on (see Section 13.5 page 13-19).

12.4 RECORDS

- Industrial Safety and Health records for health or safety incidents
- FES records for emergency response/spill cleanup
- Data Acquisition System records for incidents