

DRAFT
US EPA Region 4
Emergency Response

OSC Mercury Field Operations
Guide
January 2008

(OSC Mercury FOG)



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**DRAFT US EPA Region 4 Emergency Response
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U.S. Environmental Protection Agency (EPA) Region 4 has prepared this draft Emergency Response Mercury Field Operations Guide (OSC Mercury FOG) for the responding On-Scene Coordinator (OSC). The intent of this guidance is to help the responding OSC review response procedures and quickly find needed information during a mercury spill. The OSC Mercury FOG has been prepared by OSCs for OSCs, drawing from experiences gained from mercury spill responses. The OSC Mercury FOG should be used in conjunction with the EPA Region 5 Mercury Response Guidebook (Mercury Response Guidebook).

At the bottom of every page are lines for notes, which are intended to allow the OSC to document their experiences from mercury spill and response to share those experiences with other OSCs.

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- I. Initial Call Received by the Regional Emergency Operations Center (REOC). The Duty Officer (or Duty OSC) should assess the size of the spill and determine the appropriate response action.
 - A. The Duty Officer assessment should consider the following:
 - 1. Whether a spill or release has occurred, and whether the spill/release threatens human health, welfare or the environment.
 - 2. Size and source of the mercury spill.
 - 3. State and/or local involvement and whether or not they have requested for assistance.
 - 4. Determine response actions needed.
 - 5. Is there a viable PRP?
 - B. Size of mercury spill
(www.epa.gov/mercury/spills/index.htm)
 - 1. Compact Fluorescent light bulb - **EPA DOES TYPICALLY NOT RESPOND**. Duty Officer should talk the caller through clean-up process and reference the EPA Mercury web site.
 - 2. Thermometer - **EPA DOES NOT TYPICALLY RESPOND**. Duty Officer should talk the caller through clean-up process and reference the EPA Mercury web site.
 - 3. Thermometer to less than 1 pound (two tablespoons or 1 fluid ounce [oz]) and meets criteria to respond. Advise the caller to call the National Response Center (NRC). EPA Region 4 requires a NRC report to respond (800) 424-8802.

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- a. Talk the caller through the steps to prevent further spread of contamination and gather as much information as possible on the cause of the spill.
 - b. Insure the County Health Department is notified.
 - c. If mercury spill occurred at a school, recommend that the principal and/or County Emergency Management Agency (EMA) collect potentially contaminated shoes, clothing, book bags, etc., before contamination is potentially spread.
 - d. Duty Officer should advise a school or business to contact a qualified environmental clean-up contractor. (Mercury clean-up experience is advised)
4. One pound (1 oz) or greater (reportable quantity)- advise caller to call the NRC first-meets criteria for EPA to respond
- a. Talk the caller through the steps to prevent further spread of contamination and gather as much information as possible on the cause of the spill.
 - b. Insure the County Health Department is notified.
 - c. If mercury spill occurred at a school, recommend that the principal and/or County Emergency Management Agency (EMA) collect potentially contaminated shoes, clothing, book bags, etc., before contamination is potentially spread.

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- d. Duty Officer should advise a school or business to contact a qualified environmental clean-up contractor.
(Mercury clean-up experience is advised)

II. Health and Safety Guidelines and Removal Action Levels (RALs) for mercury vapors (see Section 3 of Mercury Response Guidebook for additional levels, e.g., personal items, vehicles, soils, etc.)

EXPOSURE LIMITS	
OSHA IDLH	10,000 $\mu\text{g}/\text{m}^3$
OSHA PEL	100 $\mu\text{g}/\text{m}^3$
NIOSH TWA	50 $\mu\text{g}/\text{m}^3$
ACGIH TLV	25 $\mu\text{g}/\text{m}^3$
EPA PPE Action Levels	
	Level C upgrade at 25 $\mu\text{g}/\text{m}^3$
	Level B upgrade 50 $\mu\text{g}/\text{m}^3$

EPA Mercury Removal Action Level (RAL)/Clean-up Levels		
Building Type	RAL	Clean-up Level
Residential	1 $\mu\text{g}/\text{m}^3$	1 $\mu\text{g}/\text{m}^3$
School	3 $\mu\text{g}/\text{m}^3$	1 $\mu\text{g}/\text{m}^3$
Industrial	25 $\mu\text{g}/\text{m}^3$	3 $\mu\text{g}/\text{m}^3$
NOTE: State Clean-up Levels may differ from EPA		

- III. Responding OSC - Before you leave the office
 - A. Initiate through Duty Officer a Superfund Technical Assessment and Response Team (START) Technical Direction Document (TDD) for at least 2

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- START Responders to assist in assessment, monitoring and documentation.
- B. Obtain multiple copies of Mercury Specific Access agreements.
 - C. Other Response Support sources (see Section 2 of the Mercury Response Guidebook)
 - 1. ATSDR 770-488-7100 (State that you are with EPA and ask to speak with the ATSDR Duty Officer)
 - 2. State emergency response program/agency
 - 3. County Health Department/Emergency Mgmt. Agency
 - 4. START
 - 5. ERRS
 - 6. Other OSCs with mercury experience
 - 7. EPA Region 4 Office of External Affairs (404) 562-8327
 - D. OSC Equipment needed from EPA Warehouse
 - 1. **OSC PPE:** 1 case tyvek, 1 case tyvek booties, 2 boxes gloves, air purifying respirator (APR), 1 box Mercury vapor cartridges, and 1 or 2 SCBA air packs, in addition to your personal response gear bag.
 - 2. **OSC CT Warehouse monitoring equipment:** 2 Lumex, 1 Jerome, 1 TVA1000, and 1 radiation meter.
 - 3. **Clean-up equipment to remember:** flashlight, tents, chairs, tables, heaters, therometers, and exhaust fans with filters.

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- START and/or ERRS can supply this equipment - see equipment list in the Mercury Response Guidebook.
- 4. Data management tools (spreadsheet for personal items, laptop, camera, video camera, etc.)
 - START can supply these tools

IV. Responding OSC - Arrival at spill location

- A. Debrief of current responding state/local agency and interview property owner (questions to ask):
 1. Understand how the spill occurred,
 2. Was a clean-up attempted,
 3. How the clean-up was conducted,
 4. What actions have been taken,
 5. Who handled or who was present during the spill,
 6. Where did the mercury originate,
 7. Where was the mercury detected,
 8. Was the mercury taken to another location,
 9. Was the mercury container opened or was the mercury handled anywhere else,
 10. Ages of people living in the home (understand sensitive population: ATSDR will ask for this information if you call them),
 11. For Businesses or Schools: Has a qualified environmental clean-up contractor been contacted? If so, does the contractor have mercury clean-up experience?
- B. Obtain Signed Access Agreement (EPA Region 4 Mercury Site-Specific Agreement)

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- C. If multiple homes and/or schools are impacted and action levels are exceeded, then multiple site accounts should be considered.

V. Response Assessment

A. Pre-entry

- 1. OSC and/or START contractor preparation of Lumex/Jerome instruments (Note: radiation/VOC survey may be needed also)
- 2. Proper PPE boots/gloves - determine the level of PPE with an open door survey or adjust as necessary during survey (Note: booties are essential for all entries to prevent tracking mercury).

B. Determination (survey of all rooms, including closets, in the property)

- 1. If **below** removal action level then advise property owner on steps to reduce contamination and/or clean-up.
- 2. If **above** removal action level then follow Sections 5 and 7 of the Mercury Response Guidebook.
- 3. Use a flashlight in a darkened room to identify mercury beads.
- 4. Identify the area of the spill and isolate it.

C. Ventilation

- 1. Use ventilation to reduce mercury vapors in the structure (engineering controls may reduce respiratory protection levels needed to work in the hot zone).

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Note: Ventilation is critical to reduce mercury vapors; begin the ventilation as soon as possible. Ventilation reduces cross contamination via mercury vapor saturation by reducing the absorption of mercury vapors into porous materials and may reduce clean-up time by allowing the off-gassing of mercury vapors from porous materials. Ventilation will also reduce the ambient mercury vapors concentrations in the exclusion zone, possibly reducing worker PPE levels. Ventilation is as simple as opening windows or doors to the outside, but be aware of where the window or doors vents are located. Ventilation should not be conducted during source identification or during the confirmation sampling period.

VI. Relocation of Residents

- A. Guidance, Superfund Response Actions: Temporary Relocations Implementation Guidance, USEPA, OSWER Directive 9230.0-97, April 2002 (also see Section 4 of Mercury Response Guidebook).
<http://www.epa.gov/superfund/community/relocation/tempreloc.pdf>
- B. Always ask residents if they have anyone, family or friends, in the area to stay with before offering relocation.
- C. Screen all personal items before allowing items to be removed from the site.
- D. Request Community Involvement Coordinator (CIC) assistance.

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- E. For relocations lasting less than 5 days, ERRS and/or Red Cross can be used (see Section 4 of Mercury Response Guidebook).
- F. If relocation is anticipated to be longer than 5 days, consider calling the Army Corp of Engineers (COE) for support. (Region 4 COE contact, Michael Groves (513) 569-7590)
 - Involve the Regional inter-agency agreement (IAG) contact (EPA Region 4 contact, Paula Walraven (404)562-8858)

VII. Clean-up Activities

- A. Clean-up levels (see Section 2 of OSC Mercury FOG, Section 3 of Mercury Response Guidebook, and Region 4 Revised Mercury Removal Action Levels at ERRB Sites, dated July 21, 2005).
- B. Conduct routine monitoring during all response activities to identify when conditions change.
- C. Change the filter in the heating, ventilation, and air conditioning (HVAC) system before using the HVAC system.
- D. Refer to Section 5 of the Mercury Response Guidebook for clean-up activities
 - 1. Steps for structures clean-up
 - a. Isolate the contaminated area from the remaining structure to prevent cross-contamination and ventilate the contaminated area to a location outside the structure.
 - b. Remove all visible mercury using an approved mercury-specific vacuum with

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- filters in place. (Note: conduct air monitoring while vacuuming)
- c. Recommend to remove any carpet that came in contact with mercury, carpet cannot be cleaned.
 - d. While conducting the mercury removal, begin heating the area from 80°F to 90°F, and use forced ventilation to evacuate mercury vapors. Note: Excessive heating may cause damage to the structure.
 - e. Once all visible mercury is removed, conduct an assessment for non-visible mercury (e.g., behind base-boards, cracks, etc.). Stop ventilation, close off the room, and conduct air monitoring to identify any remaining sources (concentrations approximately 3 µg/m³ or above). If another source is discovered, locate the source and remove it. Before major demolition (i.e. removal of subfloor or walls), contact ATSDR Duty Officer, 770-488-7100 to verify the need.
 - f. Once the room's ambient mercury vapor concentrations are less than 3 µg/m³, wash the affected area with a sulfur salt/chelating agent (follow manufacture's recommendations). While cleaning the area with a sulfur-based chelating agent, keep the area heated from 80°F to 90°F and use forced ventilation to evacuate mercury vapors.

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- g. Keep the room temperature between 80°F to 90°F and continue ventilation at least 1 hour after the surfaces are clean mopped and the surfaces are completely dry.
 - h. Reduce the room temperature to [75°F to 80°F] and close the room. Cease all ventilation and allow the room to stabilize for 1 to 2 hours. Conduct air monitoring [with Lumex]; if the ambient mercury vapor concentrations are not less than 1 µg/m³, repeat steps 3, 4, 5, and 6. If the ambient mercury vapor concentrations are less than 1 µg/m³, change the filter in the HVAC system, conduct confirmation air sampling procedures. **Note:** If the clean-up goal of 1 µg/m³ cannot be obtained, see Mercury Response Guidebook Section 5, Optional Steps, or consult ATSDR Duty Officer for guidance.
2. Steps for Personal Items (collecting, monitoring, etc. see Section 5 of Mercury Response Guidebook)
- a. Cleanup level of 10 µg/m³ for personal items. This is site-specific and based on the number and size of the item and the item's impact on the mercury vapor levels in the structure. **Note:** Clean-up Levels for personal items may range from 1 to 10 µg/m³. This is at the discretion of the OSC.

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- b. All personal items removed for mercury screening or disposal should be documented by photograph and in written description, as well as, denoted in the logbook whether an item was returned or disposed. A inventory tracking database would be appropriate to document personal items. **Note:** (COE can assist with appraisals of personal items for replacement value; if needed)
- c. Place personal items (e.g., clothing, furniture, etc.) under a large tent (weather protection) and allow to air out before bagging and monitoring (see Section5 Mercury Response Guidebook).
- d. Security measures should be in place to prevent loss of personal items.
- e. It should be noted that if large items (e.g., couch, chair, mattress, etc.) are involved, the cumulative effect of bringing those items back inside a building may cause the air in the living space (i.e., living room) to exceed the cleanup level. During an emergency response, an EPA toxicologist or ATSDR's Duty Officer (770-488-7100) should be consulted for further assistance.
- f. Personal items that are contaminated and are staged for disposal should be destroyed or secured to prevent anyone else from using contaminated items and potentially spreading contamination.

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3. Steps for Vehicles (see Section 5 of Mercury Response Guidebook)
 - a. Buses and privately owned vehicles:
Cleanup Levels of 10 µg/m³ (case specific)
Note: Clean-up Levels for vehicles may range from 1 to 10 µg/m³. This is at the discretion of the OSC.
 - b. Allow all vehicles to air out for as long as possible between monitoring and during cleanup.
 - c. For buses and privately owned vehicles (e.g., cars, mini-vans, etc.) the levels are based on discussions with ATSDR and the technical practicability of cleaning up the vehicles. During an emergency response, an EPA toxicologist or ATSDR's Duty Officer (770-488-7100) should be consulted for further assistance.
4. Consult states and local authorities where needed

VIII. Confirmation Sampling/Monitoring (see Section 3 of Mercury Response Guidebook)

- A. Air monitoring/sampling
 1. NIOSH Method 6009 (see Attachment D of Mercury Response Guidebook). Use of the Lumex is recommended for confirmation air monitoring in conjunction with the sampling protocol.
 2. Instead of air sampling, confirmation air monitoring may be conducted using the Lumex

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and in conjunction with the following procedures.

3. Change the air filter in the HVAC system before conducting air monitoring / sampling.
- B. Clearance confirmation monitoring/sampling of room(s)
 1. Designate the monitoring locations (example center of impacted room).
 2. Prior to any kind of confirmatory air monitoring in the room(s), close all windows and doors; maintain temperature between 70°F to 80°F for of 2 to 4 hours; and allow the air in the room to stabilize. **Note:** No forced air, heating or cooling.
 3. Collect (document) a total of 7 to 8 readings, one reading per hour, at each selected monitoring location for a monitoring duration of 6 to 7 hours. Readings should be collected at 3 to 4 feet.
 4. Allow three minutes per location for the instrument to stabilize in the designated monitoring location.
 5. The average of the total (7 to 8 readings) is considered the air concentration per monitoring location.
 6. Compare air concentrations to the site-specific clean-up level.

IX. Disposal (hazardous waste vs. non-hazardous)

- A. Segregate household waste/personnel items into hazardous and non-hazardous waste streams

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- 1. Hazardous waste stream would be items that came in direct contact with the mercury
- 2. Potential non-hazardous waste would be items that came in contact with mercury vapors
- B. Disposal sampling
 - 1. Collect composite samples and analyzed them for Total Mercury and Toxicity Characteristic Leaching Procedure (TCLP) waste.

Note: If the household items (e.g., carpet, furniture, clothing, etc.) or PPE is being placed in a roll-off box for disposal, you may consider placing a drum liner inside the roll-off box and collecting pieces of everything that goes into the roll-off and use those to create your composite sample. Therefore, one would not have to dig in a roll-off container to create a composite waste sample.

- C. Waste manifest for mercury residues may be complicated due to the listing of elemental mercury possibly being a listed waste (U151) or characteristic waste (D009).
 - D. If the waste is not a characteristic or listed waste a Subtitle D landfill may accept as "special waste."
 - E. Recycling elemental mercury - see Mercury Response Guidebook Section 5
- X. Other Guidance
- A. EPA Region 5 Mercury Response Guidebook
 - B. Public Outreach Documents (Mercury Response Guidebook Section 4)

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- C. How to speak to the press, consult EPA Region 4 Office of External Affairs (404) 562-8327
- D. EPA Region 4 RCRA mercury contact David Langston (404) 562-8478.

Website References

- E. EPA Mercury Website - Spills, Disposal and Site Cleanup including the Mercury Response Guidebook
www.epa.gov/mercury/spills/index.htm
- F. ATSDR - Metallic Mercury FAQs
<http://www.atsdr.cdc.gov/mercmetal5.html>
<http://www.atsdr.cdc.gov/MercMetallic05.pdf>
- G. NIOSH- Safety and Health Topic: Mercury
<http://www.cdc.gov/niosh/topics/mercury/>
- H. OSHA - Mercury Vapors
<http://www.osha.gov/SLTC/healthguidelines/mercuryvapor/index.html>
- I. ACGIH - Threshold Limit Values (TLVs[®]) and Biological Exposure Indices (BEIs[®])
<http://www.acgih.org/TLV/>
- J. EPA - Relocation Guidance
<http://www.epa.gov/superfund/community/relocation/tempreloc.pdf>
- K. CDC - Elemental Mercury Releases Attributed to Antiques
http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5623a2.htm?s_cid=mm5623a2_e
- L. Find a Recycling Center - Earth 911
<http://earth911.org/>

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