SAN DIEGO
HAZARDOUS INCIDENT RESPONSE TEAM

STANDARD OPERATING GUIDELINES

Mercury

	ITEM	DESCRIPTION:
☐	**BACKGROUND INFORMATION**	Elemental mercury is liquid at room temperature. It is used in some thermometers, dental amalgams, fluorescent light bulbs, some electrical switches, and mining. When heated it becomes a colorless, odorless gas. Exposure to mercury occurs from breathing contaminated air, ingesting contaminated food and water. Mercury can be easily spread on contaminated shoes and clothing. Mercury is a relatively heavy metal (MW 200.6, Sp. Gravity 13.6) and may be difficult to remove on carpeting, upholstery or bedding; these items may need to be discarded properly if they cannot be decontaminated. Air monitoring will need to be conducted to determine the spread of the mercury vapor. Clean up of mercury can last days, and possibly weeks depending on the extent of the spill. In most cases levels of mercury greater than 10 µg/ m^3 will require a cleanup contractor. **Common Sources** Thermometers, thermostats, batteries, fluorescent bulbs, barometers, sphygmomanometers (blood pressure cuffs), gold extraction activities. There are mercury substitutes (i.e. gallium) that have the same appearance of mercury but do not have the same hazards.
☐	**INITIAL SIZE UP**	▪ Is the spill area isolated? ▪ Evacuation needed? ▪ Control zones set up? ▪ Determine extent of exposures, including first responders. Keep all potentially contaminated people and vehicles on-scene for monitoring.
☐	**PROTECTIVE MEASURES**	▪ Isolate the area and deny access to common access points if possible. If indoors, occupants should vacate the building until air monitoring confirms it is safe for them to return. ▪ Check the HVAC system, and consider shutting down the ventilation system as the mercury can spread and contaminate the entire building. If the room can be isolated with independent ventilation (fans, windows, etc.) keep the independent ventilation going to reduce the mercury vapor. Heating mercury to >80^o F can accelerate the vapor release and dispersal process. ▪ Determine extent of spill and evaluate if a hazardous waste contractor is needed for cleanup.
☐	**PERSONAL PROTECTIVE EQUIPMENT (PPE)**	▪ Shoe covers are a must for all spills. ▪ Tyvek suit or coveralls. If air monitoring is conducted and determined to be safe, downgrade PPE to yellow booties, gloves, and eye protection. ▪ At 25 µg/m3, an APR with a mercury vapor cartridge or SCBA should be worn. APR with a mercury vapor cartridge or SCBA should be worn for initial monitoring until determined safe to downgrade. ▪ SCBA when Lumex reaches ma
☐	**TACTICAL ACTIONS**	▪ Air monitoring will need to be conducted to determine the spread of the mercury vapor. APR with a mercury vapor cartridge or SCBA should be worn for initial monitoring until determined safe to downgrade. Monitor your pathway and evaluate level at ground level versus breathing space. ▪ Any person who becomes contaminated should place contaminated clothes in a plastic bag, decontaminate him or herself (shower if needed), put on clean clothes (Tyvek ok). This should be done as to not spread contamination. ▪ Contaminated clothing and shoes must not be worn off-site.

☐	**MITIGATION AND CONTAINMENT**	▪ Usually, cleaning to a mercury vapor concentration of <10 µg/m3, followed by ventilation, is adequate. After cleaning to below 10 µg/m3, ventilate the home for at least 2 weeks. Using electric space heaters may be able to reduce this ventilation time to a few days. ▪ Free mercury droplets can be picked up with duct tape, pipettes, and/or Hg Absorb. dropper. Use appropriate PPE during clean up. ▪ Avoid vacuuming for one to two weeks. A home vacuum cleaner or shop-vac will aerosolize the mercury, increasing airborne concentrations and spreading the contamination. The vacuum cleaner also will become permanently contaminated, requiring its proper disposal. ▪ After picking up visible mercury droplets, ventilate the room, and, if possible, isolate room by closing the door. ▪ If spilled on carpet or porous surfaces they must be removed and properly disposed of. ▪ Place mercury and debris in a leak/airtight container. ▪ Mercury vapors inside buildings can be dispersed to the outside atmosphere, where the concentrations quickly fall to acceptable levels. ▪ Closing off the affected room and heating it to >80^{o} F can accelerate the vapor release and dispersal process. Windows should then be opened, and fans turned on in the room to drive the released mercury outside.
☐	**CHEMICAL INFORMATION**	▪ IDLH: 10mg/m^3 ▪ AEGL (8 hrs): AEGL 1: NR, AEGL 2: 0.33 mg/m^3, AEGL 3: 2.2 mg/m^3 ▪ PEL: Ceiling 0.1 mg/m^3 ▪ Vapor Pressure: 0.0012mmHg ▪ Specific Gravity: 13.6
☐	**TECHNICAL REFERENCES**	▪ ERG #172 ▪ NIOSH: http://www.cdc.gov/Niosh/npg/npgd0383.html ▪ WISER ▪ CDC: https://www.cdc.gov/biomonitoring/Mercury_FactSheet.html ▪ Joint EPA/ATSDR National Mercury Cleanup Policy Workgroup 2012: https://www.atsdr.cdc.gov/emergency_response/Action_Levels_for_Elemental_Mercury_Spills_2012.pdf
☐	**ADDITIONAL RESOURCES**	▪ Fire ▪ Law ▪ EMS ▪ Stormwater
☐	**NOTIFICATIONS**	▪ CalOES: spill notification ▪ CUPA: for permitted facilities ▪ Fire ▪ Stormwater ▪ EPA for large spills
☐	**USEFUL CONTACTS**	▪ Poison Control: (619) 497-8500 ▪ County Health & Human Services (HHSA): Consult Epidemiologist on Duty ▪ Household Hazardous Waste (877) 713 2784
☐	**MONITORING & DETECTION**	▪ Mercury Vapor Analyzers (Jerome and/or Lumex) ▪ Mercury indicator powder
☐	**DECONTAMINATION**	▪ Contaminated persons: remove clothing, wash hands thoroughly wash with soap and water, and remonitor. ▪ Contaminated clothing: may be decontaminated using heat, depending on level of contamination. If clothing or shoes are contaminated, personal items may be put into plastic bags, labeled to identify the owners, and collected in a central area. The bag contents may be heated from approximately 90 ^{o}F to 140 ^{o}F for 24 hours, and then vent. ▪ Contaminated Personal Belongings: these items must be scanned for mercury vapors before leaving the site.

☐	**CLEAN UP & DISPOSAL**	▪ Hg Absorb: for small spills to wipe up and absorb the droplets. ▪ Sulfur ▪ Responsible Party ▪ Licensed clean up contractor and/or household hazardous waste disposal. ▪ Photographs / sampling ▪ Do not use a vacuum (unless with approved mercury filters) or sweep with a broom. ▪ https://www.atsdr.cdc.gov/mercury/docs/Residential_Hg_Spill_Cleanup.pdf
☐	**INCIDENT TERMINATION**	▪ Safe to re-occupy: re-occupancy of a public area (e.g., school or exam room) should be cleared by using real-time air monitoring (Jerome/Lumex).

Suggested Action Levels

MERCURY CONCENTRATION (mg/m^3 = milligrams per cubic meter) ($\mu g/m^3$ = micrograms per cubic meter)	**ACTION**
0.025 mg/m^3 = 25.0 $\mu g/m^3$	Residential Evacuations/Relocation
0.01mg/m^3 = 10 $\mu g/m^3$	Measures should be taken to isolate residents from potential mercury exposure. Ventilate and heat.
<0.01mg m^3 = <10 $\mu g/m^3$	Personal affects can be bagged for 24 hrs, heated then vented, remonitored, and returned.
>0.01mg/m^3 = >10 $\mu g/m^3$	Personal effects are to be disposed of.
0.001 mg/m^3 = 1.0 $\mu g/m^3$	Residential occupancy level of 1.0 $\mu g/m^3$ that is considered "safe and acceptable" for occupancy of any structure after a spill, provided no visible mercury is present.
0.003 mg/m^3 = 3.0 $\mu g/m^3$	School clearance. Re-occupancy after a spill of an occupational or commercial setting where mercury is not usually handled.
0.003 mg/m3 = 3.0 µg/m3 to	Acceptable level for unrestricted use of family vehicles under most conditions.
0.006 mg/m3 = 6.0 µg/m3	Acceptable level to allow personal belongings to remain in owner's possession.
Greater Than 0.010 mg/m^3 = 10.0 $\mu g/m^3$	Isolation of contamination from residents or evacuation of residents
10 mg/m^3 = 10000 ugm3 IDLH (PPE Level B)	The Imminently Dangerous to Life or Health (IDLH) level for elemental mercury 30-minute exposure.
0.1 mg/m^3 Airborne (>0.1 mg/m^3 = APR: Air Purifying Cartridge)	OSHA's legally enforceable ceiling limit.
0.025 mg/m^3 (No APR required per OSHA but suggested) 25 $\mu g/m^3$ (eight-hour time-weighted average).	Ensure your APR has approved cartridges or SCBA