HS305 Mercury Spills Procedure

Policy Hierarchy link	Work Health and Safety Act 2011 Work Health and Safety Regulation 2011 Protection of the Environment Operations Act 1997 Work Health and Safety Policy
Responsible Officer	Director, UNSW Safety and Sustainability
Contact Officer	Manager, UNSW Health & Safety
Superseded Documents	HS305 Mercury Spills Procedure v2.2
File Number	2016/00369
Associated Documents	HS332 Hazardous Chemicals Procedure HS321 Laboratory Hazardous Waste Procedure

Version	Authorised by	Approval Date	Effective Date
2.3	Director, UNSW Safety and Sustainability	30 March 2016	30 March 2016

1. Purpose

To inform any person who could come into contact with mercury of the appropriate action to take to protect themselves from any health risks.

2. Scope

This procedure applies to all UNSW facilities and operations where equipment containing mercury is used or stored.

3. Definitions

See Health Hazard of Mercury in Appendix 1.

4. Procedure

a. Treat everything used during the clean-up procedure as ‘hazardous waste’. Secure the scene (use barrier tape if necessary) and restrict admission to only those persons cleaning up the spill.

b. Personal Protective Equipment: Put on rubber gloves, goggles or safety glasses and an air purifying respirator. The respirator may be a half-face or full-face respirator, depending on the risk, fitted with a cartridge suitable for mercury vapour. See such an example of a cartridge on the 3M respiratoy protections website: http://www.respiratormaskprotection.com/Respirator-Cartridge-Filter-Reference-Chart.php

c. If possible, lower the temperature. The cooler the temperature, the less mercury vapours that will be released into the air. [For example, a temperature increase of 10^0C will double mercury’s vapour pressure.] Close interior doors leading to other inside areas and open exterior doors and windows.

d. Determine if the spill must be reported. Contact UNSW Health and Safety.

e. Contain the spill: Surround or block off the mercury to keep it from spreading onto sloped or porous surfaces. Divert all mercury away from floor drains, cracks, or crevices that may impact groundwater, surface water, and soils.

f. Ventilate the room to the outdoors. Use fans to force air circulation for a minimum of one hour after clean up. In an office building, increase the air exchange rate for two days. The danger of mercury exposure is greatest in small, confined, poorly ventilated areas. Avoid breathing any dust, vapors, mist, or gas. Avoid contact with eyes, skin, and clothing.

g. Never use a domestic vacuum cleaner to clean up mercury. These devices are not adequately filtered and will spread mercury vapours.

h. Assemble clean up supplies or obtain a mercury spill kit. Mercury spill kits are commercially available and convenient, but not absolutely necessary to clean up a small mercury spill. The following are some common articles that could be used to construct an in-house mercury cleanup kit:

- pastuer pipette/eye dropper/ syringe without needle
- eye protection
- rubber gloves
- respirator (half face or full face) with Mercury cartridge
- flashlight
- paper towel
- plastic container with lid/ plastic bags with zipper seal
- tray or box
- rubber squeegee
- plastic dust pan
- adhesive strips
- powdered sulfur *1
- powdered zinc *2

*1- helps see the mercury by turning from yellow to brown and forms mercuric sulfide. Dusting the area with this powder also reduces mercury vapours.
*2- bonds with mercury and therefore stops it entering the more dangerous vapour phase .
Note: Used items are to be double-bagged and disposed of in accordance the UNSW Laboratory Hazardous Waste Disposal Procedure.

j. Personal Protective Equipment: Put on rubber gloves, goggles or safety glasses and appropriate respirator.

k. Pick up all visible mercury droplets: Inspect the spill zone with a bright light to help illuminate any hidden droplets. Clean up any metallic beads of mercury by using a plastic squeegee or index card and plastic dust pan. With the index or plastic card, sweep the mercury toward the centre of the spilled area away from any carpet, fabric, or porous surfaces. Carefully combine and consolidate the mercury droplets. Next, slide droplets onto a sheet of rigid paper like an index card.

l. Never use a broom on a mercury spill because it will only scatter the mercury droplets, making them harder to find and pick up.

m. Next, gently transfer mercury into an unbreakable plastic container with a locking or air tight lid. If necessary, suction off the droplets using an eye dropper or syringe. Adhesive tape strips may also be used to clean up any tiny remaining mercury droplets. Place the plastic container inside a second plastic container to provide additional containment protection. Tighten each lid securely so that liquid and vapours will be contained.

n. Place the mercury waste container(s) into a zip-top plastic bag: This should ensure that in the event of any leakage, all mercury will be safely contained within the packaging. Label the package “Elemental Mercury Waste, [Hazardous],” and store in a secure place.

o. Never pour liquid mercury or mercury compounds down the drain. Since mercury is heavier than water, it will accumulate in the S-trap of your drain and may continue to emit harmful vapors. It is also an environmental pollutant.

p. Remove and dispose of contaminated articles that have directly contacted mercury**.** Double or triple wrap these remnants in plastic rubbish bags and contact HS UNIT for proper disposal. Special precautions should be taken if mercury was spilled in a high traffic area or a confined area.

q. Sprinkle fine powder sulfur or zinc on the spill site to bind any remaining mercury. This may be supplied in mercury spill kits as mercury vapour absorbent or purchased separately from chemical suppliers. Apply over hard-to-reach areas such as cracks and crevices to minimise the release of mercury vapours. In instances where furniture has been exposed to mercury, wash fabric thoroughly and allow all items to air out completely. Mercury may lodge in porous areas like carpet backing or cracks and crevices. Consideration should be given to replacing affected carpet.

r. Check carefully for missed mercury: To aid in detection, a high intensity lamp may be used to better illuminate the spill area. The presence of scattered mercury droplets may also be detected by a sodium sulfide solution, which can be obtained from most chemical suppliers. This solution may also be sprayed on an affected person (but not the eyes, mucous membranes, or the mouth). Any mercury present will show up as dark, reddish brown stains. Residual mercury may then be uplifted by wiping the area with a vinegar-soaked swab, followed by a peroxide wipe.

s. Set aside everything you think might be contaminated with mercury: Package materials securely and label as “Elemental Mercury: Hazardous Waste.” Contact UNSW Health and Safety to arrange for disposal.

t. Do not place mercury-contaminated substances in the rubbish bin.

u. Monitor spill zone for mercury vapors:
Even if the impacted area appears clean, there may still be hidden residual quantities of mercury present that emit vapours. For larger-sized spills, it may be necessary to test mercury vapour levels in the immediate area. (Contact UNSW Health and Safety who can try and source a Mercury detector from other schools/centres or alternatively to source appropriate occupational hygienists) If mercury is detected, re-clean the impacted area using previously mentioned procedures and repeat testing until levels fall to within safe parameters.

v. Wash hands exposed to mercury using an alkaline soap.

w. Continue ventilation to completely air out the spill zone with outside air for a minimum of two days, preferably longer.

x. Replace broken device with a ‘mercury-free’ alternative**.**

y. Produce an inventory of all remaining mercury-containing devices and replace them with mercury free alternatives.

5. Review & History

Version	Authorised by	Approval Date	Effective Date	Sections modified
1.0	Director Human Resources	1 March 2003	1 March 2003	New document
2.0	Director Human Resources	1 January 2007	1 January 2007	No changes. Updated to UNSW template
2.1	Director Human Resources	1 March 2013	1 March 2013	Updated with legislation references. Updated Branding Logo in accordance with UNSW Branding Guidelines. Modified the document identifier from OHS to HS in accordance with WHS legislation review
2.2	Director, UNSW Safety and Sustainability	30 April 2014	30 April 2014	Reviewed for administrative updates
2.3	Director, UNSW Safety and Sustainability	30 March 2016	30 March 2016	Section 4, (b), (h) and (j) updated to include respiratory equipment as part of the PPE

Appendix 1: Health Hazards of Mercury

Mercury vapours are readily absorbed through the lungs into the bloodstream and are therefore particularly hazardous. In extreme situations, even several drops of metallic mercury may raise air concentrations to levels that may be harmful to human health. Mercury vapours are also heavier than air and may linger in higher concentrations close to the floor.