



Procedures for Working on Plumbing Traps in Laboratories

When authorized workers conduct activities involving the removal of drainage pipes and traps that potentially contain mercury, specific precautions are required in order to maintain a safe work environment for workers and other building occupants.

University of Toronto Trades workers and outside contractors alike are obligated to follow the below procedure to ensure that workers are protected, and expensive contamination of University of Toronto property does not occur.

Please note that specific projects may have specific issues. If you have any questions, please contact the Office of Environmental Health and Safety at 416-978-4467 or ehs.office@utoronto.ca.

1.0 Application

For *All Work* on Sanitary Plumbing Drains from Laboratories

There is a small chance of finding mercury in all plumbing leading from labs at the University. This is because mercury work was not tracked systematically in the past, and mercury spills or dumping into plumbing were not typically reported or recorded.

In order to prevent the small chance of a spill from resulting in a situation where mercury remediation is needed, plumbers shall take the following precautions.

1. As a pipe leading from a lab is cut on either end, a clear plastic bag should be put over the end of the pipe and then taped with duct tape so that nothing falls to the ground.
2. Place an appropriate catchment underneath the area where the pipe will be cut to catch anything that falls from the pipe (including mercury or other materials).
3. After removal, inspect the pipe for mercury before disposal. This inspection is to prevent the mercury from being spread around as the pipe is carried around. If mercury is found, the pipes must be sealed, and EHS called at 416-978-7000.
4. If it is likely that the plumbing is contaminated, please use the procedure found in Section 2.0 below.

1. Mercury

The procedures from Section 2.0 onwards apply to work involving removal of drainage pipes and traps that have a higher likelihood of containing mercury. There are three buildings on St. George Campus where there is higher probability of mercury being present in drainage pipes and traps. These buildings are Banting Institute, Best Institute and Wallberg.



In the event of an extensive mercury spill, please follow the procedure found in Appendix A.

2. Other Chemicals

U of T has a “nothing down the drain” policy, so other chemicals would not typically be found in University drains at hazardous levels. Where a concern about other chemicals being present exists, please contact EHS at ehs.office@utoronto.ca for procedures.

3. Glass Traps

Where clear glass traps are present, large quantities of mercury may be visible.

4. Highly Soiled Traps

In situations where traps are highly soiled or clogged and are a cause for concern to the workers or supervisors involved, the traps in question can be treated as if they contained chemical residues. PPE required would be limited to 8 mil nitrile gloves, goggles and regular work clothes. Section 5 (preparation) and 6 (execution and disposal) of this procedure should be followed, with the exception of:

- The requirement for the posting of signs.
- The need for respiratory equipment.
- The need for disposable coveralls. All clothing would require normal cleaning at the end of completion of the work, rather than the disposal of single use suits specified.

Note the following applies to traps that are more likely contain mercury than the average lab.

2.0 Awareness of Planned Work

The local-area occupants shall be made aware of the planned activities concerning removal of drainage pipes/traps in their area. As appropriate, the following methods should be used to communicate this message:

1. *Memorandum/Discussion with Local-Area Occupants*

This informs the pertinent individuals of the planned work, its proposed duration and in general terms summarizes the precautionary measures required to maintain a safe work environment for all the building occupants.

3.0 Definitions

Polyethylene Sheeting: Polyethylene sheeting 6 mil. Thick, in largest sheet size available to minimize seams



Work Areas: Where actual work activity involving mercury takes place

4.0 Personal Protection

- 1. Respirators** All Respiratory equipment shall be individually assigned and identified. Each worker must be instructed and tested with his/her respirator. Workers shall wear **half or full-facepiece respirators with a mercury cartridge equipped with an end of service life indicator**. Disposable single-use type respirators are not permitted. Replace cartridges as appropriate. All respirators shall be approved and labelled for protection against mercury vapour and shall meet the design and usage requirements of the National Institute for Occupational Safety and Health (NIOSH). No supervisor or worker shall have facial hair, which affects respirator-to-face seal.
- 2. Protective Equipment** All workers must be provided with full body disposable coveralls, with attached hood, shoe covers and with elasticized cuffs/hood. The coveralls shall be made of material that does not permit penetration of liquid mercury (e.g. Tyvek). All workers must also be provided with Nitrile gloves and eye protection in form of goggles or a face shield.
- 3. Practice** Workers shall not eat, drink, smoke or chew gum while in the work area.
- 4. Work Area Exit** Before leaving the work area, a worker shall remove all the protective clothing including the respirator.
Upon leaving the work area the worker shall proceed to the nearest washroom to wash hands and face.

5.0 Training

The work shall be conducted by only those personnel who have received training in:

1. The potential health hazards of exposure to mercury.
2. The proper use of personal protection, including respiratory protection and protective clothing.
3. The proper procedures for working with elemental mercury.

6.0 Preparation: Work Areas

Before beginning work:

1. Clear the immediate area of all movable objects prior to commencement of work.



2. Cover the floor under the work area with 6 mil. polyethylene plastic sheeting.
3. Where applicable, open windows prior to commencement of work.
4. Post signs informing of work taking place at the entrances to the work area.
5. Prepare a drum or bucket for containing sludge from pipes (including mercury)
6. Don respiratory equipment and protective equipment as described in 4.1 and 4.2.

7.0 Execution and Waste Disposal

1. Capture all the sludge coming out of the pipe into a drum or bucket.
2. Place the disconnected pipe into a waste container.
3. At completion of work securely close the respective containers containing the disconnected pipes and the sludge with lids or caps. If the pipes are too long to fit into a container, they shall be securely wrapped in polyethylene sheeting.
4. At the completion of work clean all the tools and equipment contaminated with the sludge with detergent and water.
5. At completion of work clean any surfaces contaminated with the sludge with detergent and water.



Appendix A

Procedure for the Cleanup of Extensive Mercury Spills

Scope

Extensive mercury spills are spills that cover and contaminate a large area regardless of the amount of mercury spilled.

Immediately After the Spill

If a contractor discovers the spill, the contractor must immediately inform their UofT contact person. The UofT personnel that learns of the spill contacts Campus Police: 8-2222(24hrs) or EHS 8-7000 (from 8-4pm) and the applicable Department(s).

EHS Environmental Protection Services (EPS) contacts the designated EHS Occupational Hygienist and Safety Specialist (OHSS). Campus Police clears the area of occupants and cordons off the spill area in consultation with EHS Environmental Protection Services (EPS).

Occupational Hygienist arranges with Utilities to turn off the ventilation if air is recirculated to other unaffected areas of the building.

Department is to send out advisory that the area is off limits.

Emergency Spill Clean-up (completed by UofT EPS)

Areas affected by spill should be not be occupied during cleanup.

Departmental contact – typically the Chair or Director/Manager of the affected area would inform the occupants of the work and would request that they stay out of the area.

EPS will construct a polyethylene barrier with signage at the entrance to the area.

Equipment/Supplies

- Mercury recovery vacuum cleaner equipped with mercury absorbing filter bed (typically carbon) and HEPA will be used.
- Amalgamation powder – zinc or sulphur.
- Tri Sodium Phosphate (TSP) or other strong cleaner.

PPE

- Full face respirator with NIOSH mercury vapours cartridges and end of service life indicator.
- Chemical suits made of Tyvek or equivalent.



- Nitrile gloves, safety boots with boot covers.

Procedure

- Floors will be vacuumed of all mercury visible to a flashlight placed on the surface.
- Mercury amalgamation powder is applied to the floors, dampened and worked into the seams between the floor tiles as well as into the cracks at the baseboards.
- Collect mercury amalgamation powder with the vacuum.
- Clean surfaces twice with TSP or equivalent.
- EPS will dispose of all contaminated materials as per Ontario Regulation 347.
- Typically, sampling will be conducted within 24hrs of the cleanup.
- OHSS will conduct and coordinate the initial clearance sampling and attain a Gold foil mercury vapour detector (Jerome 405/Jerome 431x-Arizona Instruments) or equivalent.
- Providers of rental equipment are: Maxim Environmental and Safety in Mississauga and Galson and Pine Environmental (US).
- OHSS will inform EPS of acceptable clearance level.

Remediation (if required) (completed by EPS)

- If floor level samples are equal to or above 0.010mg/m³ (Brookhaven), or if breathing zone samples are at or above 0.006mg/m³ (EPA/ASTDR), then the area will need further abatement.
- The OHSS and EPS will assess the area and a scope of work will be provided to the affected personnel (PI, Dept Chair etc.).
- Upon approval of the quote EPS will collect the CC/FC in order to charge-back the affected office/department.
- The OHSS who conducted the sampling may decide in consultation with EPS whether more abatement or encapsulation is the most appropriate course of action.
- EPS will assess and remove affected equipment and furniture from the area and discard excessively contaminated or unsalvageable equipment as needed.
- Salvageable equipment/ furniture will be vacuumed and wiped down before removal from room(s).
- If breathing zone samples are less than or equal to 0.003 mg/m³ (EPA/ASTDR) then the area may be considered clear for regular occupancy.
- OHSS will inform EPS of acceptable clearance level.
- Poly sheets and signs will be removed by EH upon notification that the area is cleared.
- At the discretion of the OHSS, further sampling may be conducted that meets OSHA ID-140 or NIOSH 6009 in order to provide a more accurate reading of mercury levels in the area.

Encapsulation



- If breathing zone samples are at or above 0.003mg/m³ (EPA/ASTDR), then the area will need encapsulation and/or further abatement.
- Encapsulation entails coating the floor and baseboards in a permanent acrylic or urethane coating or equivalent. A removable wax is not sufficient.
- An external company (AHT) will be conducted to complete this work.
- OHSS will oversee and liaise between the external company and the Dept./Office and/or Project Manager and/or Property Manager to ensure open and clear communication.
- Clearance sampling will be completed by OHSS. If breathing zone samples are less than or equal to 0.003 mg/m³ (EPA/ASTDR) then the area may be considered clear for regular occupancy.
- OHSS will inform EPS of acceptable clearance level.
- Poly sheets and signs will be removed by EH upon notification that the area is cleared.
- At the discretion of the OHSS, further sampling may be conducted that meets OSHA ID-140 or NIOSH 6009 in order to provide a more accurate reading of mercury levels in the area.

References

Chemical-Specific Health Consultation for Joint EPA/ATSDR National Mercury Cleanup Policy Workgroup, Action Levels For Elemental Mercury Spills, March 22, 2012. Accessed online March 28, 2013. http://www.atsdr.cdc.gov/emergency_response/Action_Levels_for_Elemental_Mercury_Spills_2012.pdf

Brookhaven National Labs IH15735, Mercury Spills Area Clearance Testing.02/09/2009. Accessed online March 28/13. http://www.bnl.gov/esh/shsd/sop/pdf/IH_SOPS/IH75135.pdf