

SAFE OPERATING PROCEDURE

RESPONSE TO A MERCURY SPILL

Purpose:

To provide direction and the proper response procedure in the event of a minor mercury spill for research and teaching staff members in the Department of Molecular and Cellular Biology.

Application:

This procedure should be followed in the event of a mercury spill. Students, staff and faculty working with mercury and mercury containing instruments should be familiar with the procedures outlined below.

A Mercury spill kit can be located in equipment room: SSC 3202B-C in the cupboard above the sink. Please report the use of the kit to the Local Health and Safety Committee.

These instructions are based on the manufacturer's directions and should be followed: Merconkit III Instruction Booklet. Ross Healthcare Inc. MFG code: 20-MKIT-3

Mercon™ is a mercury vapor suppressant. All products work by immediately oxidizing with the physical mercury. Then a chemical change occurs converting the elemental mercury in the more stable non-vapor-producing mercuric sulphide. In addition, the Mercon™ spill control kit solutions absorb mercury vapor and dust from the air and stop the methylation of mercury in water.

Safety Precautions:

⚠ If in doubt of the ability to clean a mercury spill safely, evacuate the lab and call for assistance ie. Your supervisor or a qualified individual. It is always best to err on the side of caution.

- ✓ DO NOT attempt to clean up spills involving more than a few milliliters. For spills larger than a few milliliters, treat as a major spill. Evacuate the lab, cordon off the area and dial x2000 for assistance. Mercury is highly toxic and releases vapours at room temperature that can accumulate to toxic concentrations.
- ✓ A mercury spill kit must be used for all small spills. Review directions provided with the kit prior to using.

- ✓ Ambient Mercury levels in your breathing zone can be controlled if you and other personnel are aware of and trained in safe mercury management.
- ✓ Do not continue to wear contaminated footwear and clothing as there is a greater risk of spreading the hazard. If liquid mercury was spilled directly on clothes, they are to be disposed. Do not attempt to launder the clothing as this will further contaminate the washer and sewage system.
- ✓ Do not use a broom to sweep up mercury droplets as there is a greater risk to spread the mercury and contaminate additional areas.
- ✓ Never use a vacuum cleaner. The vacuum will spread the vapor as it heats up in addition to being contaminated for further use. This will further spread vapor each time it is used. Household vacuums do not have the proper filtration for such hazards.
- ✓ Never use household cleaning products to clean up a spill as they have a tendency to react violently with mercury creating a larger hazard by creating additional vapors.
- ✓ Be conscious of the hazard of unseen mercury contamination in cracks, corners and untreated storage containers.
- ✓ Never dispose of Mercury into toilets, drains, sinks or other wastewater collection systems.
- ✓ Do not incinerate or bury Mercury waste.
- ✓ Never attempt to clean up Mercury spills if you are pregnant, and ensure that those that are pregnant do not work or enter areas where mercury materials are being used, stored or being cleaned up.
- ✓ Report the spill using the EHS Incident Report form:
<https://www.uoguelph.ca/hr/hr-services-environmental-health-safety/forms>

Procedure:

1. Notify your supervisor and Physical Resources - Custodial Services (x53854) to ensure they are aware of a spill and not to disturb the area: Email housekeeping@pr.uoguelph.ca to indicate the specific room and hazard involved. A mercury spill kit is provided in SSC 3202B-C in the cupboard above the sink.
2. Block off from foot traffic a large radius (approximately 6 feet) around center of spill site. Check clothing and footwear for mercury debris. Remove any contaminated clothing and footwear at edge of spill site. If possible, change into old clothes prior to cleaning the spill in the event of contamination.
3. Remove the MerconSPRAY™ from the spill kit, and wearing gloves, lab coat, face mask and goggles; proceed to spray the ambient air zone above the spill zone. Spray generously (18 – 20 pumps) into the air, starting at the breathing level and working down towards the floor, concentrating on the actual spill itself.
4. Cover all visible Mercury with MerconVAP™, leaving a wide margin for any unseen Mercury beads. Ensure that any cracks in the flooring are saturated with MerconVAP™ to suppress any Mercury beads that may be out of sight. The spill is now safe to clean up. **CAUTION:** After applying MerconSPRAY™ or MerconVAP™, floor may be slippery.

5. Open the MerconTAINER™ in the kit. Using the Mercury aspirator (see instructions below) pick up any visible mercury and deposit them in the MerconTAINER™. Ensure that all Mercury waste is placed in the MerconTAINER™.
6. To complete the decontamination of the Mercury spill site, re-apply MerconVAP™ liquid to spill zone; and, using disposable towels soaked in MerconVAP™, wipe any remaining residue including shoes, gloves and other contaminated items.
7. Place contaminated items in double layered biohazardous bags and use a hazardous waste tag provided from EHS. Fill out the chemical disposal form from the Hazardous Waste section of the EHS website: <https://www.uoguelph.ca/hr/hr-services-environmental-health-safety-programs-laboratory-safety/hazardous-waste>. Submit form to EHS for waste pickup.
8. Store the waste for pickup in a safe location i.e. a laboratory area and not a common support room.
9. Contact the local Joint Health and Safety Committee to let them know of the spill and that the kit has been used. Contact: Jamie Jones jjones15@uoguelph.ca

MERCON™ ASPIRATOR DIRECTIONS FOR USE

The MERCON™ Aspirator is a simple and easy to use waste mercury pick-up tool. It is effective on hard surfaces and under water. The kit allows for quick clean-up of spilled mercury.

1. Push loading knob all the way down.
2. Release trigger and suction up 1-2 oz. of MERCON -VAP OR MERCON-X. This exercise will familiarize user with the action of tool.
3. Place tip of Aspirator near mercury beads and repeat steps 1 and 2.
4. Tilting tip above body of Aspirator will prevent mercury from being accidentally released.
5. Hold the syringe/aspirator above Mercon™TAINER being careful to ensure tip is below upper rim
6. Gently press loading knob to slowly release any mercury into container
7. Continue with spill procedure as outlined in Mercury spill kit instructions.
8. Repeat steps 1 and 2 to clean Aspirator. Wipe down exterior surfaces using a wipe that is soaked in MerconVAP™. Place used wipes in the Mercon™TAINER.

Toxicity: Cited from the Canadian Centre for Occupational Health and Safety

Routes of Exposure: Inhalation, skin contact, skin absorption and eye contact

- **Inhalation:** VERY TOXIC. Can cause a flu-like illness 3-10 hours after exposure. Symptoms may include chest tightness, cough, headache, fever, muscle aches and runny nose. Symptoms usually disappear within 48 hours after exposure. Can cause lung injury. Symptoms may include coughing, shortness of breath, difficult breathing and tightness in the chest. Can cause life-threatening accumulation of fluid in the lungs (pulmonary edema). Can harm the nervous system. Symptoms include tremors (initially affecting the hands and sometimes spreading to other parts of the body), emotional instability (including irritability, excessive

shyness, a loss of confidence and nervousness), sleeplessness, memory loss, muscle weakness, headaches, slow reflexes, and a loss of feeling or numbness. Can cause inflammation of the inside of the mouth (stomatitis), sometimes with a metallic taste, excessive salivation, and difficulty swallowing. Other digestive system effects include abdominal pains, nausea, vomiting, and diarrhea. Can harm the kidneys. Kidney function tests may show abnormal results.

- **Skin Contact:** Not irritating. However, an allergic skin reaction may develop with long term exposure. Can be absorbed through the skin. Can cause effects as described for inhalation.
- **Eye Contact:** Not irritating.
- **Carcinogenicity:** Not known to cause cancer.
- **Ingestion:** Not harmful.
- **Effects of Long-Term (Chronic) Exposure:** VERY TOXIC. Can cause permanent damage to the nervous system. A classic sign of mercury toxicity is a fine tremor, usually of the fingers, hands or arms and occasionally the eyelids, lips, tongue, and whole body. Many occupational studies indicate that tremors become more pronounced with longer exposures to mercury. Tremors are thought to be a sensitive indicator for long-term low-level exposure to mercury vapour. Behaviour and personality changes such as irritability, excitation and shyness, psychotic reactions such as delirium and hallucinations, loss of appetite, tiredness, sleeplessness, short-term memory loss, and impaired nerve conduction have also been reported following long-term exposure. May harm the kidneys. Kidney function tests may show abnormal results. May cause an allergic skin reaction in some people. In sensitized people, contact with a very small amount of product can cause an allergic reaction. Symptoms include redness, rash, itching and swelling. This reaction can spread from the hands or arms to the face and body. Repeated exposure will make the reaction worse. Mercury may affect the heart producing increased blood pressure and/or heart rate.
- **Carcinogenicity:** Not known to cause cancer. International Agency for Research on Cancer (IARC): Group 3 - Not classifiable as to its carcinogenicity to humans. American Conference for Governmental Industrial Hygienists (ACGIH): A4 - Not classifiable as a human carcinogen.
- **Teratogenicity / Embryotoxicity:** DEVELOPMENTAL HAZARD. May harm the unborn child based on animal information. Has been associated with: effects on behaviour.
- **Reproductive Toxicity:** Not known to be a reproductive hazard.
- **Mutagenicity:** Not known to be a mutagen.

First aid Response: Cited from the Canadian Centre for Occupational Health and Safety

- ❖ **Inhalation:** Immediately call a Poison Centre or doctor. Treatment is urgently required. Transport to a hospital. Poison control Centre: 1-800-268-9017
- ❖ **Skin Contact:** Avoid direct contact. Wear chemical protective clothing if necessary. Quickly take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Wash gently and thoroughly with lukewarm, gently flowing water and non-abrasive soap for 5 minutes. Call a Poison Centre or doctor. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.
- ❖ **Eye Contact:** Avoid direct contact. Wear chemical protective gloves if necessary. Quickly and gently blot or brush chemical off the face. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 5 minutes, while holding the eyelid(s) open with a designated eye-wash station. If irritation or pain persists, see a doctor.
- ❖ **Ingestion:** Have victim rinse mouth with water. Immediately call a Poison Centre or doctor.