CHEMICAL SAFETY PROGRAM

Contents

1.0 Purpose

The purpose of this program is to provide guidance on what individuals must do in order to minimize risk when using chemicals.

2.0 Scope

This program outlines what individuals and supervisors must do in order to minimize risk when handling, storaging, and using chemicals. **It does not specify how to accomplish this.** Details on how to minimize risk in handling, storing, and using chemicals will be outlined by the referenced resources.

3.0 Roles and Responsibilities

3.1 Supervisor/Principle Investigators

- Maintain an up-to-date inventory of all chemicals in use within the research area or workspace
- Identify all designated substances in the research facility, and ensure a designated substance review has been completed prior to allowing the use of these materials
- Develop and deliver orientations for new workers with respect to chemical hazard identification, risk assessment, storage, handling, and disposal
- Develop and deliver periodic (at least annually) emergency response training specific to handling possible emergency situations involving chemicals (e.g., spills, exposures)

3.2 Workers and Students

- Be familiar with the SOPs and specific hazards of the chemicals they are working with or in proximity to
- Understand how to respond to emergencies (spills, accidental release, and exposures) with chemicals being used **before using them**
- Participate in medical surveillance programs where required

3.3 Safety Office

- Be available for designated substance assessments and reviews
- Investigate unresolved, unintentional exposures and incidents involving chemicals
- Make recommendations to supervisors where root causes have not been identified or resolved
- Maintain and update guidelines on chemical use, including this guide

4.0 Chemical Management and Control

Ensuring chemicals are used, handled, and stored with minimal risk involves the following components:

- Training on handling, storaging, disposing and using chemicals
- Creating and maintaining a complete chemical inventory
- Performing a Hazard Identification and Risk Assessment (HIRA) evaluation on work involving chemicals, and implementing controls to reduce risk

4.1 Training

Training will involve a combination of in-person and online course work. Online training is a requirement for any researcher, employee, or student working with chemicals. In-person training is based upon the work being performed and the relative risk of that work. At the University, in relation to chemicals, we have two types of work:

- Non-research related chemical work
- Research related chemical work

4.1.1 Non-Research Work

At the University, non-research work will pre-dominantly occur in non-academic departments such as Plant Operations Maintenance, Plant Operations Custodial, and Housing. Work involving the use of chemicals for these departments is not variable in nature. For this reason, supervisors should identify which chemicals are used, outline their hazards and what precautions should be taken when using, storing, handling and disposing of them. For non-research work this can be accomplished through the development of SOPs.

At minimum, training in these cases will involve the following:

- Online:
  - WHMIS (SO2017)
  - Risk Assessment (SO2500)
- In-person training performed by the supervisor or competent delegate:
  - Outlines hazards and what precautions should be taken when using, storing, handling and disposing of chemicals
  - Demonstration of processes outlined in the SOP

4.1.2 Research Chemical Work

At the University, research work with chemicals can be quite variable and may involve changing environmental conditions (temperatures and pressures), varying volumes, varying concentrations, etc. Also, unlike workers in other areas, research workers will be exposed to unique chemical hazards and may often generate unique chemical waste.

This means, workers performing research work must be aware of how to assess hazards and risks associated with the intended work, but also understand the requirements to segregate, dispose, and transport waste from area to area. For these reasons, workers expected to use chemicals in research must undergo the following training:

- Online:
  - WHMIS (SO2017)
  - Risk Assessment (SO2500)
  - Laboratory Safety (SO1010)
  - Chemical Waste Segregation (SO2070)
- In-person delivered by supervisors or competent delegate:
  - Orientation relating to chemical handling, storage and disposal – to be performed annually in-person
  - Orientation specific to emergency response – to be performed annually and in-person
  - Orientation on use of the lab's chemical inventory
  - Orientation on how to identify hazards, assess risks, and implement controls for work involving the use of chemicals

Orientation and annual emergency response templates may be found on the Safety Office training website.

4.2 Inventory

Chemical inventories are important tools that aid the University community in many ways. Completion of these inventories aids:

- Inventory control
- SDS compliance through linking most inventory items to an SDS database
- Regulatory reporting on chemical quantities (such as the Chemical Weapons Implementation Act)

4.2.1 Non-research Areas

In non-research areas such as workshops, Plant Operations controlled areas, and Central Stores, chemical inventories must be kept and maintained. These should be available upon request and employees should be made aware of how to view them.

4.2.2 Research Areas

All research areas are required to have an inventory in the University's chemical inventory software. All laboratory users must have access to search and review chemical volume and safety data. When new lab users join a research group, the supervisor shall provide instruction on how to access the research group's inventory.

Inventories shall be maintained to be current and must be reconciled (verified) annually. For inventory items that do not have SDSs automatically linked, the PI must upload SDS to the inventory module.

See the Chemical Inventory System (RSS) page for instruction on setting up and maintaining an inventory.

4.3 Hazard Identification and Risk Assessment (HIRA) Evaluations

The purpose of HIRA is to understand the risks of the hazards workers are faced with. By understanding the risks, it becomes clearer to what level a hazard must be controlled.

4.3.1 Non-research Chemical Work

In non-research settings, work is generally routine and without minimal variation making standardized procedures easy to implement. In these situations, it is expected that workers are provided in-person training on the contents of established SOPs and the precautions associated with any chemicals being used. When a new chemical or process is introduced into these facilities, supervisors should identify the following information:

- Based upon the expected use and available information, what hazards exist for the chemical
- Ensure the chemical is compatible and appropriate for the work being performed
- Based on how the chemical is to be used, outline handling, storage, and disposal protocols that will minimize the risks of the hazards

Non-research areas will complete a Job-Hazard Analysis to determine what hazards must be controlled.

4.3.2 Research Chemical Work

When new or novel chemical work is being undertaken in research, the research group performing work may use non-standard operating parameters, conditions, equipment, etc. Therefore, it is the expectation, that in research work, hazards are identified and risks are assessed before starting the work. The University requires the researcher to complete the HIRA evaluation and have it reviewed and approved by their supervisor. This can be in the standardized University format (preferred) or it can be in another method as dictated by the research provided that following information is understood:

- Based upon the chemical's physical properties, what hazards exist (it is most efficient to determine this using WHMIS hazard classifications)
- What hazards exist for any proposed reactions
- Based upon the proposed use of the chemical(s), are they compatible with the equipment to be used (should consider reaction/operating conditions such as temperatures, pressures, etc.) and equipment limitations

- What is the most likely route of exposure, and what processes are in place to minimize the risks of exposure hazards

The University has a standardized process to manage this. A guidance manual and some examples may be found on the Risk Assessment page.

5.0 Designated Substances

In Ontario, the Occupational Health and Safety Act allows for particularly toxic substances to be "designated". Designated means there is a specific regulation that outlines how to assess and address employee exposure to these compounds. Part of this requirement is for the employer to conduct a designated substance review to determine the likelihood of employee exposure. If employee exposure is likely, and there is potential for harm, then a control program is required. The current designated substances in Ontario are:

- Acrylonitrile
- Arsenic
- Asbestos
- Benzene
- Coke oven emissions
- Ethylene oxide
- Isocyanates
- Lead
- Mercury
- Silica
- Vinyl chloride

When designated substances are used it is the responsibility of the supervisor to ensure a designated substance assessment is completed before a substance's use. This can be done by contacting the Safety Office and requesting a review to be completed for the material in question. In order to complete a review the following minimum information will be required:

- How the material is stored
- Proposed use of the material – step by step process that outlines handling procedures
- The disposal of the material

The designated substance review process requires a cradle to grave understanding of the material's use. See the Designated Substances page for more information on designated substance reviews.

6.0 Chemical Waste

Work cannot and should not begin until it has properly been planned for. This includes planning for:

- The types of waste generated
- The amounts of waste generated

- The plan to dispose of the waste

All chemical waste generated at the University is disposed of through the Environmental Safety Facility (ESF). All wastes must be properly segregated where they are generated in order for them to be safely and efficiently disposed of. No waste may be sent down the drain. Details of UW's hazardous waste requirements and specifications are located here: Safety Office Hazardous Waste page.

Questions on anything found in the Hazardous Waste page can be emailed to: esf@uwaterloo.ca.

7.0 Emergencies

Emergencies must be prepared for before the work begins. For chemical work, this means understanding the management of chemical exposures, chemical spills, and unintended chemical releases (gases).

Before allowing individuals to work with chemicals, the following criteria shall be met:

- Users must understand how to manage spills and exposures to the chemicals they are working with
- Users are knowledgeable of where to obtain the necessary equipment to manage spills and exposures to the chemicals they work with
- Users are aware of who must be contact in the event of a spill or exposure to a chemical

This knowledge must be confirmed annually and documented using a toolbox talk, emergency refresher training, or some other means.

8.0 Resources

8.1 Legislation

- O.Reg. 490/09: Designated Substances
- R.R.O. 1990. Reg. 833: Control of Exposure to Biological or Chemical Agents

8.2 University Resources

- Laboratory Decommissioning
- Fire Extinguishers and appropriate extinguishing media for the chemical used
- First Aid
- Eye/face washes and emergency showers
- Safety Office Hazardous Waste Website
- Safety Office Training
- Chemical Inventory Website
- Risk Assessment and Standard Operating Procedures

- Hazardous Materials Spills

8.3 External Resources

- Cameo Chemicals
- WSPS's Workbook for Designated Substance Assessment

9.0 Record of Revisions

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October 2022	Dhananjai Borwankar	▪ Program release	Chemical Safety Program V.1.0 OCT2022