**Chemical Hygiene Plan**

**Principal Investigator\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Department\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Building/Room(s)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Principal Investigator’s Certification**

* Ensure that listed personnel have received or will receive appropriate training in safe laboratory practices and procedures prior to work beginning
* Ensure that the chemical hygiene plan (CHP) is developed, followed, and maintained
* Provide PPE appropriate to the hazards identified in the CHP
* Designate a chemical hygiene officer and ensure that the officer is performing their duties

**Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Chemical Hygiene Officer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Chemical Hygiene Officer’s Certification**

* Obtain and submit safety data sheets
* Maintain chemical inventory
* Ensure that all containers of hazardous material and hazardous waste are labelled appropriately
* Ensure that existing standard operating procedures (SOPs) are followed and new SOPs established for new or unique hazards

**Chemical Hygiene Officer Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Implementation Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
| **Annual Review Date** | **Reviewer Signature (Principal Investigator or Chemical Hygiene Officer)** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Table of Contents**

|  |  |
| --- | --- |
| Title Page and Designation of Responsible Parties | 1 |
| Table of Contents | 2 |
| Statement of Purpose | 3 |
| Laboratory Map | 4 |
| Chemical Spills and Accidental Exposure to Hazardous Materials | 5 |
| Uniform SOPs for Common Laboratory Hazards | 6 |
| Laboratory-Specific Hazardous Chemical SOPs | 24 |
|  |  |
| **Appendix** |  |
| CHP Training Certification Record | A |
| Annual Laboratory Inspection Documentation | B |
| SOP Template | C |
| Additional Training Documentation | D |
| Chemical Inventory | E |

**Statement of Purpose**

The purpose of this laboratory chemical hygiene plan (CHP) is to protect laboratory workers from harm due to exposure to hazardous chemicals by:

1. Identifying hazards before work begins
2. Identifying the appropriate personal protective equipment (PPE) and equipment necessary to safely work with a hazard
3. Identifying the best method to dispose of the hazard when work ends
4. Identifying the steps to be taken in the event of accidental exposure to a hazardous chemical

All laboratory workers must read and sign that they have read the CHP before working with hazardous chemicals. SOPs added to the plan should be dated, and new SOPs should be initialed by anyone working with the chemical who has already signed the CHP.

This document fulfills the requirements of [OSHA’s 29 CFR 1910.1450](https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1450) and [WAC 296-828-20005](https://apps.leg.wa.gov/WAC/default.aspx?cite=296-828-20005).

Because this document is directly related to safety within the lab, please store it in a location **easily accessible to all laboratory staff at all times**.

**Safety Data Sheets**

In addition to the SOPs contained in this document, safety data sheets (SDS) must be uploaded to KHA in a timely manner following the purchase of any new chemical. KHA can be found at <https://wsuspokane.kha.com/> or located through the [WSU Spokane lab safety webpage](https://spokane.wsu.edu/research/lab-safety/). KHA fulfills your regulatory requirements to have SDS available to all staff. You are not required to retain physical copies of your SDS, but you may keep physical copies in the lab space if you wish. If you are regularly working with a few specific hazards, feel free to keep them alongside the SOPs in this plan.

Please refer to the [Washington State University laboratory safety manual](https://ehs.wsu.edu/laboratory-safety-manual/) online for further information on laboratory safety.

If you have any questions regarding chemicals, safety, or your initial laboratory set up on the Spokane campus, contact Lab Services at 509-358-7621 or spok.labservices@wsu.edu.

**Laboratory Map**

**Mark laboratory boundaries.**

Mark locations for any: Fume hood; biosafety cabinet; autoclave; autoclavable waste; biohazardous waste; radioactive waste; broken glass waste; sharps disposal; gas cylinder storage; chemical storage locations including acid, base, and flammable cabinets; safety showers; eyewash stations; fire extinguishers; and chemical spill kits.

**Paste laboratory blueprint here**

**(Contact Lab Services for a high-quality map of your area)**

**Chemical Spills and Accidental Exposure to Hazardous Materials**

**Chemical Spills**

In the event of a chemical spill, follow the decontamination procedures section of your SOP. Laboratory staff who have undergone HAZCOM training are allowed to clean up small spills of known chemicals. A small spill is a spill that can be cleaned up in 10 minutes or less.

Call EH&S and 911 immediately and evacuate the area if:

* the spill is an unknown substance
* the area cannot be cleaned in 10 minutes
* the chemical can create an immediate danger to life and health (IDLH)
* the chemical has a ceiling limit listed in [WAC 296-841-20025 Table 3](https://apps.leg.wa.gov/WAC/default.aspx?cite=296-841-20025)

Employees are not permitted to clean up mercury spills regardless of size. Call EH&S immediately.

Spill kits are provided by the Office of Research. If your kit is out of date or you need additional components, contact Lab Services (ext. 8-7621).

**Accidental Exposure**

In the event of accidental exposure to a hazardous chemical, take the immediate first aid precautions listed in your SOP, up to and including calling 911.

First aid kits are provided and maintained by the Office of Research. If your kit is out of date or you need additional components, contact Lab Services (ext. 87621).

Once proper first aid has been administered, report the incident to your supervisor. The exposed personnel and their supervisor must follow the procedures outlined by WSU Human Resources at <https://hrs.wsu.edu/managers/incident-report/>. Do not hesitate to seek further medical attention. Under federal law, all medical examinations and consultations related to hazardous chemical exposure must be provided without cost to laboratory employees. Your incident report is the first step to ensuring you receive necessary medical care.

Always bring the SDS with you when consulting with physicians about exposure to hazardous chemicals.

**Uniform Standard Operating Procedures (SOPs) for Common Laboratory Hazards**

In the uniform SOP section of your CHP, you can find information about common hazards in a research laboratory environment. SOPs are written for categories of chemicals grouped by hazard type with similar requirements for PPE, cleanup, exposure control measures, storage, and waste disposal. Each uniform SOP is broken into five sections:

* Chemical class
* Protective equipment and hazard control
* Waste disposal procedures
* Decontamination procedures
* Special storage and handling

Space is provided after each SOP to list chemicals in your inventory that fall under that SOP, as well as chemicals that match the hazard but have other more stringent requirements for safe use, such as chemical-specific waste disposal procedures or unique requirements after exposure. For example, picric acid is a corrosive that is not covered under the Corrosives Uniform SOP. Solid picric acid is both corrosive and explosive, and this additional hazard requires extreme protective measures not normally required for working with corrosive materials.

**The following uniform SOPs are included in your CHP:**

|  |  |  |
| --- | --- | --- |
| **SOP** | **Page** |  |
| Corrosives | 7 |  |
| Cryogenic solids and liquids | 10 |  |
| Flammable and combustible liquids | 12 |  |
| Oxidizers | 15 |  |
| Toxic and health hazards | 18 |
| Compressed gas cylinders | 21 |  |
|  |  |  |

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL  and HEALTH HAZARDS | **Corrosives**  **Hazards**  Corrosives are solids, liquids, or gasses that can cause destruction of living tissue at the site of contact. These materials are not restricted to acids and bases and include chemicals such as bleach or phenol.  Pictogram_Corrosion**Pictograms**    \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT  and HAZARD CONTROL | **PPE**   * Fully buttoned lab coat * Safety glasses * Standard nitrile gloves may not be adequate for handling many corrosives. Consider the following table when selecting gloves for these common acids.  |  |  | | --- | --- | | **Acid** | **Recommended Glove Materials1** | | Acetic Acid | * Butyl (Unsupported) * Latex (Unsupported Natural Rubber) * Neoprene * Nitrile (Unsupported) * Polyvinyl Chloride (PVC) | | Hydrochloric Acid | * Butyl * Neoprene * Nitrile * Polyvinyl Chloride (PVC) | | Phosphoric Acid | * Natural Rubber * Neoprene * Nitrile * Polyvinyl Chloride (PVC) | | Sulfuric Acid | * Butyl * Neoprene * Polyethylene * Polyvinyl Chloride (PVC) |   1 The recommendations above are based on typical laboratory concentrations and uses. Refer to the acid’s SDS as well as [glove compatibility charts](http://ehs.umich.edu/research-clinical/planning-safe-research/glove-compatibility-chart/) for each particular concentration of acid for additional recommendations, especially for unusual concentrations or use of a particular acid.  **Hazard controls**   * Use safety shielding whenever there is risk of explosion, exothermic reaction, or splash hazards. * Fume hoods provide the best protection from corrosive agents. Restrict use of corrosives outside of the fume hood. |
| 3.  WASTE DISPOSAL  PROCEDURES | **Corrosive waste** must be collected in a sealable, compatible waste container. Placing waste container in secondary containment is recommended. The container should be stored away from incompatible materials. Do **NOT** mix acid and base wastes or store wastes together.  A completed dangerous waste label should be attached when waste is first added to the container. When container is full or no longer being used, complete a [chemical collection request form.](https://spokane.wsu.edu/ehs/chemical-waste-collection-form/) |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**   * In case of **eye contact**, flush eyes with copious amounts of water at an emergency eyewash station for at least 15 minutes and seek medical attention. * In case of **skin contact**, flush skin with copious amounts of water for 15 minutes and seek medical attention. For exposure over a large portion of the body, remove clothing and shoes and rinse thoroughly in an emergency shower for at least 15 minutes. Seek medical attention. * In case of **inhalation**, move person to fresh air and immediately seek medical attention. * In case of **ingestion**, immediately seek medical attention and follow instructions on SDS. Do not induce vomiting.   Report all accidental exposures to your supervisor  **Upon accidental release**  **If appropriate PPE for the chemical includes a respirator, treat it as a large spill.**  **Large spill**: If a large amount of corrosive material is spilled outside the fume hood, immediately evacuate, secure area, and call 911 and EH&S.  **Small spill**: If a small amount of corrosive material is spilled (it can be cleaned up in 10 minutes), alert those in the area to the location and nature of the spill. Wear the appropriate PPE and use your spill kit to remove liquid spills or a dustpan and moistened pad (if appropriate) to remove solid spills. Once the spill has been removed, treat the spill kit materials as hazardous waste. Clean the spill area with water to remove any residue, and alert EH&S that a spill has occurred. |
| 5.  SPECIAL STORAGE  and HANDLING PROCEDURES | Store in well-ventilated areas, preferably in secondary containment such as a plastic bin. Store below eye-level in a dry location and away from metal that lacks corrosion-proof coating. Segregate incompatible corrosives such as acids and bases. Do not store liquids and solids together. All secondary containers for corrosives must be clearly labelled following GHS practices. |

|  |  |  |
| --- | --- | --- |
| **Inventory chemicals that fall under the Corrosive Chemicals SOP** |  | **Corrosives that require their own SOP** |
|  |  | Nitric acid |
|  |  | Picric acid |
|  |  | Hydrofluoric acid |
|  |  | Acetic anhydride |
|  |  | Boron tribromide |
|  |  | Boron trifluoride |
|  |  | n-Butyl alcohol |
|  |  | n-Butylamine |
|  |  | Chlorine |
|  |  | 2-Chloroethanol |
|  |  | Chromic acid |
|  |  | Glutaraldehyde |
|  |  | Hydrogen bromide |
|  |  | Methyl ethyl ketone peroxide |
|  |  | Methylhydrazine |
|  |  | Potassium hydroxide |
|  |  | Thionyl chloride |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL  and HEALTH HAZARDS | **Cryogenic Solids and Liquids**  **Hazards**  Cryogenic solids and liquids are materials with extremely low boiling points. They are prone to rapid expansion during evaporation/sublimation, leading to atmosphere displacement. These chemicals are suffocation hazards.  **Pictograms**  Pictogram_Gas Cylinder  \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT  and HAZARD CONTROL | **Hazard controls**   * Always work in a well-ventilated area * Containers must have a pressure relief system * When thawing cryotubes or other small containers, place them in a hard-walled container to shield in case of explosive thawing   **PPE**   * Lab coat * Insulated cryogenic gloves * If working with quantities that have splash potential: face shield |
| 3. WASTE DISPOSAL  PROCEDURES | Contact vendor for return of dewar(s). |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**:   * In case of **skin or eye contact**, run under cool or warm water (**NOT cold or hot**) for 15 minutes. Do NOT rub affected area. Seek medical attention. * In case of prolonged **inhalation**, move person to fresh air and immediately seek medical attention. * Bring SDS to aid medical staff with diagnosis and treatment.   **Upon accidental release**:  Do not attempt to clean up any spill of cryogenic liquid. If a large spill has occurred, evacuate the area immediately and contact EH&S. Small spills in well ventilated areas will evaporate on their own. |
| 5.  SPECIAL STORAGE  and HANDLING  PROCEDURES | Store in a secure, well-ventilated area. If cryogenic gas is also reactive, keep this substance away from incompatible chemicals. |

|  |  |  |
| --- | --- | --- |
| **Chemicals that fall under Cryogenic Solids and Liquids SOP** |  | **Cryogenic solids and liquids that require their own SOP** |
| Liquid nitrogen |  | Liquid carbon monoxide |
| Liquid helium |  |  |
| Liquid argon |  |  |
| Dry ice (solid carbon dioxide) |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL  and HEALTH HAZARDS | **Flammable and Combustible Liquids**  **Hazards**  Flammable and combustible liquids are fire hazards. Flammable liquids have a flash point below199.4 °F/93 °C. Combustible liquids have a flash point above 199.4 °F/93 °C.  **Pictograms**  Flame  \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT  and  HAZARD CONTROL | **PPE**   * Lab coat: for small volumes (<1 L), a standard lab coat is sufficient * For large volumes, use a flame-resistant lab coat * Chemical resistant gloves * Safety glasses   **Hazard Controls**   * Do not heat with open flame * Do not work near ignition sources (such as hot plates) or equipment that produces static electricity * Work in a fume hood whenever possible and limit volumes outside of the fume hood to <1 L * Transfer containers inside fume hoods to prevent buildup of flammable vapors |
| 3.  WASTE DISPOSAL  PROCEDURES | Most flammable liquid is also hazardous waste. Contact EH&S to determine if your chemical must be disposed of as hazardous waste. Any waste collected must be stored in a sealable compatible waste container, preferably in secondary containment. Large volumes must be kept in the fume hood or flammable cabinet until pickup. Waste must be labelled in accordance with EH&S policies. Always leave sufficient headroom in waste containers. |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**   * In case of **eye or skin contact**, flush eyes with copious amounts of water at an emergency eyewash or shower station for at least 15 minutes and seek medical attention. * In case of **inhalation**, move person to fresh air and immediately seek medical attention. * In case of **ingestion**, immediately seek medical attention and follow instructions on SDS. Do not induce vomiting. * Bring SDS to aid medical staff with diagnosis and treatment.   **Upon accidental release**  **If appropriate PPE for the chemical includes a respirator, treat it as a large spill.**  **Large spill**: If a large amount of flammable or combustible liquid is spilled outside the fume hood, immediately evacuate, secure area, and call 911 and EH&S.  **Small spill**: If a small amount of flammable or combustible liquid is spilled (it can be cleaned up in 10 minutes), alert those in the area to the location and nature of the spill. Wear the appropriate PPE and use your spill kit to remove liquid waste. Once the spill has been removed, treat the spill kit materials as hazardous waste. Clean the spill area with water to remove any residue and alert EH&S that a spill has occurred. |
| 5.  SPECIAL STORAGE  and HANDLING PROCEDURES | * If more than 10 gallons total of flammable and combustible liquids are present in one space, you must store them in a flammable cabinet. * Store smaller volumes in a secure, well-ventilated, cool, dry place away from sparks, heat, sunlight, or other sources of ignition. * Store segregated from incompatible chemicals such as flammable metals—including magnesium, sodium, or potassium—or any chemical that can act as an ignition source. |

|  |  |  |
| --- | --- | --- |
| **Chemicals that fall under the Flammable or Combustible Liquids SOP** |  | **Flammable or combustible liquids that require their own SOP** |
|  |  | Acetic anhydride |
|  |  | n-Butyl alcohol |
|  |  | n-Butylamine |
|  |  | 2-Chloroethanol |
|  |  | Methyl ethyl ketone peroxide |
|  |  | Methylhydrazine |
|  |  | Phenylphosphine |
|  |  | Xylenes |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL  and HEALTH HAZARDS | **Oxidizers**  **Hazards**  Oxidizers are chemicals which by themselves are not normally combustible. However, their degradation yields oxygen and can result in or feed the combustion of other materials. Oxidizers may be solids or liquids. Oxidizers may have other more severe hazards associated with them, such as corrosive or toxic. Make sure you are aware of all the hazards associated with your chemical before work begins.  **Pictograms**  Pictogram_Flame Over Circle  \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT  and  HAZARD CONTROL | **PPE**   * Lab coat: For small volumes (<1 L), a standard lab coat is sufficient. For large volumes, use a flame-resistant lab coat. * Chemical resistant gloves * Safety glasses * If working outside of a fume hood, a respirator may be required   **Hazard controls**   * Work in a fume hood whenever possible, limit volumes outside of the fume hood to <1 L |
| 3.  WASTE DISPOSAL  PROCEDURES | **Oxidizer waste** must be collected in a sealable, compatible waste container. Placing waste container in secondary containment is recommended, preferably in a fume hood. The container should be stored away from incompatible materials. Do **NOT** combine oxidizer and flammable waste or store wastes together. **Arrange for waste pick up as soon as possible to remove the hazard from your workspace.**  A completed dangerous waste label should be attached when waste is first added to the container. To arrange pickup, complete a [chemical collection request form](https://spokane.wsu.edu/ehs/chemical-waste-collection-form/). |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**   * In case of **eye or skin contact**, flush eyes with copious amounts of water at an emergency eyewash station for at least 15 minutes and seek medical attention. For exposure over a large portion of the body, remove clothing and shoes. * In case of **inhalation**, move person to fresh air and immediately seek medical attention. * In case of **ingestion**, immediately seek medical attention and follow instructions on SDS. Do not induce vomiting. * Bring SDS to aid medical staff with diagnosis and treatment.   **Upon accidental release**  **If appropriate PPE for the chemical includes a respirator, treat a spill of any size as a large spill. If ANY flame is present, treat the spill as a large spill.**  **Large spill**: If a large amount of an oxidizer is spilled outside the fume hood, immediately evacuate, secure area, and call 911 and EH&S.  **Small spill**: If a small amount of oxidizer is spilled (spill can be cleaned up in 10 minutes), alert those in the area to the location and nature of the spill. Wear the appropriate PPE and use your spill kit to remove liquid waste. Once the spill has been removed, treat the spill kit materials as hazardous waste. Clean the spill area with water to remove any residue and alert EH&S that a spill has occurred. |
| 5.  SPECIAL STORAGE  and HANDLING  PROCEDURES | * Do not over purchase; only purchase what can be safely stored in the laboratory. * Keep away from combustible materials such as organic solvents. * Keep containers tightly closed. Store in a cool, dry, and well-ventilated area away from incompatible substances such as flammable and combustible liquids. Protect from sunlight. * Opened containers of oxidizing liquids must be carefully resealed and kept upright to prevent leakage. * Carefully follow manufacturer’s instructions if oxidizing liquid needs to be vented during storage. * Avoid using ignition sources (flame burners or any open flame, hot plate, etc.) and clear static electricity in the area when working with oxidizing chemicals. |

|  |  |  |
| --- | --- | --- |
| **Chemicals that fall under the Oxidizer SOP** |  | **Oxidizers that require their own SOP** |
| Household bleach |  | Nitric acid |
|  |  | Perchloric acid |
|  |  | Aqua regia |
|  |  | Chlorine |
|  |  | Chromic acid |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL and  HEALTH HAZARDS | **Toxic and Health Hazard**  **Hazards**  Toxic and health hazard chemicals are chemicals that are harmful to life when inhaled, ingested, or absorbed through the skin. These chemicals can be slow acting, such as carcinogens, sensitizers, and mutagens, or cause immediate harm up to and including death after exposure to a single dose (acute toxicity). Toxic and health hazard chemicals may have additional associated hazards.  Note the time-weighted average (TWA), permissible exposure limit (PEL), or ceiling for toxic chemicals. Work above the recommended exposure limits should be treated as exceptionally hazardous.  **Pictograms**  **Chemicals with the skull and crossbones or exploding chest and the signal word DANGER are not covered under this SOP**  Pictogram_Health Hazard Pictogram_Skull and Crossbones Exclamation Mark  \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT  and  HAZARD CONTROL | **PPE**   * Lab coat * Chemical resistant gloves. If chemical is fatal on contact, consider wearing two pairs of gloves * Safety glasses * If working outside of a fume hood, respirators may be required * If there is **ANY** splash risk, wear goggles or face shield (preferred) and a splash-proof apron, impervious sleeves, or coveralls   **Hazard controls**   * Work in a fume hood unless absolutely impossible * Do not heat or risk aerosolizing outside of a fume hood * Line work area with absorbent, leak-proof bench pads * Work with the smallest reasonable amount * Decontaminate work area with appropriate solvent |
| 3.  WASTE DISPOSAL  PROCEDURES | **Toxic and health hazard waste** must be collected in a sealable, compatible waste container. Placing waste container in secondary containment is recommended, preferably in a fume hood. The container should be stored away from incompatible materials**. Arrange for regular waste pickup and do not allow large amounts of toxic waste to accumulate.**  A completed dangerous waste label should be attached when waste is first added to the container. To arrange pickup, complete a [chemical collection request form](https://spokane.wsu.edu/ehs/chemical-waste-collection-form/). |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**   * In case of **eye or skin contact**, flush eyes with copious amounts of water at an emergency eyewash station for at least 15 minutes and seek medical attention. For exposure over a large portion of the body, remove clothing and shoes. * In case of **inhalation**, move person to fresh air and immediately seek medical attention. * In case of **ingestion**, immediately seek medical attention and follow instructions on SDS. * **If accidentally exposed to a highly toxic substance likely to kill in a single dose, immediately call 911**. * Bring SDS to aid medical staff with diagnosis and treatment.   **Upon accidental release**  **If appropriate PPE for the chemical includes a respirator, treat a spill of any size as a large spill.**  **Treat all toxic spills as large spills. Do not risk exposure.**  **Large spill**: If a large amount of a **toxic or health hazard** is spilled outside the fume hood, immediately evacuate, secure area, and call 911 and EH&S.  **Small spill**: If a small amount of **health hazard** is spilled (it can be cleaned up in 10 minutes), alert those in the area to the location and nature of the spill. Wear the appropriate PPE and use a spill kit to remove liquid waste. Once the spill has been removed, treat the spill kit materials as hazardous waste. Clean the spill area with the appropriate solvent to remove any residue and alert EH&S that a spill has occurred. |
| 5.  SPECIAL STORAGE  and HANDLING  PROCEDURES | * Store in shatterproof containers. * Keep containers tightly closed. Store in a cool, dry, and well-ventilated area away from incompatible substances. Protect from sunlight. * It is essential that all toxic and health hazards are labelled following GHS standards, even if you are working with the chemical in a single shift. |

|  |  |  |
| --- | --- | --- |
| **Chemicals that fall under the Toxic and Health Hazard SOP** |  | **Toxic and health hazards that require their own SOP** |
| Household bleach |  | Acetaldehyde |
|  |  | n-Butyl alcohol |
|  |  | n-Butylamine |
|  |  | Chlorine |
|  |  | 2-Chloroethanol |
|  |  | Chromic acid |
|  |  | 1,2-Dibromo-3-chloropropane |
|  |  | Dichloroacetylene |
|  |  | Dichlorobenzene |
|  |  | Ethylene glycol |
|  |  | Glutaraldehyde |
|  |  | Hexylene glycol |
|  |  | Hydrogen bromide |
|  |  | Isophorone |
|  |  | Methyl ethyl ketone peroxide |
|  |  | Methylhydrazine |
|  |  | Phenylphosphine |
|  |  | Sodium azide |
|  |  | Thionyl chloride |
|  |  | 1, 2, 4-Trichlorobenzene |
|  |  | Xylenes |
|  |  | Arsenic-containing compounds |
|  |  | Beryllium-containing compounds |
|  |  | Cadmium- containing compounds |
|  |  | Chromium-containing compounds |
|  |  | Cobalt-containing compounds |
|  |  | Lead-containing compounds |
|  |  | Lithium-containing compounds |
|  |  | Acrylamide |
|  |  | Adiponitrile |
|  |  | Doxorubicin |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL and  HEALTH HAZARDS | **Compressed Gas Cylinders**  **Hazards**  Compressed gasses are an inherent pressure hazard. Cylinders can rapidly release their contents into the environment and become projectiles while simultaneously displacing oxygen. Many gasses can also create a flammable atmosphere (e.g. propane) or a toxic atmosphere. Some gasses are also pyrophoric (e.g. silane) and may spontaneously ignite. Oxidizing gases (e.g. oxygen) will contribute to combustion. Understand all hazards associated with any compressed gas before work begins.  **Pictograms**  Pictogram_Gas Cylinder  \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT  and  HAZARD CONTROL | **PPE**   * Lab coat   **Hazard controls**   * Use tanks in well ventilated areas * Regularly check hoses and connections for leaks * Secure all tanks during use and transport * Replace valve cap during storage or transport * Remove damaged or defective cylinders from service IMMEDIATELY |
| 3.  WASTE DISPOSAL  PROCEDURES | Coordinate vendor return of cylinders. Follow storage procedures prior to pickup. |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**   * In case of **inhalation**, move person to fresh air and immediately seek medical attention. Know the signs and symptoms of exposure for each gas. * Bring SDS to aid medical staff with diagnosis and treatment. * In case of explosive decompression, do **NOT** remove any heavy objects such as furniture from the victim unless the gas poses a more immediate threat to life and health. Immediately call 911 and EH&S.   **Upon accidental release**  **For small leaks**: Immediately secure the cylinder and notify those working in the area of the leak. If possible, replace faulty parts. If not possible, close the cylinder and remove it from service.  **For large leaks or explosive decompression:** Immediately evacuate, secure area, and call 911 and EH&S. |
| 5.  SPECIAL STORAGE  and HANDLING  PROCEDURES | * Always secure cylinders before use or transport * Segregate empty and full cylinders and mark empty cylinders * Segregate and store cylinders by chemical compatibility (i.e., do not store pyrophoric gasses with flammable materials). Do not store flammable gasses with oxidizing gasses. |

|  |  |  |
| --- | --- | --- |
| **Chemicals that fall under the Compressed Gas SOP** |  | **Compressed gasses that require their own SOP** |
| Carbon dioxide gas |  | Carbon monoxide gas |
| Propane |  | Chlorine |
| Nitrogen gas |  | Hydrogen bromide |
| Oxygen gas |  | Ammonia gas |
| Argon gas |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Laboratory-Specific Hazardous Chemical SOPs**

**When do I need to write my own SOP?**

If the chemical you are working with:

* is listed as an exception in the uniform SOPs;
* is a hazard not covered under the uniform SOPs (e.g. explosive, self-reactive, pyrophoric);
* has a ceiling listed in [WAC 296-841-20025 Table 3](https://apps.leg.wa.gov/WAC/default.aspx?cite=296-841-20025) or is an [immediate danger to life and health](https://www.cdc.gov/niosh/idlh/pdfs/1994-IDLH-ValuesBackgroundDocs.pdf);
* has special waste disposal requirements in the state of Washington,

you are required to write an SOP using, at minimum, the SOP template found in Appendix C of this document before work with the chemical begins. You may always include additional information in your SOPs relevant to your specific use case.

You may also write an SOP for any chemical that falls under the uniform SOPs if you feel the uniform SOP is too broad for your specific hazard or use case.

You may write categorical SOPs if you have a group of similar hazards with similar handling requirements that do not have special waste disposal requirements (e.g.: Low-toxicity chemotherapeutic drugs, nucleotide analogues, organic solvents).

**If you add SOPs to this book**, make sure lab personnel who have already signed the CHP read, date, and initial any new SOP before working with the new hazard. Any SOP in the CHP at the time of signing is covered by the CHP signature page; new workers do not need to date and initial every lab-specific SOP.

**CHP Training Certification Record**

By signing the below table, I certify that I have read and understood the CHP. Furthermore, I understand that it is my responsibility to:

* Follow all environmental health and safety and radiation safety rules
* Report hazardous conditions to my supervisor or CHO
* Wear PPE and use hazard controls when indicated
* Keep informed about new chemicals as they enter the lab

|  |  |  |
| --- | --- | --- |
| Date | Name | Signature |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Annual Laboratory Inspection Documentation**

Both Washington State and OSHA require that researchers document the inspection status and proper working order of their fume hoods annually. Your annual laboratory inspection fulfills the requirement.

**Please attach your inspection form after this page**.

**SOP Template**

|  |  |
| --- | --- |
| 1.  CHEMICAL NAME(S)  and associated  PHYSICAL and  HEALTH  HAZARDS | [Chemical Name]– CAS# [Insert CAS#]also known as [Synonyms].  **Hazards**   * [Insert chemical hazard statements/descriptions and chemical information]   **Pictograms** [Consult SDS and Label – Remove those that don’t apply]  Flame Pictogram_Exploding Bomb Pictogram_Flame Over Circle Pictogram_Corrosion Pictogram_Gas Cylinder  Pictogram_Health Hazard Pictogram_Skull and Crossbones Exclamation Mark Pictogram_Environment  **Signal Word:** **DANGER or WARNING** [Use only one – Consult SDS and Label]  **Exposure Limits:** [Consult WAC 296-841 Table 3, SDS, NIOSH pocket guide, etc.]  [Insert: TWA, STEL, PEL, etc.]  **Toxicological Data:** [Consult SDS]  [Insert: LD50-Oral, LD50-Dermal, LC50-Inhalation, etc.]  \***Always refer to the Safety Data Sheet for the most detailed information**\* |
| 2.  PROTECTIVE  EQUIPMENT | Wear [type of eye protection], [type of glove] gloves and a fully buttoned lab coat. Wash hands after removing gloves. Work within a certified laboratory chemical fume hood.  [Insert/Modify any specific or additional PPE required.]  [Insert/Modify any specific or additional engineering controls required.] |
| 3.  WASTE DISPOSAL  PROCEDURES | **Waste** [Chemical Name] must be collected in a sealable, compatible waste container. Placing waste container in secondary containment is recommended. The container should be stored away from incompatible materials such as [Insert chemicals here]. [Insert/Modify any specific or additional waste disposal procedures required.]  A completed dangerous waste label should be attached when waste is first added to the container. When container is full or no longer being used, complete a chemical collection request form. |
| 4.  DECONTAMINATION  PROCEDURES | **Upon accidental exposure**  In case of **eye contact**, flush eyes with copious amounts of water at an emergency eyewash station for at least 15 minutes and seek medical attention.  In case of **skin contact**, flush skin with copious amounts of water for 15 minutes and seek medical attention. For exposure over a large portion of the body, remove clothing and shoes and rinse thoroughly in an emergency shower for at least 15 minutes. Seek medical attention.  In case of **inhalation**, move person to fresh air and immediately seek medical attention.  In case of **ingestion**, immediately seek medical attention and follow instructions on SDS. Do not induce vomiting.  **Upon accidental release**  **Large spill**: If a large amount of [Chemical Name] is spilled outside the fume hood, immediately evacuate, secure area, and call 911 and EH&S.  **Small spill**: If a small amount of [Chemical Name] is spilled (it can be cleaned up in 10 minutes) and you have been appropriately trained to clean it up, you may do so. Trained personnel should wear, at the minimum [Insert glove type], chemical safety goggles, and a fully buttoned lab coat.  If it is necessary to use a respirator, and personnel are not cleared to wear a respirator and not trained to appropriately clean up the spill, the employee should immediately evacuate, secure the area, and call 911 and EH&S.  Absorb with an inert dry material, or if the released substance is a solid, use appropriate tools to collect it and place in an appropriate waste disposal container (resealable bag, etc.) and dispose of as hazardous waste (see above WASTE DISPOSAL PROCEDURES).  As with all accidents, report any exposure as soon as possible to your principal investigator or supervisor. Additional health and safety information on [Chemical Name] can be obtained by referring to the SDS or by calling the EH&S Office (509-335-3041). |
| 5.  SPECIAL STORAGE  and HANDLING PROCEDURES | Keep container tightly closed until ready for use. Store in a secure, well-ventilated, cool, dry place away from sparks, heat, sunlight, or other sources of ignition. Keep away and store segregated from incompatible chemicals [Insert Incompatible Chemicals]. Use secondary containment when possible. [Insert any additional storage or handling requirements]. |

I certify that I have read the SOP for [Chemical Name]

|  |  |  |
| --- | --- | --- |
| Name | Initials | Date |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

The purpose of this page is to document that those who have already read and signed the CHP are aware of **NEW** hazards as they enter the lab. Lab staff is only required to initial this page if the SOP is added **AFTER** they have read and signed the CHP.

**Additional Training Documentation**

**This section of the chemical hygiene plan is optional**.

You are not required by law to document any additional training, but the CHP can be a useful place to keep records of training related to hazardous communication, bloodborne pathogens, animal care and use, respiratory program participation, fire extinguishers, or any lab-specific training.

Feel free to attach any forms here that you wish.

**Chemical Inventory**

**You are required by law to keep an up-to-date chemical inventory along with your CHP**. This inventory can be as simple as an Excel spreadsheet that lists chemical names and CAS numbers. Please attach your inventory in this section.

To make your inventory more useful consider including the following:

* Any uniform or lab-specific SOPs and page numbers alongside the chemical so that the proper conditions for storage, use, and cleanup can be rapidly identified.
* Purchase date
* Expiration date
* Storage location
* GHS hazard signal words (i.e., Toxic, Corrosive, Explosive)
* Product number and vendor