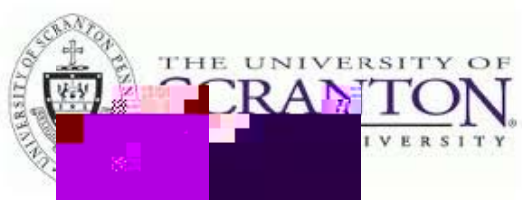


# Chemical Hygiene Plan

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**Date**

**May 2014**

# University of Scranton: Chemical Hygiene Plan

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# Section 1: Introduction

## 1.1 Purpose

## 1.3 Regulations, Standards and Industry Guidelines

The below regulations, standards and industry guidelines are referenced in this Plan:

*U.S. Department of Labor, Occupational Safety and Health Administration (OSHA)*

Occupational Exposure to Hazardous Chemicals in Laboratories [29 CFR 1910.1450]
Hazard Communications [HCS-2012- 29 CFR 1910.1200]*
Personal and Respiratory Protection [29 CFR Subpart I]
Medical and First Aid [29 CFR 1910 Subpart K]
Fire Protection [29 CFR 1910 Subpart L]

*American Chemical Society*

Identifying and Evaluating Hazards in Research Laboratories [2013]
Guide for Chemical Spill Response Planning in Laboratories [1995]

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## 1.5 Definitions

**Action Level:** A concentration designated in 29 CFR Part 1910 for a specific substance calculated as an eight hour time weighted average, which initiates certain required activities such as exposure monitoring and medical surveillance.

**Chemical Hygiene Officer:** An employee who is designated by the employer, and who is qualified by training or experience to provide technical guidance in the development and implementation of the provisions of the Chemical Hygiene Plan. This definition is not intended to place limitations on the position description or job classification that the designated individual shall hold within the employer's organizational structure.

**Chemical Hygiene Plan:** A written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment, and work practices that (i) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and (ii) meets the requirements of the OSHA Occupational Exposure to Hazardous Chemicals in Lab Standard (29 CFR 1910.1450).

**Combustible Liquid:** Any liquid having a flashpoint at or above 100°F (37.8°C), but below 200°F (93.3°C), except any mixture having components with flashpoints of 200°F (93.3°C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

(i) A gas or mixture of gases having a container, an absolute pressure exceeding 40 psi at 70°F (21.1°C); or
(ii) A gas or mixture of gases having, in a container, an absolute pressure exceeding 104 psi at 130°F (54.4°C) regardless of the pressure at 70°F (21.1°C); or
(iii) A liquid having a vapor pressure exceeding 40 psi at 100°

**Employer:** A person engaged in a business where chemicals are either used, distributed, or are produced for use or distribution, including a contractor or subcontractor.

**Explosive:** A chemical that causes a sudden, almost instantaneous release of pressure, gas and heat when subjected to sudden shock, osur.1(8(:)7.9]TEThigh)on D temp0( )6era3.291(o)8(sr.1(8

degree of hazard.

**Health Hazard:** A chemical which is classified as posing one of the following hazardous effects: acute toxicity (any route of exposu

employee exposure to hazardous chemicals0ce(a)r

**Select Carcinogen:** Any substance which meets one of the following criteria:

(i) It is regulated by OSHA as a carcinogen
(ii) It is listed under the category, "known to be carcinogens", in the Annual Report on Carcinogens published by the National Toxicology Program (NTP) (latest edition)
(iii) It is listed under Group 1 ("ca

label is determined by the chemical hazard classificatic
are provided in Figure 1, below.

| Figure 1: HCS-2012 Compliar | |
|---|---|
| **Oxidizer** | **Flammable** |
|  <br>Oxidizers | Flammables, Pyrophorics<br>Heating, Emits Flammabl<br>Self-Reactives,<br>Organic Peroxides |
| | |
| **Toxin/Poison** | **Corrosive** |
|  <br>Acute Toxicity (fatal or toxic) | Skin Corrosion/Burns<br>Eye Damage<br>Corrosive to Metals |
| | |
| **Health Hazard** | **Environmental Haz** |
|  <br>Carcinogen, Mutagenicity<br>Reproductive Toxicity, Respiratory<br>Sensitizer ,Target Organ Toxicity | Aquatic Toxicity |

**Routes of Entry:** Knowing the route of entry(ies) for a che
proper controls and protective equipment necessary
designated by the M/SDS and/or the specific laborat
routes of entry include one or more of the following: Ing

Toxic effects can be immediate or delayed, reversible c
effects of chemicals can vary from mild and reversib
episode of inhaling the vapors of petroleum
gets fresh air, to serious and irreversible, such
materials during pregnancy or perhaps ca
effects from exposure to a chemical depenc

**Signs and Symptoms of Exposure:** All labora
of exposure to the chemicals or mixtures tl
provide an indicator that an exposure is occ

and seek medical attention. Signs and symptoms of exposure are found in the M/SDS and/or the specific laboratory procedure (if developed). Common examples include:

- Headaches
- Fatigue
- Confusion
- Dizziness, lightheadedness
- Nausea, vomiting, abdominal pain
- Burns or irritation of the eyes, nose, throat
- Skin irritation or dermatitis
- Respiratory distress (cough, tightness, pain or difficulty breathing

**Occupational Exposure Values:** There are the concepts known as Occupational Exposure Values that shall be adhered to for laboratory activities. These include:

- ACGIH's Threshold Limit Value (TLV)
- OSHA's Permissible Exposure Limit (PEL) or Action Levels
- NIOSH's Recommended Exposure Level (REL)
- Ceiling Values
- Immediately Dangerous to Life and Health (IDLH) atmospheres

Exposure limits for select chemicals are provided in Appendix B of this Plan. Additionally, M/SDSs for hazardous chemicals and mixtures of hazardous chemicals cite applicable exposure limits.

| | | |
|---|---|---|
| | | Management Practices) as they become available<br>Facilitate periodic compliance reviews<br>Recordkeeping<br>Review accident forms to identify direct and root causes and provide recommendations to minimize re-occurrence |
| **2.1.5** | **Chemistry Stockroom Manager** | Assist with inventory management<br>Ensure chemical receipt protocols are followed<br>Maintain the Central Storage Area |

To ensure individuals are aware of potential hazardous chemicals in an area, the University will utilize signs that delineate certain work areas. All chemicals are labeled in accordance with OSHA requirements. Examples of signage that may be utilized in appropriate areas are depicted in Figure 1.

Emergency telephone numbers.

Identity labels showing contents of containers (including waste receptacles). The label should clearly state the full name of the chemical, the date it was placed in the container, the initials of the worker who placed the material in the container, and associated hazards of the chemical (flammable, carcinogenic, pyrophoric, etc.).

Location signs for eyewash stations, first aid kits, fire extinguishers and exits.

No smoking signs.

Food and beverages prohibition.

Warnings at areas or equipment where special hazards exist (high voltages, bodily fluid work, flammable gases in use, strong magnetic fields present, laser operation, etc.).

2. Where exposure monitoring reveals an exposu re level routinely above the action level

| Table 1: Container Labeling Systems | |
|---|---|
| **Non-GHS (until June 2015)** | **GHS-Compliant (after June 1, 2015)** |
| Identity of the chemical<br>Appropriate hazard warnings | |

2. **Hazard Evaluation-** The qualitative, and where applicable, quantitative description of the inherent properties of an agent or situation having the potential to cause adverse effects.
3. **Control Designation-**

| | | | |
|---|---|---|---|
| Fume Hood Evaluations | Testing reports provided by vendor | LSC Acting Building Manager | 5 years after the evaluation |

*Records shall be maintained in accordance with 29 CFR 1910.1020(h) “Access to Employee Exposure and Medical Records”.

### 2.8 Laboratory Safety Inspections

Inspections of laboratory equipment and practices will be performed in accordance with the below schedule by designated personnel or vend ors to ensure all elements of this Plan are implemented.

| Table | | | |
|---|---|---|---|
| **Type** | **Examples** | **Performed by** | **Frequency** |
| Fume Hood Evaluations | Testing and operational inspections in accordance with ANSI protocols | Vendor | Annually |
| Safety Equipment Inspection | Visual inspections of fire extinguishers, first aid kits, eye washes, showers and spill kits | GSA (coordinated by LSC Building Coordinator) | Monthly |
| Laboratory Inspections | Review of chemical storage, use, work practices, labels, etc. | Health and Safety Office | 1/semester |

Records for each of the above will be maintained in accordance with the provisions designated in Section 2.7 of this Plan.

- Fume hoods are not permitted to be used as storage areas.

Chemical Storage:

- Avoid storing hazardous liquid chemicals on hard-to-reach sh
- Shelves shall be made of a chemically resistant material.
- Chemical storage will be based on a hazard class sto chemicals must not be stored together. Refer to Figure _.

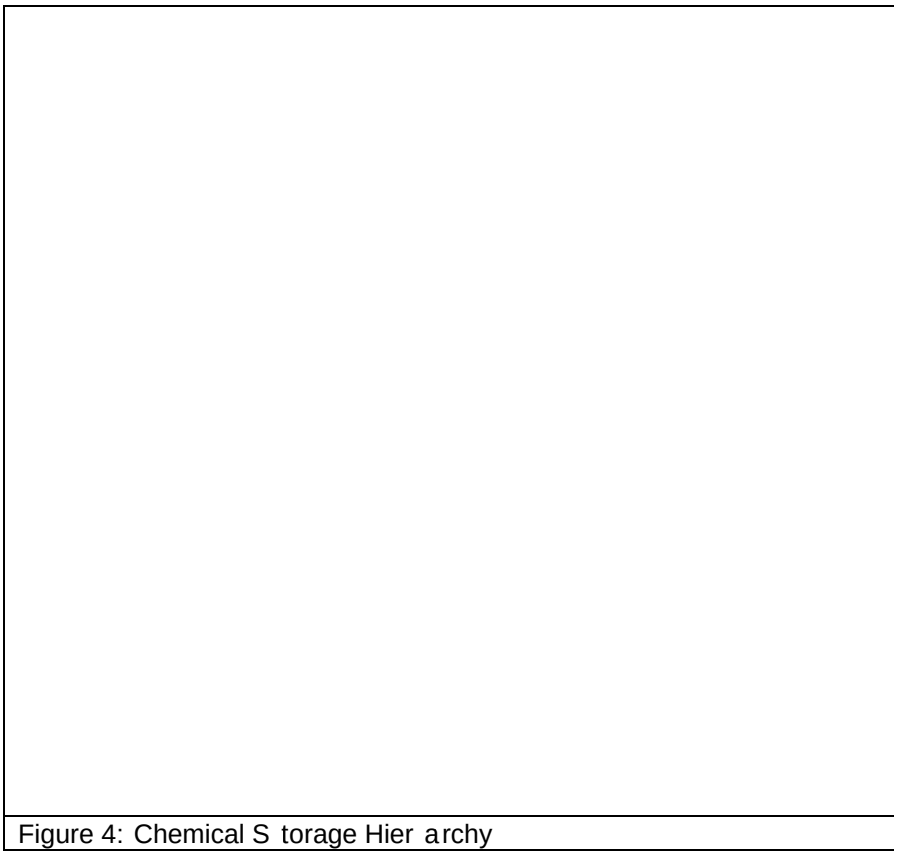

Figure 4: Chemical Storage Hierarchy

Chemicals stored in stockrooms shall be examined at least annually the Chemical Hygiene Officer. At this time, those chemicals that h appropriate shelf life or have deteriorated, have questionable corroded caps, or have developed any other problem shall be disp

Storage of chemicals within laboratories shall be kept at a minimu that will be used) and shall follow the basic provisions for stoc Additionally, storage areas within these laboratories shall be loca egress areas and high traffic walkways.

6. Minimize sources of turbulence at the hood face including foot traffic, ventilation supply diffusers, fans, or abrupt moving of arms in and out of the hood.
7.

### 3.2.3 Labels

### 3.2.5 Occupational Hygiene

All laboratory areas are designed to include areas for personnel to perform hygiene activities. Occupational hygiene requirements include:

- Washing hands and areas of exposed skin before leaving the laboratory.
- Utilizing break areas for any food/drink consumption.
- Avoiding contact with items that may have become contaminated during laboratory activities. These items, such as cell phones, calculators, laboratory instruments, etc. are to be cleaned prior to handling without protective equipment.

### 3.2.6 Transporting Chemicals

For transporting chemicals between laboratories, stockrooms, or within laboratories, the following requirements shall apply:

- Carts, bottle carriers, pails and/or secondary containers shall be used to move chemicals from one area to another. These devices shall be in good condition and be able to hold the contents safely without contributing to a release.
- When moving in the laboratory, ensure a clear walkway and anticipate sudden movement or changes in direction by others.
- The individual transporting the chemical should be knowledgeable about the hazards of the chemical and should know how to handle a spill of the material.
- When transporting compressed gas cylinders, the cylinder should always be strapped in a cylinder cart and the valve protected with a cover cap. Do not attempt to carry or roll cylinders from one area to another.
- Keep chemicals in their original packing with required labels when transporting.
- Chemicals shall not be left unattended during transport. Routes shall be planned to avoid unnecessary stops between transport.

Note that transporting of chemicals from the building is prohibited.

## 3.3 General Procedures for Certain Hazard Groups

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| Identifi e |

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   - ¾ In ca acci d speci f
   - ¾ If a fla off all
   - ¾ Small spill ki wast e wast e
   - ¾ Large proc e

3.3.2 Oxidizers

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3.3.3 Uns

Pyropho ric material s ignite spon taneously u
visible.

| Examples | Butyllithium, Silane, and |
|---|---|
| Ide ntifiers | |
| Handling and PPE | Refer to sp ecific handl<br>that requir es use of an<br>any release involving a |
| Storage | ¾ Storage must be in a |
| Incom patibles | ¾ Air |

Water reactive mat erials react with wate
hazardo us conditio n. Special precautions
depend on the spe cific material , and the c

| Examples | Alkali and a |
|---|---|
| Ide ntifiers | |
| Handling and PPE | ¾ Refer to<br>that req<br>clean up |
| Storage | ¾ Storage |
| Incom patibles | ¾ Aqueous |

Peroxidi zables are substances
peroxid es can expl ode with im

Peroxides form inside the containers of some materials even if th
Peroxide formation may be detected by visual inspection for c
specialized kits. If you suspect that peroxides have formed, do no
since peroxides deposited on the threads of the cap could detonat

| Examples | Ethyl ether, Tetrahydrofuran, Liquid paraffins (al |
|---|---|
| Identifiers | |
| Handling | ¾ Do no open or handle any con<br>Notify the Chemical Hygiene Off icer upon id<br>¾ Handle under precautions similar to that lis3o0056 Tc -.0013 Tw [( t)-14.rt9.2(r) 12.06 re W n B<br>¾ Maintain accurate inventory, la<br>materials.<br>¾ Minimize peroxide formation i<br>containers placed in a cool pla c<br>or below the temperature at w h<br>precipitates.<br>¾ Inspect for peroxides of any ope<br>¾ Do not use solutions of peroxide<br>which the solvent might be<br>concentration of peroxide in the<br>¾ Do not use metal spatulas or ma<br>compounds, since contaminati<br>decomposition. Ceramic, Teflon<br>are usually safe to use.<br>¾ Do not use glass containers<br>Polyethylene bottles with screw-t |
| PPE | ¾ Eye protection (goggles)<br>¾ Face shields<br>¾ Chemical resistant gloves<br>¾ Lab coats |
| Storage | ¾ Date all peroxidizable materials u<br>¾ Dispose of after 18 months from<br>date of opening.<br>¾ Avoid friction |
| Incompatibles | ¾ Organic and Inorganic Acids |

3.3.4 Corrosive Materials

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precauti ons. The pro
specific procedures

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specifie d chemicals

| Ide ntifiers |
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Particula rly Hazardo
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recordk eeping, han
use form found in A p

Carcino gen: F
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Reproductive
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High Acute To x
OSHA-defined
body wei ght; (
by continuous
concentration
per liter or less
inhalation for
encountered b

Allergen s
Embryot

Allergens: Allergens are agents that produce an immunologic reaction, such as asthma or dermatitis. Diazomethane, Isocyanages, Formaldehyde, Chromium, Nickel, Bichromates

Embroyotoxics: Organomercurials, Lead compounds, Formamide

Work with these materials shall occur only in a fume hood or othe r enclosed containment device, whose performance has been confirmed prior to the start of work. The fume hood must be labeled “Hazardous Material – Do Not Turn Off” and designate chemic al names. Minimal PPE requirements include suitable gloves and la boratory goggles to prevent skin contact.

Chemicals of Moderate, Chronic, or High Acute Toxicity Examples include Hydrogen Cyanide, Hydrofluoric Acid, Diisopropylfluorophospha te. The following general requirements are designated by this plan:

- At least two people must be in the immediate area when highly toxic chemicals are in use.
- All work will be done in a hood (or glove box), whose adequate performance has been established immediately prior to the start of the work (the hood must have a face velocity of at leas
  area of the laboratory for use with select carcinogens. The hood switch must be labeled “Hazardous Chemicals in Use - Do Not Turnf”.
- 

  the area. These signs must also bear the specific names of the chemicals being used, and the names of the workers using the chemicals.
- Work which generates aerosols must trap all vapors to prevent their discharge with hood exhaust.
- 
  washed immediately after working with these materials.
- All waste material geJ-.9(n)7(e)-.9(ra)8.4(ted)4.3( sho)10(u)5]ld be stored in closed, suitably labeled (Canc

  generated waste should be chemically converted to a non or less toxic form. All contaminated clothing should be sealed in plastic and properly labeled to await incineration.

Chemicals of High Chronic Toxicity Examples include Dimethylmercury, Nickel Carbonyl, benzo[a]pyrene, N-nitrosamines, bi s(chloromethyl)ether, aflatoxin $B_1$. The following general requirements are designated by this plan:

¾

¾

### 3.3.6 Compressed Gases

The publications of the Compressed Gas Associat ion and of major supplier s should be consulted before using compressed gases. The rules for proper use of compressed gases include the following:

| | |
|---|---|
| Examples | Oxygen, Nitrogen, Helium, Nitric oxide, Acetylene |
| Identifiers | |
| Handling | ¾ Handle cylinders of compressed ga ses as high-energy sources and therefore as potential explosives.<br>¾ When storing or moving cylinders, secure the protective caps in place over the valves in order to protect the valve stems.<br>¾ When moving cylinders, use only properly designed wheeled carts, and before moving, strap the cylinders securely in place on the(l)-253.2(r0 -1.227e)-1.7(r )-6(s1.6(<br>¾ |

- Do not open the lid until the rotor has completely stopped.
- Do not operate the centrifuge above designated speeds.
- Samples are to be run balanced.

¾ Do not bump, lean on, or attempt to move the ultracentrifuge while it is running.
¾ If atypical odors or noises are observed, stop use and notify the laboratory coordinator.
¾ Do not operate the ultracentrifuge if there has been a release. Follow procedures listed in Section 5 of this Plan for response actions.
¾ Inspect the ultracentrifuge after completion of each operation. Report concerns immediately.

3.4.3 Vacuums

While performing work in an evacuated system, hazards include release of chemical vapors, or implosion that may release glass, particles, fir e or chemicals. The following requirements are designated for use of vacuums when working with reduced pressure:

¾ Ensure the proper units are selected for use.
¾ Always use the apparatus in accordance with manufacturer guidelines.
¾ Protect mechanical vacuum pumps by usin g cold traps, with vented exhausts.
¾ Use shielding when working with glass vessel s at reduced pressure. Only glassware made specifically for operations at reduced pressure shall be utilized.
¾ Glass vacuum desiccators shall be protected with friction tape applied in a grid pattern. Where practical, replace glass desiccators with applicable plastic ones.
¾ Ensure the apparatus is assembled appropriately.

3.4.4 Temperature- Based Devices

When working with temperature-controlling devices, the following is required:

¾ The actual heating element in any laboratory heating device should be enclosed in such a fashion as to prevent a laboratory worker or any metallic conductor from accidentally touching the wire carryin g the electric current.
¾ If the heating element is exposed, the device should be either discarded or repaired before it is used again.
¾ Heating devices should not be exposed to flammable liquids or vapors.

3.5 Personal and Respirator y Protective Equipment

The use of Personal and Respiratory Protective Equipment (PPE/RPE) within University laboratories includes the general requirements and any additi onal specific requirements designated by the Hazard Analysis. All laboratory personnel shall be trained in the proper use and care of P/RPE in addition to assigned requirements for each activity they perform.

Equipment that can provide protection against hazardous chemicals includes, but is not limited to: safety glasses, goggles, face shields, gloves , footwear, respirators and protective clothing. This equipment is designed to provide an immediate barrier between personnel and the hazardous material, thereby minimizi ng the spread of contaminants.

All P/RPE shall be certified by the appropriate orga nization, such as ANSI, ASTM, NIOSH, etc., and utilized in accordance with OSHA requirem ents codified in Subpart I of 29 CFR 1910.

### 3.5.1 Attire Requirements and Body Protection

All laboratory personnel and any visitors are required to abide by the following attire requirements for any entry into a University laboratory setting:

- All loose hair and clothing must be confined
- Closed-toe shoes are required
- Contact lenses are prohibited
- Entry into a laboratory where active work is performed requires the use of a flame-resistant lab coat and goggles, at a minimum.
- Footwear that is appropriate (minimizing slip/trip potential) for the laboratory setting shall be worn.

Additional PPE may be required as designated by the Hazard Analysis. This may include: hand and face protection, respiratory protection, or the use of chemical-resistaz1r to fol

### 3.5.5 Respiratory Protection

For activities where the Hazard Analysis designates the use of Respiratory Protection, the University Respiratory Protection Program sha ll be implemented. This Program has been developed to meet OSHA requirements specifie d at 29 CFR 1910.134. These requirements include:

- ¾ Appropriate selection of respirators
- ¾ Medical pre-qualification
- ¾ Training
- ¾ Fit Testing
- ¾ Proper use, inspection and maintenance

The above elements shall be conducted through the Health and Safety Office.

## Section 4: Specific Procedures

As new laboratory activity procedures are developed, reviewed and approved, they will be added to this Section.

1. The Faculty member will complete the Hazard Analysis Form, Appendix E of this Plan.
2. The form will be submitted to, and revi ewed by the Chemical Hygiene Officer.
3. The Chemical Hygiene Officer will work with the submitting individual to approve the procedure.
4. The finalized procedure will be mainta ined in this Section of the Plan.

List of approved procedures:

| No.* | Procedure Name |
|---|---|
| 2015-1 | |
| 2015-2 | |
| 2015-3 | |
| 2015-4 | |
| 2015-5 | |
| 2015-6 | |
| 2015-7 | |
| 2015-8 | |
| 2015-9 | |
| 2015-10 | |

*The assigned procedure number will be based on a sequential order for each approved year (e.g. YEAR-#, or 2015-1, 2015-2 … 2015-n).

# Section 5: Contingency Planning and Response

### 5.2.2 Eye Washes

All laboratories are equipped with plumbed eye washes designed to provide temporal water supply for the minimum 15 minutes per eye recommended by medical industry for chemical exposures. The units are inspected and tagged on a weekly basis to ensure proper operation, flow, water clarity and temperature. For chemical exposures to the eye(s), the victim must flush each affected eye for at least 15 minutes, using the thumb and forefinger to hold eyelids away from the eyeball and moving eyes continuously.

In the event of a disruption in water supply, labo ratory work shall be prohibited unless secondary eye wash stations capable of supplying a minimum of 15 minutes of flush are immediately available.

As referenced in Section 3.2.4, housekeeping practices shall ensure unimpeded access to the eye wash stations.

### 5.2.3 Drench Showers

All laboratories are equipped with plumbed dren ch showers for large exposures to liquid and solid chemicals. Showers are inspected/tagged on a weekly basis and designed to provide constant temporal water supply and collection of water for proper drainage. For small or large skin exposures to chemicals, flooding of the a ffected areas for 15 minutes (minimum) should occur during/after removing the chemical and any clothing or jewelry. The victim should use caution to not spread the chemical to other parts of the body (such as when removing clothing).

As referenced in Section 3.2.4, housekeeping practices shall ensure unimpeded access to the shower stations.

## 5.3 Chemical Release Procedures

All spills, regardless of size, shall be address promptly. This Plan references the American Chemical Society Guide for Chemical Spill Respon se Planning in the Laboratory. This guideline defines two (2) spill classificat ions: (1) Simple; and, (2) Comp lex. Knowing the differences betweeical407 -16 b -24.6w [(All.52216 TD 2ln4.3(ical5s(nce2(an)-6s13 Tcdc 0 T3(s)1.5(u)59 -31.64ec0(ical407 -1nd,)11

devices (pans, brooms, aspirators, etc.), neutralizing agents, and containers. In the event an item is used from any spill kit, it shall be replaced in a timely manner.

5.3.2 Simple Spills

Procedures for Simple Spills, as defined in 5.2.1 are listed below.

- NOTIFY: Immediately notify the Instructor or laboratory supervisor and other laboratory personnel of the spill and confirm the spill meets the definition of a Simple Spill. Restrict access to the area.
- PERSONAL PROTECTION: Don PPE consisting of, at a minimum, double layer chemical resistant gloves and goggles. For certain quantities of liquid spills, additional arm/body protection and face shields may be warranted. Ensure other hazards are addressed, such as broken glass.
- CONTROL AIRBORNE DUSTS/VAPOal a0f /CsI9. TD (POa /C .POas /Cs6 cs )6(may)4.3J 0 g 11.6766 0 Tmay

### 5.3.3 Complex Spills

Complex spills will require outside assistance fr om the fire department or in-house/contracted hazardous materials teams. Follow protocols id entified in the Emergency Response Plan, as summarized below:

For Immediately dangerous situations:

- ¾ Pull the fire alarm
- ¾ Evacuate the building, closing doors behind you
- ¾ Do not return to the building until directed by emergency responders

If there is no immediate danger:

- ¾ Evacuate the room and call University Police
- ¾ Report any chemical or inci dent information available
  - o Name
  - o M/SDS
  - o Quantities, container type
  - o Hazards
  - o Injuries
- ¾ Do not return until direct ed by University Police

After the incident is cleared, complete the inci dent report form and forward to the Chemical Hygiene Officer.

## 5.4 Incident Reporting

All incidents, including safety concerns, injuries, sp ills and near misses, shal l be reported as soon as practical. Report includes the completion of the Incident Report Form found in Appendix H of this Plan, and forwarding to the Chemical Hygi ene Officer. The Chemical Hygiene Officer and the Health and Safety Office shall be responsibl e for review of each form. This review will facilitate any corrective actions necessary, such as modification of this Plan, purchasing additional equipment, additional training, or re -evaluation of hazards (e.g. Hazard Evaluations).

## 5.5 Emergency Equipment Inspections

All emergency and safety equipment shall be insp ected as directed by regulations or standard industry practice. This includes, but is not limited to:

- ¾ Fire Extinguishers: Visual inspection mont hly and annual competent person inspections
- ¾ Fire Detection/Suppression: Building fire detection and suppression systems will be inspected every 6 months by the contracted firm.
- ¾ Spill Kits: Monthly visual inspection
- ¾ First Aid Kits: Monthly visual inspection to ensure adequate stock
- ¾ Eye Washes: Weekly tests to ensure water quality, temperature and flow
- ¾ Drench Showers: Weekly tests to ensure water quality, temperature and flow

Inspections shall only be performed by individuals knowledgeable and/or certified where required. All equipment will be tagged after successful inspections. Equipment that is damaged shall be taken out of service and immediately reported to the controlling individual. Records for all inspections will be forwarded twice per year to the Health and Safety Office.

## 5.6 Critical Operations Shutdown

In accordance with the Emergency Evacuation Plan, any operation designated as a Critical Operation shall be reported to the Health and Safety Office for a review. This review shall determine protocols required to ensure proper shutdown and evacuation of laboratory personnel in the event of an emergency.

# Appendix A

Chemical Hygiene Plan

Chemical Hygiene Plan

designated indvidual shall hold within the employer's organizational structure.

Chemical Hygiene Plan means a written program developed and implemented by the employer which sets forth procedures, equipment, personal protective equipment and work practices that (i) are capable of protecting employees from the health hazards presented by hazardous chemicals used in that particular workplace and (ii) meets the requirements of paragraph (e) of this section.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers or failure of control equipment which results in an uncontrolled release of a hazardous chemical into the workplace.

Employee means an individual employed in a laboratory workplace who may be exposed to hazardous chemicals in the course of his or her assignments.

Hazardous chemical means any chemical which is classified as health hazard or simple asphyxiant in accordance with the Hazard Communication Standard (§1910.1200).

Health hazard means a chemical that is classified as posing one of the following hazardous effects: Acute toxicity (any route of exposure); skin corrosion or irrita tion; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); aspiration hazard. The criteria for determining whether a ch emical is classified as a health hazard are detailed in appendix A of the Hazard Communication Standard (§1910.1200) and §1910.1200(c) (definition of "simple asphyxiant").

Laboratory means a facility where the "laboratory use of hazardous chemicals" occurs. It is a workplace where relatively small quantities of hazardous chemicals are used on a non-production basis.

Laboratory scale means work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipula ted by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

Laboratory-type hood means a device located in a laboratory, enclosur e on five sides with a moveable sash or fixed partial enclosed on the remaining side; constructed and maintained to draw air from the laboratory and to prevent or minimize the escape of air contaminants into the laboratory; and allows chemical manipulations to be conducted in the enclosure without insertion of any portion of the employee's body other than hands and arms.

Walk-in hoods with adjustable sashes meet the above definition provided that the sashes are adjusted during use so that the airflow and the exhaust of air contaminants are not compromised and employees do not work inside the enclosure during the release of airborne hazardous chemicals.

Laboratory use of hazardous chemicals means handling or use of such chemicals in which all of the following conditions are met:

(i) Chemical manipulations are carried out on a "laboratory scale;"

1910.1450(f)(2)
Such information shall be provided at the time of an employee's initial assignment to a work area where hazardous chemicals are present and prior to assignments involving new exposure situations. The frequency of refresher information and training shall be determined by the employer.

1910.1450(f)(3)
Information . Employees shall be informed of:

1910.1450(f)(3)(i)
The contents of this standard and its appendices which shall be made available to employees;

1910.1450(f)(3)(ii)
the location and availability of the employer's Chemical Hygiene Plan;

1910.1450(f)(3)(iii)
The permissible exposure limits for OSHA regulated substances or recommended exposure limits for other hazardous chemicals where there is no applicable OSHA standard;

1910.1450(f)(3)(iv)

1910.1450(g)(1)(iii)
Whenever an event takes place in the work area such as a spill, leak, explosion or other occurrence resulting in the

# Appendix B

OSHA PELs and ACGIH TLVs

University of Scranton
Chemical Hygiene Plan

A current list of OSHA Permissible Exposure Limits (PEL) is found at:

https://www.osha.gov/dsg /topics/pel/index.html

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A current list of ACGI H Threshold Limit Values (TLV) is found at:

http://www.acgih.org/

# Appendix C

Employee Training Records

University of Scranton
Chemical Hygiene Plan

# Appendix D

New Chemical Procurement Request Form

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Chemical Hygiene Plan

# Appendix E

## Hazard Analysis Form

University of Scranton
Chemical Hygiene Plan

| | |
|---|---|
| THE UNIVERSITY OF SCRANTON A JESUIT UNIVERSITY | Chemical Hygiene Plan: Hazard Analysis Form |

| | |
|---|---|
| Chemical/Procedure Name: | |

| General | | | |
|---|---|---|---|
| Faculty/Principal Investigator: | | | |
| Course Name: | | Course Number: | |
| Procedure Description: | | | |
| | | | |
| | | | |

| Hazards | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Chemical | | | | | | | Physical | | | | | |
| Chemical/Equipment | Health | Flammable | Corrosive | Sensitizer | Acute Toxin | Water Reactive | Pyrophoric | Shock-Sensitive | Open Flame | Electrical | Equipment | Temperature | Other |
| [redacted] | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

# Appendix F

Particularly Hazardous Substance Form

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Chemical Hygiene Plan

# Appendix G

Lab Safety Equipment List

| Lab Room No. | |
|---|---|

# Appendix H

Incident Report Form

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Chemical Hygiene Plan

# Appendix I

Typical Solvents and Information

University of Scranton
Chemical Hygiene Plan

| Solvent | Flammability Class | Boiling Point | Flash Point | Explosive Limits | NFPA 704 |
|---|---|---|---|---|---|
| Acetone | IB | 56°C | -18°C | 2 – 13% |  |
| Hexane | IB | 69°C | -7°C | 1 – 8% |  |
| Pentane | IA | 36°C | -40°C | 1 – 8% |  |
| Heptane | IB | 98.4°C | -4°C | 1 – 7% |  |
| Acetonitrile | IB | 82°C | 2°C | 3 – 16% |  |
| Methylene chloride | none | 40°C | none | 12 – 23% (>100°C) |  |
| Chloroform | none | 62°C | none | none |  |
| Ethyl ether | IA | 35°C | -45°C | 1 – 49% |  |
| Ethanol (absolute) | IB | 78°C | 12°C | 3 – 19% |  |
| Methanol | IB | 65°C | 11°C | 6 – 36% |  |
| Isopropyl alcohol | IB | 82°C | 12°C | 2 – 13% |  |
| Tetrahydrofuran | IB | 66°C | -21°C | 2 – 12% |  |
| Ethyl acetate | IB | 77°C | -4°C | 2 – 12% |  |
| Toluene | IB | 112°C | 4°C | 3 – 19% |  |
| Xylenes | IB | 140°C | 25°C | 1 – 7% |  |
| Benzene | IB | 80°C | -11°C | 1 – 8% |  |
| Dimethylformamide | II | 158°C | 58°C | 2 – 15% |  |
| Methyl ethyl ketone | IB | 80°C | -7°C | 2 – 12% |  |