|  |
| --- |
| Hazard Control Plan |

[Name of Process Being Evaluated and Lab Name]

**TEMPLATE INSTRUCTIONS: Some sections will require more or less detail depending on your procedure. Send completed HCPs to ehrslaba@ehrs.upenn.edu for upload to your lab’s document section in BioRAFT. EHRS will review HCPs on your request; however, the supervising faculty member is responsible for ensuring that a thorough hazard assessment has been performed. Replace red text with your text in this template.**

# Purpose

• • •

A Hazard Control Plan (HCP) is a standard operating procedure for a specific process performed in your laboratory or department. The HCP describes the hazardous materials or equipment in use and details the controls that will be put in place to minimize risk of exposure, injury, and other incidents. While the HCP may also include experimental procedures, its purpose is primarily to document the hazards and controls for the process. An HCP is typically written for procedures with particularly high hazards or when new hazards are introduced for the first time. A hazard assessment must be repeated and the HCP amended whenever changes are made to the process.

Hazard Control Plan

[Name of Process Being Evaluated and Lab Name]

Date HCP Prepared:  *[Date]*

HCP Prepared by:

|  |  |
| --- | --- |
| Name | *[Name]* |
| Position/title | *[Postion/title]* |
| Email address | *[Email]* |
| Phone number | *[Phone number]* |
| Supervising Faculty Member | *[Faculty member’s name]* |
| Department | *[Department name]* |
| Contributors | *[Names]* |

Location of Process:

|  |  |
| --- | --- |
| Building | *[Building]* |
| Room number | *[Room]* |
| EHRS hood number (if applicable) |  |
| Other location information |  |

### References:

*[Insert literature or research notebook references for this procedure here. Specify which procedure in the paper is the one you will be following, e.g. “Method 3, page 1427”]*

*[Specify here if there are any parts of the procedure you will be modifying in your experiment, e.g. using a different solvent, a different substitution on a molecule, or different reaction conditions such as temp]*

# General Description

Brief, General Description of Process Including Research Goal/Outcome.

# Scope and Limitations

This Hazard Control Plan applies to the equipment, chemicals, and tasks described herein. Any deviation in materials, pressures, temperatures, or other operational parameters specified in this HCP must be evaluated for new potential hazards and necessary controls before implementation of the changes.

**Describe any limitations in scope that are specific or important to this hazard control plan (if applicable).**

# Hazard Identification

The following chemical and physical hazards have been identified for this process/equipment. [put “x” in box next to hazards]

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Chemical** |  | **Physical/Other** |
|  | Carcinogens |  | Ionizing radiation |
|  | Corrosive Liquids |  | Radioactive materials |
|  | Perchloric Acid |  | Lasers |
|  | Engineered Nano Materials |  | UV light sources |
|  | Flammable Chemicals |  | Inert compressed gases |
|  | Hazardous Gas (Flammable, Oxidizing, Corrosive, Toxic) |  | Electrical Hazards |
|  | Highly Toxic Chemicals |  | Heavy material handling equipment |
|  | Irritants |  | Working at Heights (4 foot or higher) |
|  | Explosive compounds |  | High heat |
|  | Peroxide formers |  | Open Flame |
|  | Pyrophoric chemicals |  | Lithium Batteries |
|  | Strong Oxidizers |  | Noise hazards |
|  | Water Reactive Chemicals |  | Particulates from machines and operations |
|  | Cryogens and Dry Ice |  | Pressure and Vacuum vessels |
|  | Teratogens and/or reproductive hazards |  | Robotic Machinery |
|  | Exothermic reaction/Other chemical reactivity hazards |  | Shop equipment |
|  |  |  | Biological Hazards |
|  |  |  | Exposed blades, needles, etc. |
|  |  |  |  |
|  |  |  |  |

# Training Requirements

*Training beyond the standard EHRS lab safety training is required for hazardous lab processes. Specify here what equipment, procedure, or task training is required for this process.*

# Tasks, Hazards, and Controls

Describe **each process step** that involves a hazardous material or procedure.

(See Appendix B for an example task description)

1. **[Task Name]**

[Task Description]

[Photos]

***Hazard-Control Table Instructions:***

(See Appendix B for an example)

* *Fill in the hazard (e.g. Flammable Chemical) in the top row. Enter the risk (e.g. fire) below the hazard.*
* *Define the likelihood and severity of the risk along with any risk factors*
* *See Appendix A for an example of a completed table and definitions of risk severity and likelihood levels. (High(H), Medium(M), and Low(L))*
* *Fill-in any controls that are in place or will be put in place. (You do not need to enter a control for each category.)*

***Duplicate the table as many time as is necessary for each hazard and risk of each step.***

|  |
| --- |
| **Hazard: [Name Hazard Here]** |
| **Risk** | **Likelihood** | **Severity** | **Risk Factors** |
| [Enter risk here] | H, M, or L | H, M, or L | [Enter risk factors here – conditions or actions that would increase risk] |
| **Controls** |
| **Administrative [work practices]** |  |
| **Engineering** |  |
| **Personal Protective Equipment** |  |
| **Other mitigating factors****(inherent risk reduction)** |  |
| **Recommendations for additional controls [EHRS USE ONLY]** |  |

**Link to Penn Chemical Hygiene Plan SOP for this hazard:** [If applicable, include the link to SOP or Fact Sheet from Penn’s CHP]

1. **[Task Name]**

[Task Description]

[Photos]

|  |
| --- |
| **Hazard: [Name Hazard Here]** |
| **Risk** | **Likelihood** | **Severity** | **Risk Factors** |
| [Enter risk here] | H, M, or L | H, M, or L | [Enter risk factors here – conditions or actions that would increase risk] |
| **Controls** |
| **Administrative [work practices]** |  |
| **Engineering** |  |
| **Personal Protective Equipment** |  |
| **Other mitigating factors****(inherent risk reduction)** |  |
| **Recommendations for additional controls [EHRS USE ONLY]** |  |

**Link to Penn Chemical Hygiene Plan SOP for this hazard:** [If applicable, include the link to SOP or Fact Sheet from Penn’s CHP]

1. **[Task Name]**

[Task Description]

[Photos]

|  |
| --- |
| **Hazard: [Name Hazard Here]** |
| **Risk** | **Likelihood** | **Severity** | **Risk Factors** |
| [Enter risk here] | H, M, or L | H, M, or L | [Enter risk factors here – conditions or actions that would increase risk] |
| **Controls** |
| **Administrative [work practices]** |  |
| **Engineering** |  |
| **Personal Protective Equipment** |  |
| **Other mitigating factors****(inherent risk reduction)** |  |
| **Recommendations for additional controls [EHRS USE ONLY]** |  |

**Link to Penn Chemical Hygiene Plan SOP for this hazard:** [If applicable, include the link to SOP or Fact Sheet from Penn’s CHP]

***Continue adding tasks and hazard-control tables as necessary to describe all hazardous steps of the process.***

**General Considerations**

**(Not specified elsewhere in this HCP)**

**[Storage](https://ehrs.upenn.edu/policies-resources/chemical-hygiene-plan%22%20%5Cl%20%22paragraph-945)****[and Transport](https://ehrs.upenn.edu/policies-resources/chemical-hygiene-plan%22%20%5Cl%20%22paragraph-945)**

*[Identify where and how hazardous materials will be stored and transported.]*

**[Waste Disposal](https://ehrs.upenn.edu/health-safety/regulated-waste/chemical-waste)**

*[Indicate whether there are any special waste disposal practices for the waste produced by this process.]*

[**Building/Lab Specific Emergency Procedures**](https://ehrs.upenn.edu/emergency-info)

*[Indicate where the nearest emergency exit and safety shower are located.  Refresh the lab group on the emergency phone numbers and evacuation procedures. Include any special emergency response or spill clean-up instructions for this particular process.]*

Optional attachments:

* Safety Data Sheets
* Operation Manuals for Equipment
* Experimental Procedure
* List of Individuals Trained and Authorized on this Procedure

# Appendix A: Definitions of Risk Likelihood and Severity Level

**Likelihood**

**---------------------------------------------------------------------------**

**Low:**

To the best of your knowledge, this has not happened in the past with same or similar equipment/material/location.

*And*

This would not be expected to occur under normal operating conditions

*And*

This would only be expected to occur in the event of a rare upset condition.

**---------------------------------------------------------------------------**

**Medium:**

To the best of your knowledge, this has not happened in the past with same or similar equipment/material/location.

*And*

This would not be expected to occur under normal operating conditions.

*And*

This would be expected to occur under reasonably anticipated upset conditions.

**---------------------------------------------------------------------------**

**High:**

This is known to have happened in the past with same or similar equipment/material/location.

*And/or*

This could occur under normal operating conditions.

*And/or*

This could occur under reasonably anticipated upset conditions.

**---------------------------------------------------------------------------**

**Severity**

**---------------------------------------------------------------------------**

**Low:**

This would not cause an injury or exposure that would require medical evaluation or treatment.

*And*

No permanent damage to equipment or facility would result.

*And*

Damages would not result in downtime of more than a few hour.

 **--------------------------------------------------------------------------**

**Medium:**

Injuries or exposures would not exceed first-aid level treatment and would not result in any lost work days due to injury.

*And/or*

Minor equipment or facility damage would result.

*And/or*

Damages would result in downtime of a few hours or more.

*And/or*

A hazardous material spill clean-up would need to be done by the lab.

 **--------------------------------------------------------------------------**

**High:**

Injuries or exposures would require medical treatment beyond first-aid and/or would result in lost work days due to injury.

*And/or*

Serious equipment or facility damage would result.

*And/or*

Damage to the facility would be beyond the lab/room of origin.

*And/or*

Damages would result in more than one day of downtime.

*And/or*

External hazmat team required for hazardous material spill clean-up

**---------------------------------------------------------------------------**

# Appendix B: EXAMPLE TASK/HAZARDS/RISKS/CONTROLS

1. **Diluting hydrofluoric acid**

Hydrofluoric acid (49%) is poured from a 500-mL bottle through a plastic funnel into a 25-mL plastic graduated cylinder to the 11-mL mark. Any excess acid that was dispensed is poured from the graduated cylinder back into the bottle. The 11-mL of hydrofluoric acid are then poured into a 250-mL plastic beaker containing 50 mL of D.I. water.

Photo of Equipment/Process if available

(See Example Hazard-Control Table on Next Page)

EXAMPLE HAZARD-CONTROL TABLE

|  |
| --- |
| **Hazard: Highly toxic and corrosive chemical (Hydrofluoric acid)** |
| **Risk** | **Likelihood** | **Severity** | **Risk Factors** |
| Serious burns to eyes or skin from hydrofluoric acid exposure | M | H | Chemical spill/splashPoor housekeeping practices/contaminated surfaces |
| **Controls** |
| **Administrative [work practices]** | -Label the area where HF is stored and used.-Do not work with HF when alone in lab. Notify lab mates before working with HF-Conduct this task only inside of a working chemical fume hood.-Use an appropriately sized funnel for the size of the graduated cylinder.-Close HF bottle immediately after pouring chemical.  Do not leave bottle open.-Wipe off outside of bottle with a damp paper towel after use.  -Clean up all spills immediately.  Ensure that no liquids puddles or droplets are on the work surface when done.-Remove gloves if they become contaminated.  Change gloves immediately after completion of task.  -Wash hands immediately after completion of task.-Thoroughly rinse all labware immediately after use.-No other procedures should be done in the fume hood until all HF work is complete, the waste has been collected, and equipment and materials have been cleaned, properly discarded, or removed from the area.   |
| **Engineering** | -Use the chemical fume hood sash as a barrier to shield your face and as much of your body as possible while performing this task. -Use a metal clamp to secure the graduated cylinder from tipping during pour. |
| **Personal Protective Equipment** | Standard lab attire (long pants, fully-enclosed shoes) and-lab coat-safety glasses-Minimum 8-mil-thickness nitrile glove or double glove with 4-mil nitrile gloves |
| **Other mitigating factors****(inherent risk reduction)** | An HF exposure kit with non-expired calcium gluconate gel is available in the lab near the area where HF is stored and used. Training is provided to all lab workers on the location and use of the kit. |
| **Recommendations for additional controls [EHRS USE ONLY]** |  |

**Link to Penn Chemical Hygiene Plan SOP for this hazard:** http://www.ehrs.upenn.edu/programs/labsafety/chp/sop/hydrofluoric\_acid.html