

UNIT SPECIFIC PLAN FORM

The Unit Specific Plan completes the comprehensive Laboratory and Research Safety Plan (LRSP) on the EHS website located at http://www.ehs.psu.edu/occhealth/lab_safety_plan.pdf. All research and laboratory personnel must review both the LRSP and Unit Specific Plan and sign the certification of agreement in section VIII.

INVESTIGATOR INFORMATION

Principal Investigator: _____
E-Mail: _____
Department: _____
Office Address: _____
Office Phone: _____
Office Fax: _____
Laboratory/Farm
Address* : _____
Laboratory Phone(s): _____

Note: *List the addresses for all labs in which your personnel work.

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Please answer all questions and do not leave any blanks. If a question has no connection to the work in your lab(s), please write “NA” or “not applicable” next to the answer. If you wish to add additional information, attach separate sheets for elaboration.

I. RESEARCH OVERVIEW

A. Description of Activities or Research. Please supply a narrative explaining the goals of your research and briefly describe the experimental procedures typically performed in your work area. This information is requested to help EHS review your Unit Specific Plan Form with more insight.

II. CHEMICAL SAFETY

A. Inventory of Chemical Agents. Please list, using the [CHIMS](#) software, all the chemicals used in your research and/or maintained in stock. University safety policy [SY20](#) requires a current inventory of chemicals for each work area. Make note of any compounds with carcinogenic potential. The list shall be thorough and comprehensive. Information regarding classification of chemicals as cancer hazards can be found OSHA-Specified Cancer-Causing Agents in Appendix A, the Chemical Safety Fact Sheet, of the [Laboratory and Research Safety Plan](#).

Consider whether you can justify maintaining a stock of rarely-needed chemicals that may remain on storage shelves for many years. The EPA requires the University to institute a chemical waste minimization program. A basic foundation of this program is to order only the amounts of stock necessary to support the research work. Excess should not be purchased because it increases hazardous waste volume and raises the risk of significant spills.

Minimal stock is also beneficial in protecting the safety of EHS and fire department emergency responders. The greater the volume of chemicals on hand, the greater the risk that breakage of containers could lead to mixing of incompatible agents or release of reactive compounds.

I agree that I have reviewed my inventory and have eliminated as many surplus chemicals as possible.

YES NO

I have provided easy access to Safety Data Sheets (MSDSs) for each of the chemicals included on the inventory.

YES NO

If NO, why not?

Note: The EHS webpage, www.ehs.psu.edu can provide you access to an electronic MSDS database.

B. Use of OSHA-Specified Carcinogens. Please refer to the list of those compounds specifically regulated by OSHA as cancer-causing agents in Appendix A, the Chemical Safety Fact Sheet, of the [Laboratory and Research Safety Plan](#). Individual occupational standards have been promulgated for these materials. For example, 29 CFR 1910.1048 is the standard that mandates engineering controls and work practices in workplaces where formaldehyde is used.

If one of these chemicals is used or stored in your work areas, a "Standard Operating Procedure" (SOP), Appendix A of the Unit Specific Plan, is required. Again using formaldehyde as an example, the PI supervising a work area where formaldehyde is in use must determine, "using objective data, that the presence of formaldehyde or formaldehyde-releasing products in the workplace cannot result in airborne concentrations of formaldehyde that would cause any employee to be exposed above the action level or the short-term exposure limit (STEL) under foreseeable conditions of use." The SOP provides the appropriate handling procedures to ensure exposure levels are not exceeded.

To address this requirement for documentation, please check **YES** if the following generic statement applies to your practices. **YES** **NO**

- I have evaluated the use of the OSHA-classified carcinogens included on my chemical inventory. Based on the minimal quantities present and the limited frequency of use, I do not expect OSHA permissible exposure limits (PELs) or action levels (usually assumed to be one-half the PEL) to be exceeded.

These chemicals are handled with appropriate ventilation controls to minimize possible airborne exposures. They are stored in a labeled, designated area.

I have reviewed:

- all operations which could generate inhalation hazards from these agents and the assignment of workers performing these operations
- all information, observations, or calculations which would indicate employee exposure
- any employee complaints of symptoms which may be attributable to exposure to these chemicals.

I do not believe that exposure monitoring is necessary to confirm my conclusion that exposures are below regulated thresholds; however, I am aware that I may request EHS to consult or to collect air sampling data. If I am in doubt about my decision that exposure is controlled, I will seek outside advice from EHS. My workers have been informed that they may request air monitoring if concerned about their health and safety. I will honor any employee request for additional evaluation.

If the above description does not reflect your situation and you replied **NO** to the question above, please explain your protocol for OSHA carcinogens in the box below.

C. Hazardous Chemicals. Please refer to the attached *Chemical Safety Fact Sheet* (CSFS) in Appendix A of the [Laboratory and Research Safety Plan](#), for the handling of the hazardous chemicals noted in the chemical inventory.

In accordance with the training I have provided, all workers in the work areas under my supervision will adhere to the practices described in the CSFS. We will comply with the University safety policies. **YES** **NO**

Each person is aware of the health and physical hazards involved with the chemicals they are using. **YES** **NO**

All students and employees working with chemicals or supervising someone who works with chemicals have attended Laboratory Hazard Communication training found on the EHS website, https://apps.opp.psu.edu/ehs_training/ **YES** **NO**

If **NO**, explain how your practices deviate from the standard and why you have chosen to alter approved procedures.

D. Compressed Gas Cylinders. Please refer to the attached *Compressed Gas Cylinders Fact Sheet* (CGCFS) in Appendix A of the [Laboratory and Research Safety Plan](#), for the handling of compressed gas cylinders noted in the chemical inventory.

Does your research work involve the use of compressed gas cylinders? If **NO**, please skip to Section E. **Highly Reactive Materials, High-Pressure Reactions, or Vacuum Systems.** **YES** **NO**

If **YES**, all workers in the work areas under my supervision will adhere to the practices described in the CGCFS, in accordance with the training I have provided. We will comply with University safety policies. **YES** **NO**

Each person is aware of the proper practices required for handling pressurized cylinders. **YES** **NO**

If **NO**, explain why not.

E. Highly Reactive Materials, High-Pressure Reactions, or Vacuum Systems. Please refer to the attached *Highly Reactive Materials, High-Pressure Reactions, or Vacuum Systems Fact Sheet* (HRMFS), in Appendix A of the [Laboratory and Research Safety Plan](#), for the handling of highly reactive materials noted in the chemical inventory and/or associated system hazards.

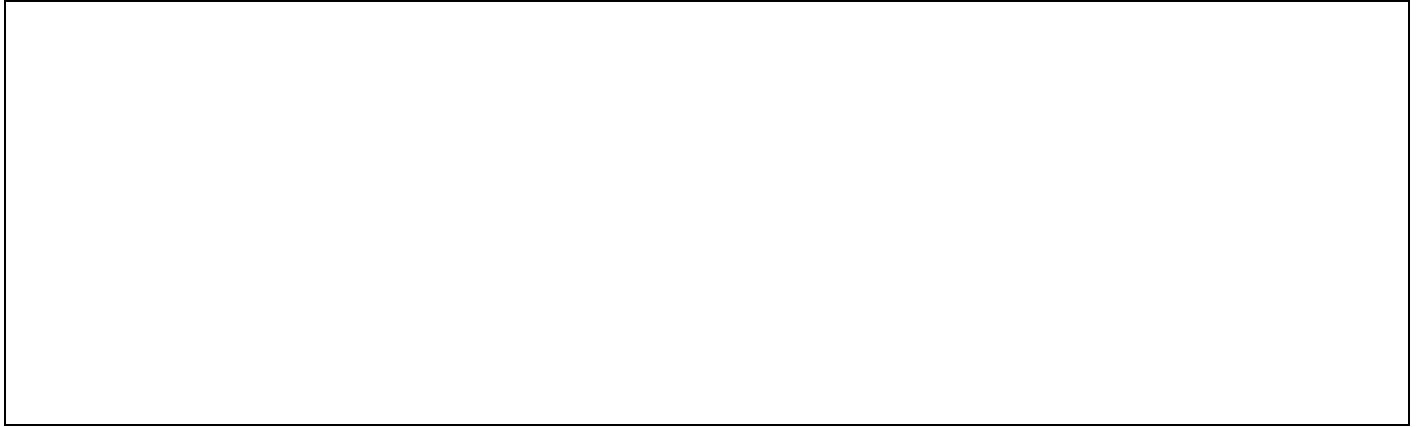
Is research work involving highly reactive materials, high-pressure reactions, or vacuum systems conducted in your work area? If **NO**, please skip to section **IV. Biological Safety.** **YES** **NO**

If **YES**, all workers in the work areas under my supervision will adhere to the practices described in the HRMFS, in accordance with the training I have provided. We will comply with University safety policies. **YES** **NO**

Each person is aware of the health and physical hazards involved with the chemicals they are using. **YES** **NO**

Each person is prepared to minimize the potential for explosions or implosions. **YES** **NO**

If **NO** to either, explain why not.



F. Inhalational Anesthetic Agents.

Does your research work involve the use of inhalational anesthetic agents? If **NO**, please skip this section. YES NO

If **YES**, please confirm that human exposure during the use of inhalational anesthetic agents is controlled by (check all that apply):

- Charcoal canister
- Downdraft table
- Capture hood
- Used in chemical fume hood

Has the use of this anesthetic gas been monitored by EHS? YES NO

Note: Most common anesthetic agents such as halothane, isoflurane, and metofane are associated with liver and kidney disease in humans. Some are considered to be reproductive toxins. Proper training of lab workers will stress that the chemical fume hood is essential to minimizing potential exposure.

G. Pesticides

Does your research work involve the use of pesticides? If **NO**, please skip this section, otherwise continue. YES NO

I have reviewed the requirements of the [Penn State Pesticide Management Program](#). YES NO

I certify that my facility has a pesticide business license and pesticide applications are only made by certified pesticide applicators. YES NO

Pesticide applicators always read the label and are aware of the hazards of the pesticides they are applying. YES NO

My facility has all of the required PPE for every pesticide that is stored. YES NO

Pesticide storage areas have secondary containment for liquid pesticides and the storage areas are inspected every month. YES NO

All pesticide application records for the previous three years are available. YES NO

My facility falls under the requirements of the Worker Protection Standard. If **NO**, please skip the remainder of this section. YES NO

If the answer to the previous question is YES, I am meeting all of the Worker Protection Standard requirements

YES NO

Please provide an explanation for any deviations from the requirements of the Pesticide Management Program:

III. BIOLOGICAL SAFETY

A. Biosafety Level 2 (BL2). Please see [Biosafety in Microbiological and Biomedical Laboratories](#) (BMBL) for explanation of the measures needed to control biological agents that are associated with human disease.

Is research work with BL2-classified agents conducted in your work area? If **NO**, please skip to section **B. Bloodborne Pathogens Program**.

YES NO

If **YES**, all workers in the work areas under my supervision will adhere to the practices described in the BMBL, in accordance with the training I have provided. We will comply with any given safety policies mandated by the Institutional Biosafety Committee (IBC).

YES NO

Each person is aware of the health hazards involved with the infectious agents or infected animals they are handling.

YES NO

If **NO**, explain why not.

B. Bloodborne Pathogens Program. This segment of the *Unit Specific Plan*'s Biological Safety section is required if you handle or store human blood, blood products, or other potentially infectious materials as part of your research effort. Please refer to the [Blood Borne Pathogen Program](#) for the proper procedures and controls for working with human blood, blood products and other potentially infectious materials. Please pay attention to the part listing practices specific to the use of human blood.

The Bloodborne Pathogens (BBP) Standard requires engineering and work-practice controls as a means of eliminating or minimizing occupational exposure. To address this regulation, the University maintains a comprehensive [Bloodborne Pathogens Program](#) (BPP) for the users of human materials. Laboratory-specific protocols or concerns are covered here in the *Unit Specific Plan*.

Does your research work involve the use of human blood, blood products, and other potentially infectious materials?

YES NO

If **NO**, please skip to section **C. Recombinant DNA Safety Program**.

- | | | |
|--|--|---------------------------------------|
| A copy of the BPP Training information has been included in the Laboratory Safety Plan. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Workers have been trained to understand the information and a copy is accessible when work is in progress. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Adequate and appropriate PPE has been provided and its use is mandated in the work area. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Workers follow the appropriate decontamination procedures for waste materials and spills. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Have you contracted with a laundry service to wash lab coats that have been decontaminated in the work area? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Do you maintain adequate housekeeping? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Hepatitis B vaccination has been offered without charge to each worker for whom exposure is reasonably anticipated. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| HBV consent/waiver forms have been filed for all workers for whom exposure is reasonably anticipated. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Workers have been informed of the post exposure evaluation and follow-up (PEEFU) procedures, which can be found in the Exposure Control Plan . | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| The protocol includes an evaluation or investigation of the circumstances surrounding exposure incidents. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

If **NO** to any of the above questions, why not?

- | | | |
|---|--|---------------------------------------|
| In accordance with the BBP Standard and the training I have provided, all workers in the work areas under my supervision will adhere to the practices described in the BMBL and the BBP Training Program. We will comply with any given safety policies mandated by the IBC . | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Each person is aware of the health hazards involved with the human-derived, potentially infectious materials they are using. | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

If **NO**, why not?

Please describe any laboratory-specific BBP practices or procedures, which supplement or differ from the information presented in the BBP Training Program.

C. Recombinant DNA Safety Program. Please refer to [University Policy SY-24](#) to clarify the applicability of this section.

- | | | |
|---|--------------------------|--------------------------|
| Is Recombinant DNA research work conducted in your work area? If NO , please skip this section. | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| If YES , have you filed the required Recombinant DNA registration form and returned it to the Office for Research Protections (ORP)? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Have you included rDNA safety information in your work area's SOPs? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Each person is aware of the hazards of rDNA research and the required safety practices. | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| If NO , why not? | | |

D. Infectious Waste Disposal. Please refer to [University Policy SY-29](#) to clarify the applicability of this section.

- | | | |
|---|--------------------------|--------------------------|
| Is Infectious Waste generated in your lab/work area? If NO , please skip this section. | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| If Yes , is the material autoclaved? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Are sharps collected in rigid, leakproof, closeable containers? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |

IV. RADIATION SAFETY

Radiation Protection Programs are targeted at the protection of people and the environment from all forms of electromagnetic and ionizing radiation. The EHS protection programs are grouped around the sources of that radiation and how their safe use is controlled at PSU.

A. Non-ionizing Radiation Program

- | | | |
|---|--------------------------|--------------------------|
| Does research involve the use of UV light? If No, skip to B. | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| If YES , all workers in my laboratories will be made aware of the hazards and be trained on proper | YES | NO |

procedures and provided with appropriate PPE. YES NO

Each person is aware of the health hazards involved with the UV light they are handling. **YES** **NO**

B. Laser Program

Does research involve the use of lasers? If No, skip to C. **YES** **NO**

If **YES**, all workers in my laboratories will be made aware of the hazards and be trained in accordance with [SY-17](#) and provided with appropriate PPE. Lasers will be registered with EHS, and laser specific procedures will be developed and complied with. I will ensure that the annual self audits are properly performed and documented with the laser procedures. **YES** **NO**

C. Radiation Producing Equipment Program

Does research involve the use of Radiation Producing Equipment? If No, skip to D. **YES** **NO**

If **YES**, all workers in my laboratories will be made aware of the hazards and be trained in accordance with [SY-15](#). The devices in my laboratory will be registered with EHS, and I will develop and follow specific procedures for the use of the equipment. **YES** **NO**

D. Radioactive Material Program

Does research involve the use of radioactive material? If No, skip to next section. **YES** **NO**

If **YES**, I will request authorization to use radioactive material and comply with the requirements in SY-15. I will ensure that I and my staff are trained in accordance with [University Isotope Committee](#) requirements and comply with the Rules and Procedures for Users of Radioactive Material at The Pennsylvania State University. **YES** **NO**

V. ANIMAL-RELATED HAZARDS

Research and husbandry activities involving animals introduce some hazards that are not present to other employees and students. Primary hazards from laboratory animals include bites, scratches and allergic reactions to animal dander. Primary hazards from agricultural animals include kicks, crushing or pinning injuries, being stepped on, and the open work environment that is usually associated with farms and the equipment used there. Some animals also carry infectious diseases that are transmissible to humans (zoonoses). Animal work often also involves the use of inhalational anesthetic gases or chemical carcinogens/tumor promoters. All persons working with animals must complete an Animal Worker Questionnaire and complete the training requirements listed at the end of this section.

Do you work with animals as part of research, teaching or testing? **YES** **NO**

If you do not work with **Animals**, you may skip this section.

A. Physical Hazards

Have steps been taken to prevent kicks, bites and scratches from animals? **YES** **NO**

If **Yes**, please describe:

Are rigid, leakproof, lidded sharps containers available for the collection of sharps?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does your work require you to use an autoclave (steam sterilizer)?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
If Yes , have you been trained in the proper operation of the device?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does your work involve the use of compressed gas cylinders?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
If Yes , have you been trained on their hazards and how to prevent accidents?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Have electrical hazards in your work been identified and controlled?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does your job involve heavy lifting (>50 pounds)?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
If Yes , have you been trained on proper lifting procedures by EHS?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Are there high noise areas in your work area?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
If Yes , are they posted with warning signs?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Have employees received training on hearing protection?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Are there confined spaces in your work area?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
If Yes , have employees been trained in proper entry procedures?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Have employees been trained in Lock Out Tag Out procedures?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does your work involve working with or around a powered take-off shaft?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

B. Biological Hazards

Do the animals that you care for carry any potential zoonoses?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
If Yes , have you been trained in the signs and symptoms of these diseases?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
Does your animal activity involve an experimentally-introduced infectious agent?	YES <input type="checkbox"/>	NO <input type="checkbox"/>

If **Yes**, please list:

Note: All animal research involving the use of biohazardous materials (as defined by University Policy SY-24) in animals require the completion of an Animal Biohazard Protocol.

C. Chemical Hazards

Does your work involve the use of inhalational anesthetic gases (such as isoflurane)?	YES <input type="checkbox"/>	NO <input type="checkbox"/>
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If **Yes**, please confirm that human exposure during the use of inhalational anesthetic gases is controlled by the following methods (check all that apply):

- Charcoal canister
- Downdraft table
- Capture hood
- Used in chemical fume hood

- Has the use of this anesthetic gas been monitored by EHS? YES NO
- Are chemical carcinogens (i.e., DMBA, TPA) or other tumor promoters used? YES NO
- If Yes, have you been trained on methods to minimize your exposure? YES NO

Please list commonly used cleaners and disinfectants used in your work:

D. Training

All persons involved in the care and use of animals must complete the following training:

- [Institutional Animal Care and Use Committee Training](#)
- [Occupational Health and Safety Training](#)
- [Various EHS Training Courses for Animal Care Personnel](#)

VI. PHYSICAL HAZARDS

Please indicate the physical hazards present in your work area.

- 1. Electrical hazards (potential electroshock, burns) from gel electrophoresis units, uninsulated wires, lyophilizers, evaporators, and other equipment with high voltage
- 2. High- and low-temperature equipment such as gel dryers, furnaces, heated elements, steam, or cryogenic materials
- 3. Compressed gas cylinders which could become projectile missiles
- 4. Broken glassware, scalpels
- 5. Needles
- 6. UV light that could result in dermatitis and eye injury
- 7. Lasers
- 8. Noise at levels which cause discomfort or stress
- 9. Heavy objects, heavy materials (metal or brick blocks, weights) that could fall, and wheels of moving carts or full waste containers that could crush feet.
- 10. Grinding, sanding, filing operations that could generate flying particles
- 11. Shop equipment including, but is not limited to, items such as belt sanders, miter saws, band saws, drill presses, lathes, milling machines, radial arm saws, table saws and routers. If yes, Refer to section 9.0 of the PSU Machine Shop Safety Program for requirements. The program can be found here: <http://www.ehs.psu.edu/occhealth/safety.cfm>

12. High-pressure systems

13. Other (*please elaborate in the box below*):

Have you provided appropriate training for your workers on the physical hazards? This training shall include an explanation of the hazards and the possibilities for injury.
If **NO**, why not?

YES

NO

VII. SAFETY PRECAUTIONS IN PLACE

C. Engineering Controls for Physical Hazards. What controls have you provided to minimize exposure to physical hazards in your work area?

Please indicate which engineering controls are provided:

1. **Machine guarding**, e.g., covers over vacuum pump belts, metal or acrylic plastic enclosures over wheels and blades, barriers or shields on drills, chuck shields on lathes, etc. (*please describe*):

- 2. **Control of hazardous energy**
 - a) Lockout/Tagout mechanical systems and procedures, e.g., any device over the disconnect switch, circuit breaker, valve or other energy-isolating mechanism that locks it in the “safe” or “off” position; written warnings at the mechanism.
 - b) Other protective engineering measures that automatically cease power supply, e.g., remote shutoff buttons; emergency panic buttons at the tool; mechanical stops such as pins and valves.
- 3. **Containment measures**, e.g., spill trays underneath vessels, tape or wire mesh on glassware, berms around apparatus, curtains around lasers or welding areas (*please describe*):

- 4. **Shielding**, e.g., shatterproof shields around reaction or equipment (*please describe*):

- 5. **Other** (*please elaborate*):

Have you trained your workers to adequately apply the engineering controls at all times?

YES **NO**

If **NO**, why not?

B. Ventilation Controls for Inhalation Hazards. Please indicate which of the following ventilation controls are present in your work area.

- 1. **Chemical fume hoods**

How many? _____

Where are they located? _____

(EHS maintains a database used to track hoods and record annual performance testing results.)

- 2. **Walk-in hood**
- 3. **Flexible local exhaust ducts** (a.k.a. snorkels, sucker hoses, elephant trunks)
- 4. **Tissue culture hood**
- 5. **Biological safety cabinets (BSC)**

Class I: suitable for work with low- and moderate-risk biological agents (ventilated cabinet for protection of workers and environment, with an un-recirculated inward airflow away from the operator).

Class II: suitable for work with low- and moderate-risk biological agents (ventilated cabinet for protection of workers, product, and environment, with inward flow for personnel protection and downward HEPA-filtered, laminar airflow for product protection).

- 6. **Portable “smoke hog” or ductless fume hood** (charcoal and HEPA filters must be changed at least every 6 months)
- 7. **Other** (*please elaborate*):

C. Personal Protective Equipment (PPE). The employer is responsible for assessing the workplace to determine if PPE (supplementary to engineering controls) should be used to protect against the hazards in given operations. The employer certifies the workplace hazards assessment, chooses the proper equipment, issues it to workers who need it, and trains these employees to understand the requirements for their involvement. Employer insures that pesticide label required PPE is present for all pesticides at the facility. Employees must be taught:

- when PPE is necessary
- what PPE is necessary
- how to properly don, doff, adjust, and wear PPE
- the limitations of the PPE
- proper care, maintenance, useful life, and disposal of PPE
- to follow labeling instructions when working with pesticides.

Do the operations in your work area or under your supervision require PPE?

YES **NO**

Do you supply an adequate stock of the PPE necessary to protect your workers (at no cost to the employee/student)?

YES **NO**

Note: Be aware that EHS surveys the PPE supplies during annual visits. If you have questions as to appropriate PPE, EHS can help you with your assessments.

Please indicate which of the following PPE is provided to your workers.

1. **Eye and face protection** are required when the worker is “exposed to eye or face hazards from flying particles, molten metal, liquid chemicals, infectious materials, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.” In addition, eye and face protection are required for workers handling biological agents.

safety glasses with sideshields

If safety glasses are used, consider the following requirements:

- a) if there is a UV light exposure, the safety glasses shall be approved by the American National Standards Institute (ANSI) for protection against UV light
- b) if lasers are in use, the safety glasses shall be approved by ANSI for protection against the specific type of laser present
- c) prescription safety glasses shall be provided for those requiring vision correction
- d) contact lens wear may be regulated by the principal investigator/supervisor (The policy for contact lens wear is decided by each individual investigator/supervisor.)
- e) contacts and vision-corrective glasses are no substitute for safety eyewear; they are acceptable in conjunction with safety glasses.

splash goggles

face shields

2. **Hand protection** is required when employees’ hands are “exposed to hazards such as those from skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes.” In addition, hand protection is required for workers handling biological agents.

Note: Barrier creams are not considered acceptable hand protection.

latex gloves or equivalent

other chemical-resistant gloves (materials: Viton, Silvershield, PVC, nitrile, neoprene, butyl rubber)

thermal gloves (materials: pigskin and other leather, Kevlar, Nomex, aluminized backs)

cut-resistant gloves (materials: mesh layer, steel filament yarn, Spectra/Kevlar/Vectran)

Glove Selection Procedures – Gloves shall be chosen based on appropriateness for a specific hazard. There are three prime performance factors used to evaluate the chemical compatibility of a glove material with the agents to be handled.

- a) *Degradation rating*: the change in one or more of the physical properties of a glove caused by contact with a chemical. Degradation typically appears as hardening, stiffening, swelling, shrinking, or cracking of a glove.
- b) *Breakthrough time*: the elapsed time between the initial contact of the test chemical on the surface of the glove and the analytical detection of the chemical on the inside of the glove.
- c) *Permeation rate*: the rate at which the test chemical passes through the glove material once breakthrough has occurred and equilibrium is reached (based on absorption of the chemical on the surface of the glove, diffusion through the glove, and desorption of the chemical on the inside surface of the glove).

These characteristics change with each glove manufacturer’s product. A neoprene glove from Ansell Edmont will show different performance results than a Baxter neoprene glove, despite the apparent similarity in composition. Glove efficiency may even vary within a manufacturer’s product line, depending on thickness and coating. For instance, Ansell Edmont neoprene unsupported gloves are suitable for wear with muriatic acid under careful control conditions. The supported neoprene gloves are rated as “good” for muriatic acid. A glove selection chart with information regarding the effectiveness of a specific glove material and brand for a given chemical is available from the EHS website at [glove selection chart](#).

To arrive at the best glove for your specific operations, consider the points below in the selection process:

- the performance characteristics of the glove relative to the task being performed
- glove thickness vs. needs for dexterity
- conditions present
- duration of use
- the potential hazards identified for the operation.

Offer proper hand sizes and length options (wrist/forearm, elbow, shoulder). Cuffs are discouraged since they may inadvertently capture chemicals in the folds.

Please do not underestimate the importance of careful glove selection. Inadequate prior inquiry may have serious repercussions, as illustrated by the death of a researcher who suffered from mercury poisoning after contaminating her latex glove with dimethylmercury. Latex was not the correct type of glove to use with this highly toxic agent.

If you provide nitrile gloves as the basic staple for the glove supply, you must communicate the following comprehensive requirements to your staff.

Nitrile is generally an adequate material for use with a wide variety of chemicals. It shall not be used with chemicals/chemical mixtures for which it is not recommended by the manufacturer (or for which no rating is available). Despite its selection as the main glove type for common everyday usage, other, possibly superior, options will be considered in preparing for new experiments and hazardous procedures.

Staff will change gloves frequently throughout the day and whenever gloves have become contaminated. Workers wash their hands each time gloves are changed and prior to eating, drinking, applying cosmetics, or smoking.

Please confirm that you will investigate the correct glove(s) to be purchased for your work area.

YES **NO**

If latex is the foundation of your glove supply, you will ensure that latex is sufficient for the operations conducted by those workers under your supervision.

YES **NO**

If latex is not an appropriate choice, the glove of optimum performance will be provided.

YES **NO**

Workers are trained to understand the particulars of the glove selection process and the weaknesses of latex.

YES **NO**

Nonpowdered gloves or latex alternatives will be offered to workers who experience dermal sensitivity problems. Workers are trained to recognize the symptoms of latex allergy.

YES **NO**

3. **Head protection** is required when employees work in areas where there is a potential for injury to the head from falling objects and low ceilings.

safety helmet/hard hat that meets ANSI criteria

4. **Foot protection** is provided when there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and where employees' feet may be exposed to electrical hazards. Safety shoes must comply with ANSI criteria.

- steel-toed shoes for impact and compression hazards**
- shoes with metatarsal guards**
- shoes with steel midsoles for puncture-resistance**
- chemical-resistant boots or overshoes**
- other:**

5. **Respiratory protection** is employed only when effective engineering controls are not feasible to prevent atmospheric contamination or as required by a pesticide label. EHS must do a risk assessment to evaluate hazards where respirators may be needed.

respirators are supplied

• Check **YES** if you meet the following requirements of the Respiratory Protection Program.

YES

NO

- a) EHS has been contacted to register the respirator users (EHS maintains a database of all employees who wear respirators. If respirators are dispensed to your workers, their names must be in the database.)
- b) documented the respirator selection procedures
- c) annual medical questionnaire has been reviewed by a licensed health care provider (LHCP); examination conducted as recommended by the LHCP
- d) wearer has been fit tested
- e) wearer has been trained.

6. **Laboratory clothing** is necessary to protect the skin and personal clothing against contamination.

lab coat, cotton

disposable chemical-resistant lab coat

chemical-resistant coverall suit (e.g., Tyvek or Saranex)

lab apron, rubber

7. **Hearing protection** must be provided when sound levels exceed OSHA permissible noise exposures (noise exposure table available from EHS) when measured on the A scale of a standard sound level meter at slow response.

earplugs

hearing band

Earmuffs

• Do you provide an audiometric testing program?

YES

NO

• Do you understand the [Noise Reduction Rating](#) (NRR) and have you explained its significance to wearers of hearing protection?

YES

NO

General questions regarding PPE :

a) Lab coats are worn at all times when workers are in the lab.

YES

NO

b) Lab coats are worn only inside the lab and are removed before lab workers leave the work area (to prevent the spread of contamination outside the workplace).

YES

NO

c) Short pants and open-toed shoes/non substantial shoes (e.g., sandals, ballet flats) are not worn inside the work area.

YES

NO

d) Eye protection, gloves, and lab coats are worn by any worker who handles chemical or biological agents.

YES

NO

e) Gloves are not worn when opening doors or touching objects that may spread contamination to others.

YES

NO

The PPE checked above adequately protects workers against hazards inside the work area.

YES

NO

If **NO** to **ANY** of the questions in this PPE section, explain why your practice deviates from safety policy.

D. Emergencies and Spill Decontamination. Please refer to the *Emergency Response Training Fact Sheet* in Appendix A of the [Laboratory and Research Safety Plan](#). OSHA regulations require employers to train workers how to respond to emergency situations, including fires and releases of, or substantial threats of releases, hazardous substances.

1. **Emergency response –**

- | | | |
|--|--|---------------------------------------|
| Have you made your building’s emergency evacuation plan available to your workers? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Have you discussed the procedures to follow in the event of fire? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Do your workers know where to gather outside during a building evacuation? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Have you posted the required Laboratory Information on the laboratory door? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Have you attached the University emergency phone numbers next to your telephones? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

If **NO** to any, explain.

Chemical Spill Response

- | | | |
|--|--|---------------------------------------|
| Have you trained your workers to understand the difference between minor and major chemical spills? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Do they know how to evacuate work area and building? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Do they understand that they must call EHS for major spills, after 911 has been notified if appropriate? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Do they know when evacuation of a work area is required? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

Biological Spill Response

- | | | |
|---|--|---------------------------------------|
| Have you trained your workers how to handle a potential biological spill? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Are workers aware that EHS should be called for biological spills that may involve the generation of respirable droplets or aerosols? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |
| Do they know when evacuation of a work area is required? | YES
<input type="checkbox"/> | NO
<input type="checkbox"/> |

2. **Eyewashes** – An ANSI-approved, continuous flow eyewash should be located in every work area

where chemical or biological agents that are injurious to the eye are in use or storage. Eyewashes shall be located within 10 seconds travel time of a hazard. For use of strong acids or caustics, the eyewash shall be immediately adjacent to the hazard. Eyewashes must be tested weekly, i.e., they must be activated to allow flushing of accumulated sediments in the line.

- | | | |
|---|--------------------------|--------------------------|
| Is there a properly functioning eyewash provided in every appropriate work area? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Is it easily accessible from any part of the work area? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Does the water flow without use of the operator's hands to hold the eyewash open? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |

If **NO** to any of these statements, explain.

- | | | |
|--|--------------------------|--------------------------|
| Do you follow weekly eyewash inspection and testing and document testing using the form found on the EHS website http://www.ehs.psu.edu/occhealth/eyewashinspectionform.pdf , ? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Is area around eyewash unobstructed? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |

If **NO**, explain.

3. **Safety shower** –A safety shower should be located in accessible areas that require no more than 10 seconds to reach from work areas where chemical or biological agents are in use or storage. EHS is available to help determine where showers are necessary. The shower shall be located on the same level as the hazard and the path of travel shall be free of obstructions that may inhibit the immediate use of equipment. Showers are tested by EHS on an annual basis. Check the inspection tags to ensure that your nearest shower has been tested within the last 12 months. Report any testing lapses to EHS.

- | | | |
|--|--------------------------|--------------------------|
| Please confirm that a shower, when needed, is available in adequate proximity to your work areas. | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Are the showers to be used by your workers in emergencies free of obstructions? There should be no obstructions to easy shower access. | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |

If **NO**, explain.

4. **First aid kit** – Please refer to University Safety policy [SY-21 First Aid Kits](#).

- | | | |
|--|--------------------------|--------------------------|
| Have you supplied a first aid kit? http://guru.psu.edu/policies/SY21.html | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |
| Do your workers know where to find the kit and is it always accessible during their hours of work? | YES | NO |
| | <input type="checkbox"/> | <input type="checkbox"/> |

For those labs that work with hydrofluoric acid, EHS recommends supplying a stock of 2.5% calcium gluconate gel. The purchase of this material is warranted by the severe corrosive effects caused to skin and bone by HF acid.

Does your research work involve the use of HF acid?

YES

NO

If YES, do you provide benzalkonium chloride?

YES

NO

If NO, why not?

E. Fire Protection Measures.

1. **Fire extinguishers** – University safety policy requires a fire extinguisher in every work area. Missing fire extinguishers should be reported to Office of Physical Plant. Please ensure that the fire extinguishers present in your work areas are appropriate for the hazards found there.

Class A: ordinary combustible materials, such as wood, cloth, paper, rubber, and many plastics

Class B: flammable liquids/gases

Class C: energized electrical equipment where the electrical non-conductivity of the extinguishing media is of importance

Class D: combustible metals, such as magnesium, titanium, zirconium, sodium, and potassium
(A bucket of sand may be substituted for a dry powder extinguisher in the case of organometallic fires)

Have you provided the appropriate class(es) of extinguishers?

YES

NO

Have you trained your workers to know which class to use for a particular fire?

YES

NO

If NO to any of the preceding questions, explain:

Notes: EHS will gladly conduct fire extinguisher training. OPP will inspect and maintain all fire extinguishers, both inside and outside work areas. Check the inspection tag to ensure timely recertification and call OPP for follow-up if the tag is not current.

Note: Fire blankets are discouraged as first aid materials due to their tendency to hold heat close to the body. They can be responsible for amplifying the severity of a burn.

2. Do you provide any specially-designed fire suppression system? (This does not include building sprinklers)

YES

NO

If YES, please describe type and purpose.

3. Do you enforce an 18-inch line of clearance between items in storage and the sprinkler heads? Fire code requires sufficient clearance for proper sprinkler head operation. Obstructions to clearance will disrupt the pattern of water flow. This includes inappropriate storage of cardboard boxes above wall cabinets. Excessive storage also affects the air flow in the laboratory and safe ventilation rates.

YES

NO

Storage of flammable materials – Refrigerators used to store flammable liquids must be “explosion-safe” or “explosion-proof”. Explosion-safe refrigerators are free of ignition sources within the storage compartment. Explosion-proof refrigerators have been designed to protect against ignition of flammable vapors both inside and outside the storage compartment.

Control of Ignition Sources

Do you store flammable materials in refrigerators?

YES **NO**

If **YES**, are the refrigerators explosion-safe? **or**

YES **NO**

explosion-proof? (A **NO** response to both indicates a source of concern regarding fire possibilities.)

YES **NO**

5. **Related topic** – proper refrigerator practices

Segregation of Materials

Have you confirmed that food and beverages are **not** stored in any refrigerator used for chemicals or materials of any kind?

YES **NO**

Labeling

Are the chemical storage refrigerators labeled to indicate that storage of food and beverages in these units is prohibited?

YES **NO**

Have you labeled all non-explosion-safe/proof refrigerators to indicate that flammable materials may not be stored here? [Refrigerators - Explosion Proof \(SY11\)](#)

YES **NO**

F. Area Monitoring and Alarms. Please list the type and room number of any monitoring devices intended to detect environmental contamination, such as monitors/alarms for gas releases.

Alarm Type	Laboratory
1.	
2.	
3.	
4.	
5.	
6.	
7.	

The following requirements must be met:

- Alarm information detailing the different alarms’ sounds and significance must be included in the laboratory safety door posting on the outside door to the work area.
- the operations manual for the device, instrument, or equipment must be available in an easily accessible location for authorized workers who can address the alarm.

Have you fulfilled each of these alarm requirements?

YES **NO**

If **NO**, why not?

G. Safety Documentation.

- Have you provided the Laboratory Safety Plan in an easily accessible location in your work areas? YES NO
- Have you established a current chemical inventory utilizing [CHIMS?](#), the PSU required software? YES NO
- Have all workers received the initial and annual refresher laboratory safety training? YES NO
- Have your workers been trained to understand the controls available to protect them from the health and physical hazards? YES NO

Spill plan Requirements:

The following is a summary of the types of spill plans at Penn State that may be required for a facility, depending on the materials stored and the quantity.

Chemical Storage:

- *Preparedness, Prevention, and Contingency (PPC) Plan:*
Facilities that meet the following conditions are required to have a PPC Plan:
 - The facility is an industrial or commercial installation that has the potential for causing accidental pollution of the air, land, or water, or the endangerment of public health and safety; or
 - The facility has a National Pollutant Discharge Elimination System (NPDES) stormwater permit.
 - The facility is a manufacturing or commercial installation that generates hazardous waste.
- *Off-Site Emergency Response Plan:*
Facilities that store [Extremely Hazardous Substances](#), as defined by the Emergency Planning Community Right to Know Act, at or above the threshold planning quantity are required to identify themselves as emergency planning facilities, designate an emergency coordinator, and have Emergency Off-Site Response Plans.

Oil Storage:

- *Spill Prevention, Control, and Countermeasures (SPCC) Plan:*
Facilities that meet the following conditions are required to have an SPCC Plan:
 - The facility could reasonably be expected to discharge oil in quantities that may be harmful into or upon the navigable waters of the United States or that may affect natural resources;
 - The facility has oil in aboveground containers, completely buried tanks, and temporary storage containers; and
 - The facility has completely buried storage capacity of more than 42,000-gallons of oil in tanks that are not regulated under 40 CFR §280 or 281, or the facility has an aggregate aboveground storage capacity greater than 1,320-gallons.
- *Preparedness, Prevention, and Contingency (PPC) Plan:*
Facilities that store oil in quantities above 55-gallons, but less than that required for the SPCC Plan are required to have a PPC Plan (see Chemical Storage above).
- *Spill Prevention Response (SPR) Plan:*
Facilities that store oil in regulated aboveground storage tanks in quantities that exceed 21,000 gallons in one location are required to have SPR Plans.

Is your facility required to have a spill plan? If YES, please continue. YES NO

Please list the type of spill plan here:

Plan	Laboratory location
1.	
2.	

I review my spill plan annually and provide required updates to EHS. YES NO

All personnel at my facility have received the annual training required by our spill plan.

YES
 NO

I agree that prior to the closure of my work area I will complete the *Laboratory Closeout Checklist* form to ensure the safe removal of all potential hazards and/or hazardous materials. I am aware that this form is available from the EHS website,

YES
 NO

- [Procedures for Moving Your Laboratory](#) 

- [Notification Form](#) 
- [Certification Form](#) 

H. Controlled Substances

Does your research work involve the use of controlled substances/pharmaceuticals/drugs?

YES
 NO

If NO, please skip this section

I certify that I am currently licensed by the DEA to possess and use controlled substances.

YES
 NO

The controlled substances are stored in a safe or lockable cabinet.

YES
 NO

Detailed records of all controlled substances received and used are maintained.

YES
 NO

My records can account for the total amount of each controlled substance at any given time.

YES
 NO

A separate record sheet is used for each controlled substance.

YES
 NO

My records are kept in a bound notebook (not a 3 ring binder or spiral notebook).

YES
 NO

Unwanted or expired controlled substances are disposed of through EHS.

YES
 NO

VIII. CERTIFICATION OF AGREEMENT

A *Certification of Agreement* must accompany all Unit Specific Plans.

Principal Investigator's Agreement.

I certify that the information presented in the submitted Unit Specific Plan Form is accurate and complete.

I agree to comply with all the procedures required in the *Unit Specific Plan* and to fully train and supervise all researchers under my direction.

Principal Investigator's/Unit Manager's Signature

Date

Laboratory/Research Safety Officer:

Lab/Research Safety Officer Signature

Campus Address

Campus Phone

Staff Agreement and Confirmation of Training.

1. I agree that I have thoroughly read and understood the supervising principal investigator's *Unit Specific Plan* (including any attached *Annual Reviews*, *Clarifications*, and EHS correspondence).
2. I have access to this safety information at all times when I am working.
3. I have been trained to be able to identify the hazards to which I may be exposed and to follow the work practices and procedures discussed in the plan.
4. I certify that I will conduct my research work safely and that I will be responsible for following stated safety policies.

Name	Signature	Campus Address	Campus Phone

Inventory of Chemical Agents. (Print out list from CHIMS)

APPENDIX A

STANDARD OPERATING PROCEDURES

Standard Operating Procedures (SOPs) must be developed if your operations include the routine use of carcinogens, reproductive toxins, substances which have a high degree of acute toxicity or work with a piece of equipment or operation that may pose any physical hazards, i.e. lasers, x-ray equipment, high voltage equipment, etc.

The key idea with laboratories having standard operating procedures is to ensure a process is in place so that an experiment is well thought out and includes and addresses relevant health and safety issues.

At a minimum, SOPs should include details such as:

- The chemicals involved and their hazards.
- Special hazards and circumstances.
- Use of engineering controls (such as fume hoods).
- Required personal protective equipment.
- Spill response measures.
- Waste disposal procedures.
- Decontamination procedures.
- Description of how to perform the experiment or operation.

Standard Operating Procedures do not need to be lengthy dissertations and it is perfectly acceptable to point laboratory personnel to other sources of information. Examples to include as part of SOPs include:

“To use this piece of equipment, see page 4 in the operator’s manual (located in file cabinet #4).” “The chemical and physical hazards of this chemical can be found in the MSDS – located in the MSDS binder. Read the MSDS before using this chemical.”

EH&S can assist laboratories in developing general and specific SOPs for chemical use in laboratories. Due to the large variety of research and the number of laboratories on the PSU campus, it is the responsibility of each laboratory, department and college to ensure that SOPs are developed and the practices and procedures are adequate to protect their workers who use hazardous chemicals.

BLANK SOP FORM

[HTTP://WWW.EHS.PSU.EDU/OCHEALTH/PSU SOP FORM.PDF](http://www.ehs.psu.edu/occhealth/psu_sop_form.pdf)

SOP Training: http://www.ehs.psu.edu/occhealth/sop_training.pdf

The following links are examples of SOPs from other university websites:

**Disclaimer: EH&S has not verified the accuracy of the information contained within these links and SOPs. It is the responsibility of the laboratory personnel to ensure the accuracy. These links are being provided only as examples and each work area should write an SOP that is specific to their processes and procedures. These links and SOP procedure are courtesy of Tom Shelly, Cornell University.*

- UCLA SOPs <http://www.sop.ehs.ucla.edu/>
- [A list of SOP examples and resources on the web from the University of Maryland](#)
- [The SOP library \(with numerous examples\) from the University of California - Irvine](#)
- [The Michigan State University SOP webpage \(with a number of examples\)](#)
- [A blank form that can generate a custom SOP online – Michigan State University.](#)
- [Example of a procedural SOP – Stanford University](#)
- [Example of a chemical specific information sheet type SOP \(generic – not work area specific\) – University of California, Irvine](#)
- [A blank template for chemical specific or chemical group SOP - University of California, Irvine](#)
- [The University of Delaware SOPs](#)
- [Example of a chemical list SOP \(generic – not work area specific\) – University of Pennsylvania](#)