

UNIVERSITY OF UTAH
Department of Physics and Astronomy
Safety Manual
Revised: August 2019

Part 1

POLICY

A. Policy setting

It is the policy of the University of Utah to provide a safe and healthy workplace in compliance with the Occupational Safety and Health Act (OSHA) and regulations of the Department of Labor. This requires, amongst other things, the development of a departmental general safety and chemical hygiene plan.

B. Purpose

This is the first in a series of documents that constitutes the General Safety and Chemical Hygiene Plan (GSCHP) for the Department of Physics and Astronomy (DPA) at the University of Utah, as required by the aforementioned regulation. Its purpose is to describe proper general practices, procedures, equipment, and facilities to be followed/used by all personnel (employees, PIs, teaching assistants, students, and visitors) working in each laboratory within the department. This is to protect them from potential health hazards while working with equipment and chemicals, and to keep the potential for exposure at a minimum. It is the responsibility of the administration, principal investigator, faculty, and research personnel to know and follow the plan.

These series of documents is not intended to cover all hazards found in the department, but instead is intended as an introduction to the most common hazards that a person might encounter. It is important that each group (research group, laboratory class) develops and maintain its own general safety and chemical hygiene plan that covers the specific hazards present in that group or class. Each group is also required to develop Standard Operating Procedures and document all lab specific trainings.

C. Personnel Covered by this Plan

This General Safety and Chemical Hygiene Plan applies to all work involving facilities and hazardous substances within the space assigned to the Department of Physics and Astronomy. All researchers and visitors who are conducting research within the Department laboratories must undergo General Safety and Chemical Hygiene Training and submit proof of completion prior to commencing work. This plan *currently* does not cover the research and other activities carried out outside of the campus location of DPA, that is it does not cover out-of-campus locations of the Cosmic Rays Group, ECE Nanofab facility, National Laboratories, astronomic observatories, biophysics laboratories located in Crocker Science Center and others.

D. Instructions for the Use of the Safety Manual

The part of the safety manual pertinent to a particular group or research/education/work is determined by the PI/supervisor.

E. Acknowledgement

Portions of the DGSCHP were drawn from CHP of the Department of Chemistry at the University of Utah

I. Responsibility, Authority, and Resources.

A. Safety Committee

The safety committee assists the Department Chair with the development and implementation of the Departmental General Safety and Chemical Hygiene Plan. The committee is composed of tenured, tenure-track faculties (group A) and regular employees of the department (group B). The committee is responsible for administering the Safety Day training (group A), investigating accidents and near misses (both group A and B) and administering a lab inspection program, recordkeeping of inspection, training and reports for the department (mostly group B). The committee is also responsible working with OEHS (Occupational Environmental Health and Safety), providing advice and assistance to personnel on various OEHS matters.

Members of the DPA Safety Committee (2019-2020)

Zhiheng Liu (contact person) (zhliu@physics.utah.edu)
Andrey Rogachev, chair (rogachev@physics.utah.edu)
Saveez Saffarian
Charlie Jui
Gernot Laicher
Harold Simpson

Once a year (currently in Jan-March) the safety committee administers the Safety Day (Safety Training Day), which provides the basic safety training to all department. It consists of four sessions on 1) General Safety, 2) Laser Safety, 3) Cryogenic Safety and 4) Chemical Safety. Each session includes a video and/or oral presentation and a discussion of the corresponding subject. At the end of the sessions, each participant and a representative of the safety committee sign the training completion form, which certify that the participant understands and agrees to follow the safety rules in the department. The forms are scanned and send to the supervisors and PI's and also kept for the record by the committee. The videos and other materials are made available for review and individual lab training.

The department does not provide training for biological and radioactive safety. If a group conducts or plan to conduct this type of research in locations of the Department, the group's PI must inform the Safety Committee.

The content, periodicity and tracking of the safety training for non-research personnel of the department is determined by the Chair.

B. Supervisors

Supervisory responsibility falls on the principal investigators (PIs), as well as the following departmental personnel:

Undergraduate/Graduate Laboratory Classes	Course Instructor, overall supervision, Gernot Laicher (gernot@physics.utah.edu)
Machine Shop	Ed Munford (edm@physics.utah.edu)
He-liquefaction facilities	Hans Malissa (hmalissa@physics.utah.edu)
Other facilities	Harold Simpson (hsimpson@physics.utah.edu)

The primary responsibility of the supervisor is to ensure that the General Safety and Chemical Hygiene Plan is implemented and to ensure compliance with the OEHS Laboratory Standard. This includes (but is not limited to):

- 1) Ensure that all personnel comply with the departmental GSCHP and do not operate equipment or handle hazardous chemicals without proper training and authorization.
- 2) Develop a lab specific GSCHP. Maintain documentation that states that all personnel have read and will comply with the lab specific GSCHP. Ensure compliance.
- 3) Review and approve standard operating procedures (SOPs) for work with hazardous chemicals or dangerous procedures/equipment.
- 4) Maintain documentation on all safety trainings.
- 5) Ensure that proper Personal Protective Equipment (PPE) (such as safety glasses) is available and properly used by all personnel and visitors.
- 6) Define the location of designated areas for work with particularly hazardous substances and ensure the proper inventory of these chemicals.
- 7) Ensure that authorized visitors follow the rules and assume responsibility for visitors' actions and safety.
- 8) Assist and cooperate with OEHS when necessary.
- 9) Formulate procedures for dealing with accidents that may result in the unexpected exposure of personnel or the environment to toxic substances.
- 10) Investigate accidents and near misses and report them to the safety committee.

- 11) Report to the safety committee incidents that resulted in an exposure of chemical substances.
- 12) Take action to correct work practices and conditions that may result in the release of toxic chemicals and/or accidents.
- 13) Instruct personnel to properly dispose of unwanted and/or hazardous chemicals.
- 14) Provide annual refresher safety training that is tailored to the group's safety needs, and maintain careful documentation of these trainings. (If suitable the Safety day training can be used instead. It is a duty of a Supervisor to decide if Safety Day training is sufficient)
- 15) Arrange for non-lab personnel to be informed of potential hazards, and instruct them on how to minimize risks.
- 16) Be a safety role model to personnel.
- 17) In an evacuation to work with the safety officers to: i) account for all personnel; ii) to check assigned building areas are evacuated; iii) to ensure that all equipment, reactions, etc. are shut off or in a stable state upon evacuation of the labs.

C. Groups Safety Officers

Depending on the research group's size, a PI can assign a safety officer (graduate student or post doc). These are assigned annually. The responsibilities of the safety officer are defined by a supervisor. They may include:

- 1) To advise and assist lab supervisors in training of new personnel.
- 2) To evaluate and make safety recommendations to the safety committee.
- 3) To inspect and ensure proper function of group safety equipment, such as spill kits, fire **extinguishers**, eyewash stations, and safety showers.
- 4) To be in charge of chemical waste and pick-up.
- 5) To enforce the GSCHP, and report unsafe practices to the lab supervisor (PI).

D. Research Personnel

Research personnel, as defined by the GSCHP, are those working under the direction of the supervisor. Visitors (including employees, staff, and students from other research groups) must also follow the GSCHP and additional regulations set for the space. Research personnel must follow the GSCHP along with any additional regulations set by the supervisors (i.e., group safety manuals).. It is the responsibility of all research personnel to:

- 1) Read, understand, and follow all safety rules and regulations of the GSCHP and additional, lab-based regulations.
- 2) Plan and conduct all experiments in accordance with the GSCHP.
- 3) Promote good housekeeping practices in the lab.
- 4) Communicate pertinent portions of the GSCHP to others in the work area (particularly new researchers or undergraduates).
- 5) Notify the group safety officer and/or supervisor of any hazardous conditions or unsafe work practices.
- 6) Use appropriate PPE (personal protective equipment) at all times.
- 7) Immediately report any job-related illness or injury to the supervisor.
- 8) Immediately report any accidents, incidents, and near misses to the supervisor.

E. Occupational and Environmental Health and Safety Office (OEHS)

The Occupational and Environmental Health and Safety Office (oehs.utah.edu) is responsible for control, review, disposal, monitoring, and advice with respect to work with chemicals and biological agents used in research and teaching. They are responsible for fire extinguisher training, aid the department in chemical hygiene training, and also offer more advanced safety training as needed. They can be reached for advice or assistance, particularly as it involves exposure to chemicals, fire, or other accidents.

Key OEHS Personnel (2016)

OEHS Office

801.581.6590

8am-5 pm Monday-Friday

801-585-2677

Non-emergencies after hours

questions@OEHS.utah.edu
James Stubbs, Associate Director 801-585-5788
james.stubbs@ehs.utah.edu
Matt Lundquist 801-585-9413
matt.lundquist@ehs.utah.edu
Clint Haymond, Fire Marshall 801-585-9122
Clint.Haymond@ehs.utah.edu

Information and Training

A. Initial Training

Prior to commencing work in any lab, all personnel must complete the following safety training:

- a) Attendance and participation in the department Safety Day (general safety session is mandatory, others are to be decided by PIs). Currently this training is held annually in Jan-March. If attendance is not possible, one must review the online safety videos available on Canvas/Department website. This should be followed by the discussion with supervisor, after which both the employee and supervisor have to sign the form certifies that the training has been provided.
- b) Lab-specific training indicated by the supervisor including review of the lab specific chemical hygiene plan and relevant standard operating procedures (SOPs).
- c) Summer REU students must also attend the safety training and watch SD videos.

B. Refresher Training

The refresher training can be done by participating in the Safety Day. In addition at least once a year each research group should have a safety refresher meeting that covers topics pertinent to the lab.

C. Documentation of Training, Safety Training and Advisory Day

All training must be documented. Documentation should include a description (date, title, who gave the training, date, and printed names of those who attended. **A signature** of each attendee is also required to certify training was completed. A training log template is available on the Department page.

After completing the training personnel are required to complete the "Departmental Safety training Completion Form" found in Department Canvas Safety Site forms folder once they passed the safety training and prior to working in the lab.

Lab specific training, including refresher trainings, must be documented and maintained by Supervisors and Safety Officers.

Advisory Day is the Departmental event, is hold at the end of Fall and Spring semesters. During this day every graduate student, a student's advisor and advisory committee have 15 min meeting, where students research progress is discussed. It is now required that the advisory committee checks if the student has passed all needed safety training. That is, the student needs to present a copy of a signed Completion form from the Safety day and similar form signed by the student and the student advisor for lab-specific training. During the "advisor-out" part of the meeting the committee should ask if the student has concerns regarding the safety in the lab/group.

The form for the Advisory day should have corresponding field for safety check.

D. Information on Hazardous Substances

It is the responsibility of all researchers to be aware of the health and safety hazards associated with all chemicals involved in their work. Several resources are available to you:

1. **Safety Data Sheets (SDS), formerly Material Safety Data Sheets (MSDS)**, that ship with the chemical, and can also be found online at the vendor's website. The more familiar you are with the language of these datasheets, the more useful they will be to you, so it is good practice to look up these sheets for all chemicals in a reaction.

2. **UCLA** has compiled a large database on **standard operating procedures**, or SOPs, for working with chemicals. This can be accessed here: <http://www.sop.ehs.ucla.edu/>
- *Prudent Practices in the Laboratory: Handling and Management of Chemical Hazards*. Great reference for working with chemicals, quenching reactive species, how to cleanup spills, understanding the various hazards found in the lab, and for Laboratory Chemical Safety Summaries (LCSSs).
 - *Wiley Guide to Chemical Incompatibilities*. Great resource for checking the compatibility of chemicals and waste.
 - *Destruction of Hazardous Chemicals in the Laboratory*. Reference for how to quench reactive chemicals as part of a reaction sequence so that they can safely be disposed of with the bulk chemical waste of the research group.

E. Accidents and Near Misses

With any accident (big or small), the group safety officer and PI should be contacted immediately (may require a phone call). For serious incidents notify OEHS by calling 801-581-6590. For minor incidents forward incident information via email to the assigned OEHS specialist.

It will be at the PIs discretion as to how best circulate information of the accident or near miss to the rest of the department. Usually, details of the incident will be shared with all PIs and the Safety Committee so that safety issues can be discussed (as appropriate) during group meetings. Alternatively/additionally, the incident may be communicated via the safety committee to the whole department. This is to ensure that as a whole the department learns from accidents/near misses, and are better prepared.

To help identify and correct unexpected hazards, it is necessary that personnel prepare written reports describing the circumstances of all serious accidents (available on Safety Canvas Site). One copy of the report should be submitted to the Department OEHS Coordinator (questions@oehs.utah.edu), and one copy should be given to the supervisor of the laboratory in which the accident took place. Reports should be filed within one week of the date of the accident. The submitted copy should bear the original signature of the individual preparing the report.

Written accident reports must be prepared following any of the following incidents:

1. Fires that require extinguishing or the sounding a fire alarm.
2. Any accident that results in an injury requiring medical attention. An injured employee, in conjunction with their supervisor must complete the Worker's First Report of Injury (available from HR) and submit to the HR absence management team as soon as possible following the incident