

REQUIRED READING AND TRAINING  
FOR ALL NEW AND CURRENT  
NSC PERSONNEL

# Total Safety and Health Plan

Accident Prevention Program  
NUCLEAR SCIENCE CENTER  
Rev. 2.5, 8/2025

Dodgen Research Facility &  
NUCS Core Facility

Washington State University

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## **Appendix A – List of Abbreviations**

ANSI: American National Standards Institute

APP: Accident Protection Program

BPPM: WSU's Business Policies and Procedures Manual

CFR: Code of Federal Regulations

CGA: Compressed Gas Association

DAC: Derived Air Concentration

DOH: Washington State Department of Health

DOSH: Washington State Department of Occupational Safety and Health

DRF: Dodgen Research Facility

EH&S: WSU Environmental Health and Safety

GHS: Globally Harmonized System of Classification and Labeling of Chemicals

GM: Geiger-Müller survey meter

HCS: Hazard Communication Standard

IDLH: Immediate Danger of Life and Health

IPA: Isopropyl alcohol

L&I: Washington State Department of Labor and Industries

LEL, or LFL: Lower Explosive Limit, or Lower Flammable Limit, of a vapor or gas; the lowest concentration that will produce a flash of fire when an ignition source is present.

LSM: Laboratory Safety Manual

NFPA: National Fire Protection Association

NIOSH: National Institute for Occupational Health and Safety

NMR: Nuclear Magnetic Resonance

NRC: Nuclear Regulatory Commission

NSC: Nuclear Science Center

NUCS: Nuclear and Chemical Science

OHS: WSU Environmental Health and Safety Occupational Health and Safety

OR-IT: Office of Research IT

OSHA: U.S. Occupational Safety and Health Administration

PEL: Permissible Exposure Limit. Amount of a substance that a person may be exposed over a period of time, usually expressed in fifteen minute and eight-hour limits. (OSHA and/or WAC specific)

PI: Principal Investigator

PPE: Personal Protection Equipment

ppm: Parts per million is the concentration of a gas or vapor in air - parts (by volume) of the gas or vapor in a million parts of air.

PTFE: Teflon

QA/QC: Quality Assurance and Quality Control

QR: Quick-response code

RAM: Radioactive Material

RCRA: Resource Conservation and Recovery Act provides guidance for hazardous and non-hazardous waste regulations

RMS: WSU Environmental Health and Safety Risk Management Services

RO: Reactor Operator

RSO: Radiation Safety Office

SCWE: Safety Conscious Work Environment

SDS: Safety Data Sheets

SHS: Safety, Health, and Security

SNOOP: is a leak detection solution sold by Swagelok

SOP: Standard Operating Procedure

SPPM: WSU's Safety Policies and Procedures Manual

SRO: Senior Reactor Operator

STEL: Short Term Exposure Limit

SWA: Stop Work Authority

THSP: Total Health and Safety Plan

TLV: Threshold Limit Value

TWA: Time Weighted Average

UEL, or UFL: Upper Explosive Limit, or Upper Flammable Limit of a vapor or gas; the highest concentration that will produce a flash fire when an ignition source is present.

WAC: Washington Administrative Code

WSU: Washington State University

# 1 INTRODUCTION

## 1.1 References

- WAC 296-800-140: *Accident Prevention Program*
- *WSU Safety Policies and Procedures Manual (SPPM)*

## 1.2 Purpose

The WSU Nuclear Science Center (NSC) Accident Prevention Program (APP) utilizes the Total Health and Safety Plan (THSP, this document) to establish Center-wide policies and procedures intended to prevent workplace accidents, illnesses, and injuries through effective policy. These policies support the systematic identification, evaluation/assessment, elimination and/or control of workplace hazards. To implement effective hazard controls, this policy clearly defines safety responsibilities, identifies resources for correcting or controlling hazards and outlines training requirements for personnel potentially exposed to workplace hazards.

WAC 296-800-140 states that it is the responsibility of the Nuclear Science Center to establish, supervise and enforce an APP that is effective in practice. Additionally, the NSC must develop a written APP (*WAC 296-800-14005*) and develop, supervise, implement, and enforce safety and health training programs that are effective in practice (*WAC 296-800-14020, WAC 296-800-14025*).

This document also is to direct general use of all radioactive and non-radioactive material use in labs present in the Dodgen Research Facility and the Nuclear and Chemical Science (NUCS) Core Facility, managed by the Nuclear Science Center. It also covers policies and procedures of the Nuclear Science Center staff and department management for use of the laboratories, how to perform experiments, order chemicals, and perform laboratory housekeeping activities safely in the facility.

Prior to performing laboratory work, employees and researchers must read and understand this THSP.

## 1.3 Facility Description

### 1.3.1 General

The Dodgen Research Facility features a 1.0 MW TRIGA reactor, WSU Nuclear Science Center managed laboratories, offices, break rooms, janitorial closets and three bathrooms, a machine shop, and three loading and receiving docks.

The Nuclear and Chemical Science (NUCS) Core Facility features one NMR spectrometer, five high-purity germanium gamma-ray detectors, an X-ray absorption/emission spectrometer, a small angle X-ray scattering diffractometer, a dynamic light scattering instrument, two X-ray diffractometers, an alpha spectrometer, one gamma irradiator, a WSU Nuclear Science Center managed laboratory and offices.

The Laboratory Safety Manual, including this document, applies to each part of the WSU Nuclear Science Center managed laboratories.

### 1.3.2 Access and Key Etiquette

Keys to Dodgen Research Facility shall be distributed at the discretion of the NSC Director and tracked by the Reactor Supervisor.

Access to the NUCS Core Facility shall be granted and tracked by the Associate Director of the

NUCS Core Facility.

### **1.3.3 Break Room Areas**

No laboratory work is to be performed in common areas (Dodgen Research Facility Rooms 150 and 250 and Fulmer 151) or bathrooms (Dodgen Research Facility Rooms 4, 5 and 124). No chemicals shall be disposed of in the break room or janitorial room sinks (Dodgen Research Facility Rooms 122 and 105). Dodgen Research Facility Rooms 201A and 201B and Fulmer Hall 151 and 151A shall be free of radioactive material.

### **1.3.4 Machine Shop and Dock Areas**

The machine shop located at Dodgen Research has power tools and machines such as saws, drill press, air compressor, and a variety of hand tools. Paint and painting supplies are also stored in the machine shop for patchwork around the facility. There are two dock areas on the east side of the Dodgen Research Facility (1<sup>st</sup> floor and 2<sup>nd</sup> floor) and one on the west side of Dodgen Research Facility (Beam Room South). The NUCS Core Facility has hand tools (magnetic and non-magnetic) for repair of the instrumentation located within and these can be found in Fulmer B3.

### **1.3.5 Reactor Radiochemistry Laboratory**

The reactor radiochemistry laboratory (Dodgen Research Facility Room 101), which is designed for chemistry experimental laboratory work as well as repackaging for radioactive samples that are being prepared to be shipped. Room 101 features chemical storage cabinets, 4 fume hoods, one oven, and one desiccator.

### **1.3.6 Radioactive materials (Machines)**

The X-ray diffraction/absorption/emission instrumentation is located in Room 114 of the Dodgen Research Facility and Room B3 of Fulmer Hall (NUCS Core Facility). The instrument design prevents personnel from any exposure to instrument generated X-rays, however the completion of Radiation Worker Training (RSO Training) is required prior to using the instrument. The Bruker 500 MHz NMR spectrometer, Bruker D8 Venture single crystal X-ray diffractometer, Bruker D2 Phaser powder X-ray diffractometer, and easyXAFS 300+ are approved for the analysis of radioactive samples.

## **1.4 Scope**

The APP establishes workplace safety requirements for NSC supervisors, employees, volunteers, faculty, students, and users. The THSP chapters contained herein provide guidance for personnel engaged in specific Center (building) activities where hazards are present or may be encountered. Supervisors and employees are engaged in preparing each chapter. *Washington Department of Safety and Health (DOSH) rules and WSU's Safety Policy and Procedures Manual (SPPM)* are referenced for adherence to State rules and WSU policy.

This THSP includes Nuclear Science Center activities in the Dodgen Research Facility and Nuclear and Chemical Science Core Facility at Fulmer Hall (NUCS-Fulmer).

This THSP is not a static document and is subject to regular review and revision when improvements to policies and procedures are identified. All employees are responsible for a safe workplace and recommending improvements to existing policy. Employees are expected to hold themselves and their peers accountable for maintaining a safe and healthy work environment. Any employee who does not comply with the applicable safety policies and procedures, or who is negligent in their responsibilities will be subject to corrective and/or disciplinary action.

Employees have the authority to halt any work activity which they believe may be an imminent threat to life, health, property, equipment, or any other action which causes a concern, or could result in a concern for safety.

This THSP does not establish safety requirements for activities that are not identified in the following chapters. Personnel required to engage in activities not covered by this THSP must contact their supervisor to develop applicable procedures and receive training and additional approvals as required.

Each laboratory or instrument bay in the Dodgen Research Facility and NUCS Core Facility has a red binder, *Laboratory Safety Manual*, which comprises the laboratory and facility safety program. Inside, the manual is divided into sections including *Total Health and Safety Plan*, *Chemical Hygiene Plan*, safety data sheets, and various surveillance forms and procedures. The *Total Health and Safety Plan* covers requirements for safely conducting work and identifying hazards at the facility. The *Laboratory Standards* document covers laboratory specific expectations, and this document covers procedures for common activities in the lab.

This *Laboratory Safety Manual* and all its sections, including this document, applies to all NSC employees, WSU students, contractors, and visitors utilizing the NSC laboratories located in the facility.

## **1.5 Procedures**

This THSP establishes Nuclear Science Center safety policy. In some instances, these extend to task specific safety procedural requirements. Documentation demonstrating procedural requirements may also be required as referenced in the following chapters. Program managers and supervisors are expected to integrate these procedures into the appropriate work activities and employees are expected to apply them on the job.

## **1.6 Dissemination**

This document is available to all Nuclear Science Center employees on the N: drive, M: drive, in each lab's Laboratory Safety Manual (LSM), and may be printed in its entirety or individual sections as desired. The THSP can also be found on the NSC website: <https://nsc.wsu.edu/safety/>.

## **1.7 Change Management**

Individual sections within this document will be reviewed no less frequently than every 3 years to ensure they remain current. The Director or Associate Director will be responsible for ensuring periodic reviews are conducted. Responsibility for conducting revisions will be delegated by the Director or Associate Director to capable personnel.

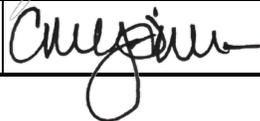
Substantive changes to the previous chapters shall be made effective only after documented review and approval by the NSC Level 4 Safety, Health, and Security Committee. Modifications shall be tracked in the change log located in Appendix A of this chapter. Minor changes such as corrections of typographical errors, editing for clarity or formatting that do not change the execution of the procedure may be made by any NSC staff member, but the modifications shall be approved and documented by the laboratory manager with a memorandum.

## 1.8 Appendix A – THSP Change Table

Table 1-1: Revision tracking for the Total Health and Safety Plan.

Date	Rev.	Section	Reason for Change	Description of Change
10/2017	0.1	N/A	N/A	N/A
10/2020	0.2	1	More detail was added to chapter 1.6 on how to update procedures from Rev 0.2 onward.	Addition of this change table, procedures on updating the THSP and removal of individual chapter change logs.
10/2020	0.2	All	The changes to chapter 1.6 remove the need for individual chapter change logs.	Removal of change logs from individual chapters of the THSP.
10/2020	0.2	12	Chapter 12 was updated to reflect the newest version of SPPM 2.80 Compressed Gas and Gas Cylinders	Changes to supervisor responsibilities and location of gas cylinder storage
10/2020	0.2	9	During development of the Laboratory Signage Program, postings and regulatory guidance was found that would improve the Hazard Communication Program	Hazard communication signage, signal word choice, barricade tape, and lockout/tagout sections were added.
10/2020	0.2	10	Safety program enhancement.	New chapter to document the Laboratory Signage Program.
1/2021	0.2	7	Safety program enhancement.	New chapter to bring awareness to confined spaces in the facility.
8/2021	0.3	12	Hazard description for respirator use.	Added description to Table 11-5 for hazards in the facility requiring the use of respirators.
6/2022	1.3	Multiple	Added NUCS Core Facility (Dodgen & Fulmer) to document	Added wording to include the NUCS Core Facility and to clarify whether the locations were in Dodgen or Fulmer.
4/2023	1.4	Ch. 4 addition, Renummer all chapters	Creation of Level 4 SHS Committee (Ch. 19, now Ch. 20); addition of updated policies on safety culture.	Edited chapter 20 on SHS committee (Level 4) for NSC. Added new chapter on safety culture (new Ch. 4).
7/2023	1.5	N/A	Corrected typos in Rev 1.4 & includes finalized version of Chapter 4	Fixed typos in chapter 8.5 and includes Chapter as approved by SHS committee.
8/2025	2.5	Multiple	Combined Facility Safety Procedures, Rev. 1.8 and THSP, Rev. 1.6 into singular document. Typos, updated facility policies in Chapter 12. Added list of abbreviations.	Updated Chapter 12 with descriptions of hazard communication signage requirements and multiple typos throughout the document. Added NFPA symbols and descriptions. Updated cross-referencing. Added section 2.6 fitness for duty statement.

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Submitted By:	 Zachariah Heiden	Date:	August 27, 2025
Reviewed By:	 Corey Hines, Director	Date:	8/27/2025

## **2 GUIDANCE & INSTRUCTIONS**

### **2.1 References**

1. SPPM 2.16, *Safety Orientation*
2. *WSU Executive Policy 20 Alcohol and Drug Policy*

### **2.2 Purpose**

This *Accident Prevention Program (APP) Total Health and Safety Plan (THSP)* provides guidance and establishes safety policy and procedures at the Nuclear Science Center. The THSP incorporates requirements established in *Washington State Division of Occupational Safety and Health (DOSH)* rules, and *WSU's Safety Policy and Procedures Manual (SPPM)*.

NSC supervisors are expected to integrate procedures into relevant/applicable work activities, and employees are expected to apply them on the job. Sample procedural forms are referenced in individual THSP chapters and are to be used when they apply.

In situations where imminent danger or serious hazard(s) exist(s), any employee has the authority to cease work until the danger or hazard has been controlled.

The WSU Nuclear Science Center employs a two-person rule for any operations involving heights over 4 feet, crane operations, or maintenance involving heavy (>50 lbs) systems.

Radios shall be worn at all times by NSC reactor operations and research staff members.

### **2.3 Responsibilities**

DOSH rules identify employer responsibilities for employee safety. WSU's SPPM is similarly structured, identifying the departmental/unit authorities, including supervisors as the individuals responsible for employee safety. General supervisor and employee safety responsibilities are presented in Chapter 3, the following THSP chapters identify specific departmental, supervisor and employee responsibilities referencing DOSH rules and WSU's SPPM.

### **2.4 Training**

The WSU Nuclear Science Center *Total Health and Safety Plan* is part of the Accident Prevention Program and required reading for all current and new employees of the department. Employees are be required to read and understand the THSP and complete Chapter 25: SAFETY TRAINING.

### **2.5 Documentation**

Each employee has a personnel file maintained by the Office Administrator. APP training for new and current employees are kept in the individual's personnel file via signed memorandum by the trainer and employee.

### **2.6 Fitness for Duty**

All persons within the Dodgen Research Facility, Nuclear Science Center, and NUCS Core Facility adhere to WSU policies and procedures. The NSC RO/SRO Requalification Program is required for all WSU reactor licensees.

### **2.7 New-Hire Safety Orientation**

New-hire orientation and safety training is required for all NSC employees, contractors, students, faculty, staff, and graduate students. Before new employees are released to perform duties

without direct supervision of a properly trained supervisor or co-worker, they must satisfactorily complete required safety training. See Chapter 25 for details.

## **2.8 WSU Drug and Alcohol Policy**

Employees are expected to read and comply with *WSU Executive Policy #20, Alcohol and Drug Policy*.

## **2.9 Job Class Requirements**

Each of the Center's position descriptions include specifications for physical and mental requirements and typical working conditions for the position. The position description identifies personal protective equipment and associated medical surveillance/monitoring requirements. Employees must possess the knowledge, skills and abilities to fulfill position description requirements and apply safety rules and procedures.

## **2.10 Emergency Preparedness**

General Campus Emergency: In the event of a general emergency campus wide, employees will receive notification and general instructions via the campus emergency public address system or the WSU Alert network communication system.

Employees are required to sign up for WSU Alerts, employees may select whether to receive alerts via telephone/mobile phone, text, electronic mail or any combination thereof.

Nuclear Science Center Emergency Plan and Implementing Procedures: A current copy of the Nuclear Science Center Reactor *Emergency Plan* is available in Room 201, 250B, or on file on the N: drive. Employees must gather during a building emergency south of the facility in the parking lot. Training on building evacuation and pertinent policies and procedures are performed during initial access training and required annual building emergency and security training provided by licensed personnel. Building occupants should also familiarize themselves with first aid kit and fire extinguisher locations.

Emergency Kits. Emergency kits are located in the from office and transformer vault. Licensed staff are trained in the utilization of the emergency kits and will provide them as necessary.

Decontamination Kits. Decontamination kits are located in the janitor closet in the stairwell and the transformer vault. Licensed staff are trained in the utilization of the emergency kits and will provide them as necessary.

## **2.11 Fire Safety**

Employees are required to evacuate the building when a fire alarm is activated and shall not attempt to extinguish any fire unless they have received fire extinguisher training.

### **2.11.1 Upon discovering a fire:**

- Immediately notify other persons in the area. Call, or have them call 911.
- If the fire is small (such as a wastebasket fire) and there is minimal smoke, fire extinguisher trained employees may attempt to put the fire out with an appropriate fire extinguisher. If the fire grows and/or there is thick smoke, do not continue to fight the fire and immediately evacuate the building.
- Non-designated personnel are to immediately evacuate and go to the designated gathering area.

- Notify your supervisor you have evacuated and are safe.

### **2.11.2 Supervisors notified of a fire are to:**

- Instruct employees to evacuate to the designated gathering area located across the parking lot in the motorcycle parking area.
- Insure all employees have been evacuated and are accounted for.
- Verify 911 has been called.
- Determine if the fire has been extinguished. If fire has grown or there is thick smoke, evacuate any employees attempting to fight the fire.
- Go to the designated gathering area and verify that all the employees are accounted for. If an employee is missing, no one will be permitted to re-enter the building.
- Notify responding firefighting personnel when an employee is missing and may be in the building.

## **2.12 Fire Protection**

Facilities services in conjunction with the WSU Fire Marshall and the Pullman Fire Department maintain fire protection equipment and pull stations throughout the building. The following details the best practices for maintaining fire code compliance at the NSC.

- All hallways must have a maintained and clear path to the exit east end doors or the stairwell from every lab and office. The path must be a minimum of 48 inches in width with no obstructions.
- Circuit breaker panels must be free of obstruction out to 36 inches.
- Fire extinguishers and pull stations must not be covered and must be free of obstruction.
- Ceilings must be free of non-permanent installations and personal items to 24 inches below the ceiling.
- Waste pallets must be removed from the facility and off-site in a timely manner. Do not allow accumulation of pallets.
- Extension cords must be the minimum required to react from outlet to unit. Coiled extension cords can generate heat and create a fire hazard. Extension cords are not to be used as a substitute for a permanent power installation.
- All junction boxes must have covers on them unless temporary work is being performed.
- All extension cords, power cables, and surge protectors must be in good condition with no tears, rips, or degradation of the cord. Do not repair with electrical tape.
- All gas cylinders must be securely fastened to an anchor structure.
- Large containers (even empty ones) with flammable markings must be stored in flammable cabinets with not in use.
- All labs, offices, general areas, storage areas must be well kept and organized.

### **2.13 Chemical Storage**

For details on requirements on chemical storage, refer to sections of this THSP. A small subset of chemicals may be stored in the laboratory, including bulk solvents (e.g. acetone, DI water), however large quantities of chemicals are stored in designated chemical laboratory rooms.

### **2.14 Eyewash and Safety Shower**

Facilities Services maintains eyewashes and safety showers are available in all NSC laboratories. The equipment shall be tested by laboratory workers on a weekly basis and documented in the Laboratory Safety Manual located in each lab. Signs are posted to indicate the location of the equipment.

### **2.15 Fume Hoods**

Fume hoods are located throughout the NSC laboratories. The following precautions are for operation and use of these fume hoods at the NSC.

- All fume hoods shall be tested and documented to follow the rules of the chemical hygiene plan and the Laboratory Safety Manual. No fume hoods shall be used that do not meet these requirements.
- Personnel shall not disable the 18" sash stop which would diminish the airflow.
- The hood sash shall be lowered when not in use to achieve optimal containment.
- Personnel shall only introduce their arms and no other part of their body within the hood when carrying out laboratory work with open chemical containers.

### **2.16 Spill Kits**

Spill-control kits capable of absorbing hazardous spills are located in each lab throughout the facility. This THSP provides guidance on the use of spill-control devices.

### **2.17 First-aid Kits**

First-aid kits are located throughout the Dodgen Research Facility in Rooms 2, 100E, 101, 112A, 114, 116, 200E, 201, 215, and 221 and the NUCS Core Facility in each instrument bay (Fulmer B3) and Fulmer 151A.

### **2.18 Radioactive Decontamination Kits**

Large scale decontamination kits are located in the Transformer Vault and Room 105 at Dodgen Research Facility. Smaller scale kits are located under or near sinks in frequently used radiation labs at Dodgen Research Facility and the instrument bays of all instruments certified for radioactive sample analysis in the NUCS Core Facility.

## **3 RESPONSIBILITIES**

### **3.1 References**

1. SPPM 2.10 *Accident Prevention Responsibility*

2. SPPM 2.24 *Accident Reporting and Follow-Up*
3. WAC 296-800-110 *Employer Responsibilities: Safe Workplace*
4. WAC 296-800-120 & 12005 *Employee Responsibilities*
5. *HRS Alcohol and Drug Abuse Manager Guidelines*
6. Exec Policy #20 *Alcohol and Drug Policy*
7. *Hazard Assessment Form*

### **3.2 Introduction**

The responsibility to maintain a safe workplace resides with each employee; for themselves, their peers, and the public. That responsibility includes the elimination of hazards wherever possible and reporting actual or potential hazards immediately upon their observation. Specific safety responsibilities are identified in this chapter's subsequent sections and further discussed as they apply to this *Accident Prevention Program*.

### **3.3 Access Control**

Access control policies and procedures are found in the NSC Administrative Procedures. Keys to Dodgen Research Facility shall be distributed at the discretion of the NSC Director and tracked by the Reactor Supervisor. Access to the NUCS Core Facility shall be granted and tracked by the Associate Director of the NUCS Core Facility.

### **3.4 Directors**

Directors ensure employees in their units adhere to State rules, WSU policies, and departmental safety policy. Directors must coordinate and manage safety responsibilities with their supervisors and employees as appropriate to effectively implement safety policies. Safety performance shall be specifically addressed in position descriptions and performance evaluations.

#### **3.4.1 Directors shall**

- Administer the program.
- Adopt this THSP and provide input/revision as necessary to address/incorporate unique unit requirements while adhering to State rules.
- Solicits input from subject matter experts ensuring Departmental policies are aligned with State requirements.
- Ensure supervisors implement Department safety policies per this APP.
- Ensure appropriate participation in Department Safety Committee meetings.
- Ensure a safe and responsible work environment.
- Designate a laboratory manager for each laboratory.
- Ensure that all personnel who engage in laboratory operations have received documented and appropriate training.
- Ensure supervisors perform and document Hazard Assessments (using the hazard assessment form) and identify the resources necessary to provide appropriate engineering and administrative controls and/or Personal Protective Equipment (PPE) to unit personnel.
- Disseminate safety information to appropriate personnel.

- Receive and review reports, surveys, accident reports, and other information relating to safety and loss control.
- Review injury trends and establish prevention measures.
- Review and/or conduct incident investigations and inspections.
- Evaluate the need for corrections that may be necessary to remedy or improve various workplace safety concerns, allocate necessary resources and ensure the remedy is implemented and maintained.
- Perform document reviews at least once per year, unless activities change and ensuring that the plans are compatible with current laboratory operations. Additional review (and modification, if necessary) will occur before new experiments or new procedures are implemented if the experiments and/or procedures differ substantially from ongoing laboratory work, and/or before a new hazardous material, instrument, or procedure is brought to the laboratory.
- Ensure that all personnel performing laboratory work have signed the List of Authorized Laboratory Personnel, placed in the Laboratory Safety Manual, which serves as evidence that the Laboratory Safety Manual have been read and understood by each individual performing laboratory work.

### **3.5 Supervisors**

Supervisors ensure their employees adhere to safety policies and are provided the necessary training and resources to perform work safely. Supervisors are accountable to the director for adherence to relevant safety policies and objectives. Safety performance shall be specifically addressed in position descriptions and performance evaluations.

#### **3.5.1 Supervisors shall:**

- Ensure safety policies and procedures are understood and implemented by themselves and their employees.
- Promote employee participation in the health and safety program.
- Perform and document Hazard Assessments of work areas under their control and tasks performed by their employees. Hazard assessments shall identify the engineering and administrative controls and/or PPE necessary to perform work safely.
- Ensure their employees receive the required and necessary training to implement hazard controls and wear PPE.
- Require the proper care and use of PPE.
- Eliminate or control workplace hazards quickly when observed or identified to them by their employees.
- Report workplace hazards observed or identified to them by their employees that are outside their ability or require additional resources to control.
- Review injury trends and establish prevention measures.
- Submit incident reports and conduct supervisor's incident investigations when employees sustain a workplace injury or are subject to a significant nearmiss.
- Act to secure prompt medical attention for injured persons.

- Enforce the conditions of *WSU's Return to Work policy*.

### **3.6 Laboratory Managers**

Designation of a laboratory manager will be documented by a memorandum naming the individual. A list of the current laboratory managers are seen in Appendix A – List of Laboratory Managers for NSC Space. A copy of the memorandum will be kept on file in the laboratory safety binder for each laboratory. Any of these duties may be delegated to laboratory personnel other than the laboratory manager by the laboratory manager.

#### **3.6.1 Laboratory Managers shall:**

- Train, document, and maintain employee adherence to the Nuclear Science Center Laboratory Safety Manual.
- Ensure completion of WSU required training.
- Ensure that work proposed to be performed in the laboratory is approved and documented before initiation of the work.
- Perform and document any required laboratory surveillances. Additional surveillances will occur before new experiments or new procedures are implemented and/or before a new hazardous material, instrument, or procedure is brought into the laboratory.
- Ensuring the posting of appropriate signs intended for laboratory worker and visitor awareness of laboratory hazards and location of laboratory safety equipment. This includes, but is not limited to signs on doors, maps of the building, including location of eyewash stations, fire extinguishers, and evacuation routes, hazardous material storage, and hazardous waste storage.
- Ensure that eyewash and safety showers are tested on a regular basis, and proper documentation of these tests are maintained.
- Screen for safety hazards and ensure that these screens are documented and reviewed annually. Hazard analyses will be reviewed and updated concurrently with any major changes in laboratory operations or upon introduction of new equipment or processes that could present previously unidentified hazards.
- Maintain proper knowledge of the chemicals and instruments:
  - Ensure that the radioactive material inventory (RAM inventory) in each NSC laboratory for which they manage is up to date and reported to the RSO if required.
  - Ensure maintenance of a chemical inventory for each lab.
  - Maintain current SDSs.
  - Ensure that no hazardous substance is being used in the laboratory unless all requirements of the Laboratory Safety Manual are met, that proper documentation was completed prior to any use of any hazardous substances, and that management of hazardous wastes is in accordance with the Laboratory Safety Manual.
- Ensure the proper operation and use of all the laboratory instruments, that those instruments remain calibrated, and that the maintenance contracts are up to date.
- Conduct “check out” for laboratory workers upon termination of employment. The check-out procedure will include:

- The laboratory worker has returned any WSU property that may have been in possession of the laboratory worker.
  - The laboratory work area of the departing employee has been cleaned and organized, especially including identification of all samples and chemicals.
  - The departing laboratory worker turns in all records, such as data and laboratory notebooks.
- Conduct laboratory personnel meetings.

### **3.7 Laboratory Workers**

Laboratory workers include NSC personnel, contractors, and visitors performing laboratory work in the laboratory facilities. All laboratory workers must satisfy the following requirements:

- Read, understand, and comply with the Nuclear Science Center Total Health and Safety Plan.
- Become familiar with the NSC Chemical Hygiene Plan before using chemicals.
- Document laboratory work proposed to be performed in the laboratory and ensure its review and approval before initiation of the work. The document shall, in particular, demonstrate thoughtful planning to minimize the amount of hazardous waste produced.
- Refrain from unsafe operations.
- Inform laboratory manager of previously unidentified hazards.
- Escort guests during visits of the NSC laboratory facilities.

### **3.8 Employees**

Employees actively participate in Department health and safety programs, familiarize themselves with WSU and Departmental safety policies, and work with their supervisors and coworkers to control or eliminate workplace hazards. Employees have the right and responsibility to refuse unsafe work. Employee safety performance shall be specifically addressed in position descriptions and during performance evaluations.

#### **3.8.1 Employees shall:**

- Review, understand, and adhere to State safety rules and WSU and departmental safety policies, including this APP.
- Strive to make all work environments and operations safe.
- Report for work in good physical and mental condition to safely carry out assigned duties.
- Keep all work areas clean and free of debris and obstacles.
- Request assistance or training when unsure of how to perform any task safely.
- Correct unsafe conditions within their scope of work.
- Report observed safety and health violations, suspected violations, safety concerns, and anticipated hazards to his or her immediate supervisor immediately upon observation or detection. If such reported conditions are not subsequently corrected, the employee is to report the failed correction to their Supervisor or the Director for further action.
- Proactively and constructively participate in safety training.

- Pass verification testing in all mandatory safety training prior to performing work.
- Use and maintain all PPE and safety devices provided.
- Maintain and properly use all tools under his or her control.
- Assist fellow employees in implementing safety procedures and adhering to safety requirements.
- Not interfere with another employee's use of any safety device or safeguard.
- Not use intoxicating beverages, narcotics, or other substances that can impair judgement in or around the workplace or enter the workplace while under the influence of intoxicating beverages or narcotics.

### **3.9 Visitors**

A visitor is defined as anyone who is not routinely assigned by NSC management to perform laboratory work in the area being visited. One or more laboratory workers during their visit must escort visitors at all times. Badging requirements are found in the NSC Administrative Procedures and are applicable to all persons in the Dodgen Research Facility.

### **3.10 Safety Compliance**

#### **3.10.1 Purpose**

Compliance with all safety rules and procedures is a condition of employment when working for the Nuclear Science Center. All employees must familiarize themselves with University and Department safety policies and procedures and comply with them in every respect. Supervisory personnel at all levels are responsible for taking immediate corrective action when an unsafe action is observed.

#### **3.10.2 Reporting**

If non-compliant behavior or conditions are observed, or come to the attention of any employee, immediate action shall be taken to correct the non-compliant behavior or condition and the employee's supervisor shall be notified.

There are several ways an employee, student, visitor, or others can report safety related concerns. This include, but are not limited to:

- (1) By calling EHS at 509-335-3041 and reporting the activity via telephone
- (2) By reporting a safety concern anonymously on the NSC website (<https://nsc.wsu.edu/safety-concern/>)
- (3) By written or verbal communication to a coworker or colleague, who shall report the concern to NSC management in writing.

#### **3.10.3 Labor and Industries Site Inspection**

If a *Washington State Department of Labor & Industries Division of Occupational Safety and Health* (L&I/DOSH) inspector arrives at your work location in Pullman to conduct a safety and health inspection, immediately contact your supervisor who in turn will contact their chain of command and contact WSU Environmental Health & Safety (EHS) at 509-335-3041. If not on site when the inspector arrives, the immediate supervisor will go to the site as soon as notified. If on site, the supervisor will remain on site while the inspector is present. EH&S serves as the L&I/DOSH coordinating liaison for WSU and will assist with the inspection process.

### 3.10.4 Investigation & Resolution

The supervisor shall immediately conduct an investigation and document the results.

All reports received shall be documented in writing, investigated, and corrected by the Level 4 NSC Safety, Health, and Security Committee and then submitted in writing, both completed and in progress, at each Reactor Safeguards Committee meeting for review and approval of the resolution of the concern.

### 3.10.5 Action

Failure to comply with safety policies and procedures is to be considered serious and result in timely corrective or disciplinary action judged to be appropriate for the specific circumstances at hand. Progressive corrective/disciplinary action is appropriate for addressing non-compliance issues, recognizing that more serious offenses do not necessarily require that intermediate steps be taken first. Questions concerning appropriate corrective or disciplinary action should be addressed to the appropriate Director/Manager or *Human Resource Services*.

## 3.11 Appendix A – List of Laboratory Managers for NSC Spaces

Table 3-1: List of laboratory managers for NSC spaces.

Facility	Room Number	Laboratory Manager
Dodgen Research Facility	2	Clark Filip
Dodgen Research Facility	21	Xiaofeng Guo
Dodgen Research Facility	101	Zach Heiden
Dodgen Research Facility	110	Zach Heiden
Dodgen Research Facility	112	Zach Heiden
Dodgen Research Facility	114	Zach Heiden
Dodgen Research Facility	116	Zach Heiden
Dodgen Research Facility	119	Zach Heiden
Dodgen Research Facility	121	Xiaofeng Guo
Dodgen Research Facility	201	Clark Filip
Dodgen Research Facility	210	Zach Heiden
Dodgen Research Facility	214	Zach Heiden
Dodgen Research Facility	215	Zach Heiden
Dodgen Research Facility	221	Zach Heiden
Fulmer Hall	B3	Zach Heiden
Fulmer Hall	151	Zach Heiden
Fulmer Hall	151A	Zach Heiden

## **4 SAFETY CULTURE**

### **4.1 References**

1. Guidance for Establishing and Maintaining a Safety Conscious Work Environment, Regulatory Information Summary (RIS) 2005-18, U.S. Nuclear Regulatory Commission.
2. Freedom of Employees in the Nuclear Industry to Raise Safety Concerns without Fear of Retaliation, Policy Statement, 5/14/1996, U.S. Nuclear Regulatory Commission.

### **4.2 NSC Policy Statement on Safety Culture & Safety Conscious Work Environment**

Students, staff, faculty, and visitors to the Nuclear Science Center expect a safe environment, and WSU is obliged to provide a workplace free from recognized hazards. A safe work environment relies upon a positive safety culture that requires open communication of safety concerns amongst all workers engaged in any activity they are trained to perform. Personnel must also feel empowered to report safety concerns to NSC management, campus safety resources, or directly to regulatory agencies without fear of reprisal.

A safety conscious work environment is a tenant to positive safety culture and safe operations at the Nuclear Science Center. Multiple avenues in reporting concerns shall be available to workers that include both formal, informal, verbal, and written concerns, and employees shall have the expectation that each concern will be evaluated, controls applied and corrections made when and where identified.

### **4.3 Work Processes**

- Due to the breadth of work at the Center, multiple resources are available to support safe work practices and provide a safe workplace.
  - For Center-wide work processes and required training, see the NSC Total Health and Safety Plan, the NSC Facility Procedures, and the Laboratory Safety Manual. These documents are reviewed annually by NSC management.
  - For procedures involving the reactor Facility License R-76, and those procedures required in Technical Specification 6.8(2): See the NSC Reactor Standard Operating Procedures, NSC Emergency Plan Implementing Procedures, and the NSC Administrative Procedures. These documents are reviewed annual by all licensees, and biennially by the WSU Reactor Safeguards Committee.
  - For procedures for client specific processes, see the NSC Guidelines for QA/QC activities.
  - For NUCS work processes, see the NSC Research Procedures and Forms.

### **4.4 Environment for Raising Concerns**

The NSC maintains a safety conscious work environment (SCWE) where personnel may freely raise safety concerns without fear of retaliation, intimidation, harassment, or discrimination.

A SCWE encourages employees to raise concerns to supervisors, management, and regulators; requires that those concerns are promptly reviewed, assigned priority, investigated, and resolved; and that timely feedback is provided to personnel identifying concerns.

The NSC Total Health and Safety Plan provides policies and procedures for training, raising workplace concerns, and roles and responsibilities of employees, supervisors, and NSC administration. NSC Administration will identify, through reporting avenues below, the safety concern, document the concern, and work with the supervisor and/or employee to resolve the safety concern in a timely manner. Safety concerns will be addressed at each weekly NSC Senior Staff meeting, and the report with resolution will be presented to the Level 4 Safety, Health, & Security Committee and the Reactor Safeguards Committee during the regular quarterly meetings.

**4.4.1 Anyone at the Nuclear Science Center may raise safety concerns through the following avenues (internal to WSU):**

- “Report a Safety Concern” at <https://nsc.wsu.edu/safety-concern/>
- Notify their NSC Safety Committee (Level 4) representative or inform anyone on the committee (<https://nsc.wsu.edu/shs/>) of their concern.
- SPPM 2.52: Reporting Hazards - University personnel observing serious safety concerns affecting or potentially affecting University employees are to immediately contact:
  - (1) immediate supervisor; and
  - (2) the unit administrator (NSC Director, [cchines@wsu.edu](mailto:cchines@wsu.edu)), and/or
  - (3) Environmental Health and Safety (EH&S); telephone 509-335-3041.
- Reporting Hazards Caused by Contractors. If University personnel observe serious hazards to University employees created by building or construction contractors, the personnel are to report the hazards to Environmental Health and Safety; telephone 509-335-3041. Environmental Health & Safety coordinates with either Facilities Services, Capital or Facilities Services, Operations to communicate the safety concern to the contractor.

**4.4.2 Anyone at the Nuclear Science Center may raise safety concerns through additional avenues (external to WSU):**

- U.S. Nuclear Regulatory Commission website: <https://www.nrc.gov/about-nrc/contactus.html>
- Washington State Labor and Industries (L&I): <https://lni.wa.gov/>
- Washington State Department of Health, Office of Radiation Protection: <https://doh.wa.gov/community-and-environment/radiation/contact-information>
- U.S. Occupational Safety and Health Administration (OSHA): <https://www.osha.gov/workers/file-complaint>

**4.5 Stop Work Authority**

The Director of the Nuclear Science Center authorizes Stop Work Authority (SWA) for Dodgen Research Facility and NUCS Core Facility personnel, when unexpected conditions or hazards arise. SWA is necessary to promote the concept that immediate action can prevent injury, illness, or death in the workplace, and allows employees to stop work if they believe there is an immediate danger present.

NSC Management shall reinforce expectations that individuals take the time to do the job right the first time, seek guidance when unsure, and stop if an unexpected condition or equipment response is encountered.

Employees must stop work activities when confronted with an unexpected condition, communicate with supervisors, and resolve the condition prior to continuing work activities. When appropriate, individuals shall consult system and equipment experts.

#### **4.6 Training**

Documented training on this THSP chapter shall be provided to all NSC employees, students, and PIs. NSC reactor licensees receive documented annual required reading for the THSP.

## 5 ACCIDENTAL INJURY REPORTING

### 5.1 References

1. SPPM 2.24 *Accident Reporting and Follow-Up*
2. SPPM 2.26 *Investigating Accidents*
3. *Incident Report Form*
4. *Supervisor's Accident Investigation Report*
5. *Witness/Injured Person Statement Form*
6. *Motor Vehicle Safety SPPM 7.20*
7. *Motor Vehicle Accident Form*

### 5.2 Purpose

This Chapter establishes requirements, responsibilities and procedures for reporting significant near misses, incidents resulting in injury, work related illness or death and accidents involving property damage.

### 5.3 Scope

All significant near misses, accidental injuries, work-related illnesses and accidents resulting in property damage must be reported to supervisors immediately for evaluation and investigation. WSU must report employee fatalities or in-patient hospitalizations within eight (8) hours of the incident. WSU must report non-hospitalized employee amputations or loss of an eye within twenty-four (24) hours of the incident. Contact EH&S (335-3041) immediately after seeing to proper medical care/first aid/treatment for all major incidents. Do not disturb the scene of a major accident except to attend to the affected employee(s) and/or prevent further injury. The scene must otherwise remain intact to support WSU's and L&I's accident investigation.

Supervisors must report *any* significant near miss, accidental injury, or work-related illness within 24 hours of occurrence by submitting an online Incident Report (<https://hrs.wsu.edu/managers/incident-report/>). In the absence of the supervisor, it is the Manager/Director's responsibility to insure the required documentation is submitted. Procedures for reporting accidents/injuries and work-related illnesses are documented in the *WSU Safety Policies and Procedures Manual*, section 2.24.

### 5.4 Responsibilities

#### 5.4.1 Supervisors

- Immediately reporting (after ensuring appropriate treatment for injured personnel) all significant near misses, accidental injuries and work-related illnesses.
- Investigating all significant near misses, accidental injuries and work-related illnesses and completing a *Supervisor's Accident Investigation Report*.
- Based upon the results of the investigation, taking action to prevent future incidents.
- Requiring that employees immediately report all significant near misses, accidental injuries and work-related illnesses and accidents resulting in property damage.
- Completing a *Motor Vehicle Accident form* when involved in a motor vehicle accident.

#### **5.4.2 Employees**

- Immediately reporting (after ensuring appropriate treatment for injured personnel) all significant near misses, accidental injuries and work-related illnesses.
- Taking action to prevent future incidents.
- Completes a *Witness/Injured Person Statement* when injured or witness to incidents.
- Completing a *Motor Vehicle Accident form* when involved in a motor vehicle accident.

#### **5.5 Process**

1. When an injury occurs, take measures to avoid further injury, evaluate the severity of the injury, and if needed, call for emergency assistance/911.
2. Responding to an Injury Incident – SPPM 2.20 *General Workplace Safety* outlines injury incident response procedures for notifying EMS, rendering first aid and transporting injured person. Further information is available at: SPPM 2.20.
3. The supervisor conducts an incident investigation and interviews (when feasible) the employee and any witnesses involved. The supervisor then completes the Supervisor's Accident Investigation Report within 48 hours of the incident (see also SPPM 2.26).
4. Injured persons and witnesses must complete a Witness/Injured Person Statement.
5. The Assistant/Associate Director(s) reviews the documents.

#### **5.6 Form Distribution and Routing**

After completing the online *Incident Report*, automated notifications and a copy of the form will be distributed to HRS, EH&S and the reporting supervisor via electronic mail. The Associate Director reviews the incident report. It is the responsibility of the supervisor to distribute a copy of the Incident Report and any submitted attachments to the affected party.

1. The Director reviews the report and evaluates the severity/potential severity of incident. If a need for additional timely attention is indicated, the Director will contact the supervisor to determine what corrective action has taken place or is needed.
2. If additional timely attention is not indicated, the reports will be held for review at the next Safety Committee meeting. This Committee meets semi-annually to review Departmental operations including incident reports, verify completion of appropriate paperwork, determine contributing causes, review recommended corrective actions, and ensure completion of the corrective action.
3. The Safety Committee may agree with the investigation and corrective action taken or may suggest alternatives.

#### **5.7 Motor Vehicle Accidents**

For an accident involving a motor vehicle, regardless of how minor, the driver must immediately notify her or his supervisor, Risk Management, and the Motor Pool (if a Motor Pool vehicle was involved). See SPPM 7.20 for additional information

1. For an accident involving a motor vehicle with injuries, the driver must also immediately notify the local area law enforcement department. Law enforcement personnel should investigate all accidents resulting in:

- a. Damage costing over \$700 to motor vehicles,
  - b. Damage to other property, and/or
  - c. Injuries to individuals.
2. The driver must submit a completed *State of Washington Vehicle Accident Report* (SF-137) to their supervisor within 24 hours. The supervisor is responsible for reviewing this document and submitting the original to Risk Management and a copy to the Motor Pool (if Motor Pool vehicle involved) within two working days of the accident.
  3. Supervisors are responsible for ensuring the most current version of the *Vehicle Accident Report* (SF-137) and post motor vehicle accident instructions are available in the glove compartment of all motor vehicles prior to use.

## **6 ERGONOMICS**

### **6.1 References**

1. SPPM 2.74 *Ergonomics*
2. SPPM 2.24 *Accident Reporting and Follow-Up*
3. SPPM 2.26 *Investigating Accidents*

### **6.2 Purpose and Scope**

Sprains and strains are among WSU's most common workplace injuries. This chapter supports the systematic reduction and elimination of workplace ergonomic hazards through early identification and mitigation. Hazard mitigation includes the following:

- Establishing clear responsibilities for identifying, evaluating and eliminating ergonomic hazards;
- Training employees to recognize ergonomic hazards and apply ergonomic principles;
- Encouraging preventative strategies; and,
- Instituting procedures sustaining the systematic identification, reduction and elimination of workplace ergonomic hazards.

### **6.3 Responsibilities**

#### **6.3.1 Directors**

Directors are responsible for incorporating ergonomic equipment fees/expenses, such as ergonomic chairs, materials handling equipment and computer desks into departmental budgets and funding requests.

#### **6.3.2 Supervisors**

- Identifying ergonomic concerns;
- Evaluating ergonomic concerns identified by employees;
- Providing or arranging for ergonomic training; and,
- Making recommendations to reduce the potential for musculoskeletal injury.

To assist with identifying potential ergonomic hazards, supervisors and employees are encouraged to request an ergonomic evaluation from the EH&S *Occupational Health and Safety unit* in writing.

#### **6.3.3 Employees**

- Attending and participating in ergonomics training;
- Applying good ergonomic practices;
- Using proper lifting techniques and equipment; and,
- Reporting ergonomic concerns to their supervisor.

Employees are also responsible for their own personal health and conditioning. Every employee should take steps to reduce their chances of back injury by addressing the following risk factors: stress, fitness, and posture. Physical conditioning influences lifting ability. Using proper strength

and stretching exercises may help reduce the potential for musculoskeletal injury.

#### **6.4 Training**

All employees shall receive information ergonomics related training and learn to apply ergonomic principles at the time of their initial safety orientation. Ergonomic principles incorporated into employee training include, but are not limited to:

- Neutral vs Awkward Postures
- Proper Lifting and the Power Zone
- Allowing Time for Movement and Stretching
- Reducing Excessive Force
- Reducing Excessive Motions
- Minimizing Contact Stress
- Reducing Excessive Vibration
- Eliminating Trip/Slip Hazards

Any training involving new equipment or new processes will include an ergonomics discussion when appropriate. Supervisors must document all training with the EHS RMS training coordinator. Re-training will be required and documented when employees are observed using poor lifting techniques or not following ergonomic recommendations while using equipment or performing tasks.

#### **6.5 Procedures**

Work area ergonomics will be evaluated at least annually during safety inspections. Work areas should be designed and organized to mitigate potential ergonomic hazards and reduce possible injury. Decisions affecting new equipment purchases and new work procedures will incorporate ergonomic considerations.

Employees will stop work at the first sign of pain or discomfort that may be related to an ergonomic issue (e.g. back injury or repetitive motion strain), notify their supervisor and seek medical attention if necessary. Supervisors will complete an *Incident Report* see [SPPM 2.24](#) and a *Supervisor Investigation Report* (see SPPM 2.26.5). The supervisor is encouraged to request an ergonomic evaluation from the EH&S *Occupational Health and Safety unit*. The safety committee will evaluate and/or investigate all reported ergonomic incidents.

When workplace or procedural improvements are identified by an EHS ergonomics specialists to mitigate ergonomic hazards, the affected employee(s) and supervisor shall respond to the recommendations in a timely manner and in writing with a strategy to mitigate the identified hazards. Recommended actions may include modifying equipment and procedures or obtaining new equipment. Personal protective equipment should only be considered after engineering and administrative controls have been evaluated and determined infeasible.

Current research indicates that back belts should not be used as personal protective equipment (PPE) to prevent back injuries. Back belts have not been proven to be effective in preventing back injuries and are not considered to be personal protective equipment. Therefore, EH&S does not provide, nor encourage the use of, back belts.

Any changes to the work function that require Reasonable Accommodations for medical conditions should be coordinated through *WSU Human Resource Services*.

## 7 FALL PROTECTION

### 7.1 References

1. SPPM, 3.34, *Elevated Work Safety*
2. SPPM, 3.34, *Fall Protection Plan Form*
3. WAC 296-800-260, *Floor Holes and Openings and Open-Sided Floors*
4. WAC, 296-24-88050 Appendix C, *Fall Protection Requirements for General Industry*
5. LNI Website
6. WSU BPPM 90.01, *Records Retention*

### 7.2 Scope

This chapter establishes fall protection requirements for Nuclear Science Center employees referencing the following: WAC, 296-24-88050 Appendix C, Fall Protection Requirements for General Industry and WAC 296-800-260: Floor Holes and Openings and Open-sided Floors.

Work areas with fall hazards may only be worked on by Authorized Persons as designated by Competent Persons in writing. Competent persons are designated in writing by the Assistant Director, Reactor Operations.

### 7.3 Responsibilities

Employees assigned to a job with a fall protection plan have the authority to take immediate corrective action to eliminate employee exposure to fall hazards.

#### 7.3.1 Supervisors

- Inspect and evaluate all work sites for potential fall hazards, including hazards from falling objects. Fall hazards are documented and communicated referencing this chapter's requirements.
- Inspect, or designate an appropriate individual to inspect fall protection anchors for damage and deterioration prior to each use. Fall protection anchor devices or points are inspected referencing the inspection process noted in this chapter's inspection section. Non-compliant anchor devices or points are identified and tagged out of service.
- Ensure all work sites with fall hazards are guarded with applicable fall protection and falling object protection.
- Ensure fall protection plans are prepared when required by a Competent Person with an understanding of regulatory fall protection requirements and fall protection systems.
- Communicate personal protective equipment (PPE) requirements to employees referencing this APP's PPE Chapter.
- Ensure the fall protection plan is communicated to all employees assigned to a job and enforced during work.
- Discipline personnel not adhering to the fall protection plan.
- Ensure the fall protection plan is posted on the job site until the job is completed. Since the NSC manages one building and two labs in Fulmer Hall, the job site is considered

to be the Dodgen Research Facility and Rooms 151, 151A, and B3 in Fulmer Hall. Fall protection plans will be kept in the Laboratory Safety Binder in room 201A of the Dodgen Research Facility.

- Arrange for employee fall protection training.

### **7.3.2 Employees**

- Inspect and assess all work sites for potential fall hazards, including hazards from falling objects. Review workplace-specific fall hazard assessments and when authorized, document and communicate hazards referencing this chapter's requirements.
- Inspect all fall protection anchors prior to use for deterioration and damage.
- Use an anchor point only after it has been confirmed not to be damaged, and labeled, or approved for use as an anchor point by an authorized person.
- When authorized, prepare fall protection plans, communicate plans to employees assigned to a job and post plans on the job site.
- Acknowledge reading and understanding the fall protection plan for specific jobs.
- Use personal protective equipment (PPE) in accordance with this APP's PPE chapter.
- Follow the fall protection plan and use the required fall protection equipment and/or system when working in the fall hazard area.
- Participate in fall protection training.

## **7.4 Training**

Employees identified as exposed, or potentially exposed to fall hazards receive training. Fall protection training will include the following:

- When fall protection is required;
- Basic fall protection, once at the time of hire;
- Advanced fall protection, when required to prepare fall protection plans;
- Job-specific fall-protection instructions, when assigned to a workplace with a related fall protection plan, and;
- Re-training will be required when:
  - There have been changes in the workplace, such as new processes and equipment, which render previous training obsolete;
  - Changes in the types of equipment that render the previous training obsolete;
  - When an employee exhibits inadequate knowledge, skill and understanding or non-conforming use of the equipment; and/or
  - When regulatory requirements (DOSH) change.

## **7.5 General Requirements**

All elevated workplaces of 4 feet or more, except loading docks, will be inspected and assessed for fall hazards and guarded with fall protection and inspected for hazards from falling objects. All workplaces having a fall hazard of 4 feet or more will have a written, site-specific, fall protection plan

prepared, communicated to assigned employees and posted at the job site before employees begin work.

The Dodgen Research Facility and the NUCS Core Facility has several fall hazards requiring the employees of the NSC to perform work on the reactor, facility, and associated systems while in a fall hazard area. The following sections outline requirements prior to and during work in these areas. Area specific fall protection plans and documentation are covered in the *Laboratory Safety Binder* located in 201A of the Dodgen Research Facility.

## **7.6 Fall Protection Work Plan**

The job-specific fall protection plan shall be documented using the standard WSU Fall Protection Work Plan, form 3.36 on the NSC N:/ drive. Fall protection plan documents are stored in the Laboratory Safety Binder in 201A. These plans may be modified for similar future work at the same location. The fall protection plan document shall be retained at the facility. Fall protection plans shall be reviewed and approved by a Competent Person.

## **7.7 Fall Protection Anchor Point Inspection**

The means, methods, and materials used to install fall protection anchor points or devices that will be used by employees shall be inspected and approved for use by a Competent Person (fall protection) or by a Washington State licensed structural engineer or architect for conformance to the WAC requirements and to manufacturer's installation instructions.

WSU Facilities maintains all anchor points. Prior to use each use an authorized person shall inspect the anchor points and immediately report any issues to an NSC Competent Person.

## **7.8 Fall Hazard Locations at the Dodgen Research Facility**

There are several primary fall hazards exist at the facility requiring NSC staff to safely protect themselves during the course of their job. The fall hazards are briefly described in the subsections below. If any new hazards are assessed and do not have fall protection plans, those locations will be immediately reported to an NSC competent person.

### **7.8.1 Facility Roof**

The Dodgen Research Facility roof is accessed on at least a quarterly basis by NSC personnel to change out environmental dosimeters. Anchor points have been installed by WSU Facilities Services for use with lanyards and harnesses are required while changing dosimetry and to service exterior cameras. A fall protection plan and rescue plan will be reviewed by the Competent Person and Authorized Person prior to each work on a fall hazard.

### **7.8.2 Reactor Pool Room 201 Mezzanine**

The reactor pool room 201 has a mezzanine positioned over the control room. The mezzanine serves as an equipment storage area and a photography location. The mezzanine is accessed by a working platform with stairs and is utilized by NSC staff, students, and WSU employees on at least a daily basis. WSU EHS approved fall prevention guardrails and self-closing gates that meet OSHA and WAC standards are installed. The stair ladder leading up to the mezzanine is a working platform.

### **7.8.3 Reactor Pool Room 201 Crane Suspension**

Use of the overhead crane for annual in pool inspections requires the suspension of one NSC employee in a purpose-constructed basket. The basket is suspended with weight rated and tagged rigging to the crane that is inspected prior to use.

#### **7.8.4 Reactor Pool Room 201 Bridge**

The reactor bridge in room 201 does not present a hazard unless the gate ladder door is open. For situations where this is the case, refer to the fall protection plan located in the laboratory safety binder in 201A.

#### **7.8.5 Facility West End Trap Doors**

These doors are rarely used. Prior to using the facility west end trap doors, a hazard assessment and fall protection plan shall be developed.

#### **7.8.6 Interior / Exterior East Gantry Crane**

The crane located in the east wing of the facility has trap doors travelling three floors. Opening of the doors for the interior/exterior facility east crane and moving the crane between floors both present fall hazards. Full body harnesses, anchor points, and lanyards are utilized for fall protection. Refer to the fall protection plan located in the laboratory safety binder in 201A.

#### **7.8.7 General Ladder Use**

The facility employs use of ladders throughout for maintenance and troubleshooting activities. Refer to chapter 20 on ladder safety in this THSP for instructions and training requirements.

### **7.9 Fall Hazard Locations at the NUCS Core Facility**

There are several primary fall hazards exist at the facility requiring NSC staff to safely protect themselves during the course of their job. The fall hazards are briefly described in the subsections below. If any new hazards are assessed and do not have fall protection plans, those locations will be immediately reported to an NSC competent person.

#### **7.9.1 General Ladder Use**

The facility employs use of ladders throughout for maintenance and troubleshooting activities. Refer to the chapter on ladder safety (Chapter 20) in this THSP for instructions and training requirements.

## 8 CONFINED SPACES

### 8.1 References

1. Safety Standards for Confined Spaces, WAC 296-809
2. *Exit Routes*, WAC 296-800-310
3. *Workplace Structural Integrity*, WAC 296-800-27020
4. SPPM 3.32.3: *Confined Spaces*

### 8.2 Overview

Departments and employees are to follow the procedures in the University's Permit-Required Confined Space Program, which are designed to protect employees required to enter hazardous confined spaces.

### 8.3 Classification

#### 8.3.1 *Non-Permit Required Confined Spaces*

A confined space does not require a permit for entry if all physical and atmospheric hazards can be eliminated and not just controlled. Those spaces can be accessed as many times as needed but still call for caution.

A non-permit required confined spaces is a space that meets all of the following criteria:

- Is large enough and arranged so that an employee can fully enter the space.
- Has limited or restricted entry or exit.
- Is not primarily designed for human occupancy.

Non-permit required confined spaces at the Nuclear Science Center include the purification pit (Dodgen Research Facility, Room 101A) and the ion exchange pit (Dodgen Research Facility, Room 106) accessed from the reactor pool room (Dodgen Research Facility, Room 201). Spaces that do not require a permit must be evaluated when changes occur in their use of configuration and be reclassified as appropriate.

#### 8.3.2 *Permit Required Confined Spaces*

A confined space requires a permit for entry if all hazards cannot be eliminated but can be just controlled. Those spaces require a special entry permit and training is required to be entered.

A permit-required confined space is a space that meets all the requirements of a confined space plus one or more of the following characteristics capable of causing death or serious physical harm:

- Contains or has the potential to contain a hazardous atmosphere (i.e., air contaminants, low oxygen levels, explosive atmospheres).
- Contains a material with a potential for engulfing someone who enters the space.
- Has an internal configuration that could allow someone entering to be trapped or asphyxiated by inwardly converging walls.
- Contains a physical hazard (i.e., electrical shock or moving parts).

- Contains any other recognized safety or health hazard that could either impair the ability to self-rescue or result in a situation that presents an immediate danger to life or health.

Note: A confined space can become a permit-required confined space if atmospheric and/or physical hazards are created by work activities within the space, such as chemical cleaning, painting, sealing, torch cutting, welding and other similar activities.

## **8.4 Responsibilities**

### **8.4.1 Environmental Health & Safety**

- Managing the written permit-required confined space entry program.
- Evaluating confined spaces to identify inherent and potential hazards;
- Identifying and labeling permit-required confined spaces.
- Coordinating with units in developing confined space entry procedures.
- Conducting atmospheric monitoring.
- Providing supervisor and employee training.

### **8.4.2 Supervisors**

- Notifying EH&S of confined spaces and potentially permit-required confined spaces that employees might enter.
- Ensuring that employees are trained prior to entering permit-required confined spaces.
- Ensuring that employees follow established permit-required entry procedures.
- Not entering, and not allowing employees to enter, a confined space to rescue incapacitated employees

### **8.4.3 Employees**

- Understanding the contents of this THSP chapter;
- Following permit-required confined space training.
- Following permit-required confined space entry procedures.
- Not entering a confined space to rescue incapacitated employees

## **8.5 Training**

Training topics required for employees involved in permit-required confined space activities provided by EH&S may include:

- Roles and responsibilities
- Hazards of the permit space
- Procedures from your program created to protect employees, such as methods used to isolate and control hazards, equipment use, equipment maintenance and evacuation;
- For individuals not authorized to perform rescue, the dangers of attempting unauthorized rescue.

## **8.6 Emergency Rescue**

Only specially trained and authorized personnel are allowed to participate in emergency rescue operations. Call 911 to report confined space emergencies. The emergency dispatcher contacts trained emergency responders to perform rescue operations. In the event of an emergency, you may be asked to assist in a supporting role such as helping guide emergency personnel to the confined space location, but you cannot participate in any hands-on rescue activities.

## 9 GENERAL MATERIALS HANDLING & STORAGE

### 9.1 References

1. *Housekeeping, Drainage & Storage*, WAC 296-800-22035
2. *Exit Routes*, WAC 296-800-310
3. *Workplace Structural Integrity*, WAC 296-800-27020
4. *Materials handling and storage – Handling materials*, WAC 296-24-215215
5. *Construction Material Handling, Storage, Use, and Disposal* WAC 296-155-325 and WAC 296-155-335.
6. *Ergonomics*, SPPM 2.74
7. *Safety Precautions for Office Workers* SPPM 2.78
8. SPPM Chapter 8: *Flammable/Combustible Liquid Storage*
9. SPPM Chapter 5: *Chemical Waste*
10. THSP Chapter 7: *Fall Protection*
11. THSP Chapter 6: *Ergonomics*

### 9.2 Purpose

This THSP chapter supports safe material handling and storage practices, intended to reduce or eliminate material handling and storage related accidents and injuries, and maintain clear routes for emergency access and egress.

### 9.3 Scope

This chapter applies to all employees engaged in material handling and storage activities. Materials storage safety applies to the reduction or elimination of physical hazards (e.g. tripping, falling, struck by object) and chemical hazards (e.g. flammability, corrosivity, reactivity and toxicity). This APP's ERGONOMICS chapter establishes requirements for reducing or eliminating ergonomic hazards associated with material handling.

### 9.4 Responsibilities

#### 9.4.1 Supervisors

- Understanding the contents of this THSP chapter;
  - Designating appropriate storage areas for materials under their control;
  - Designating and providing appropriate storage containers when applicable;
  - Identifying appropriate Personal Protective Equipment (PPE).
  - Providing necessary material handling equipment to support safe material handling practices e.g. carts, dollies, drum dollies, pallet jacks;
  - Training employees on the appropriate material storage locations and practices;
- Training employees on appropriate material handling practices.

#### 9.4.2 Employees

- Understanding the contents of this THSP chapter;
- Storing materials in designated areas;
- Storing materials in designated containers when applicable;
- Wearing PPE;
- Using material handling equipment safely e.g. carts, dollies, drum dollies, pallet jacks;
- Participating in material storage training;
- Participating in material handling training.

## 9.5 Training

Training will be provided to employees once at the time of hire when related to the employee job classification. Retraining will be required when:

- There have been changes in the workplace, such as new processes or material handling equipment;
- Changes in the types of materials handled and/or stored;
- When an employee exhibits inadequate knowledge, skill and understanding or non-conforming practices in the safe handling and storage of materials.
- Training will require participants to demonstrate an understanding of the topic and a proficiency handling and storing materials. Training information will include:
  - Storing materials so they do not pose a tripping or other hazard and do not interfere with walkways or emergency egress. Emergency exit routes must be at least 7 feet 6 inches high and no projections may reduce the height from the floor to less than 6 feet 8 inches. Exit routes must be 28 inches wide minimum (or wider to accommodate occupant load).
  - Storing materials so they may be accessed safely for retrieval (e.g. store heavy materials lower and lighter materials higher).
  - Storage capacity of shelving, cabinets, mezzanines, etc.
  - Rated capacity of material handling equipment (e.g. pallet jacks or powered lifts).
  - Designated storage locations (e.g. flammable materials storage, gas cylinder storage).
  - Compatible/incompatible materials storage (e.g. do not store oxidizers or reactives with flammables).

## 9.6 Requirements for General Materials Storage for WSU

For WSU employees moving or handling any materials for storage, please follow guidelines outlined in SPPM 2.74 - *Ergonomics* and this THSP's ERGONOMICS chapter (Chapter 6).

- Before moving materials, evaluate the pathway through which the materials will be moved and confirm the path is free from obstruction. Consider the need for assistance or use of equipment if the terrain is uneven.
- Wear appropriate PPE. If you are unsure what PPE might be appropriate, contact your supervisor.

- When manually moving materials, seek help when a load cannot be handled safely.
- When placing blocks under raised loads, ensure the load is not released until hands and feet are clear. Blocking materials must be large and strong enough to support the load safely. Damaged materials will not be used for blocking.
- Stored materials must not create a hazard. Storage areas must be kept free from accumulated materials that may cause tripping, fires, explosions, or contribute to harboring pests. When stacking and piling materials, be aware of such factors as the materials' height and weight, how accessible the stored materials are to the user, and the condition of containers/container's compatibility with the stored materials.
- All bound material should be secured to prevent it from sliding, falling, or collapsing.
- Drums, barrels, and kegs must be stacked symmetrically. If stored on their sides, the bottom tiers must be blocked to prevent rolling. When stacked on end, put planks, sheets of plywood, or pallets between each tier to make a firm, flat, stacking surface. When stacking materials two or more tiers high, the bottom tier must be blocked on each side to prevent shifting in either direction.
- Maximum safe load limits of floors within buildings and structures, in pounds per square foot, shall be shall not be exceeded.
- Gas cylinders shall be capped while moved, gas cylinder carts must be equipped to provide cylinder restraint while in transit. Gas cylinders must be capped while not in use. Oxidizing gas cylinders may not be stored within 20 feet of flammable gas cylinders unless both cylinders are in use. Toxic gas storage requires monitoring equipment or ventilated gas cylinder storage cabinets. Do not exceed fire code allowable quantities. See also this APP's COMPRESSED GAS CYLINDERS chapter (Chapter 17). For additional information contact the EHS OHS Assistant Director.
- Chemicals shall be segregated by hazard class when stored or transported. Do not store chemicals alphabetically without first segregating chemicals by hazard class. Flammables shall not be stored with oxidizers or reactives. Do not exceed fire code allowable quantities. For additional information reference the chemical's/product's Safety Data Sheet and/or contact the EHS OHS Assistant Director. See also this plan's HAZARD COMMUNICATION PROGRAM chapter (Chapter 12).

## **10 LABORATORY RULES**

### **10.1 The Two Person Rule**

Many people pass through the laboratory building frequently throughout the business day. Therefore, a single person may perform laboratory work alone during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, excluding holidays, unless the laboratory worker is engaged in a hazardous task. Hazardous tasks of any kind may not be carried by a lone laboratory worker. Laboratory workers must consult with the laboratory manager if there is any uncertainty about whether a particular task is hazardous in order to determine appropriate mitigating actions.

Some types of non-laboratory work may be performed at any time by a lone worker in the laboratory building. Such non-laboratory work includes data processing on a computer, writing reports, reading and reviewing documents, and other types of non-laboratory work that are typically carried out in an office environment.

### **10.2 Eating and Drinking in the Laboratory**

Eating, drinking, or storing food are strictly prohibited in the laboratory rooms. WSU is a tobacco-free campus.

### **10.3 Distractions**

Every person in the facility shall ensure they are able to hear alarms and announcement on the public address system. This applies to music in labs and personal music players with earbuds.

### **10.4 Laboratory Attire**

When working with radioactive material gloves shall be worn at all times. When gloves are put on, they shall be considered contaminated and should be disposed of in a radioactive trash box located in the lab where the work is being performed or surveyed and disposed of as appropriate. Gloves shall NOT be worn outside of labs unless transporting radioactive material and the "One Glove Rule" shall be followed or a second individual without gloves shall help open doors and navigate around other obstacles.

The wearing of laboratory coats is recommended. Laboratory coats will be made available to every laboratory worker.

### **10.5 Fiberglass Molded Lab Tray System**

The NSC employs a tray system when working with RAM. Laboratory workers must use a fiberglass molded designated lab tray lined with absorbent lab paper whenever working with RAM. The use of RAM will be signified by the placement of a RAM sticker as seen in Figure 10-1. A label identifying the individual working with the RAM, task being completed, start and end date is also required to be present on the lab paper as seen in Figure 10-2.

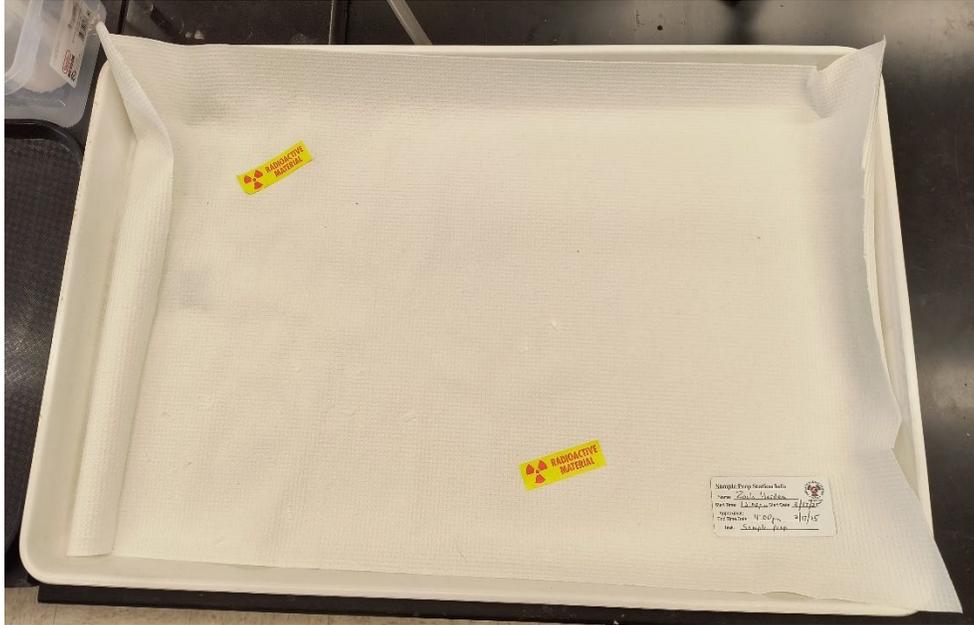


Figure 10-1. Lab tray system for use of radioactive materials.

A photograph of a white, rectangular sample label. The label is titled 'Sample Prep Station Info' and features the logo of the Nuclear Science Center at WSU. The label contains handwritten information: Name: Zach Heiden, Start Time: 12:00pm, Start Date: 2/17/25, Approximate End Time/Date: 4:00pm 2/17/25, and Task: Sample Prep.

Figure 10-2. Sample label for working with laboratory trays.

The tray system is meant to minimize the spread of contamination when working with RAM. The replacement of absorbent lab paper between uses assists with tidiness and containment of material. When work is completed, tools, glassware, PPE, lab paper and lab tray shall be scanned out and disposed of properly and returned to their appropriate place.

### 10.6 Housekeeping

- Good housekeeping is a key to performing operations safely: Keep laboratory areas clean and uncluttered.
- Close containers, except when in use.
- Avoid excess material scattered on floor, benches, desks, or tables.
- Replace unused chemicals or equipment in proper cabinets or locations.

- Route wires, cables, hoses, straps, etc, to minimize tripping hazards.
- Bundle cables to phone, computers, instruments, and other electrical equipment.

## **10.7 Performing Laboratory Work with Chemicals**

### **10.7.1 Selecting and Procuring Chemicals**

The chemicals shall be selected and procured in accordance with the NSC Chemical Hygiene Plan, and personnel shall:

- Attempt to substitute hazardous chemicals with less hazardous ones when possible.
- Minimize quantities to fit anticipated usage.
- Design procedures to use minimum quantities of hazardous materials.
- When in doubt, consult the laboratory manager before purchasing hazardous materials.
- Orders shall be performed by a laboratory manager or NSC budget authority.

### **10.7.2 Receiving and Accepting Shipments of Chemicals and Laboratory Supplies**

- The shipment of chemicals and laboratory supplies will be received at the front desk of the NSC, in room 50.
- Packages containing chemicals and laboratory supplies shall be opened in the NSC laboratory facilities in the labs for which they are to be used.
- Upon opening packages, the receipt inspector shall inspect the shipment against the packing list, inspect the shipment for any damage or malfunctioning. If damage is observed, document damage and contact sales representative.
- The receipt inspector shall give packing lists to the NSC administrator, who will keep them on file.

### **10.7.3 Selecting and Procuring Radioactive Materials**

Procuring radioactive materials for use at the NSC labs is to be done in consultation with the WSU Radiation Safety Officer, NSC laboratory manager, and the authorized user.

Any procurement involving off site shipment of radioactive materials to an onsite lab at the Dodgen Building, transfer of RAM between labs within the facility, or transfer of radioactive material produced by the reactor to any non-reactor laboratory space will be performed after notification and approval of the transfer to the University RSO.

### **10.7.4 Receiving and Accepting Shipments Radioactive Materials**

Receiving and acceptance of RAM shall be done in accordance with the SPPM.

### **10.7.5 General Laboratory Practices on the Use of Radioactive Material Laboratories**

- Bring a GM detector into all RAM labs, regardless if you are working with radioactive materials.
- Use a GM detector or equivalent to frisk out of RAM labs, regardless if you are working with radioactive materials.
- Follow all general practices on the use of chemicals located in the LSM.

- Store used stock RAM in locked cabinets in labs or locked labs if the lab is sole use.
- The NSC employs a tray system when working with RAM. Use a RAM designated tray whenever possible when working with these materials.
- Transfer of RAM from lab to lab within the Dodgen Research Facility or the NUCS Core Facility occurring through unrestricted areas must be double contained. Use vial holders, trays, and pails whenever possible. Minimize the chance occurrence of spill or tipping at all times through mechanical isolation.
- No gloves are to be worn in unrestricted areas, unless in an emergency. Maintain clean laboratory techniques in all RAM authorized labs.

#### **10.7.6 Labeling Radioactive Materials**

- RAM work areas must be designated with a RAM sticker that has the tri-foil symbol present.
- RAM must be labeled for each container that it is radioactive with a sticker containing the tri-foil symbol.

#### **10.7.7 Storing Radioactive Materials**

Storage of RAM shall be done in accordance with the SPPM.

# 11 HAZARD NOTIFICATION

## 11.1 References

1. SPPM: 2.10, *General Workplace Safety - Accident Prevention Responsibility*
2. SPPM: 2.52 *General Workplace Safety – Hazard Notification*
3. SPPM: *Hazard Notification Form*
4. WSU BPPM 90.01, *Records Retention Schedule*

## 11.2 Purpose and Scope

This chapter establishes responsibilities and procedures for reporting workplace safety hazards identified by Nuclear Science Center personnel. Procedures for reporting safety hazards that may impact students or campus visitors are also included.

WA State Department of Labor and Industries web site provides hazard alerts at <http://www.lni.wa.gov/safety/hazardalerts/> that highlight emerging or newly recognized safety or health hazards in the workplace that can cause death or serious injury or illness.

## 11.3 Responsibilities

Personnel observing serious safety concerns affecting or potentially affecting University employees, students, or the public are to immediately contact their supervisor.

Hazards that can be addressed immediately and the corrective action is within the employee's ability, job description, and training shall be resolved and reported by the employee. Hazards that cannot be immediately addressed shall be appropriately isolated and/or demarcated to prevent employees, students, or the public contacting the hazard.

Personnel are to report all safety hazards to their supervisor and safety committee, using the [Hazard Notification form](#). For hazards requiring resolution by Facilities as a maintenance request, the building coordinator or their designee (e.g. via assignment or backup while away from work or working out of office) completes a myFacilities request for maintenance and communicates the appropriate urgency.

The unit responsible to address the safety hazard completes "Corrective Action" portion of the Hazard Notification form.

## 11.4 Reporting Process

Employees observing serious safety concerns affecting or potentially affecting the safety of themselves or WSU personnel in their workplace are to:

- Immediately inform the work-unit supervisor and/or manager/director;
- Should the hazard result in an accidental injury, work related illness OR a significant near miss submit an incident report per the *Safety Policies and Procedures Manual* 25.20;
- Upon review by the supervisor and a determination that corrective action cannot be implemented by the supervisor's work unit, the workplace hazard shall be documented using the [Hazard Notification form](#).
- The supervisor will notify the Safety Committee of the hazard for evaluation. The supervisor should report the concern to the Associate Director.

## **12 HAZARD COMMUNICATION PROGRAM**

### **12.1 References**

1. WAC 296-901 *Hazard Communication*
2. WAC 296-800-180 *Material Safety Data Sheets*
3. *Safety Data Sheets*
4. SPPM 5.10 *Chemical Hazard Communication Program*
5. SPPM 5.66 *Recycling or Disposal of Chemical Wastes*
6. OSHA 1910.145 *Specifications for Accident Prevention Signs and Tags*

### **12.2 Appendices**

- Appendix A – Glossary
- Appendix B – Signal Word Decision Matrix
- Appendix C – Globally Harmonized System (GHS) Pictograms

### **12.3 Scope**

This chapter covers the requirements for chemical hazard communication where the NSC, as an employer, provides information to employees about the hazardous chemicals to which they are exposed. The chemical hazard communication includes labels and other forms of warning, safety data sheets (SDS), information and training.

### **12.4 Responsibilities**

#### **12.4.1 Directors**

- Serve or appoint a hazard communication manager
- Developing this written hazard communication program; and,
- Maintaining a list of workplace hazardous chemicals and SDS for Nuclear Science Center workplace hazardous chemicals in the front office and in the laboratory safety binder in each of the NSC labs.

#### **12.4.2 Supervisors**

- Obtaining and providing SDS to the Hazard Communication Manager;
- Ensuring workplace hazardous chemicals are labeled per this chapter's requirements;
- Understanding this chapter's requirements; and,
- Ensuring employees receive hazard communication training including the contents of this chapter.

#### **12.4.3 Employees**

- Informing their supervisor when workplace hazardous chemical labels are damaged or otherwise inadequate;
- Contacting their supervisor as needed for assistance interpreting SDS; and,
- Understanding this chapter and participating in hazard communication training.

## 12.5 General Policy

The Associate Director has overall responsibility for the *Hazard Communication Program*. A copy of this program and the safety data sheets (SDS) are readily available in the NSC *Laboratory Safety Manual* located in each laboratory and can be found on the NSC website for each laboratory (<https://nsc.wsu.edu/nsclabs/>).

## 12.6 Hazard Communication Standard Summary

The Hazard Communication Standard is based on a simple concept - employees have both the need and right to know the identities and hazards of the chemicals they are potentially exposed to when working. Employees also need to know what protective measures are required. This knowledge should reduce work-related injuries and illnesses caused by chemical exposure.

The Hazard Communication Standard establishes uniform requirements incorporating the *Globally Harmonized System of Classifying and Labeling Chemicals* (GHS) to assure that the hazards of all chemicals imported, produced or used in U.S. workplaces are evaluated. The hazard information and associated protective measures are to be transmitted to affected employers and potentially exposed employees.

Chemical manufacturers and importers must convey the hazard information they learn from the evaluations to employers by labels on containers and SDSs. All covered employers must have a hazard communication program to convey this information to their employees through container labeling, SDSs, information and training.

## 12.7 Hazard Communication Signage

Signs are classified according to use, when specifying hazard alerting signs the signal word that best fits the consequence should be chosen. Work place safety signs use a combination of symbols and text to communicate the nature of the hazard, the consequences of the hazard and how to avoid the hazard.

Tags shall be used as a means to prevent accidental injury or illness to employees and shall be posted until the hazard is eliminated. The tag shall display a signal word such as "Danger," "Caution," "Radiological Hazard," or the radiological hazard symbol. The major message shall indicate the specific hazardous condition or the instruction to be communicated to the employee. The decision matrix in Appendix B – Signal Word Decision Matrix shall be used to determine the appropriate signal word.

- Danger signs/tags warn of specific dangers and radiation hazards, the sign indicates immediate danger and that special precautions are necessary. The danger signal word should only be used in the most serious situations.
- Warning signs/tags indicate hazardous situations which if not avoided could result in serious injury or death. The warning signal word should be used for hazards between caution and danger in severity.
- Caution signs/tags warn against potential hazards or caution against unsafe practices, the sign indicates a possible hazard against which proper precautions should be taken. The caution signal word is used in situations that might cause an injury classified as minor to moderate.
- Non-Hazardous Alerting Safety message are used where there is a need for general instructions and suggestions relative to safety measures. Safety signal words are often hand-written messages that give more details about specific hazards.

## 12.8 Chemical Inventory List

The Laboratory Manager will maintain a list of the hazardous chemicals used by the Nuclear Science Center laboratory employees or known to be present in the department's buildings and update the list as necessary. The list will be updated immediately upon receipt of any newly acquired chemical(s). The identity of each chemical on the list must match the product identifiers (chemical name and CAS #) on the container label and on the SDS. The inventory tracking list must include the following information for each chemical: product identifier on the container label, manufacturer name and attached SDS file (or link to it). Optional items may include: unit name that is primary user of chemical and building name where chemical is located. The unit supervisor will determine the required tracking items beyond the mandatory items listed above.

The inventory tracking list will be maintained in each NSC lab. NSC operated laboratories use tracking via Quartz for real time chemical and inventory management.

## 12.9 Container Labeling

The Laboratory Manager is to ensure all primary and secondary containers of hazardous chemicals in their area are properly labeled. Labels on containers from the manufacturer or distributor are to list the following six items:

1. Product Identifier (Identity of the hazardous chemical(s) on a label or SDS);
2. Signal Word (Danger or Warning);
3. Hazard Statements;
4. Pictograms (see Appendix 2);
5. Precautionary statements; and
6. Name, address and telephone number of the chemical manufacturer, importer, or other responsible party.

CHEMICAL NAME	HAZARD KEY 4-SEVERE 3-SERIOUS 2-MODERATE 1-SLIGHT 0-MINIMAL
MSDS #	
<input type="checkbox"/> FIRE HAZARD	
<input type="checkbox"/> HEALTH HAZARD	
<input type="checkbox"/> INSTABILITY	
REMARKS:	
MANUFACTURER:	
PHONE:	

All secondary containers are to be labeled, tagged or marked upon transfer of the product to the secondary container by the person handling the product. Information on secondary labels must include, at minimum, the product identifier (chemical name and/or CAS #) and hazard information from the manufacturer's label and/or SDS. Additional information from the six items listed above may be used as necessary to enhance hazard communication. Information not on the label must be conveyed to the employee(s) through information and training.

If manufacturer provided labels are not available for the secondary containers, all units shall utilize a label which meets the requirements of the Hazard Communication Standard for secondary containers as described in the previous paragraph. Labels utilizing the *National Fire Protection Association* (NFPA) or *Hazardous Materials Identification System* (HMIS) hazard rating system may be used (example above and to the right). It shall be noted that this style of label by itself does not meet the requirements of the Hazard Communication Standard, therefore any additional information on the chemical substance must be conveyed to the employee through information and training.

For labeling assistance see the unit supervisor or refer to WAC 296-901-14012.

## 12.10 Safety Data Sheets (SDS)

An SDS (formerly referred to as MSDS and now structured differently for compliance with the *Globally Harmonized System of Classification and Labeling of Chemicals*, or GHS) is any printed or written document obtained or developed by the chemical manufacturer or importer for use by the end user of the product. The SDS must follow the specific content as described in WAC296-901-14014. The SDS must include all 16 Sections as outlined in the Hazard Communication Standard.

#### **12.10.1 Chemicals Encountered in Laboratories or Shops**

Routine activities (such as lab inspections or safety consultations) will require personnel to work among hazardous chemicals either in storage or in use. Lab personnel, specifically Principal Investigators (PIs) and Laboratory Managers, are responsible for obtaining SDSs for all chemicals in their respective labs.

#### **12.10.2 Obtaining SDSs**

SDSs may be obtained by contacting the manufacturer or supplier, searching the internet, visiting the *Environmental Health and Safety and Risk Management* website ([www.ehs.wsu.edu](http://www.ehs.wsu.edu)) or by following the procedures in the Safety Policies and Procedures Manual (SPPM 5.10).

#### **12.10.3 Communicating SDSs**

The Laboratory Manager is responsible for reviewing incoming SDSs for safety, health and employee protection information, and conveying any new information and training to affected employees. If there are questions or concerns, the Laboratory Manager shall be available for assistance.

#### **12.10.4 Documenting SDSs**

SDSs will be documented and be available to all employees during their work shift for review via online access to the EH&S server or the NSC website (<https://nsc.wsu.edu/nsclabs/>). For those employees without computer access, the lab manager will inform employees how they may obtain SDS information and provide it to them upon request. If requested by the employee, the lab manager is responsible for obtaining a printed copy. If SDSs are not available, immediately contact your lab manager. Refer to this Chapter's *Employee Exposure Records* section for additional information.

For more information on SDSs refer to WAC 296-901-14014.

### **12.11 Employee Information and Training**

All employees will receive training on the Hazard Communication Standard, including updated labels and SDSs affected by GHS, upon initial employment. The lab manager is responsible for organizing employee Hazard Communication training. Training will be conducted by a person knowledgeable and competent in the topic (the management is responsible for determining the competent person for providing this training in their unit).

Prior to starting work, employees using, or potentially exposed to, hazardous chemicals receive initial training on the Hazard Communication Standard and the safe use of those chemicals. Additional training shall be conducted when a new chemical hazard is introduced into the workplace and as needed. Training will be conducted before employees use or work in the vicinity of a hazardous chemical. Employee training is to be documented by recording the employee names, and the date and content of the training in the Laboratory Safety Manual. See THSP *Chapter 25 – SAFETY TRAINING* for instructions on documenting the training records.

The following training and information are provided to each employee covered by this program:

1. A summary of the Hazard Communication standard and the purpose, location and availability of the written program, the list of hazardous chemicals, and associated SDSs. A summary of the standard is at the beginning of this chapter.
2. Information identifying any operations in employee work area where hazardous chemicals are present.
3. Information and training on reading chemical labels and reviewing SDSs to obtain appropriate hazard information. The glossary at the end of this program lists some common SDS terms.
4. Information and training on the physical and health hazards and/or any other hazards of the chemicals in the work area, including the likely symptoms or effects of overexposure. The glossary at the end of this program lists some common physical and health hazard terms.
5. Training on the methods and observation techniques used to determine the presence of a hazardous chemical release. Detection methods may include monitoring devices, visual appearances or odor.
6. Training on the measures the department has implemented to minimize employee exposure to hazardous chemicals. These measures may include engineering controls, specific work practices employees must follow and the use of personal protective equipment to minimize chemical exposure.
7. Training on the emergency procedures to initiate in the event an employee is exposed to a hazardous chemical.
8. Training on the procedures required for cleaning up chemical spills.

If an employee has been exposed to a hazardous chemical refer to the *Chemical Exposure Incident Procedure* section of this program for instruction.

For more information on Employee Information and Training, refer to WAC 296-901-14016.

### **12.12 Entering Laboratories**

Personnel can potentially be exposed to hazardous chemicals when entering research or teaching laboratories while providing services.

Personnel are to review signs posted at the entrance of the laboratory for information about potential hazards and the appropriate protective measures. Some laboratories should not be entered without an escort from the respective laboratory or department (i.e. active laser laboratory). Supervisors and employees are encouraged to directly communicate with laboratory personnel for additional information about potential hazards and protective measures.

### **12.13 Chemical Spills**

Employees, not specifically trained in incident response/spill clean-up can clean-up chemical spills ONLY when all of the following conditions are met:

- The spill is located within the employees' normal work area.
- The chemical is known and the spill can be cleaned-up in 15 minutes or less.
- Employees are trained to safely clean-up small chemical spills.
- Employees can wear the same personal protective equipment that they wear during normal work activities in which the chemical is handled.

- Appropriate clean-up supplies are readily accessible.
- The chemical does not have a ceiling limit listed in WAC 296-841 and cannot create an Immediate Danger to Life and Health (IDLH) atmosphere. IDLH information can be found in the *NIOSH Pocket Guide to Chemical Hazards*.
- Clean-up materials are disposed of per SPPM 5.66.

If any of the above conditions cannot be met, then immediately call 911 and qualified emergency response personnel will respond to clean-up the spill.

Only specially trained personnel can clean-up spills in the Nuclear Science Center buildings where these conditions are not met or where the spill involves radioactive materials.

#### **12.14 Barricade Tape**

The use of temporary barrier or other types of visual safety items can be used to alert people of a temporary hazard. Access to certain areas can be managed by preventing pedestrian traffic from accidentally entering an unsafe zone. If a barrier is used to limit access due to high dose rates, the dose rate at the barrier shall be appropriately labeled. A contact person should be visible on the sign for facility users who would like to know more about the temporary barrier.

#### **12.15 Lockout/Tagout**

OSHA's *Control of Hazardous Energy* standard, 29 CFR 1910.147, commonly referred to as the "Lockout/Tagout" standard, requires the adoption and implementation of practices and procedures to shut down equipment, isolate it from its energy source(s), and prevent the release of potentially hazardous energy while maintenance and servicing activities are being performed. Workers performing service or maintenance on equipment that may be exposed to injuries from the unexpected energization, startup of the equipment, or release or stored energy in the equipment shall be adequately labeled to prevent injury.

#### **12.16 Personal Protective Equipment (PPE)**

Supervisors are to perform hazard assessments for each work task to evaluate whether hazards, including chemical hazards, are present, or are likely to be present, requiring the use of engineering controls, administrative controls, and/or PPE (see SPPM 3.10) and THSP Chapter 14 on PERSONAL PROTECTIVE EQUIPMENT.

Supervisors are responsible for evaluating chemical hazards, selecting suitable, properly fitting PPE and ensuring that staff are properly informed and trained on the use of selected PPE using information from the SDSs, container labels and other resources as necessary per SPPM 3.10 and the EH&S *Personal Protective Equipment SOP*. Employee PPE training shall be documented.

#### **12.17 Hazardous Non-Routine Tasks**

Periodically, employees may be required to perform non-routine tasks involving hazardous chemicals. Prior to starting work on any non-routine task, the supervisor or designee will conduct a PPE hazard assessment and provide affected employees with the following information and training:

1. The specific hazards related to the non-routine tasks
2. Protective measures required
3. Steps the department is taking to reduce chemical hazards

4. Emergency procedures
5. How to procure, use and maintain PPE as determined by the PPE hazard assessment

#### **12.18 Chemical Exposure Incident Procedure**

In the event an employee may have been overexposed (inhalation, ingestion, injection, or skin contact) either accidentally or possibly to a hazardous chemical, after the necessary medical care has been provided, the supervisor must complete an *Incident Report* form (see SPPM 2.24). The following information should be included on the form: the specific chemical(s), the duration of the exposure, the type of exposure (inhalation, ingestion, injection, or skin contact), and personal protective equipment used. *Environmental Health and Safety* retains this form for 30 years post-employment as an employee exposure record.

#### **12.19 Employee Exposure Records**

WAC 296-800-180 defines SDSs as employee exposure records, which must be preserved for at least 30 years post-employment. The SDSs for chemicals no longer used or chemicals which are used but no longer produced shall be retained and maintained for 30 years, including MSDSs for chemicals ceased being used or produced before the June 1, 2015 transition to the SDS format compliant with WAC 296-901. The unit supervisor is responsible for updating the last known date of use in the department's record in order to track this requirement.

## 12.20 Appendix A – Glossary

Carcinogen: a substance or agent which induces cancer or increases its incidence

Chemical: means any substance, or mixture of substances

Classification: means to identify the relevant data regarding the hazards of a chemical; review those data to ascertain the hazards associated with the chemical; and decide whether the chemical will be classified as hazardous according to the definition of hazardous chemical in this section. In addition, classification for health and physical hazards includes the determination of the degree of hazard, where appropriate, by comparing the data with the criteria for health and physical hazards.

Common name: means any designation or identification such as code name, code number, trade name, brand name or generic name used to identify a chemical other than by its chemical name.

Corrosive: A chemical that produces destruction of skin tissue, namely, visible necrosis through the epidermis and into the dermis

Flammable Liquid: A liquid having a flash point of not more than 93°C (199.4°F). Flammable liquids with a flash point >140°F and ≤199.4°F are identified as “combustible liquids” on the SDS and label.

Flashpoint: The minimum temperature at which a liquid gives off vapor in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

Hazard category: means the division of criteria within each hazard class, e.g., oral acute toxicity and flammable liquids include four hazard categories. These categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally.

Hazard class: means the nature of the physical or health hazards, e.g., flammable solid, carcinogen, oral acute toxicity.

Hazard statement: means a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical including, where appropriate, the degree of hazard.

Hazardous Chemical: Any chemical which is classified as a physical hazard or a health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Health Hazard: A chemical which is classified as posing one of the following hazardous effects: Acute toxicity (any route of exposure); skin corrosion or irritation; serious eye damage or eye irritation; respiratory or skin sensitization; germ cell mutagenicity; carcinogenicity; reproductive toxicity; specific target organ toxicity (single or repeated exposure); or aspiration hazard. The criteria for determining whether a chemical is classified as a health hazard are detailed in WAC 296-901-14022, *Appendix A-Health hazard criteria*.

Irritant: A chemical, which is not corrosive, that causes a reversible inflammatory effect on living tissue by a chemical action at the site of contact.

Label elements: means the specified pictogram, hazard statement, signal word and precautionary statement for each hazard class and category.

LEL, or LFL: Lower Explosive Limit, or Lower Flammable Limit, of a vapor or gas; the lowest concentration that will produce a flash of fire when an ignition source is present.

Oxidizer: A chemical that initiates or promotes combustion in other materials, causing fire either by itself or through the release of oxygen or other gases.

PEL: Permissible Exposure Limit. Amount of a substance that a person may be exposed over a period of time, usually expressed in fifteen minute and eight-hour limits. (OSHA and/or WAC specific)

Physical Hazard: A chemical that is classified as posing one of the following hazardous effects: Explosive; flammable (gases, aerosols, liquids, or solids); oxidizer (liquid, solid or gas); self-reactive; pyrophoric (liquid or solid); self-heating; organic peroxide; corrosive to metal; gas under pressure; or in contact with water emits flammable gas. WAC 296-901-14024, *Appendix B-Physical hazard criteria*

Pictogram: means a composition that may include a symbol plus other graphic elements, such as a border, background pattern, or color, that is intended to convey specific information about the hazards of a chemical. Eight pictograms are designated under this standard for application to a hazard category.

ppm: Parts per million is the concentration of a gas or vapor in air - parts (by volume) of the gas or vapor in a million parts of air.

Precautionary statement: means a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage or handling.

Pyrophoric: A chemical that will ignite spontaneously in air at a temperature of 130 degrees F or below within five minutes after coming in contact with air.

Sensitizer: A chemical that causes a substantial proportion of exposed people or animals to develop an allergic reaction in normal tissue after repeated exposure to the chemical.

Specific Gravity: A chemical that is weighed against the weight of an equal volume of water. If a material cannot be dissolved and floats on water it has a specific gravity less than one. If the number is greater than one it will sink.

STEL: Short Term Exposure Limit

TLV: Threshold Limit Value

TWA: Time Weighted Average

UEL, or UFL: Upper Explosive Limit, or Upper Flammable Limit of a vapor or gas; the highest concentration that will produce a flash fire when an ignition source is present.

Vapor Density: The weight of a vapor or gas compared to the weight of an equal volume of air. Materials lighter than air have vapor densities less than 1.0. Materials heavier than air have vapor densities greater than 1.0.

Water-Reactive: A chemical that will react to water to release a gas that is either flammable or presents a health hazard.

Work area: means a room or defined space in a workplace where hazardous chemicals are produced or used, and where employees are present.

## 12.21 Appendix B – Signal Word Decision Matrix

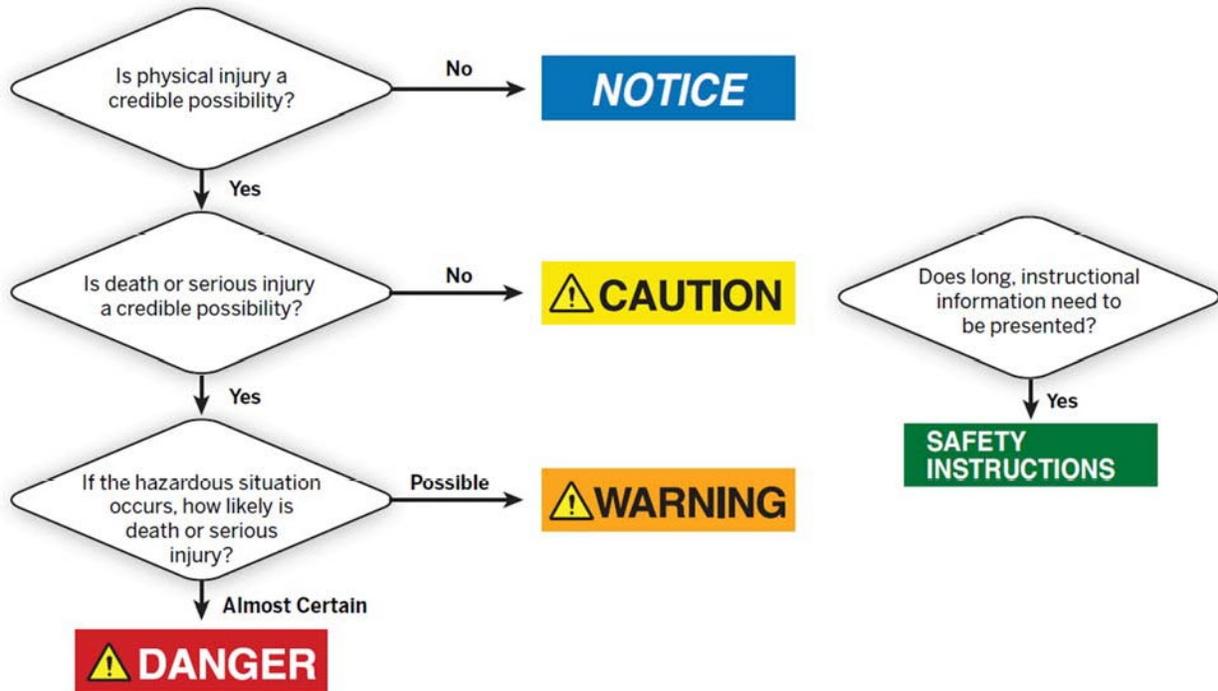


Figure 12-1. Flow chart of how to communicate the severity of an incident.

## HCS Pictograms and Hazards

<p style="text-align: center;"><b>Health Hazard</b></p>  <ul style="list-style-type: none"> <li>• Carcinogen</li> <li>• Mutagenicity</li> <li>• Reproductive Toxicity</li> <li>• Respiratory Sensitizer</li> <li>• Target Organ Toxicity</li> <li>• Aspiration Toxicity</li> </ul>	<p style="text-align: center;"><b>Flame</b></p>  <ul style="list-style-type: none"> <li>• Flammables</li> <li>• Pyrophorics</li> <li>• Self-Heating</li> <li>• Emits Flammable Gas</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>	<p style="text-align: center;"><b>Exclamation Mark</b></p>  <ul style="list-style-type: none"> <li>• Irritant (skin and eye)</li> <li>• Skin Sensitizer</li> <li>• Acute Toxicity (harmful)</li> <li>• Narcotic Effects</li> <li>• Respiratory Tract Irritant</li> <li>• Hazardous to Ozone Layer (Non-Mandatory)</li> </ul>
<p style="text-align: center;"><b>Gas Cylinder</b></p>  <ul style="list-style-type: none"> <li>• Gases Under Pressure</li> </ul>	<p style="text-align: center;"><b>Corrosion</b></p>  <ul style="list-style-type: none"> <li>• Skin Corrosion/ Burns</li> <li>• Eye Damage</li> <li>• Corrosive to Metals</li> </ul>	<p style="text-align: center;"><b>Exploding Bomb</b></p>  <ul style="list-style-type: none"> <li>• Explosives</li> <li>• Self-Reactives</li> <li>• Organic Peroxides</li> </ul>
<p style="text-align: center;"><b>Flame Over Circle</b></p>  <ul style="list-style-type: none"> <li>• Oxidizers</li> </ul>	<p style="text-align: center;"><b>Environment (Non-Mandatory)</b></p>  <ul style="list-style-type: none"> <li>• Aquatic Toxicity</li> </ul>	<p style="text-align: center;"><b>Skull and Crossbones</b></p>  <ul style="list-style-type: none"> <li>• Acute Toxicity (fatal or toxic)</li> </ul>

Figure 12-2. Explanations of common pictograms used to identify hazards.

## **13 LABORATORY SIGNAGE PROGRAM**

### **13.1 References**

1. 2011 ANSI Z535
2. OSHA 1910.145
3. SPPM 4.33 *Laboratory Signage*

### **13.2 Scope**

This chapter establishes appropriate and consistent lab signage throughout the NSC. The postings communicate information regarding potential hazards and how to avoid them, identify locations of emergency equipment, direct evacuation route in emergency situations and inform people of security and limited access policies. In the event of an emergency it is imperative to provide first responders with sufficient and well-organized details on the hazards they may encounter, as well as the required safety precautions for entry and contact information.

### **13.3 Responsibilities**

#### **13.3.1 Supervisors**

- Ensuring that this policy is implemented.
- Ensuring the safety of all employees, students, and visitors in their area of control.
- Providing appropriate resources and support for people who use laboratory spaces.
- Ensuring that signage is created and posted as appropriate at the laboratory space entrance(s) under their control.
- Reviewing and updating laboratory signage annually.
- Ensuring that signage is updated if materials or conditions, e.g., hazards, required PPE, or emergency contact information, change for the laboratory space(s).
- Providing appropriate PPE as indicated on laboratory signage to visitors, if PPE is a mandatory requirement to enter the laboratory.

#### **13.3.2 Employees**

- Understanding that signage is used as a communication tool when entering laboratory spaces.
- Receiving training from the applicable PI, laboratory supervisor, faculty member, or their designee to recognize and understand the information provided on laboratory signs.
- Effectively communicating potential hazards identified by the signage to visitors.
- Utilizing the hazard controls (e.g., PPE) designated on the signage when in the laboratory.

### **13.4 Design, Application and Use of Signs or Symbols**

OSHA 1910.145 details specifications applicable to the design, application, and use of signs or symbols used to indicate and define specific hazards that could damage property, harm workers

or the public, or both. Any signs procured for lab or facility use shall be to the standards set by ANSI Z535. All signs shall include the following design features:

- Location and environment where the sign is posted shall be considered when choosing the right materials for a new posting.
- Rounded or blunt corners free of sharp edges, burrs, splinter or other sharp projections.
- The heads of bolts or fastening devices shall be located in such a way that they do not constitute a hazard.
- The wording of any sign shall be easily read and concise. The sign should contain sufficient information to be easily understood.
- Signs shall be placed such that the viewer will have enough time to avoid the hazard. Their placement shall be unobstructed from view and readable from maximum viewing distance.
- Degraded or damaged safety signs put workers and employers at risk. To avoid inadequate warnings, signage shall be replaced once it deviated from its original condition. The building safety coordinator shall replace signs or delegate the replacement of signs as needed.
- All signs shall be designed according to their use;
  - Danger signs shall have a red background, any letter shall be white.
  - Warning signs shall have an orange background, any letter shall be black.
  - Caution signs shall have a yellow background, any letters shall be black.
  - Safety instruction signs may have any color combination of background and lettering as long as the intention of the posting is clear. Typically, the signs will have a blue or green background with white lettering to prevent confusion between more hazardous postings.

### **13.5 Hazard Communication**

Chapter 12 of the *Total Health and Safety Plan* covers the requirements for chemical hazard communication where the NSC, as an employer, provides information to employees about the hazardous chemicals to which they are exposed. The chemical hazard communication includes labels and other forms of warning, safety data sheets (SDS), information and training.

### **13.6 Required Postings – Exterior/Public Facing**

#### **13.6.1.1 Exceptions to Posting Requirements**

A licensee is not required to post caution signs in areas or rooms containing radioactive materials for periods of less than 8 hours as per 10 CFR 20.1903, if each of the following conditions is met:

- The materials are constantly attended by an individual who takes the precautions necessary to prevent the exposure of individuals to radiation or radioactive materials in excess of the limits established in this part; and the area or room is subject to the licensee's control.
- A room or area is not required to be posted with a caution sign because of the presence of a sealed source provided the radiation level at 30 centimeters from the surface of the source container or housing does not exceed 0.005 rem per hour.

### 13.6.2 Hazard Information at the Nuclear Science Center Laboratories

The lab entrance signage allows the (Principal Investigator and/or lab personnel) to display regulatory signage. Hazards and classifications are determined and posted by the building safety coordinator. The information on each sign must also include names and emergency phone numbers of the principal investigator, any other designated personnel (i.e. building safety coordinator), and the NSC emergency phone number so that first responders and/or other safety personnel have the critical contact information readily available to them in the event of an emergency. As hazards in a lab or contact information changes, NSC management will be informed so that signage stays up to date. As this is the defining characteristic for safe and informed entry into NSC laboratory spaces, no other signage is permitted on the door or surrounding wall space.



Figure 13-1. NSC hazard posting on laboratory doors.

Each laboratory has a unique QR code identifier for their laboratory on the back of the door that will link to the laboratory safety website where the room number will show the hazard information displayed on the door, contact numbers, and further information on the hazards present in the laboratory. SDS information is included on the website for each laboratory via this QR code.

Each hazard square in the hazard information sign is available for use according to the hazards present in the laboratory space. If more than nine hazards are present, a second sign will be placed and filled in as needed. At a minimum the radiation trefoil symbol (as applicable according to THSP and 10 CFR 20) and no food or drink signs will be utilized. All hazards will be reviewed and assigned by the laboratory safety coordinator and as required.

### **13.6.3 Additional Entrances**

Laboratories with more than one entrance shall bear the proper posting as per 10CFR20 described in section 10.6.1 such that no person could enter a laboratory without knowing the potential radiation area level or materials use status.

### **13.6.4 10 CFR 20 Required Postings**

All areas where radioactive material is used or stored shall post a conspicuous sign or signs bearing the radiation symbol and words as required by 10 CFR 20.1902;

- Standard Radiation Symbol: Unless otherwise authorized by the U.S. NRC, the radiation symbol is the three-bladed design and shall use the colors magenta, or purple, or black on yellow background. The radiation symbol instructs individuals to be cognizant of a potential radiation hazard. Laboratories that post the radiation symbol shall indicate that radioactive materials are stored or used in the laboratory. Individuals entering this room who are not trained to use radioactive material, must be supervised to prohibit unauthorized removal of radioactive material or contaminated items present in the room. Laboratories bearing this sign must be locked to secure radioactive material when no one is present in the laboratory.
- Radiation area is defined as an area, accessible to individuals, in which radiation levels could result in an individual receiving a dose equivalent in excess of 5 mrem in 1 hour at 30 centimeters from the radiation source or from any surface that the radiation penetrates. Radiation areas shall require the words; "CAUTION, RADIATION AREA"
- High radiation area is defined as an area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving a dose equivalent in excess of 100 mrem in 1 hour at 30 centimeters from the radiation source or 30 centimeters from any surface that the radiation penetrates. High radiation areas shall require the words; "CAUTION or DANGER, HIGH RADIATION AREA"
- Very high radiation area is defined as any area, accessible to individuals, in which radiation levels from radiation sources external to the body could result in an individual receiving an absorbed dose in excess of 500 rads in 1 hour at 1 meter from a radiation source or 1 meter from any surface that the radiation penetrates. Very high radiation areas shall require the words; "GRAVE DANGER, VERY HIGH RADIATION AREA"
- Airborne radioactivity area is defined as a room, enclosure, or area in which airborne radioactive materials, composed wholly or partly of licensed material, exist in concentrations in excess of the derived air concentrations (DACs) specified in appendix B, to §§ 20.1001-20.2401, or to such a degree that an individual present in the area without respiratory protective equipment could exceed, during the hours an individual is present in a week, an intake of 0.6 percent of the annual limit on intake (ALI) or 12 DAC-hours. Airborne radioactivity areas shall require the words; "CAUTION or DANGER, AIRBORNE RADIOACTIVITY AREA"
- If the material(s) present in any laboratory contains the amount of licensed material exceeding 10 times the quantity of such material specified in appendix C to 10 CFR 20 the laboratory shall require the words; "CAUTION or DANGER, RADIOACTIVE MATERIAL(S)"

### 13.6.5 Hazard Stickers Approved for Use



**Laboratory Supervisor.** The name and phone number of the responsible individual(s) for the lab must be displayed. These individuals must be informed by the PI that they are the responsible individuals for the laboratory space in which their name appears.

**No Food or Drink.** No food or drink is permitted in any laboratories in the Dodgen Research Facility.

**Caution: Radioactive Materials.** This is a U.S. NRC and Washington State Department of Health required sign where radioactive materials are present. The signage has specific design, color, and condition requirements and may not be altered. See the applicable radioactive materials chapters in this NSC Total Health & Safety Plan for more information. See 12.6.4 for additional requirements.

**Cryogen.** In areas where cryogenics may be encountered, this sign shall be used. Functional specific training must be documented prior to working with cryogenics, however the presence of cryogenics in a laboratory space should not preclude entry into the laboratory space by untrained individuals as long as the hazard is safely secured and is not disturbed.

**Dosimetry Required.** Dosimetry is required in most of the laboratory spaces in the Dodgen Research Facility. Staff dosimetry, electronic personnel dosimetry (EPD), or temporary dosimeter provided by the WSU Radiation Safety Program may be used to fulfill this requirement.

**Biohazard.** In areas where biohazards may be encountered, this sign shall be used. The biohazard symbol is accompanied by the bio-safety laboratory (BSL) designation. Functional specific training must be documented prior to working with biohazards, however the presence of biohazards in a laboratory space should not preclude entry into the laboratory space by untrained individuals as long as the hazard is safely secured and is not disturbed.

**PPE Required.** Knowledge of the personnel protective equipment (PPE) requirements and recommendation are the responsibility of the PI for training their laboratory personnel. WSU also requires PPE training provided in Percipio for all employees entering laboratory spaces. See the PERSONAL PROTECTIVE EQUIPMENT Chapter in this NSC Total Health & Safety Plan for more information.

**Internal Exposure.** Any specific internal exposure hazards shall be listed under the symbol. In this case, lead and cadmium are present in the laboratory space and are included in the hazard symbol.

**Corrosive.** In areas containing substances that can damage tissues when they come in contact

with them, this sign shall be used. Many corrosive liquids are in common use, for example, in batteries. Some are used in cleaning, for example hydrochloric acid is used in some toilet bowl cleaners. Working with chemicals/substances exhibiting corrosive behavior require training of laboratory personnel prior to their use.

**Acute Toxicity.** In areas where adverse effects of a substance that result either from a single exposure or from multiple exposures in a short period of time (usually less than 24 hours) result, this sign shall be used. Working with chemicals/substances exhibiting acute toxicity require training of laboratory personnel prior to their use.

**NFPA Ratings.** NFPA ratings are required. The most severe code (highest number) will be displayed for any specific hazard present in the lab, regardless of volume using the NFPA hazard rating system. NSC approved stickers for the hazard squares are the only acceptable form of delineation of hazard in each square. See NSC personnel if these stickers are needed. To determine the laboratory NFPA rating, see [ehs.wsu.edu](http://ehs.wsu.edu) signage program. Complete the forms and save the sheet for the laboratory and send to [OR.NSC@wsu.edu](mailto:OR.NSC@wsu.edu). DO NOT post the sign on the door.

### 13.6.5.1 NFPA – Health Rating (Blue)

Table 13-1: Meanings of different health ratings.

Rating	Signal Wording	Description
4	Danger	May be fatal on short exposure. Specialized protective equipment required.
3	Warning	Corrosive or toxic. Avoid skin contact or inhalation.
2	Warning	May be harmful if inhaled or absorbed.
1	Caution	May be irritating.
0		No unusual hazard.

### 13.6.5.2 NFPA – Flammability Rating (Red)

Table 13-2: Meanings of different flammability ratings.

Rating	Signal Wording	Description
4	Danger	Flammable gas or extremely flammable liquid.
3	Warning	Flammable liquid flash point below 100 °F.
2	Caution	Combustible liquid flash point of 100 °F to 200 °F.
1		Combustible if heated.
0		Not combustible.

### 13.6.5.3 NFPA – Reactivity Rating (Yellow)

Table 13-3: Meanings of different reactivity ratings.

Rating	Signal Wording	Description
4	Danger	Explosive material at room temperature.
3	Danger	May be explosive if shocked, heated under confinement, or mixed with water.
2	Warning	Unstable or may react violently if mixed with water.
1	Caution	May react if heated or mixed with water but not violently.
0	Stable	Not reactive when mixed with water.

#### 13.6.5.4 NFPA – Special Information (White)

Table 13-4: Meanings of different special information abbreviations.

Abbreviation	Description
Oxy	Oxidizing Agent
W	Water Reactive
G	Compressed Gas
LN2	Liquid Nitrogen
LHE	Liquid Helium

### 13.7 Required Postings – Interior/Laboratory Facing

#### 13.7.1 Hanging Signage Inside the Laboratory

The approved signage will be found on the back of the entry door and consist of the following items:

- Survey out sign (in RAM laboratories)
- Emergency Contact List
- NSC Emergency Procedure
- Lab Map showing the location of safety items
- DOH Form 320-098 (in RAM laboratories or laboratories with X-ray instrumentation)
- U.S. NRC Form 3: Notice to Employees (in RAM laboratories)
- QR Code to Safety Documents for Laboratory

The only approved signage within laboratories are instrument specific posters used to describe instrument operations during tours.

#### 13.7.2 U.S. NRC Form 3: Notice to Employees

Employers are legally required by the *U.S. Nuclear Regulatory Commission* to display NRC Form 3: Notice to Employees. The posting consists of questions and answers about the NRC and its responsibilities, the employee's responsibilities and instructions to employees as to how to report safety concerns and violations of NRC rules.

The licensee (NSC) shall post current copies of NRC Form 3 in a sufficient number of places to permit individuals engaged in NRC-licensed or regulated activities to observe them on the way to or from any particular licensed or regulated activity location to which the document applies. Forms shall be replaced by the building safety coordinator if it is inconspicuous, defaced, or altered, or out of date.

#### 13.7.3 DOH Required Forms

Employers are legally required by the *Washington State Department of Labor and Industries* to display the following forms in the workplace. The postings inform employees of their rights and responsibilities. The building safety coordinator is responsible for ensuring the posters are posted in a communal location and replacing the posters as needed.

- F242-191-909 *Notice to Employees – if a Job Injury Occurs*
- F416-081-909 *Job Safety and Health Law*
- F700-074-909 *Your Rights as a Worker*

The minimum locations that the WA DOH Form RHF-3 shall be posted on interior facing door or wall surfaces are as follows;

- Front office (DRF-5050)
- Reactor related controlled access areas (201 & 2)
- Dodgen classroom (150)
- All in use RAM laboratories (B21, 101, 116, 119, 121, 214 & 221)

#### **13.7.4 Emergency Evacuation and Short Form Procedures**

At a minimum, emergency escape procedures and floor plans shall be posted such that they are easily accessible to employees, building users and visitors. In addition, the NSC also chooses to post short form emergency procedures to inform chain of command, response capable personnel and required action. The full *NSC Emergency Plan* and associated Implementing Procedures are maintained by the Reactor Operating Staff as they are the responsible party in the event of any credible emergencies at the Dodgen Research Facility under Facility License R-76. Laboratories associated and regulated by the WSU Broad Scope RAM License administered by the *WSU Radiation Safety Office* may have alternative chain of command following the termination of the emergency situation.

#### **13.7.5 Survey out Notice**

It is standard practice when exiting a radioactive materials laboratory to survey out both hands and feet to minimize the possibility of spreading radioactive contamination to unrestricted areas such as hallways and office spaces. To promote proper lab etiquette the survey out notice may be posted on the interior of each laboratory in use or in storage.

#### **13.7.6 Laboratory Maps and Safety Equipment**

All labs should contain, at the least, a first aid kit and fire extinguisher within reasonable distance from the lab - that may be in the hallway. Labs that are underequipped shall be brought to the attention of the building safety coordinator.

Where applicable all laboratories shall post a map showing the location of safety equipment including but not limited to:

- |   |                                       |
|---|---------------------------------------|
| • Emergency eyewash & showers stations  | • Auxiliary local ventilation systems |
| • First aid kits                        | • Emergency phone number sheet        |
| • Spill kits & acid neutralization kits | • Direction of exit                   |
| • Flammable liquid storage cabinets     | • Gas turn-off valve                  |
| • Fire extinguishers                    | • Circuit breaker box                 |

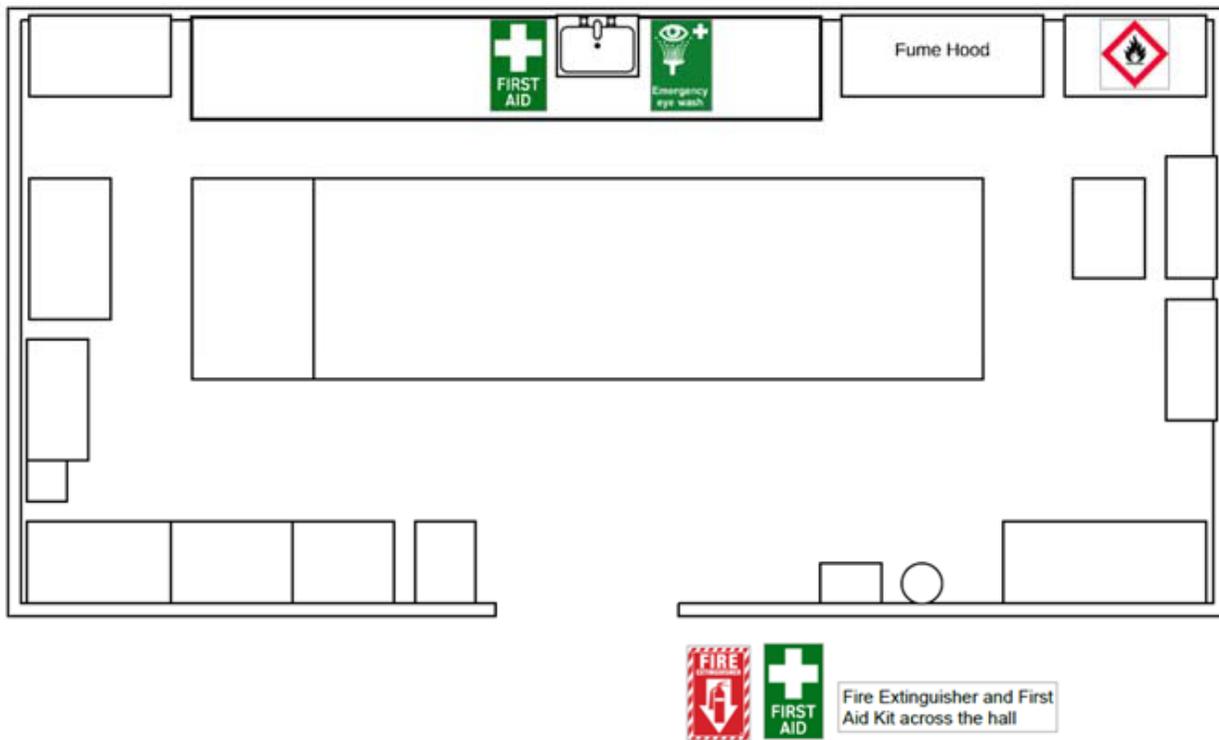


Figure 13-2. Laboratory map example.

## **14 PERSONAL PROTECTIVE EQUIPMENT**

### **14.1 References**

1. SPPM Chapter 3: *Shop/Ag Workplace Safety*
2. SPPM 3.10: *General Requirements for Personal Protective Equipment*
3. EH&S Laboratory Safety Manual; Section IV: *Standard Operating Procedures; D. Personal Protective Equipment; Workplace Hazard Assessment: PPE; Web Site; Workplace Hazard Assessment and Personal Protective Equipment Selection Charts.*  
<http://ehs.wsu.edu/labsafety/LabSafetyManual.html>
4. WAC 296-800-160, *Personal Protective Equipment*
5. WAC 296-817-20015, *Hearing Loss Prevention (Noise)*
6. WAC 296-842, *Respirators*

### **14.2 Appendices:**

*Appendix A: Hazard Assessment Certification Form*

*Appendix B: PPE Training Certification Form*

### **14.3 Scope**

This chapter establishes requirements for hazard assessments, evaluating whether hazards are present that require personal protective equipment (PPE). EH&S requires the use of personal protective equipment to protect employees from chemical, physical, biological and radiological hazards having the potential to cause injury or impairment.

Personal protective equipment must be selected and used when workplace hazards are not eliminated or controlled by engineering controls (i.e., guards, ventilation) and/or administrative controls (i.e., job rotation, work practices). Employees required to wear PPE must be trained on its proper use and limitations. This training must be documented.

### **14.4 Responsibilities**

#### **14.4.1 Supervisors**

- Performing or designating an individual responsible for performing hazard assessments;
- Documenting hazard assessments;
- Providing PPE to employees;
- Training employees to use PPE
- Retraining employees if necessary;
- Documenting training; and,
- Requiring employees to use PPE when necessary.

#### **14.4.2 Employees**

- Identifying hazards requiring PPE;

- Contacting their supervisor for guidance when hazards or hazard controls (including PPE) are unknown or require clarification;
- Maintaining PPE in good and safe condition;
- Requesting new PPE when required;
- Participating in hazard control and PPE training; and
- Using PPE as required, employees failing to use PPE as required may be subject to disciplinary action.

## 14.5 Hazard Assessments

To evaluate work areas and practices, a walk-through survey must be conducted. The walk-through survey identifies hazards that employees are potentially exposed to during while working. The walk-through survey is performed by supervisors responsible for the working conditions and practices in their areas. Supervisors conducting hazard assessments should observe work practices and obtain information from affected employees.

During the walk-through survey, supervisors should evaluate tools, equipment, facilities and work practices for the following general hazards:

- Impact/Penetration and Compression Hazards: Sources of motion (e.g., movement of tools, machine components or particles) and sources of rolling and potential falling objects must be evaluated.
- Chemical Hazards: Chemical exposures to the eyes and skin as well as inhalation hazards must be assessed.
- Noise Hazards: Loud tools and equipment should be evaluated by EH&S.
- Respirable Hazards: Processes creating dusts, mists, fumes and vapors should be evaluated by EH&S.
- Electrical Shock Hazards: Equipment using electricity must be assessed.
- Light Radiation Hazards: Welding, brazing, torch cutting, furnaces and lasers must be assessed.
- Heat/Cold Hazards: Sources of high and low temperatures must be assessed as well as employee exposure to hot or cold work environments.

A hazard re-assessment must be conducted whenever new equipment or processes are introduced, or the review of an incident report, occupational injury and/or illness records by the supervisor or EH&S indicates the potential need for additional PPE. A hazard re-assessment may also support eliminating the need for PPE based upon hazard elimination (e.g. product substitution) or the implementation of engineering or administrative controls.

Identified hazards should be eliminated or controlled using engineering and administrative controls when technologically and economically feasible. However, when engineering and administrative controls are not feasible, timely, or do not completely eliminate the hazard, PPE must be used. Contact EH&S (335-3041) for assistance in identifying and evaluating potential engineering and/or administrative controls.

The following *Workplace Hazard Assessment and Personal Protective Equipment Selection Tables* have been developed to assist supervisors in assessing their work areas. Though all work

places are to be evaluated, hazards requiring the use of PPE will generally not be found in office type work areas.

## 14.6 Training

Supervisors must ensure their employees receive information and training on how to use the assigned PPE. Personal protective equipment must always be used in accordance with the manufacturer's specifications. A written certification must be completed verifying that each employee using PPE has received and understood the required training.

Training and information to be provided to each user of PPE includes:

- Why, when, and what PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- Selection and limitations of the PPE
- Proper care, inspection, maintenance, useful life, and disposal of the PPE

Manufacturer's literature, the supplying vendor, and EH&S's OHS unit are sources for PPE selection and training assistance and materials. Employees using respirators and hearing protection are to be trained by EH&S.

Each employee must demonstrate an understanding of this training before being allowed to perform work requiring the use of PPE. Methods of demonstrating understanding include orally questioning the employee, observing the employee using the PPE in a real or artificial setting, or administering a written test.

Employees must be retrained when there have been:

- Changes in the workplace, such as new processes and equipment (e.g. engineering controls), which render previous training obsolete;
- Changes in the type(s) of PPE render the previous training obsolete; OR
- Inadequacies in an employee's knowledge or use of assigned PPE indicate the employee has not retained the requisite understanding or skill.

## 14.7 Personal Protective Equipment Selection

EH&S verifies that a hazard assessment has been performed through a written certification. After surveying work areas and practices, the supervisor completes the *Workplace Hazard Assessment Certification Form* provided in *Appendix A: Hazard Assessment Certification Form*. If a work area assessment does not reveal hazards requiring the use of PPE, enter "No Hazard" on the *Workplace Hazard Assessment Certification form*. These forms are retained by the department.

Upon completing the hazard assessment, each unit selects and provides the types of PPE suitable for the specific hazards present. The previous *Workplace Hazard Assessment and Personal Protective Equipment Selection Tables* were developed to assist supervisors in selecting appropriate PPE.

Careful consideration must be given to the level of protection, fit and comfort of the PPE. Personal protective equipment that fits poorly will not afford the necessary level of protection. Protective devices are generally available in a variety of sizes and care should be taken to ensure that the right size is selected. Some PPE is equipped with adjustable features. Adjustments should be made on an individual basis for a comfortable fit that will maintain the protective device in the

proper position. However, PPE should never be modified without written approval from the manufacturer.

The *Hazard Assessment and Personal Protective Equipment Selection Charts* only address the most frequently encountered hazards and recommended PPE. Therefore, the contents are not all inclusive. Hazards not listed may be found in your work area and special PPE could be needed. If you require assistance in conducting a hazard assessment or selecting PPE, contact EH&S OHS unit for additional information.

#### **14.7.1 Eye and Face Protection**

Eye and face protective equipment should be routinely considered for employees using, handling, sorting, bulking or working in the vicinity of others using chemicals, employees collecting building material samples via semi-destructive methods, employees entering shop, construction or renovation areas and laboratory inspectors.

General eye and face protective equipment selection criteria:

- All eye and face protective equipment shall comply with ANSI Z87.1-1989, 1998 or 2003, except eye protection designed for laser operations. Laser protective eyewear optical density is dependent on laser wavelength (Contact EH&S' *Occupational Health and Safety unit* for further information).
- Care should be taken to recognize the possibility of multiple and simultaneous exposure to a variety of hazards. Adequate protection against the highest reasonably anticipated level of each hazards must be required.
- As a general rule, face-shields, when required should be worn over primary eye protection (spectacles or goggles).
- Contact lenses wearers must also consider additional eye and face protection devices in a hazardous environment. Dusty and/or chemical environments may represent an additional hazard to contact lens wearers.
- Operations involving heat may also produce light radiation. Protection from both hazards is required.
- Protection from light radiation is directly related to spectacle filter density. Select the darkest shade that allows task performance.

#### **14.7.2 Foot Protection**

Foot protective equipment should be routinely considered for employees using, handling, sorting, bulking or working in the vicinity of others using chemicals, employees collecting building material samples via semi-destructive methods, employees entering shop, construction or renovation areas, employees collecting environmental samples outdoors on uneven terrain, employees lifting or manipulating heavy objects or working with heavy equipment and laboratory inspectors.

Table 14-1: Type of foot protection required and hazards of various activities at the NSC.

SOURCE/ACTIVITY	HAZARD	PROTECTION
IMPACT: Routinely carrying or handling materials such as packages, parts, or heavy tools.	Falling objects. As a general guide, routinely lifting hard edge objects, weighing 10 pounds or more, at waist level should be considered a hazard.	Safety shoes or boots complying with ASTM FR-2412-(most current edition) or ANSI Z41-1991 & (most current edition).
COMPRESSION: Manual and powered material handling equipment, movement of heavy objects.	Movement of transport barrels, heavy equipment.	Safety shoes or boots complying with ASTM FR-2412-(most current edition) or ANSI Z41-1991 & (most current edition).
CHEMICAL: Laboratory research, chemical handling and transferring, custodial, construction and maintenance operations.	Splash - skin burns and absorption toxicity.	Impervious rubber boot or bootie covering the shoe. Pant leg or lab coat should pass over top of boot/shoe to prevent chemical from entering.

### 14.7.3 Head Protection

Head protective equipment should be routinely considered employees entering shop, construction or renovation areas or working with heavy equipment.

Head protective equipment selection criteria:

- Protective helmets shall comply with ANSI Z89.1-(most current edition).
- Proper fitting of helmets is important to ensure it will not fall off. In some cases, a chin-strap may be necessary.

Table 14-2: Type of head protection required and hazards of various activities at the NSC.

SOURCE / ACTIVITY	HAZARD	PROTECTION
IMPACT/PENETRATION: Maintenance, movement of heavy objects.	Overhead hazards, falling objects.	<ul style="list-style-type: none"> <li>• Type I Protective Helmets (Top protection).</li> <li>• Type II Protective Helmets (Lateral impact protection)</li> </ul>
ENTANGLEMENT: Rotating machinery.	Hair becoming entangled in moving parts.	Other Protective caps or coverings.

### 14.7.4 Hand Protection

Gloves are often relied upon to prevent cuts, abrasions, burns and skin contact with chemicals that are capable of causing local or systemic effects following dermal exposure. There is not a single glove that provides protection against all potential hand hazards. Therefore, it is important to select the most appropriate glove for a particular application, and to determine how often and long it can be worn and whether it can be reused. In some cases, particularly those relating to chemical exposure, double glove use (inner and outer glove) may be required.

Physical and chemical hand protective equipment selection criteria:

- Work activities should be evaluated to determine the degree of dexterity required, the duration, frequency, and degree of exposure, and the physical stresses that will be applied.
- The toxic properties of the chemical(s) must be determined; in particular, the ability of the chemical to cause local effects on the skin and/or to pass through the skin and cause systemic effects.
- For mixtures and formulated products (unless specific test data are available), gloves should be selected on the basis of the chemical component that will break through the glove material in the shortest time.

Table 14-3: Type of hand protection required and hazards of various activities at the NSC.

SOURCE/ACTIVITY	HAZARD	PROTECTION
SHARP TOOLS/MATERIALS: Cutting, dissecting, dicing, butchering, handling sharp or ragged objects.	Lacerations from blades, knives, glass, sheet metal. Splinters from rough lumber. Severe abrasions.	Leather, Kevlar®, wire mesh or stitch gloves, cut-resistant rubber gloves.
EXTREME COLD: Handling cold materials, cryogenic research.	Frostbite.	Permeable or impervious non-insulated gloves, permeable or impervious insulated gloves.
CHEMICAL: Laboratory research, chemical handling and transferring, custodial, construction and Maintenance operations.	Glove permeation and degradation causing dry skin, dermatitis, burns, irritation or ulceration, systemic effects	Gloves composed of chemically resistant material. Refer to the Safety Data Sheet and the WSU Laboratory Safety Manual. Contact EH&S for assistance.

### 14.7.5 Hearing Protection

Hearing protective equipment should be routinely considered for employees working in loud or noisy environments. As a general rule, if you must raise your voice to speak to an individual standing 3 feet away from you, hearing protection is required.

Employees exposed to noise at 85 dBA and higher based on an 8-hour time weighted average are to be included in WSU's hearing conservation program. The program includes noise monitoring, the use of appropriate hearing protection, annual audiometric testing, and annual training.

Contact EH&S OHS unit to arrange a noise hazard assessment.

Table 14-4: Type of hearing protection required and hazards of various activities at the NSC.

SOURCE/ACTIVITY	HAZARD	PROTECTION
NOISY EQUIPMENT: High speed tools, heavy mobile equipment and frequent use of mechanized equipment.	Noise induced hearing loss.	Ear plugs, ear muffs with the appropriate Noise Reduction Rating (NRR) <sup>1</sup> .

1. Note: The NRR does not reflect the actual number of decibels (dBA) protection the hearing protection device provides. Instead, the hearing protection device provides NRR-7 protection, example: TWA=100 dBA, ear muff NRR=19 dB, estimated exposure=100-(19-7) =88 dBA.

### 14.7.6 Respiratory Protection

Respiratory protective equipment should be routinely considered for using, handling, sorting, bulking or working in the vicinity of others using chemicals, employees collecting building material samples via semi-destructive methods without a negative exposure assessment, employees entering construction or renovation areas where activities such as demolition, sanding and welding create dusts and fumes, and employees evaluating potential biohazards such as rodent or bird droppings.

Employees required to wear respirators are to be included in *WSU's respiratory protection program*. The program includes hazard assessment, air monitoring, medical evaluation, fit testing, the use of appropriate respiratory protective equipment and annual training. Employees potentially exposed to specific contaminants (e.g., lead, asbestos, formaldehyde) are to be covered by an additional medical surveillance program.

Contact EH&S OHS unit to arrange a respiratory hazard assessment.

Table 14-5: Type of respiratory protection required and hazards of various activities at the NSC.

SOURCE/ACTIVITY	HAZARD	PROTECTION
Employees exposed to activities creating dusts, mist, fumes and vapors.	Oxygen deficient atmospheres, irritants, carcinogens, sensitizers and other health effects.	Supplied air respirators (SCBAs, air-line) and air-purifying respirators (half and full face) <sup>1</sup> .
Employees cleaning/decontaminating reactor equipment using acid baths or other chemical treatments.	Potential exposure to noxious or hazardous gases or potential environments for creating noxious gases.	Supplied air respirators and training.

1. Different airborne contaminants require significantly different levels of respiratory protection based upon airborne contaminants and contaminant concentrations (e.g. compared to permissible exposure levels, immediately dangerous to life and health thresholds), respirator applied protection factors, contaminant specific regulations, respirator cartridge service life and other factors. Therefore, when seeking to protect employees from additional or newly identified airborne hazards, it is critical that the EH&S OHS unit be consulted to assist in identifying the appropriate level of respiratory protection.

### 14.7.7 Miscellaneous PPE

Personal protective equipment not listed on the preceding charts may be required when employees are exposed to cold weather, laceration, burn, abrasion, chemical and fall hazards. Personal protective equipment to consider includes: Snow and ice cleats, chaps, aprons, lab coats, protective sleeves, knee pads, coveralls, safety vests, welding coats, and personal fall restraint and arrest systems.

14.8 Appendix A: Hazard Assessment Certification Form

SAMPLE WORKPLACE HAZARD ASSESSMENT CERTIFICATION FORM			
<b>Instructions: Complete form using Personal Protective Equipment Hazard Assessment Guidelines. Completed form is to be retained for departmental records.</b>			
<b>Person conducting the hazard assessment:</b>		<b>Date of hazard assessment:</b>	
Work Activity Assessed	Location of Assessment (Blg/Rm)	Hazard(s) Identified	PPE Selected (Make & Model #)
Grinding - Metal	Building #7 - Shop	Flying Particles	Safety glasses w/side shields or goggles
		Noise	Ear Plugs or Muffs *
Gas Welding	Building #5 - Shop	Flash Burn (Optical Radiation)	Welding Goggles with 4-8 shading
		Burns to Hands	Leather Gloves
Tree-Trimming	Campus	Falling Branches	Hardhats - Type C
		Abrasions to Hands	Leather Gloves
		Noise	Ear Plugs or Muffs*
Cutting of Meats and Vegetables	Dining Hall Food Prep Areas	Cuts to Hands	Wire Mesh Gloves
Office Work	Building #6 Room 123	None	None
Mastic Floor Stripping	Campus	Sodium Hydroxide/Respiratory Exp.	Air Purifying Respirator*
		Sodium Hydroxide/Skin Exposure	Neoprene or PVC Gloves
		Sodium Hydroxide/Eye Exposure	Chemical Goggles
I, <u>      <b>Xxxx Y. Zzzz</b>      </u> , certify that the assessment of the identified work activities has been performed. <b>Date:</b> Month/Day/Year <div style="text-align: center; margin-top: 5px;"><b>Signature</b></div>			

14.9 Appendix B: PPE Training Certification Form

<b>PERSONAL PROTECTIVE EQUIPMENT TRAINING CERTIFICATION</b>		
<p>_____</p> <p style="text-align: center;"><b>Employee's Name</b></p>	<p>has been assigned and trained to use the following personal protective equipment when working in areas and/or tasks identified below:</p>	
Area/Task	PPE Required - ✓Applicable Boxes	PPE Selected (Make & Model)
	<input type="checkbox"/> Eye/Face Protection <input type="checkbox"/> Head Protection <input type="checkbox"/> Foot Protection <input type="checkbox"/> Hand Protection <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Other: _____	
Area/Task	PPE Required - ✓Applicable Boxes	PPE Selected (Make & Model)
	<input type="checkbox"/> Eye/Face Protection <input type="checkbox"/> Head Protection <input type="checkbox"/> Foot Protection <input type="checkbox"/> Hand Protection <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Other: _____	
<p>I, _____,</p> <p style="text-align: center;"><b>Employee's Signature</b></p>	<p>have received and understood the training on the PPE listed above. This training included the areas, tasks and hazards requiring PPE; how to properly put on, wear and take off the PPE; PPE selection criteria, and the proper care, inspection, maintenance, useful life and disposal of the PPE.</p>	
<b>Supervisor:</b>		<b>Date(s) of Training:</b>

## **15 DEPARTMENTAL EQUIPMENT**

All computers including general workstations, office workstations, laptops, and equipment workstations are property of the Department and the State of Washington. The use, modification, and maintenance of this equipment must be in accordance with the following sections.

### **15.1 Computers**

This section covers hardware and software for all computers in the department, owned by the department.

- 1) Any new computer purchases, or old computer surplus will be done through NSC management and OR-IT.
- 2) No modification of hardware or software will be made without prior approval by NSC management and WSU Office of Research IT (OR-IT). OR-IT will perform the modification.
- 3) NSC employees are not permitted to modify or change operating systems or add additional operating systems to departmental machines.
- 4) No file storage is permitted on the local computer C:/ drive. Storage locations on Desktop and My Documents are permitted as these have maintained backups.
- 5) File storage is maintained offsite by OR-IT. A local copy may be permitted utilizing a clean flash drive; however, the primary storage location will be on the OR-IT managed file server.
- 6) NSC Reactor Operations will utilize the N:/ drive for all departmental and reactor records; NSC Research Division will use the M:/ drive for all departmental and research data. The NUCS Core Facility will use the Z:/ drive for all NUCS Core Facility instrument data archives and calibrations.

### **15.2 Instrumentation**

- 1) Equipment and instruments shall be assembled, installed, used, and maintained in accordance with the manufacturer's recommendations.
- 2) At present, no offsite storage or network capabilities are enabled for instrumentation computers. Therefore, the collection and storage of the data from these computers are the responsibility of the laboratory managers and researcher that utilize the instrument.
- 3) Personnel may modify the use or design of equipment or instruments with the approval the laboratory manager.
- 4) All safety guidelines outlined in the equipment or instrument handbooks will be followed.

### **15.3 Instrumentation Specific Procedures and Maintenance**

- 1) Procedures for calibration, operation, and maintenance of the instrumentation located in the NUCS Core Facility can be found in the Laboratory Safety Manual located in the instrument bay for instruments operated by the NUCS Core Facility.
- 2) The NUCS Core Facility maintains and operates the following instrumentation:
  - a. High-purity germanium gamma-ray detectors for the analysis of radioactive samples (see procedure QAPNAA-3)

- b. Bruker D2 Phaser Powder X-ray Diffractometer for the analysis of powder samples by X-ray diffraction (see procedure OPPXRD-1)
  - c. Bruker D8 Venture Single Crystal X-ray Diffractometer for the analysis of single crystal samples by X-ray diffraction (see procedure OPSCXRD-1)
  - d. easyXAFS 300+ for the analysis of samples by X-ray absorption/emission (see procedure OPXAFS-1)
  - e. Malvern Zetasizer Pro Blue Dynamic Light Scattering Instrument for the analysis of the size and zeta potential of emulsions (see procedure OPDLS-1)
  - f. Bruker Avance Neo 500 MHz NMR Spectrometer for the analysis of samples by NMR spectroscopy (see procedure OPNMR-1)
- 3) Only the Bruker 500 MHz NMR Spectrometer is approved for the analysis of radioactive samples by NMR spectroscopy and follows procedure RISP-1.
  - 4) Only the Bruker D8 Venture single crystal X-ray diffractometer is approved for the analysis of radioactive single crystal samples by X-ray diffraction and follows procedure RISP-2.
  - 5) Only the Bruker D2 Phaser powder X-ray diffractometer is approved for the analysis of radioactive powder samples by X-ray diffraction and follows procedure RISP-3.
  - 6) Only the easyXAFS 300+ X-ray spectrometer is approved for the analysis of radioactive single samples by X-ray absorption/emission and follows procedure RISP-4.
  - 7) Only the Xenocs Xeuss 3.0 X-ray scattering spectrometer is approved for the analysis of radioactive X-ray samples by X-ray scattering and follows procedure RISP-5.

## **16 ELECTRICAL**

### **16.1 Laboratory Building Electrical**

NSC employees, contract associates, and student interns **are strictly prohibited** to perform any work on any of the laboratory building electrical systems. All laboratory building electrical system work will be done by WSU Facilities Services with licensed electricians.

### **16.2 Reactor Console Electrical**

For work on systems with less than 50 volts, only qualified workers who are Senior Reactor Operators shall work on these systems unless they are under direct supervision of qualified workers.

For work on systems with 50 volts or greater, NSC supervision shall be notified, and permission granted prior to performing any work on these systems.

# 17 COMPRESSED GAS CYLINDERS

## 17.1 References

- WAC 296-24 *Part K Compressed Gas and Compressed Gas Equipment*
- WAC 296-24 *Part E Hazardous Materials, Flammable and Combustible Liquids, Spray Finishing*
- *Compressed Gas Association “CGA P-1: Safe Handling of Compressed Gases”*
- *International Fire Code (IFC) Section 3004: Storage of Compressed Gases*
- *IFC Section 3005: Use and Handling of Compressed Gases*
- *Washington Department of Health Publication “DOH 331-364: How to Handle Chlorine Gas Safely”* May 2010.

## 17.2 SPPM 2.80.1 Compressed Gasses and Gas Cylinders Scope

NSC personnel working with or around compressed gas cylinders, shall be knowledgeable of, and comply with, this chapter’s requirements and the rules, policies and procedures referenced above. This chapter includes subsections that reference the following:

## 17.3 Responsibilities

### 17.3.1 Supervisor

- Ensure compressed gas cylinders are inspected, used and stored per this chapters requirements, State rules, SPPM 2.80 and *International Fire Code*.
- Ensure that damaged cylinders are immediately returned to the supplier.
- Ensure an inventory and safety data sheets (SDS) are kept for all gas cylinders in their area.
- Ensure employees use appropriate personal protective equipment (PPE) when working with or around compressed gases.
- Ensure an incident response plan is in place for responding to an emergency involving compressed gasses and cylinders.
- Ensure personnel under their supervision (employees, paid and unpaid students) receive necessary training. Training shall include general safety guidelines on working with compressed gasses and compressed gas cylinders and gas specific (e.g. flammable, toxic, etc.) hazards.
- Reviewing all incident reports and ensuring that appropriate corrections are made.
- Communicating incidents and corrective actions to affected personnel.

### 17.3.2 Employee

- Shall inspect, use and store compressed gas cylinders per this chapter’s requirements, state rules and *International Fire Code*.
- Shall not use gas cylinders if damaged and shall notify their supervisor of damaged gas cylinders and arrange for immediate return to the supplier.

- Shall confirm the identity of the gas before using by reading the label or other markings on the cylinder. If cylinder contents cannot be identified through the label or markings, return cylinder to the supplier without using.
- Shall not modify, tamper with, paint, obstruct, remove or repair any part of the cylinder, including the pressure relief device and the container valve or the valve protection device. It is illegal to remove or to change the prescribed numbers or marks stamped into cylinders.
- Shall use appropriate PPE as required by department/supervisor.
- Shall participate in required training before using any compressed gases.

#### **17.4 Training**

WSU personnel working with or around compressed gases shall be trained at the time of hire in general compressed gas and compressed gas cylinder safety principles, including site-specific safety procedures and gas specific hazards. Training will require participants to demonstrate an understanding of the topic and proficiency using the equipment. Re-training will be required when:

- There have been changes in the workplace, such as new processes and equipment, which render previous training obsolete;
- Changes in the types of equipment that render the previous training obsolete;
- When an employee exhibits inadequate knowledge, skill and understanding or non-conforming use of the equipment.

#### **17.5 Guidelines for Use**

- Cylinders shall always be secured in an upright position to protect against falling or rolling. Valves must be closed at all times when gas is not in use. Removable valve protection caps must be fully threaded onto gas cylinders when regulators are not attached.
- Cylinders (full and empty) must be anchored at all times to a wall or bench clamp or secured within cylinder racks or stands. An appropriate restraint device (strap or chain) shall always be used.
- Cylinders shall be used in a secured area that is cool, dry and well ventilated and shall not be exposed to excessive dampness, salt, corrosive chemicals or fumes.
- Gases shall not be transferred from one compressed gas cylinder to another. Do not attempt to refill gas cylinders.
- Perform regular visual inspections of compressed gas cylinders for leaks, cracks, and deformities. Always ensure that all connections are leak tight. Each time connections are loosened and retightened each connection should be checked with a soap and water solution (oil free soap). Do not check with flame. If a cylinder is ever thought to be defective, it should be removed from service and returned to the supplier for replacement.
- All compressed gases must be used through a pressure regulating device on the cylinder or manifold. Always use a regulator to reduce gas cylinder pressure to the operating pressures recommended by the equipment manufacturer. All piping and equipment must meet the standards of the *Compressed Gas Association*.

- Never use regulators, gages, hoses, and other appliances for gases with different chemical properties other than those for which it was designed by the manufacturer unless the manufacturer or supplier provides information indicating that this can be done safely.
- Never force connections that do not fit. Threads on regulator connections or other auxiliary equipment must be the same as those on the cylinder valve outlet.
- Keep cylinders, valves and fittings clean. Never apply sealants (liquid or tape form) or lubricants to any cylinder valves or connection fittings. Do not use PTFE tape. Never let oil or grease contact your cylinder or its valve and fittings, especially oxygen cylinders.
- Oxygen regulators must be marked "Use No Oil". Regulators and fittings must meet the specifications of the Compressed Gas Association.
- Install flashback arrestors on both the fuel gas and oxygen cylinder regulators.
- Never attempt to adapt and use a fuel gas or inert gas regulator on an oxygen cylinder. A special protective device is incorporated on the oxygen regulator to harmlessly dissipate the heat caused by the recompression when the cylinder valve is quickly opened. Such a protective device is not furnished on fuel gas and inert gas regulators.
- Never partially open cylinder valve ("cracking" cylinder) to remove dust, dirt or debris from the cylinder inlet.
- Before attaching a regulator to a gas cylinder, be sure the regulator adjusting screw is fully released (backed off in a counter clockwise direction) so that there can be no flow through the regulator when the cylinder valve is initially opened. Never stand in front of a regulator when you are opening a cylinder valve.
- Always open the cylinder valve slowly so that gas pressure will build up slowly in the regulator (particularly in an oxygen cylinder). Quick opening of the cylinder valve causes a buildup of heat due to recompression of the gas. When combined with combustible materials, ignition and explosion may result. Never use force when opening or closing valves.
- When in use, cylinder valves used in the fully open position may become stuck in this open position. To prevent this, ensure that the hand wheel or cylinder valve key is turned back half a turn.
- Before removing a regulator, close the cylinder valve and release remaining pressure from regulator. Removing regulator fittings under pressure may result in serious personal injury as fittings may be ejected at high velocity.
- Never tamper with the safety devices on cylinders (fuse plugs, safety discs, etc.) and do not permit torch flames or sparks to strike the cylinder.
- Always refer to the various gases by their proper names. (Do not refer to oxygen as "air" or acetylene as "gas".)
- Never attempt to mix gases in a cylinder or fill an empty one from another (particularly oxygen cylinders). Mixture of incompatible gasses and/or heat caused by recompression of the gas or gasses may result in ignition and fire.
- Never use oxygen or other gases as a substitute for compressed air in operation of air-operated tools, blowing off parts, or for ventilation purposes. The only exception to this rule is where oxygen is used to blow out port passages and talcum powder or dust from welding hoses when setting up new or old "dusty" equipment.

- Defective hoses must always be removed from service. Never repair hoses with tape. Gas hoses must meet the specifications of the *Compressed Gas Association*.
- Never use wrenches or tools except those provided or approved by the gas manufacturer. Avoid using a wrench on valves equipped with hand wheels. Do not hammer on any cylinder, especially the valve wheel, in an attempt to open or close the valve. Do not tamper with the relief valves. If you have trouble, contact the supplier for assistance.
- Never use a hammer on the valve protection caps to loosen them. If necessary, use a piece of wood to soften the impact and prevent sparks and damage to the cap. If you have trouble, contact the supplier for assistance.
- Never use cylinders as rollers to move other material or as supports or for any purpose other than to contain their contents as received. Do not let cylinders bump into each other or let them fall.
- Do not place cylinders where they can become part of an electric circuit or might be burned by electric welding arc. Do not use them as a ground during electric welding.
- Always follow the manufacturer's recommendations for setting up and operating equipment, including gas cylinder operating pressures. When in doubt about the proper handling of a compressed gas cylinder or its contents, consult the manufacturer or supplier of the gas.
- Repair work on cylinders, cylinder valves, gauges, and regulators must be done by qualified personnel.
- Wear appropriate PPE when working with compressed gases.

#### **17.6 Guidelines for Storage**

- Cylinders must be stored per local, state, and federal regulations and per applicable fire codes and *Compressed Gas Association* (CGA) standards. At the DRF, gas cylinders are stored in room 123 or properly stored at their place of use.
- Names and hazard classes of the gases must be posted in the cylinder storage area.
- Cylinders shall always be secured in an upright position to protect against falling or rolling, on a firm, level floor (ideally concrete), especially liquefied fuel cylinders in order to keep the safety devices in the vapor phase.
- Valves must be closed with valve protection caps secured when regulators are not on the cylinders. Caps should be hand tight and not forced or over tightened.
- Cylinders (full and empty) must be anchored at all times to a wall or bench clamp or secured within cylinder racks or stands. An appropriate restraint device (strap or chain) shall always be used.
- Empty and full cylinders shall be stored separately with the storage layout designed so that cylinders made up of old stock can be removed first with minimum handling of other cylinders. Empty cylinders must be marked accordingly using the attached tear-off wire tag label or other suitable sign or tag or by writing "Empty" or "MT" in chalk on the cylinder. For laboratories, arrangements should be made for empty cylinders to be picked up by the supplier as soon as possible. Never try to refill a compressed gas cylinder.
- Rotate stock of full cylinders, and use cylinders on a "first in, first out" basis.

- Storage areas should be cool, dry, and well ventilated. Cylinders must be stored away from excessive heat sources, such as stoves, furnaces, radiators, electric welding tools, direct sunlight, and the presence of open flames. Cylinders should not be subjected to a temperature above 125 degrees Fahrenheit (52 degrees Celsius). Cylinders must be stored at least 20 feet from combustible and incompatible materials, such as oil, gasoline, or waste, and vegetation. They should not be exposed to excessive dampness, salt or to corrosive chemicals or fumes.
- Cylinders must not be subjected to artificially created low temperatures without the approval of the supplier. Many steels undergo decreased ductility at low temperatures.
- Cylinders must be grouped, and the groups subsequently arranged by type of gas contained. Incompatible gases, such as flammable and oxidizing, shall be separated by a minimum of 20 feet or by a noncombustible barrier of at least 5 feet high having a fire resistance rating of at least one-half hour. Post “No Smoking” signs.
- Toxic gas monitors must be installed in toxic gas storage areas and set to alarm if a release is detected. Exhausted enclosures may be required by fire code.
- Corrosive gases shall be managed with the same precautions as toxic gases. Gas distribution systems must be gas compatible.
- Cylinders stored outside must be protected against severe weather, tampering, combustible waste, and the ground beneath to prevent rusting. Combustible material, including vegetation, shall be kept a minimum of 20 feet from cylinders. If snow or ice accumulate on a cylinder, thaw at room temperature, or with water at a temperature not exceeding 125 degrees Fahrenheit (52 degrees Celsius).
- Cylinders must be protected from objects that would cut, damage or otherwise produce an abrasion in the surface of the metal. Cylinders should not be stored near elevators or gangways, or in locations where heavy moving objects may strike or fall on them.
- Store cylinders away from heavy traffic and emergency exits. Do not store cylinders in hallways.
- Storage use and handling areas must be secured against unauthorized entry or access to unauthorized personnel.
- Gas cylinders should not be stored longer than one year without use.
- Never store liquid or gas chlorine cylinders with ammonia cylinders.

### **17.7 Guidelines for Transport**

- Connected equipment (e.g. regulators) must be removed prior to transport. Valves must be closed to prevent internal contamination and removable valve protection caps shall be secured at all times during handling and transport.
- Wear suitable PPE when transporting cylinders. Leather gloves and safety footwear, for example, can provide some protection against falling/slipping cylinders crushing hands or feet during moving.
- Use a suitable hand truck or cart in good condition designed for cylinder movement with cylinder firmly secured. Avoid lifting/lowering cylinders on steps. Use ramps when available.
- When moving gas cylinders short distances, rolling them on their bottom edges (edge-rolling) should be avoided if possible unless cylinder is on a smooth, level, firm surface. Sliding,

dragging or rolling cylinders on their sides is not permitted as it causes excessive wear and may weaken cylinder walls by metal erosion.

- Cradles shall be used for hoisting. Lifting magnets shall not be used. Ropes, chains or slings are not authorized when transporting cylinders unless provisions have been made on the cylinder for appropriate lifting attachments, such as lugs.
- Avoid dropping and striking cylinders together. Do not drop cylinders as a method of transfer.
- Do not lift cylinders by the cap, valves, or valve hand wheels. Do not bear-hug cylinders to affect a lift.
- Do not attempt to catch or restrain a falling cylinder.
- Fuel gas and liquefied fuels must be stored and shipped valve end up.
- Cylinders must be upright when they are transported in powered vehicles.
- All cylinders with a water weight of over 30 lbs. must have caps or other protection.
- Valve protection caps must be on cylinders at all times while transported, excluding welding gas moved about a localized work area on a specialized carrier/dolly.
- Use freight elevator when possible. If use of a freight elevator is not possible, do not use an elevator with people on it or allow other people to ride on the elevator when transporting cylinders. When asphyxiant gases are transported in an elevator, send the cylinder up or down by itself if at all possible but only if the elevator can be made to not stop at other floors before it is removed.
- Do not attempt to handle cylinders if you are fatigued, physically compromised, or under the adverse influence of medication.

### **17.8 Gas Cylinder Distribution Systems**

- Gas cylinder distribution systems e.g. valves, regulators, tubing must be compatible with the gas conveyed by the system. Do not use grease or oil on valves or other connections carrying oxidizing gas.
- Gas cylinder distribution systems supplying flammable, corrosive or toxic gas must be inspected regularly for leaks. Leak tests may be performed by using SNOOP or soapy water, using a gas detector, or by pressurizing the delivery system and evaluating pressure within the system over time (tightness testing). Leaks are most frequently detected at connections/fittings.
- Flexible tubing is preferable for connections frequently detached and reconnected, e.g. between the cylinder and distribution system, regulator and distribution system and distribution system and equipment. Disconnecting and reconnecting rigid tubing can cause premature wear. Flexible stainless-steel tubing options are available.
- Gas distribution tubing passing through fire rated walls or enclosures must be sealed to maintain the integrity of the fire rating e.g. fire caulk.
- Gas distribution tubing must be located sufficiently distant from electrical equipment such that arcing is not feasible.
- Gas cylinder valves must be closed when gas is not in use.

### **17.9 Guidelines for Compressed Gas Cylinders – Emergencies**

Note: Hydrogen gas' explosive limits range from 4% to 77% with an ignition energy of just 0.02 millijoules, hydrogen fires may be invisible.

Minor Leak: If a leak or a suspected leak occurs in a gas cylinder attempt to stop the leak by tightening a valve or packing nut. If this does not work, attempt to situate cylinder so that it is in a fume hood or under local exhaust ventilation such as a canopy hood or snorkel. If this cannot be done and if it is safe to do so, immediately transport the cylinder outside of the building away from possible fire or ignition sources in a location that is free from wind currents that might carry the gas to an ignition source. If the gas is flammable, or toxic, place a sign warning against these hazards.

If it is not safe or physically possible to move the cylinder, notify those in the area and evacuate the area and/or building. Contact EH&S and notify the supplier for instructions as to the return of the cylinder. If the minor leak involves corrosive or toxic gas, notify those in the area, secure area, evacuate building, and call 911.

Major Leak: If a major leak occurs, notify those in the area, and evacuate building or area. Activate the fire alarm and call 911 when it is safe to do so. Notify the supplier for instructions as to the return of the cylinder.

- A safety data sheet (SDS) must be readily available for each type of gas.
- Emergency equipment, such as emergency eyewash, emergency shower, and fire extinguisher, shall be available.
- Emergency procedures must be developed and implemented for emergency situations. Posting emergency procedures is recommended.

## 18 BUILDING SAFETY INSPECTIONS

### 18.1 References

1. SPPM 2.78 *Safety Precautions for Office Workers*
2. SPPM 2.50 *Self Inspection*
3. *Safety Inspection Checklist*
4. WAC 296-155-020 *Housekeeping*
5. *Workplace Hazard Assessment Certification Form*

### 18.2 Scope

Workplace safety self-inspections are important to identify and control workplace hazards and to ensure compliance with University policies and regulatory requirements. University policy regarding the performance of safety self-inspections are provided in *Safety Policy and Procedures Manual* SSPM 2.50.

### 18.3 Requirements

Unit managers must ensure building safety inspections are performed annually, at a minimum. However, high-hazard areas (e.g. chemical storage sites) should be inspected more frequently or when new construction, renovation, or significant process changes occur. The following are Nuclear Science Center safety and housekeeping inspection schedules:

- Office areas are inspected annually;
- Laboratories are inspected per the lab safety manual on a weekly basis;
- Chemical storage areas are inspected bi-annually, dangerous waste storage areas are inspected weekly, per RCRA requirements.

Laboratory managers must ensure safety inspections are documented and documentation is available for review by department personnel. Records shall be maintained per NSC policies.

### 18.4 Building Inspection Procedures

Building safety inspections are intended to evaluate potential workplace safety and health hazards referencing the policy requirements outlined in the university safety policy and procedures manual (SPPM).

- Inspections of work areas must be completed by a different unit (e.g. *Environmental Services* inspects the *Occupational Health and Safety* work areas).
- The inspection must be conducted by the safety committee member or appointee for each unit. It is recommended the Director or unit manager periodically attend the inspection.
- The inspection must be documented using the EH&S *Building Safety Inspection Checklist (Appendix A)* and submitted to all unit managers.
- The unit managers shall review and acknowledge the information submitted on the *Building Safety Inspection Checklist*. Any deficiencies must be communicated to the responsible supervisor(s) and affected employees. Unit managers must work with supervisors and employees to fix deficiencies and recommended corrective actions.

- Supervisors are required to take immediate remedial action to correct any safety deficiencies found during the inspection as identified on the report.
- The EH&S Director is responsible to arrange funding of feasible corrective actions that may require modifications to facilities, new furniture or equipment.
- The EH&S Safety Committee must review the *Building Safety Inspection Checklist* at the first meeting following the completion of the inspections. All deficiencies shall be reviewed by the Safety Committee to ensure corrective action has been satisfactorily completed or if further recommendations or follow-up is necessary.

The WSU Nuclear Science Center is committed to identifying and promptly controlling hazardous conditions and practices that are likely to result in injury or occupational illness to employees or occupants. All employees must cooperate with the inspection process and recommended corrective actions.

### **18.5 General Workplace Hazard Assessment**

Supervisors are required to develop and maintain a standard workplace hazard assessment certification form (see Chapter 14, PERSONAL PROTECTIVE EQUIPMENT) for routine tasks performed by their employees. Supervisors must review the form for additional hazards, as needed, to support the work performed by their employees.

Employees observing a potential safety and health concern are to contact their supervisor. The supervisor should take immediate action to correct the concern. Building maintenance issues should be reported to the Operations unit and *Facilities Operations* at 335-9000.

## **19 CRANE INSPECTIONS**

### **19.1 Purpose**

The Dodgen Research Facility is equipped overhead cranes and chain hoists. Documented safety training shall be completed prior to operation of the crane. Crane operators shall complete the necessary documentation prior to operating the crane.

### **19.2 Location and Storage of Cranes**

There are two overhead cranes located in 201 Pool Room and the east end of the building in the Mechanical Room. The parking position of the 201 crane is above the mezzanine, the east facility crane parking position is in the mechanical shop, and the parking position of the B21 crane is in the southwest side of the laboratory area.

### **19.3 Requirements**

All training requirements will be met and any discrepancies will be documented and immediately reported to the Competent Person.

### **19.4 Training**

All NSC personnel with a need to operate the crane will be trained prior to operation. Authorized users of the cranes will be documented by the Competent Person in the *Lab Safety Manual*.

NSC personnel with a need to use the crane will log in sufficient time that the Competent Person is comfortable with the safe use of the crane. Practice time will be documented, with and without load practice.

### **19.5 Pre-Operation Checks and Inspection of Rigging**

Prior to the day's operations for use of the crane, a pre-operational check shall be performed and documented. See the form for pre-operational checkout of the crane(s) located in the *Laboratory Safety Manual*.

### **19.6 Operation of the Crane**

- Side pulling occurs when the load is lifted from rest in a direction that is not entirely perpendicular with the ground. This will result in load shifting, swinging, and can cause the crane to collapse. Absolutely no side pulling is permitted.
- Swaying of the load occurs with the crane is started or stopped abruptly, or smooth motion of the crane and load is not maintained. While some sway will occur, endeavor to keep sway to a minimum.
- Keep hoist ropes vertical.
- Be aware of the upper, lower, and side to side limits of the crane movement.
- Be aware of any overhead crane obstructions that the crane or load could hit during travel. In some cases, the limit of the crane exceeds an obstruction and will crush it and/or harm the crane.
- Check load limits on all equipment, ensure that the limit of the equipment is greater than the load limit. NEVER rely on safety factors to take additional weight.
- All parking positions shall be maintained following each crane use.

- Pre-operational checks will be performed and documented.

### **19.7 Use of Rigging**

All rigging must be documented, weight rated, purpose made, tagged, and inspected prior to each use. Job specific crane training will be conducted by a competent person prior to crane and rigging use.

### **19.8 Use of the Nylon Barrel Sling**

The nylon barrel sling shall be used for 30 and 55-gallon open head drums. Barrels must be closed with barrel rings tight prior to lifting. The weight rating on the nylon barrel sling is 1000 lbs. Rigging shall be using the crane in the configuration shown below:



Figure 19-1. Example of where to correctly place the lifting straps when rigging a barrel.

## 20 LADDER SAFETY

### 20.1 References

1. SPPM 3.34: *Elevated Work Safety*
2. WAC 296-876: *Ladders-Portable and Fixed*

### 20.2 Scope

This chapter covers the safety of Nuclear Science Center employees when using ladders. The requirements are governed by *Washington Administrative Code 296-876, Portable and Fixed Ladders and WSU Safety Policy and Procedure Manual (SPPM) Chapter S3.34, Elevated Work Safety*.

### 20.3 Appendices

Appendix A – Ladder Inspection Checklist

Appendix B – Guidelines for Ladder Use

### 20.4 Responsibilities

#### 20.4.1 Supervisors

- Ensure all employees that use ladders receive ladder safety training before performing work.
- Provide the correct ladder types for the intended application(s).
- Ensure ladders are inspected when first placed into service, prior to every use, and immediately after potential damage from impact (e.g. tip over, excessive heat, or corrosive chemicals).
- Ensure ladders with defects are taken out of service immediately, affixed with an out-of-service or do-not-use sign and disposed as soon as possible.

#### 20.4.2 Employees

- Participate in training when required.
- Select the appropriate portable ladder for the work activity.
- Maintain ladders in good, usable condition.
- Inspect ladders before each use by using the inspection checklist (Appendix – A).
- Do not use defective ladders, take the ladder out of service immediately, and report the observed defects to their supervisor.

### 20.5 Training

Training is provided to employees by the EH&S *Occupational Health and Safety* (OHS) unit. Retraining is required when an employee exhibits inadequate knowledge, skill or understanding or non-conforming use of ladders. Training will require participants to demonstrate an understanding of WAC 296-876 and a proficiency using ladders. Training information will include:

- The proper selection, use, placement and care in handling and transporting ladders.
- The maximum intended load capacities of ladders that are used.

- How and when to inspect ladders.

## 20.6 Appendix A – Ladder Inspection Checklist

Appendix A

# Ladder Inspection Checklist

Provided by Werner Co.

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**Stepladder**

Fiberglass



Circle Areas of Damage

Size \_\_\_\_\_ ft.

Aluminum     Wood

**Steps:** Loose, Cracked, Bent or Missing

**Rails:** Cracked, Bent, Split or Frayed  
Rail Shields

**Labels:** Missing or Not Readable

**Pail Shelf:** Loose, Bent, Missing or Broken

**Top:** Cracked, Loose or Missing

**Spreader:** Loose, Bent or Broken

**General:** Rust, Corrosion or Loose

**Other:** Bracing, Shoes, Rivets

Yes    No

Actions:     Ladder tagged as damaged & removed from use  
 Ladder is in good condition

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**Extension Ladder**

Fiberglass     Aluminum



Circle Areas of Damage

Size \_\_\_\_\_ ft.

**Rungs:** Loose, Cracked, Bent or Missing

**Rails:** Cracked, Bent, Split or Frayed

**Labels:** Missing or Not Readable

**Rung Locks:** Loose, Bent, Missing or Broken

**Hardware:** Missing, Loose or Broken

**Shoes:** Worn, Broken or Missing

**Rope/Pulley:** Loose, Bent or Broken

**Other:** Bracing Rivets

**General:** Rust, Corrosion or Loose

Yes    No

Actions:     Ladder tagged as damaged & removed from use  
 Ladder is in good condition

Figure 20-1. Ladder Inspection Checklist.

## 20.7 Appendix B – Guidelines for Ladder Use

### 20.7.1 General

- Ensure ladders are set-up and secured to prevent accidental displacement or use barricades when in a location where they could be displaced by workplace activities or traffic. Place the ladder with a secure footing on a firm, level support surface. Do not place on snow, ice or other slippery surface unless it is secured or equipped with slip-resistant feet applicable to the support conditions.
- Ensure correct types of ladders are used so the maximum intended load (MIL), (MIL = the weight of the employee + tools) does not exceed manufacturer's rated ladder capacity (see MIL ratings below).
- Ensure ladders are not moved, shifted, or adjusted while occupied by personnel.
- Do not place ladders on boxes, barrels or other unstable bases.
- Metal ladders shall not be used in the vicinity of energized electrical equipment or lines.
- Wood ladders shall not be painted with opaque paint, except for numbering purposes.
- Ladders transported on motor vehicles shall be properly supported and secured to the vehicle at all times to prevent damage.
- Do not use ladders for skids, braces, workbenches, or for any purpose other than climbing.
- When you are ascending or descending a ladder, do not carry objects that will prevent grasping the ladder with both hands.
- Always face the ladder when ascending and descending.
- Only one person is allowed on a ladder at a time.
- Do not jump from a ladder when descending.
- Ladder components must be free of grease and/or oil.
- Do not store portable ladders near sources of heat, moisture, or chemicals.
- Store portable ladders in a position to maintain straightness and to avoid impact damage.

### 20.7.2 Ladder Types

Table 20-1. Ladder types, uses, and weight ratings.

Duty Rating	Ladder Type	Use	MIL Pounds
Extra Heavy Duty	IA	Industry, utilities, contractors	300
Heavy Duty	I	Industry, utilities, contractors	250
Medium Duty	II	Painters, offices, light maintenance, storage warehouse	225
Light Duty	III	General household type use	200

### 20.7.3 Portable Step Ladders

- Do not place tools or materials on the steps or top cap of a stepladder.
- Do not use the top cap or top step of a stepladder as a step or stand.

- The top step can be used if it is 18” or more below the top cap.
- Always level all four feet and lock spreaders in place.
- Do not use a stepladder as a straight ladder or in a partially open position.
- Do not use or climb on the rear braces or shelf unless they are specifically designed for that purpose.

#### **20.7.4 Portable Straight type or Extension Ladders**

- Straight or extension ladders must extend at least three (3) feet beyond the supporting object when used to access an elevated work area.
- After raising the extension portion of a two or more stage ladder to the desired height, check to ensure that the safety dogs or latches are engaged.
- Set and use at a pitch so that the horizontal distance from the top support to the foot of the ladder is about one-quarter of the working length of the ladder.
- Place ladders so that side rails are equally supported by the top support, unless the ladder is equipped with a single support attachment.
- Make sure the top support of the ladder is reasonably rigid and able to support the load.
- All ladders must be equipped with safety (non-skid) feet.
- All extension or straight ladders must be secured or tied off at the top when work is to be performed on the ladder.
- Always use a full body harness with a lanyard that is secured to an anchor point rated for fall arrest and secure the ladder secured at the top and base when work requires the use of both hands and is more than 25 feet above the ground or floor.
- Work shall not be performed from a ladder more than 25 feet above the ground or floor if the work requires wearing eye protection or a respirator.
- Do not tie or fasten ladder sections together to make a longer ladder unless the manufacturer endorses this use and all manufacturer required fittings/attachments are available.
- Ensure each section of a multi-section ladder, when fully extended and locked in position to be used, overlaps the adjacent section as indicated in Table 2, *Minimum Required Overlap for Extension Ladders*.

#### **20.8 Table 2: Minimum Required Overlap for Extension Ladders**

Table 20-2. Minimum required overlap needed for various ladder sizes.

<b>Ladder size (ft)</b>	<b>Minimum required overlap for a two-section ladder (ft)</b>
Ladder height ≤ 36	3
36 > Ladder height ≤ 48	4
48 > Ladder height ≤ 60	5

## 21 MACHINE & TOOL SAFETY

### 21.1 References

1. SPPM 3.62: *Machinery Safeguards*
2. WAC Chapter 296-806: *Machine Safety*
3. WAC Chapter 296-807: *Portable Power Tools*
4. WAC 296-155-360: *Part G, Tools Hand and Power*

### 21.2 Scope

This chapter establishes safe work practices while operating machines and/or tools. Machines, tools and their moving parts present a workplace hazard. Installed and used properly, protective safeguards, engineering controls and administrative controls protect workers by helping to reduce machine and tool hazards.

Protective safeguards and engineering controls are generally physical barriers that either enclose or isolate machine and tool hazards. Safeguarding requirements are specific to the hazard(s) controlled and safeguarding methods used to control the hazard(s). Method and equipment specific requirements are further detailed in the WAC(s) referenced above. Examples of protective safeguards and engineering controls include: machine/tool guards, blade guards, railings, auto braking and shut off devices, ventilation equipment, etc. Examples of administrative controls include: job rotation, work practices, warning signs, etc.

### 21.3 Responsibilities

#### 21.3.1 Supervisors

- Machines and tools in the workplace are assessed for hazards and required PPE.
- Required personal protective equipment is documented on a Workplace Hazard Assessment Form such as: Chapter 14.8 *Appendix A: Hazard Assessment Certification Form*.
- Employees are trained how to use PPE and engineering controls, and follow administrative controls. PPE, engineering and administrative control training shall be documented on a Training Certification Form such as Chapter 14.9 *Appendix B: PPE Training Certification Form*.
- Employees are trained in the proper and safe use of machines and tools and their protective safeguards and engineering controls in accordance with the manufacturer's instructions and WAC Chapter 296-806, WAC Chapter 296-807 and WAC 296-155-360 requirements.
- Machines and tools are equipped with appropriate safeguards and safeguard are used per WAC Chapter 296-806 , WAC Chapter 296-807 and WAC 296-155-360.
- Inspection checklists are developed for machines, tools, protective safeguards and engineering controls in accordance with manufacturer's and applicable WAC (requirements) and they are periodically inspected and the inspection documented, filed and retained as specified in Chapter 18.
- Machines and stationary and portable tools with reported inadequate or non-functioning safeguards and/or engineering controls are tagged with a hazard

notification sign or an out-of-service sign, and when necessary removed from the use area or disconnected from its power source.

- Employees conform to the following requirements.

#### **21.4 Employees**

- Inspect and confirm operation of machine and tool safeguards prior to each use in accordance with applicable WAC requirements.
- Disconnect the energy source using the lockout procedure when inspecting or maintaining machines and tools in accordance with *Chapter 12.15: Lockout/Tagout* of this THSP.
- Use machines, tools and protective safeguards in accordance with the manufacturer's instructions.
- Maintain machine and tool safeguards in accordance with WAC for Machine Safety at: WAC Chapter 296-806, WAC Chapter 296-807 and WAC 296-155-36060.
- Use applicable personal protective equipment when operating machines and tools in accordance with the applicable hazard assessment training and the manufacturer's instructions.
- Only remove safeguards during maintenance, service, and repairs when power sources are disconnected and controlled in accordance with *Chapter 12.15: Lockout/Tagout* of this THSP Manual.
- Return all safeguards to their correct location and confirm operation after maintenance activity is complete.
- Do not wear loose clothing, neckties, rings, or other jewelry which could be caught or entangled in moving parts.
- Wear caps, hair nets, or other protection which confines hair that is long enough to be caught or entangled in moving parts.
- Report all machine and tool hazards and non-functioning safeguards to supervisor immediately and disconnect and lockout the energy source and tag out the machine with an out of service label.

#### **21.5 Training**

Training will be provided to workers once at the time of hire and documented and retained in accordance with *Chapter 25: SAFETY TRAINING*. Re-training will be required when:

- There have been changes in the workplace, such as introducing new processes and/or equipment;
- Changes in the types of machines, tools or equipment;
- And/or when an employee exhibits inadequate knowledge, skill and understanding or non-conforming use of the machine, tool or equipment.

Training will require participants to demonstrate an understanding of the operating instructions, the safety requirements for using the machine and tool and a proficiency using the machine and tool while applying safety measures. Training information will include:

- Inspection requirements prior to the use of each machine and tool;

- The hazards associated with the machine and tool;
- The required safeguards, controls and general safety procedures for each machine and tool used; and.
- The required PPE and its use related to each machine and tool referencing THSP Manual

## 22 WASTE MANAGEMENT

### 22.1 Waste Minimization

All waste chemicals, including contained gases, liquids, and solids that are toxic, ignitable, corrosive, and/or reactive are to be handled as hazardous waste unless a waste profile has been completed to determine and demonstrate that they are not hazardous. To minimize the hazardous wastes generated by laboratory operations, personnel are encouraged to:

- Substitute less hazardous materials and chemicals for regulated hazardous ones whenever possible.
- Minimize the quantities of chemicals ordered to fit anticipated usage and minimize the volume of excess chemicals on hand.
- Modify processes to generate smaller quantities of hazardous waste, whenever possible.

### 22.2 Radioactive Material Trash Disposal

Radioactive trash is disposed of in 2 ft<sup>3</sup> lined cardboard boxes or 55-gallon drums. These containers are distributed by the Radiation Safety Office on an as needed basis from the Dodgen Storage Building located behind the Dodgen Research Facility.

All radioactive trash should be consolidated when available to a central radioactive trash box if space permits. Do not let boxes collect in laboratory spaces. Once a box is full:

- Close the bag lining with a zip tie,
- Seal the box with packing tape on all sides,
- Inform the laboratory manager that a rad box is full, and request a new one,
- Fill out the Rad Waste Disposal Pickup form for the box, and
- Schedule a rad waste pickup by filling out the online radioactive waste pickup form at <https://radsafety.or.wsu.edu/ehsa/> Non-Radioactive Trash Disposal

Empty boxes, packing material, excess paper and other trash that does not fit in the standard trash cans or wastebaskets in the laboratory area shall be taken by the person generating the waste to the local dumpster for disposal.

Glassware, wire, and all other sharp objects shall not to be placed in trashcans or wastebaskets with the regular trash. Broken glass disposal cartons are available in the laboratory facilities for this purpose.

Waste containing flammable material shall not be disposed of in regular trash. Wipes or towels that had been wetted with alcohol (IPA) or acetone may be disposed of in regular trash, but only if they have been used until dry. Otherwise, these flammable wastes must be handled as hazardous waste.

#### 22.2.1 Wooden Pallets

Wooden pallets are frequently used for transportation of heavy items. Do not allow wooden pallets to accumulate, as they are a fire hazard. To dispose of wooden pallets, first stack them next to the dumpster on the west side of the facility. Do not place wooden pallets in the dumpster. Next, submit a work request at [myfacilities.wsu.edu](http://myfacilities.wsu.edu) under "surplus disposal." Include the location and number of pallets to be removed. Facilities will then pick up the waste pallets.

### **22.2.2 Cardboard**

Cardboard must not be allowed to accumulate in hallways or laboratory spaces. Gas bottle storage contains a large blue plastic container used for the aggregation of cardboard. To dispose of cardboard, flatten the box and place in the plastic container. Prior to the container overfilling, submit a work request at [myfacilities.wsu.edu](http://myfacilities.wsu.edu) under “surplus disposal.” Include the location and plastic container to be emptied. Facilities will then pick up the cardboard waste.

### **22.3 Disposal into the Sanitary Sewer**

Many of the liquid chemical wastes produced in the laboratory are not hazardous. However, per Environmental Health & Safety regulations, laboratory workers are not authorized to determine which wastes may be disposed of in the sanitary sewer. Therefore, no chemical wastes can go down the drain of a sanitary sewer.

### **22.4 Disposal of Empty Containers**

Cardboard containers are provided for glass containers and broken glass. Consult the Laboratory Safety Manual or contact Environmental Health & Safety for questions regarding disposal of empty containers.

### **22.5 Disposal of Consumer Items**

Consult the Laboratory Safety Manual or contact Environmental Health & Safety for questions regarding disposal of consumer items.

### **22.6 Management of Hazardous Waste**

Consult the Laboratory Safety Manual or contact Environmental Health & Safety for questions regarding disposal of hazardous waste.

### **22.7 Recycling**

Containers for collection of NSC work product are placed in several locations on the second floor of the Dodgen Research Facility. Corrugated cardboard is recycled in a bin outside of the first-floor east doors of the Dodgen Research Facility or bin outside the first-floor main doors of Fulmer Hall. Recycling containers for office paper, plastic containers/bottles, and aluminum reside in Dodgen 150.

Battery recycling buckets are maintained in the front office (room 50 of the Dodgen Research Facility) and reactor shop (room 201A of the Dodgen Research Facility) for used batteries. Environmental Health & Safety processes the waste battery recycling buckets when notified.

## **23 SAFETY BULLETIN BOARDS**

### **23.1 References**

1. SPPM 2.14 - *Safety Bulletin Boards*
2. WAC 296-800-19005 *Provide a safety bulletin board in your work place*

### **23.2 Purpose**

*The Safety Bulletin Board* provides a location for communicating safety topics and concerns to WSU EH&S employees.

### **23.3 Location**

Each University Department or Unit must install and maintain a safety bulletin board in an appropriate central location, such as a break room or near the main building entrance. The EH&S bulletin board is located in the corridor adjacent to room 81 in the Dodgen Research Facility.

The NSC safety bulletin boards are in the Dodgen Research Facility, Room 50: Front Office and Room 150: Conference Room.

### **23.4 Responsibility**

Department or Unit administrators in coordination with the safety committee or safety committee representative are responsible for ensuring the required materials are posted on the safety bulletin board. Department or Unit administrators

### **23.5 Required Content**

1. *Job Safety and Health Law* (F416-081-909)
2. *Your Rights as a Worker in Washington* (F700-074-909)
3. *If a Job Injury Occurs/Workers Compensation* (F242-191-909)
4. The OSHA 300 Summary must be posted from February 1 to April 30 each year. The annual OSHA 300 summary may be obtained by contacting EH&S 335-3041.
5. Labor and Industries (L&I) violations received by the department for the required (varies) posting interval.

### **23.6 NSC Specific Required Content**

1. U.S. NRC Form 3: Notice to Employees
2. Additional safety materials may also be posted on the bulletin board.

### **23.7 Maintenance**

In order to maintain a professional appearance worn material should be replaced periodically. Dated material is to be removed. It is recommended that at a minimum, materials be reviewed every 6 months.

Although some information is required to stay posted on your safety bulletin board, encourage employees to return periodically by adding new safety educational materials available free from L&I, such as posters or safety tips, and also update your safety bulletin board with the latest information.

### **23.8 Assistance**

Contact the *EHS Occupational Health and Safety* unit at 335-3041 with questions concerning safety bulletin boards. Contact the NSC 5-8641 for questions concerning NSC specific content on safety bulletin boards.

## **24 SAFETY, HEALTH, & SECURITY COMMITTEE (LEVEL 4)**

### **24.1 References and Resources**

1. SPPM 2.12: *Unit Safety, Health, and Security Committees and Meetings*
2. Safety Committees / Safety Meetings: WAC 29-800-130
3. *Washington State Department of Labor and Industry Safety Meetings and Committees*

### **24.2 Purpose**

Safety committees provide a venue for communicating and evaluating workplace safety and health concerns identified by employees. The NSC Level 4 Safety, Health, and Security (SHS) Committee is intended to represent all NSC employees. All non-management NSC employees may attend safety committee meetings, and an NSC management representative will be present to ensure employee concerns are raised to the management level.

### **24.3 NSC SHS Committee Structure**

This committee information is for the NSC SHS committee.

### **24.4 Membership**

#### **24.4.1 Non-management Representatives**

- Non-management representatives consist of the reactor manager, a member of permanent staff from reactor operations, a member of permanent staff from NSC research, a student from reactor operations, a student from research, and a WSU faculty member.
- Additional non-management representatives can be included on the safety committee during the annual elections.
- Employees nominate and elect fellow workers to represent them on the committee.
- Employees elect committee members to serve for a two-year term (one-year appointment for student members). Members may be reelected by their peers. There is no limit on the number of terms to which employees may be re-elected.
- If a member cannot attend, a substitute member can be designated to attend in their place. An email must be sent to the Safety Committee Chair prior to the start of the safety committee meeting.
- Vacancies are filled by special election.
- If a non-management representative chooses to not complete their term of membership, a replacement member will be appointed by management for the duration of the term of membership.
- Term of membership: August 15th through August 14th of the following year
- Each non-management representative is a voting member.

#### **24.4.2 Management Representatives**

- The unit administration appoints at least one management representative to the committee.
- If a member cannot attend, a substitute member can be designated to attend in their place. An email must be sent to the Safety Committee Chair prior to the start of the safety committee meeting.

- The number of management members may not exceed the number of non-management employee members.

#### **24.4.3 Committee Chair**

- The committee chair is elected by the members to a one-year term (August 15<sup>th</sup> – August 14<sup>th</sup> of the following year).
- The committee chair must be a current non-management representative.
- The outgoing chair has the duty to help organizing the 4<sup>th</sup> quarter meeting (October).
- Elections
- Nominations are brought to the 3<sup>rd</sup> quarterly meeting (July) and are brought forward at the beginning of the election portion of the agenda.
- Additional non-management representatives can be added through a nomination process and approved by a majority of the representatives.

#### **24.5 NSC SHS Committee Functions**

Safety meeting agendas must include the following activities:

- Review Level 3 Office of Research SHS Committee minutes.
- Assist unit supervisors in promoting or publicizing relevant safety and health topics (i.e. issues, policies, programs, training).
- Evaluate employee safety concerns, reported hazards, and suggestions, and proposing solutions.
- Assist unit supervisors in reviewing job procedures and recommending improvements.
- Evaluate Incident Reports and Supervisor's Accident Investigation Reports to determine causes/problems and recommending methods of prevention or solutions.
- Refer unresolved safety problems to the unit administrator.
- Review and approve, biennially, the NSC's Accident Prevention Program, THSP, Facility Procedures, and Laboratory Safety Manuals and make recommendations to the unit administrator on improvements.
- Assist unit supervisors in coordinating and conducting annual safety self-inspections.

Optional meeting activities:

- Meeting annually with the unit administrator and supervisors to select projects based on their activities, potential hazards, accident history, and WSU policy requirements.
- Reporting progress on safety projects during safety committee meetings.

#### **24.6 Meetings**

This committee meets quarterly (January, April, July, and October, the third Tuesday at 1 pm in Dodgen 218) and begin at the scheduled time or when a quorum has been reached (at least 4 members present, with one being a representative from management).

The length of each meeting may not exceed one hour except by a majority vote of the committee.

## **24.7 Documentation**

### **24.7.1 Minutes**

The committee chair documents safety meetings.

The NSC SHS Committee must document the minutes of meetings. The Committee may use the *Safety Meeting Report and Agenda form* on SPPM 2.12.4-5 or may create a report to document meetings.

### **24.7.2 Routing**

The Safety Committees must route the safety meeting report to unit administrators or supervisors for signature.

The Safety Committee will submit signed meeting reports to the unit by direct distribution to employees or by posting copies on safety bulletin board.

## **24.8 Retention**

The Safety committee will maintain copies of the safety meeting reports on file for at least two years, in accordance with University records retention requirements. (See BPPM 90.01.)

## 25 SAFETY TRAINING

### 25.1 References

1. SPPM 20.31 *Safety Training*
2. SPPM 2.16 *Safety Orientation*
3. *Safety Orientation Checklist*
4. SPPM 3.10 *General Requirement for PPE*

### 25.2 Purpose and Scope

This WSU Nuclear Science Center *Accident Prevention Plan* is required reading for all current and new employees of the Center. Employees are be required to read and understand the program. All employees are required to complete the requirements in *Section 2.6: New Hire Safety Orientation* in addition to the rest of the requirements in the APP. All NSC employees will fill out WSU form 2.16.2 [Safety Orientation Checklist](#).

This chapter establishes responsibilities and training requirements for NSC employees where training is identified as an administrative control to reduce workplace hazards or is required by State rule.

### 25.3 Responsibilities

#### 25.3.1 Supervisors

- Understanding the contents of this chapter;
- Ensuring employees receive *New Employee Safety Orientation* training including access and time to review this APP;
- Identifying employee work activities requiring training as outlined in this APP;
- Identifying training resources and permitting time during the work shift for employee training, initially with refresher training as required;
- Ensuring employee training is documented and training records are maintained; and,
- Evaluating employee performance and arranging for retraining when necessary.

#### 25.3.2 Employees

- Understanding the contents of this chapter;
- Participating in *New Employee Safety Orientation* training and familiarizing themselves with this APP;
- Understanding what work activities require training prior to engaging in those work activities;
- Participating in training as required;
- Demonstrating proficiency and an understanding of the safety principles learned; and,
- Requesting additional training whenever concern arises over the adequacy of their existing training relating to specific work activities.

## 25.4 Requirements

Employee job classifications and their assigned duties aid Supervisors in determining an employee's required safety training. Supervisors must be familiar with the employee training requirements established in this APP.

SPPM 2.18 requires that all employees receive training from the employing department on various topics. The NSC required safety training includes completing the following training links:

- *Back Injury Prevention*
- *Slips, Trips, and Falls – Module 1 AND Module 2.*
- *Fire Extinguisher Operation*
- *Use of PPE: Eye Protection and Hand Protection*
- *Office Safety and Health*

## 25.5 New Hire Orientation

Every new WSU employee will be provided a safety orientation referencing the requirements established in SPPM 2.16 *Safety Orientation*. A *Safety Orientation Checklist* must be completed (see the PDF version of 2.16.2) and recorded in the employee training record. Rehires or cyclical workers with less than six (6) months duration away from work, need not be considered new hires except at the start of their initial cycle.

Each employee must be briefed on the contents of this document and may be instructed to read selected safety materials, attend classroom-based training, and/or complete on-line training directly pertaining to assigned duties. Before new employees are released to perform work without the direct supervision of a properly trained supervisor or co-worker, they must satisfactorily complete the required safety training.

Initial safety training must include an overview of this THSP with specific instructions and time allotted for employees to read this THSP and understand their responsibilities. Employees shall be instructed not to engage in the following activities or work with the following materials without receiving additional work activity or specific material handling training (Note: The following list is provided for guidance and may not be all inclusive):

- Chemical Handling
- Respirator Use (non-voluntary)
- Confined Space Entry
- Work above 10 feet
- Ladder Use
- Work from Scaffolds
- Operate Lifts
- Trench/Excavation Work
- Work with Hazardous Energy/LOTO
- Hot Work (Weld/Cut)
- Work with Blood Borne Pathogens/OPIM
- Electrical Work
- Asbestos Work
- Lead Based Paint
- Dangerous Waste Handling
- Spill Response
- Signaling/Flagging
- Laboratory Work
- Work around Lasers
- Work around Radio Transmitters
- Pesticide Handling

- Operate Powered Tools
- Compressed Gas
- Radiation Safety

## 25.6 New Employees Should Also Understand

- They are to report any unsafe conditions or practices immediately to their supervisor;
- They have authority to stop work if any unsafe conditions or practices are present until such time as they are controlled;
- Nothing we do is so important as to necessitate the violation of standing safety practices; and
- Failure to comply with safety policies and procedures will be considered serious and result in timely corrective or disciplinary action judged to be appropriate for the specific circumstances at hand.

## 25.7 Specific Training Topics

Employees shall receive training as specified in *Washington Administrative Code (WAC)* and/or the *WSU Safety Policy and Procedures Manual (SPPM)* and this APP. Contact the EHS OHS unit for specific information. Records of specific trainings will be recorded in the respective Laboratory Safety Manuals.

## 25.8 Training Resources

Supervisors and trainers may obtain training aids from the following sources:

- The EHS home page <http://ehs.wsu.edu/> has training courses, DVDs, videos, fact sheets on numerous safety topics directly from the *Environmental Health and Safety Department*. If you don't see information on a topic call EHS and we will help get you the training you need.
- Posters and audio-visual safety trainings from the State of Washington Division of Occupational Safety and Health (DOSH) <http://www.lni.wa.gov/safety/>
- Audio-visual materials from *Academic Media Services*. See BPPM 80.13.
- Direct purchase from non-WSU vendors. Contact *Public Safety* or *Environmental Health and Safety* for assistance.

## 25.9 Recordkeeping

- New hire orientation and initial safety training shall be documented with the *Employee Lab & workplace Safety Training form*. All certificates of training for reactor operations personnel will be saved according to the following steps. Signed copies of current *Employee Lab & Workplace Safety Training forms* and the updated training tabulator are kept in Chapter 20 of the *Total Health and Safety Plan*.
- Supervisors should obtain a copy of the training form/sign-in-sheet used by the training provider. Supervisors provide training documentation to the NSC administrator for incorporation into their personnel file.
- Training dates, class titles and employee names will be recorded when an employee participates in a training event. The sign-in sheet for training must include a description of the class content. Employees are to personally sign in for each training event.

- For training requiring an evaluation or test, a copy of the employee's evaluation or test results will be placed in the employee's training records. Employees who fail to satisfactorily complete the evaluation or test will require retraining. Repeated failure to satisfactorily complete the evaluation or test may be addressed as a performance issue and handled accordingly.
- Training records will be retained after the employee's separation from employment referencing BPPM 90.1, *University Records--Retention and Disposition*.

## **26 ACCIDENT PREVENTION PROGRAM TRAINING**

Training documentation is kept in the master Laboratory Safety Manual located in Room 201 at the Dodgen Research Facility and is available electronically on the N: (N:\Emergency Preparedness\Accident Prevention Program\Lab Safety Manual\Training Documentation) and M: (M:\NUCS Core Facility\Safety\Documentation) drives.