

Battelle Contractor Environment, Safety & Health Manual



PNNL Contractor Environment, Safety & Health Manual

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Forms

(click on desired form to open)

- [Class II Penetration Permit](#)
- [Competent Person Designations and Instructions](#)
- [Construction Supervisor Safety Inspection Checklist](#)
- [Daily Excavations/Trenches Safety Inspection Checklist and Inspection Log](#)
- [Electrical Energized Work Permit](#)
- [Fall Protection Work Plan](#)
- [HESP Arc Flash Calculator](#) (Excel)
- [Job Safety Analysis](#)
- [Lock and Tag Logsheets](#)
- [Lockout/Tagout Inspection Form](#)
- [Lockout/Tagout Safety Mastercard](#)
- [Lockout/Tagout Written Instruction Form](#)
- [Management Removal of Lock and Tag](#)
- [Orientation Checklist](#)
- [Orientation Record](#)
- [Permit for Working with Open Flame, Welding, Cutting, or Grinding](#)
- [PNNL Contractor Employee Job Task Analysis Form](#)
- [Periodic Inspection Checklist](#)
- [Prejob Safety Planning Signoff](#)
- [Preliminary Hazard Assessment Form](#)
- [Safety Meeting Sign-in Roster](#)
- [Scaffolds Inspection Checklist](#)
- [Subcontractor Electrical Worker Qualification Form](#)
- [Training Attendance Record](#)
- [Weekly Safety Meeting Agenda](#)

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Exhibits

(click on desired exhibit to open)

- [Acquiring Locks and Tags](#)
- [Authorized Worker Requirements](#)
- [Checklist for Insulating Rubber Gloves](#)
- [Controlling Organization Lockout/Tagout Process](#) (PDF)
- [Decision Chart](#) (PDF)
- [Eight Criteria for Proceeding with Verbal Authorization Only](#)
- [Excavation Detail Sketch](#)
- [Exceptions to Lockout/Tagout Requirements](#)
- [Federal and State Medical Surveillance Requirements](#)
- [Hazards Analysis Process](#)
- [Hazardous Energy Isolation Practices](#)
- [Images of the Lockout/Tagout Danger Tags](#)
- [Job Safety and Health Protection](#) poster (PDF)
- [Lockout/Tagout Temporary Lifts Tag](#)
- [Preparing Controlling Organization Tags and Entering Logbook Information](#)
- [Program Overview for Short-Term Authorized Workers](#)
- [Reviewing Work Process – Taking a Second Look for Safety](#)
- [Right to a Safe and Healthful Workplace](#) poster (PDF)
- [Sample Lockout/Tagout Program](#)
- [Worker Protection for DOE Contractor Employees](#) poster (PDF)
- [Written Instructions on Lockout/Tagout](#)

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Introduction

The PNNL Contractor Environment, Safety & Health (CESH) manual (referred to as “this Manual” hereafter) has been developed to identify the minimum requirements for Contractors and Subcontractors performing industrial, construction, service, maintenance work in Battelle facilities.

In this Manual, Contractor means the person or organization entering into a contract with Battelle.

Subcontractor means any Subcontractor or supplier at any tier who supplies goods and/or services to the Contractor in connection with the Contractor’s obligation under the same contract.

This Manual contains excerpts from, and references to, numerous regulations, codes, and standards, including the following documents:

- U.S. Department of Energy (DOE) Orders
- Occupational Safety and Health Administration (OSHA) 29 Code Of Federal Regulations (CFR) 1910 and CFR 1926
- Washington Industrial Safety and Health Act (WISHA) WAC 296-155
- American National Standards Institute (ANSI)
- National Fire Protection Association (NFPA)

This Manual does not state the requirements of these regulations, codes, and standards in their entirety.

Each Contractor/Subcontractor is responsible for compliance with ALL applicable requirements that govern their work at Battelle facilities, including any consensus standards incorporated therein by reference.

This Manual also contains sample forms that exhibit the minimum information required for documentation. Contractor/Subcontractors may use these forms or comparable equivalents.

In addition, Subcontractors may be asked to prepare certain job-specific submittals (e.g., an asbestos work plan or lockout and tagout procedure) for review by Battelle.

Integrated Safety Management System

A successful Contractor must utilize a safety management system that conforms to Battelle’s Integrated Safety Management (ISM) requirements. An effective ISM plan establishes a single system that integrates requirements into the work planning and execution process to protect the workers, public, and the environment. ISM provides the mechanisms for increasing worker involvement in work planning, including hazard and environmental impact identification, analysis, and control; work execution; and feedback/improvement processes.

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ISM can be framed in the following logical progression of seven topics:

- Define the scope of work in a manner that effectively allocates resources to address safety, programmatic, and operational considerations.
- Analyze the hazards associated with the work.
- Develop/implement hazards controls, evaluating hazards per an agreed-upon set of safety standards and requirements. Administrative and engineering controls that mitigate hazards shall be tailored to the work being performed.
- Perform work under the conditions and requirements established and agreed-upon.
- Provide feedback and improvement on the adequacy of controls, opportunities for improving the planning and execution of the work.
- Clearly define roles and responsibilities for all levels within Battelle and its Contractors.
- Competence must be commensurate with responsibilities for all personnel possessing the experience, knowledge, skills, and abilities that are necessary to discharge their defined responsibilities.

Contractor program flexibility is understood and encouraged as long as program tenets adequately address the spirit and intent of the ISM provisions.

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Program Policy

1.0 Purpose

To identify key aspects of contractor safety that provide all employees a safe and healthful workplace while also protecting the environment.

2.0 Responsibility

Contractors adhere to the [Program Policy](#) CESH procedure (PDF).

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Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
ALARA	As Low as Reasonably Achievable
ANSI	American National Standards Institute
CFR	Code of Federal Regulations
BCR	Battelle Contract Representative
CM	Construction Manager
CPR	Cardiopulmonary Resuscitation
CSHP	Construction Safety and Health Plan
dBA	Decibels
DOE	U.S. Department of Energy
ECT	Equivalent Chill Temperature
EU	Electrical Utilities
EWP	Electrical Work Permit
GFCI	Ground Fault Circuit Interrupters
HAZCOM	Hazard Communication
HGET	Hanford General Employee Training
IARC	International Agency for Research on Cancer
IDLH	Immediately Dangerous to Life and Health
IH	Industrial Hygiene
ISM	Integrated Safety Management
JSA	Job Safety Analysis
MSDS	Material Safety Data Sheet
NEC	National Electric Code
NFPA	National Fire Protection Association
NRR	Noise Reduction Rating
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PNWD	Pacific Northwest Division
PPE	Personal Protective Equipment
TLV	Threshold Limit Value
TWA	Time-weighted-average
WAC	Washington Administrative Code
WBGT	Wet Bulb Globe Temperatures
WISHA	Washington Industrial Safety and Health Act

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Definitions

Action Level: The airborne concentration of a non-carcinogenic contaminant that is 50 percent of the established threshold limit value (TLV) for that contaminant, or the concentration of a known or suspected carcinogen that is consistent with as low as reasonably achievable (ALARA) principles. OR the level of airborne beryllium exposure ($0.2 \mu\text{g} / \text{m}^3$ as an 8-hour time-weighted average) above which protective measures outlined in 10 CFR 850.23 must be implemented.

Actual Slope: The slope to which an excavation face is excavated.

Administrative Controls: Work practices designed to confine exposure to hazards to within permissible limit values.

Affected employee: A person whose position requires him to operate or use a system which is under lockout or tagout or whose position requires him to work in an area where a system which is under lockout or tagout is being serviced or maintained.

Aerial Lift: Vehicle-mounted aerial devices used to elevate personnel for work sites aboveground, including the following:

- extensible and articulating boom platforms
- aerial ladders
- vertical towers
- combination of any of the above.

Note: These devices are considered aerial lifts regardless of rotating capacity or power source.

ALARA (As Low As Reasonably Achievable): As it pertains to industrial hygiene (non-radiological), the practice of limiting employee exposures (physical, chemical, and biological) to toxic agents to a level "as low as reasonably achievable."

Anchorage: A secure point of attachment for lifelines, lanyards, or deceleration devices which is capable of withstanding the forces specified in the applicable sections of this procedure and Washington Industrial Safety and Health Act (WISHA) standards.

Approved: Tested and certified by the manufacturer, or any recognized national testing laboratory, to possess the strength requirements specified.

Authorized employee: A qualified person who is designated, in writing, by the designated authority, to request, receive, implement, and remove energy control procedures.

Beryllium-affected worker: An individual who has been diagnosed with beryllium-sensitization or chronic beryllium disease.

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Beryllium article: A manufactured item that is formed to a specific shape or design during manufacture that has end-use functions that depend in whole or in part on its shape or design during end use, and that does not release beryllium or otherwise result in exposure to airborne concentrations of beryllium under normal conditions of use.

Beryllium-assigned worker: A worker who has been assigned by his/her manager to perform work anticipated to involve exposure to airborne beryllium at or above $0.01 \mu\text{g}/\text{m}^3$. Such exposure is likely to be on an infrequent basis.

Beryllium-contaminated material: Refers to equipment and/or items that were used in beryllium production work, or have surface contamination levels greater than $0.2 \mu\text{g}/100 \text{ cm}^2$ or the background level for local soils, whichever is greater.

Beryllium-controlled area: A facility or an area within a facility where beryllium surface contamination levels are known to exceed $0.2 \mu\text{g}/100 \text{ cm}^2$ and an evaluation has been performed indicating that airborne beryllium exposures are possible during routine work in the area. These areas will be posted to indicate the presence of beryllium, and access will be controlled. Areas in facilities which have the potential for current beryllium exposure based on past beryllium work will be treated as potential beryllium contamination areas until an evaluation of surface contamination levels has been performed.

Beryllium regulated area: Refers to an area in which the airborne concentration of beryllium exceeds, or can reasonably be expected to exceed, the action level.

Beryllium work restriction: When the site occupational medical contractor (SOMC) issues a beryllium medical recommendation, a temporary or permanent work restriction will be implemented to comply with the recommendation. The purpose of the restriction is to prevent current and future employee exposure to airborne beryllium.

Biologic Hazard: A condition created by any microbial unit presenting a risk or potential risk to man, either directly or through disruption of the environment.

Body Belt (Safety Belt): Shall not be used.

Boom-Supported Elevating Work Platform: A type of aerial lift commonly known as the "JLG" manlift.

Carcinogen: Any chemical known or suspected by the Occupational Safety and Health Administration (OSHA), American Conference of Governmental Industrial Hygienists (ACGIH), National Toxicology Program (NTP), or International Agency for Research on Cancer (IARC) to cause cancer in humans or laboratory animals.

Catenary Line: See "Horizontal Lifeline."

Cave-In: The separation of a mass of soil or rock material from the side of an excavation, or loss of soil from under a trench shield or support system, and movement into the excavation in quantity that it could entrap, bury, injure, or immobilize a person.

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Chemical Agent: Any chemical substance in the form of vapor, gas, dust, fume or mist, which is capable, or potentially capable, of presenting a risk to the well-being of humans.

Competent Person: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt, corrective measures to eliminate them. A Competent Person is also one who has extensive knowledge/experience in a particular activity or job function.

Container: Any bag, barrel, bottle, box, can, cylinder, drum, vessel, tank, tank truck, or rail car that contains a hazardous chemical. (Piping systems or pipes are not considered containers for the purpose of the hazard warning labels, but must be identified as to their content.)

Secondary Containers: Those that are filled from an original container.

Subsequent Containers: Those that are filled from a secondary container.

Note: Secondary and subsequent containers are usually of decreasing volume to facilitate field use.

Continuous Fall Protection: The design and use of a fall protection system such that no exposures to an elevated fall hazard occurs. This may require more than one fall protection system or a combination of preventative or protective measures.

Cross Braces: The horizontal members of a shoring system installed perpendicular to the sides of the excavation; the ends bear against either uprights or walls.

Deceleration Device: Any mechanism (e.g., a rope grab, rip stitch lanyard, specifically woven lanyard, and automatic self-retracting lifeline) which serves to dissipate more energy during fall arrest than does a standard line or strap webbing lanyard.

Distress: Soil in a condition where a cave-in is imminent or likely to occur. Distress indications may be fissures, slumping, spalling, raveling, or small amounts of materials separating from the face. The bottom may bulge or heave and the edge may sink or lower.

Equipment: Ladders, scaffolds, ramps, runaways, railings, barricades, sheet piling, shoring, bracing and any such safeguards. Protective construction and devices used in affording protection to the worker engaged in excavation work.

Electrical equipment: Any device that produces, consumes stores, transmits, or converts electrical energy.

Electrical line: Any conductor used in the transmission of electrical energy from one point to another.

Embankment: An artificial or man-made bank of earthen material.

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Energy control procedure: The overall written procedure (including responsibilities, procedural steps for lockout and tagout, and requirements for testing the effectiveness of energy control measures) to be used for the control of hazardous energy.

Energy isolation device: A physical device that prevents the transmission or release of energy. Includes, but is not limited to, manually operated circuit breakers, disconnect switches, slide gates, slip blinds, line valves, blocks, or similar devices, capable of blocking or isolating energy, with a position indicator. The term does not include push buttons, selector switches, and other control circuit type devices.

Energy Source: Includes electrical, mechanical, hydraulic, pneumatic, chemical, thermal, nuclear, stored, or other energy.

Engineering Controls: Ventilation, isolation, guarding, material substitution, limit switches, and other feasible means for minimizing exposure to hazards.

Excavation: Any man-made cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth-to-width relationship, an excavation may become a trench.

Faces or sides: The vertical or inclined earth surfaces formed because of excavation work.

Failure: The breakage, displacement, or permanent deformation of a structural member or connection to reduce its structural integrity and its supportive capabilities.

Fall Arrest System: The use of multiple, approved safety equipment components (such as body harnesses, lanyards, deceleration devices, drop lines, horizontal and/or vertical lifelines, and anchorages) interconnected and rigged as to arrest a free fall.

Fall Protection Work Plan: A written planning document which identifies all areas on the jobsite where a fall hazard of 6 ft/10 ft or greater exists. The plan describes the method(s) of fall protection to be utilized to protect employees, and includes the procedures governing the installation, use, inspection, and removal of the fall protection method(s) selected.

Fall Restraint System: An approved device and any necessary components that function together to **restrain** an employee in such a manner as to prevent that employee from falling to a lower level. (Examples: Standard guardrails or harness attached to securely rigged restraint lines or anchorage points.)

Floor Hole: Any opening measuring less than 12 in, but more than one inch in its least dimension in any floor, roof, or platform through which materials may fall.

Floor Opening: An opening measuring 12 in or more in its least dimension in any floor, roof, or platform through which persons may fall.

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Foot Protection: Substantial footwear made of leather or equally firm material, shall be worn by all employees in any occupation in which there is a danger of injury to the feet (required in all construction work areas). Tennis shoes, thin or soft-soled athletic shoes, open-toed sandals, slippers, or other similar shoes shall not be worn. Exceptions may be approved for special or unique situations, and justifications documented in the JSA.

Full Body Harness (Class III): A configuration of connected straps to distribute a fall arresting force over at least the thighs, shoulders, and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration device.

Full Body Harness System: A Class III full body harness and lanyard which is attached to an anchorage meeting the requirements of Part C-1, WAC 296-155, or attached to a horizontal or vertical lifeline which is properly secured to an anchorage capable of withstanding the forces specified in the applicable sections of WAC 296-155 and this procedure.

Full personnel protection: When a tagout device is used in place of a lockout device, full personnel protection is provided when 1) the tagout device is attached at the same location as the lockout device would have been attached, 2) all tagout-related requirements of this Section have been complied with, and 3) additional means have been taken to provide a level of safety commensurate with that of a lockout device. Such additional means include the removal of an isolating circuit element, blocking of a control switch, opening and tagging an extra (separated by distance) disconnecting device, or the removal of a valve handle to reduce the likelihood of energization.

Hazardous energy control plan: The written plan which clearly and specifically identifies the hazardous energy sources and outlines the scope, purpose, responsibilities, and procedural steps for lockout and tagout and the requirements for testing the effectiveness of energy control measures to be used for the control of hazardous energy from stated sources.

Hazardous Material: Any substance that presents a physical or health hazard to humans.

Health Hazard: Any substance or agent that may cause acute or chronic effects to employees who are exposed to it.

Horizontal Lifeline (Catenary Line): A horizontal rope, wire rope, rail, or synthetic cable that is installed on a horizontal plane between two anchorages and used for attachment of a worker's lanyard, either by tying or by means of a sliding connection.

Incidental employee: an employee who, under normal circumstances, would not be in an area where a system is under lockout but is required to enter or pass through such an area.

Industrial hygienist: a person having a college or university degree or degrees in engineering, chemistry, physics, or medicine or related biological sciences who, by virtue of special studies and training, has acquired competence in industrial hygiene. Such special studies and training must have been sufficient in all of the above cognate sciences to provide the abilities to recognize the environmental factors and stresses associated with work and work operations and to understand their effect on people and their well being; to evaluate, on the basis of experience and with the aid of quantitative measurement techniques, the magnitude of these stresses in

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terms of ability to impair an individual's health and well being; and to prescribe methods to eliminate, control or reduce such stresses when necessary to alleviate their effects. (See the Bulletin of the American Board of Industrial Hygiene for additional details.)

Inspection: A documented visit to and evaluation of a facility or work area in respect to compliance with applicable safety standards and regulations.

Isolation: An activity which physically prevents the transmission or release of energy.

Lanyard: A rope, suitable for supporting one person, with one end fastened to a safety belt or harness and the other end secured to an anchorage point or a lifeline.

Lockout: A form of hazardous energy control utilizing the placement of a lockout device, in accordance with established procedures, on an energy isolating device to verify the energy isolating device and the system being controlled cannot be operated until the lockout device is removed.

Lockout device: A device that uses a positive means, such as a key or combination lock, to hold an energy isolating device in the safe position and prevent the energizing of a system.

Pressure systems: All pipe, tubing, valves, controls, and other devices which operate or are maintained above atmospheric pressure. *See definition of vacuum systems*

Manufacturer's Label: Written, printed, or graphic material displayed on, or affixed to, containers of hazardous chemicals in accordance with applicable regulations.

Material Safety Data Sheet (MSDS): A document concerning a hazardous chemical prepared in accordance with applicable regulations.

Maximum Allowable Slope: The steepest incline of an excavation face that is acceptable for the most favorable site conditions is the ratio of horizontal distance to vertical rise (H:V).

Moving Ground: Any ground, which for any reason, will not remain in its original location.

Physical Agent: Potentially harmful conditions such as excessive noise, temperature extremes, ionizing radiation, non-ionizing radiation, and pressure extremes.

Protective System: A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping systems, shield systems, and other systems that provide the necessary protection.

Registered Professional Engineer: A person registered as a Professional Engineer in the State of Washington in the appropriate discipline. The registered Professional Engineer shall comply with the Washington State Department of Licensing requirements, Chapter 18.43 RCW.

Runaway: A passageway for persons, elevated above the surrounding floor or ground level.

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Self-Propelled Elevating Work Platform: A type of aerial lift commonly known as the “scissor” type aerial lift.

Sheeting: The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (shield system): A structure that can withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or designed to be portable and moved along as work progresses. Shields can be remanufactured or job-built according to data from the manufacturer or designed by a registered Professional Engineer. Shields used in trenches are usually called “trench boxes” or “trench shields”.

Shoring (shoring system): A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation that is designed to prevent cave-ins.

Sides, Walls, or Faces: The vertical or inclined earth surfaces formed because of excavation work.

Sloping (sloping system): A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation to prevent cave-in.

Snap Hook: A self-closing connecting device with a gatekeeper latch or similar arrangement that will remain closed until manually opened. This includes single action snap hooks that require a second action on a gatekeeper before the gate can be opened.

Standard Railing: A railing that consists of a top rail, intermediate rail, toe board, and posts, and shall have a vertical height of 42 in from upper surface top rail to floor, platform, runway, or ramp. The railing shall be able to withstand at least the minimum of 200 pounds top rail pressure with a minimum of deflection.

Static Line: See “horizontal lifeline.”

Stored energy: Energy (electrical, mechanical, or chemical) that might be found in a charge capacitor, a loaded spring, chemical solutions, or other similar hazardous form.

Support System: A structure such as underpinning, bracing or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

System: Includes machinery, equipment, and electrical, hydraulic, and pneumatic lines and their subsystems.

Tagout: A form of hazardous energy control procedure utilizing the placement of a tagout device, in accordance with established procedures, on an energy isolating device to indicate that the energy isolating device and the system being controlled may not be operated until the tagout device is removed.

Tagout device: A prominent warning device, such as a tag with a means of attachment, which can be securely attached to an energy isolating device in accordance with established

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procedures to indicate that the energy isolating device and system being controlled may not be operated until the tagout device is removed.

Threshold Limit Value (TLV): TLVs refer to airborne concentrations of substances, and represent conditions under which it is believed nearly all workers may be repeatedly exposed day after day without suffering adverse health effects.

Toeboard: A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent material falling.

Trench: A narrow excavation made below the surface of the ground. The depth is generally greater than the width, but the width of a trench is not greater than 15 ft

Trench Jack: Screw or hydraulic type jacks used as cross bracing in a trench shoring system.

Unprotected Side/Edge: Any side or edge where there is not a wall or handrails.

Unstable Rock: Rock material on the side or sides of the excavation not secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Unstable Soil: Earth material, which because of its nature cannot be depended upon to remain in place without extra support such as a system of shoring.

User: A person who packages, handles, transfers, or otherwise comes in contact with hazardous chemicals during the workday.

Vertical Lifeline (Dropline): A vertical rope from a fixed anchorage, independent of the work surface, to which the lanyard is affixed or tied.

Wales: Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

Warning Line System: A barrier erected on a walking and working surface or a low pitch roof (4 in 12 or less), to warn employees that they are approaching an unprotected fall hazard(s).

Vacuum systems: All pipe, tanks, tubing, valves, controls, and other devices which operate or are maintained below atmospheric pressure.

Violation: An omission or commission, a condition, or a situation that is in conflict with the procedures, standards, or requirements of OSHA, Division of Occupational Safety and Health (DOSH: formally WISHA), National Fire Protection Association (NFPA), National Electric Code (NEC), American National Standards Institute (ANSI), or other safety and health agencies.

De minimis: Minor, nonserious violations that can usually be corrected on-the-spot and present no potential for serious injury.

Nonserious: Minor violations that present a low potential for serious injury/property damage.

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Serious: Violations that present a moderate to high potential for serious injury/property damage.

Repeated: Occurring more than once; may be de minimis, nonserious, or serious.

Imminent Danger: An impending or threatening situation which, if left uncorrected, is likely to result in serious injury/property damage.

Stop Work Orders: A directive to cease work issued for failure to follow procedures, imminent danger situation/conditions, accumulation of safety violations, etc.

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Prejob Planning

1.0 Purpose

To establish a method for identifying, controlling, and documenting hazards associated with contractor activities and communicating this information to all affected workers.

2.0 Responsibility

Contractors adhere to the [Prejob Planning](#) CESH procedure (PDF).

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Safety Orientations

1.0 Purpose

To define the requirements, responsibilities, and system for orienting employees to this Plan, and to instruct employees to the job-specific requirements.

2.0 Responsibility

2.1 Contractor is responsible for the following:

2.1.1 Orienting their employees and subcontractor employees to this Manual (or their own when deemed acceptable by Battelle) and completing the [Orientation Checklist](#) prior to individual employees beginning work activities.

Note: Escorted personnel including vendors, engineers and infrequent visitors, can be exempt from orientation provided they are escorted and kept out of hazardous areas.

2.1.2 Verifying that each employee and lower-tier employee has reviewed the applicable/required procedures and signed the [Orientation Record](#).

2.1.3 Verifying that employees have the required training to perform their designated task.

2.1.4 The checklist and signature sheet shall be available at the jobsite.

2.2 Employees shall be responsible for understanding and complying with the Plan and job-specific requirements.

3.0 General Requirements

3.1 Employees shall be oriented as identified on the [Orientation Checklist](#), and to procedures the Contractor identifies that are applicable to the project. These procedures must be checked on the *Orientation Checklist*.

3.2 Topics to be covered during the orientation (as a minimum) include:

- Employer rights and responsibilities.
- Disciplinary procedures.
- Alcohol and Drug Abuse policies.
- Access to exposure monitoring data/records.
- Location of JSAs and company safety program.
- Emergency signals, response, and notification requirements for the area.
- Location of fire extinguishers, pull box alarms, emergency evacuation routes, and first aid facilities.
- How to report injuries.

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- How to report unsafe conditions.
- The use and care of personal protective equipment.
- Identification of hazards gases, chemicals and materials; instruction on the hazards of these products and their safe use.
- Instruct employees regarding smoking around Battelle facilities. Additionally, Contractors are encouraged to establish designated smoking areas for their facilities. The designated smoking area provides a healthier workplace for the employee where “passive smoke” effects are minimized and the rights of smokers are respected.
- Location of nearest Medical Aid Station.
- Location of nearest telephone.

3.3 The employees, after understanding the procedures identified in the *Orientation Checklist*, sign the [Orientation Record](#).

4.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Orientation Checklist	Contractor	Contractor
Orientation Record	Contractor	Contractor

5.0 References

- 29 CFR 1910 Occupational Safety and Health Standards (OSHA)
- 29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
- WAC 296-155 Safety Standards for Construction Work (WISHA)

6.0 Forms

- [Orientation Checklist](#)
- [Orientation Record](#)

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Safety Meetings and Inspections

1.0 Purpose

To define the system for conducting safety and health meetings and inspections that will facilitate compliance with the Occupational Safety and Health Administration/Washington Industrial Safety and Health Act (OSHA/WISHA).

2.0 Responsibility

2.1 The Contractor shall be responsible for the following:

- daily and weekly safety briefings
- daily safety and health inspections of the jobsite(s), documenting the results, and correcting noted deficiencies
- weekly safety and health inspection of the jobsite with at least one employee
- correcting unsafe conditions and acts as soon as possible.
- responding to employee concerns.

2.2 Employees shall be responsible for the following:

- attending daily safety briefings
- attending safety and health meetings at least weekly
- reporting unsafe acts/conditions and concerns.

3.0 General Requirements

Supervisors and managers shall exercise their personal leadership in the conduct of operations under their control to afford all practicable protection to employees, Battelle and DOE property, and the environment. The Contractor shall provide for the correction of unsafe conditions and the continual observance of good safety practices.

3.1 Safety and health meetings shall address the following items:

- Safety, health, and job-related issues/concerns related to the particular operation.
- Accident investigations conducted since the last meeting, to determine if the cause of the unsafe acts or conditions were properly identified and corrected.
- Safety and Health inspection findings since the last meeting.
- Safety Inspection Report items issued to the Contractor by Battelle or DOE personnel since the last meeting.

3.2 Minutes of safety and health meetings shall be taken and attendance will be documented on the [Safety Meeting Sign-in Roster](#). (Minutes of each meeting are retained by the employer for the duration of the job.)

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4.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Contractor Supervisor Safety Inspection Checklist	N/A	Contractor
Weekly Safety Meeting	N/A	Contractor

5.0 References

29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Safety and Health Regulations for Construction (OSHA)
WAC 296-155	Safety Standards for Construction Work (WISHA)

6.0 Forms

- Contractor Supervisor Safety Inspection Checklist
- [Weekly Safety Meeting Report](#)

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Hazard Communication

1.0 Purpose

To reassure the hazards of all hazardous materials produced, imported, or used are transmitted to affected employees. Required components of a Hazard Communication Program include the method of hazard determination, Material Safety Data Sheets (MSDSs), labels and other forms of warning, employee information training, and a written Hazard Communication Program defining the above.

2.0 Responsibility

2.1 The Contractor shall be responsible for the following activities:

2.1.1 Developing, promoting, updating, and administering the Hazard Communication Program.

2.1.2 Determining the hazards of materials used in the workplace, making MSDS' available to employees, labeling containers, and providing information and training to employees on hazardous materials.

2.1.3 Maintaining a list of hazardous materials and MSDSs to be used on the project.

2.1.4 Developing work practice requirements for hazardous materials identified in the [Job Safety Analysis](#) (JSA).

2.1.5 Labeling secondary and subsequent hazardous material containers.

3.0 General Requirements

3.1 The Hazard Communication Program shall comply with the applicable statutory requirements:

- 29 Code of Federal Regulations (CFR) 1910, Subpart Z; Hazard Communications
- Washington Administrative Code (WAC) 296-62, Part C; Hazard Communications

3.2 Employees and contract personnel shall be provided with an overview of the Hazard Communication Program during the hiring process.

3.3 Users of hazardous materials shall receive specific training for those materials they use prior to initial use, and periodically thereafter. Specific training shall include the location of MSDS and inventory list(s) in the workplace, and the method(s) employees may use to access this information.

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- 3.4 Each original container of hazardous materials shall have the manufacturer's label affixed to it or be labeled, marked, or tagged showing the identity of the hazardous chemicals, the appropriate hazard warning, and the name and address of the chemical manufacturer, importer, or other responsible party.
- 3.5 Secondary and subsequent containers of hazardous chemicals shall be labeled, marked, or tagged prior to use with the identity of the hazardous materials and the appropriate hazard warnings.
- 3.6 A copy of the written Hazard Communication Program and a list (inventory) of hazardous materials shall be kept in the work area.
- Note:** The list (inventory) may be a book of MSDSs, appropriately labeled and periodically updated to reflect the workplace inventory.
- 3.7 Employees shall have ready access to review and copy MSDSs for hazardous materials they work with.
- 3.8 Areas where physical and/or biologic hazards are known to exist shall be clearly designated as such (with signs, placards, etc.) along with control requirements (ventilation, hearing protection, safety glasses, etc.).

4.0 Procedure

4.1 Hazard Determination

- 4.1.1 MSDSs supplied by the material manufacturers, vendors, and/or client shall be the principal source of health hazard information. It is the responsibility of the Contractor to provide an MSDS which meets the following minimum requirements:
- The Washington State Industrial Safety and Health Administrative (WISHA) code (WAC 296-62-05413) describes the required content of MSDSs acceptable for use in the Hazard Communication Program (also acceptable to OSHA). (Out-of-State suppliers are not required to reference DOSH permissible exposure limits or carcinogen listings)
 - Copies of MSDSs received shall be legible.
- 4.1.2 When an MSDS appears inadequate, or is not available, or the composition of the material is unknown or questionable, the manufacturer, vendor, and/or client shall be contacted for more details prior to use of the material.
- 4.1.3 Examples of qualities that make a material "hazardous" include but are not limited to the following:
- Flammable, combustible, and/or explosive

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- Corrosive (acids/caustics)
 - Irritating/damaging to the eyes and/or skin on contact
 - Any human known or suspected carcinogen.
- 4.2 An MSDS shall be required for each hazardous material used in the workplace. A single MSDS may apply to complex mixtures having similar hazards and composition. MSDSs shall be available for process chemicals and products in customer's facilities where a potential for exposure exists. A master file or notebook of all MSDSs used on the project shall be maintained, and the location of such shall be made known to all employees.
- 4.3 Labels and Other Forms of Warning
- 4.3.1 The Contractor shall comply with the following label/warning requirements:
- 4.3.1.1.1 Each secondary and subsequent container of hazardous materials in the workplace shall be labeled, tagged, or marked with the identity of the hazardous material contained therein, and show hazard warnings appropriate for employee protection.
- 4.3.1.1.2 Labels shall be legible, in English (plus other languages if appropriate), and prominently displayed on the container.
- 4.3.1.1.3 The identity of the hazardous material may be any chemical or common name that is indicated on the MSDS and will permit cross-reference to be made among the list of hazardous materials, the label, and the MSDS.
- 4.3.1.1.4 Portable containers into which hazardous chemicals are transferred need no label if all of the following conditions are met:
- The contents of the portable container are for the immediate use of the person making the transfer.
 - The container is used only by, and remains under the control of the person making the transfer.
 - The unlabeled portable container is used only within the work shift during which it was originally filled.
- 4.3.1.1.5 A label shall be used to identify containers that do not meet the conditions noted in subparagraph 5.3.1.4.
- 4.3.1.1.6 Labels on incoming containers shall not be destroyed, removed or defaced.

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4.4 Employee Information and Training

4.4.1 Employees shall undergo Hazard Communication (HAZCOM) training at the time of hire, prior to commencing work on the project. Minimum requirements of the training shall be as follows.

- Signs and symptoms of overexposure.
- Methods and observations that may be used to detect and identify hazardous chemicals such as odor, visual presence, etc.
- Physical and health hazards of materials used.
- Location of MSDSs and the format in which they are maintained.
- How to use MSDSs.
- Methods of protection from material hazards.

4.4.2 Prior to using any newly introduced hazardous material or product, supervisors shall obtain a copy of the appropriate MSDS and review it with their employee

5.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Training Completion Record	Contractor	Contractor

6.0 References

29 CFR 1910 Occupational Safety and Health Standards (OSHA)
29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
WAC 296-155 Safety Standards for Construction Work (WISHA)

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Recordkeeping and Responsibilities

1.0 Purpose

To describe a mechanism for investigating, reporting, and analyzing accidents that occur during construction activities.

2.0 Responsibilities

- 2.1 Contractor and Subcontractor employees are responsible for reporting all injuries or occupationally-related illnesses as soon as possible to their immediate supervisor.
- 2.2 The Contractor shall report all injuries or illnesses to the Battelle Contract Representative (BCR) within 24 hours **except** for an accident with any of the consequences listed below, in which case reporting shall be immediate:
 - fatal injury
 - three or more persons admitted to hospital
 - property damage in an amount specified by the contract.

Contractors are responsible for notifying OSHA/DOSH when such notifications are required by the regulations.

3.0 General Requirements

- 3.1 A supervisor shall not decline to accept a report of injury or illness from a subordinate.
- 3.2 An accident scene shall not be disturbed, except for rescue and emergency measures, until it has been released by the investigating official.
- 3.3 Daily records of all first aid treatments not otherwise reportable shall be maintained on prescribed forms and furnished to the Battelle Contract Representative upon request.
- 3.4 All records of exposure and accident experience incidental to the work (this includes exposure and accident experience of both the Contractor and its Subcontractors) shall be maintained. As a minimum, these records shall include exposure work-hours and a log of occupational injuries and illnesses (OSHA/DOSH forms).
- 3.5 All records of employee exposure to toxic materials and harmful physical agents shall be maintained. The Contractor shall immediately notify Battelle of any excessive exposure and the hazard control measures that will be taken to control the exposure.
- 3.6 Access to the project's Worker Compensation Claims Report that details the compensable accidents experienced on the project by the Contractor and its Subcontractors will be provided to Battelle upon request.

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Housekeeping

1.0 Purpose

To establish the requirements for housekeeping.

2.0 Responsibility

2.1 The Contractor shall enforce with this procedure.

2.2 Employees are responsible for complying with this procedure.

3.0 General Requirements

3.1 Housekeeping activities shall comply with applicable OSHA/WISHA requirements.

3.2 During the course of construction, alteration, repair or demolition of buildings and structures, continuous clean-up of the work area shall be performed; including removal of all rubble, scrap, boxes, crates, and excess material to trash disposal area.

3.3 At the end of each work shift, a general clean-up of all work areas shall be performed.

3.4 All floors and walkways shall be maintained in good condition.

3.5 Every floor, working surface, and passageway shall be kept free from protruding nails, splinters, loose boards or openings.

3.6 Cleaning and sweeping shall be performed in such a manner as to minimize the contamination of the air with dust.

3.7 Hoses and electrical conductors across aisles or passageways shall be covered or suspended overhead so that there is no tripping hazard. Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways, and wherever turns or passages must be made.

3.8 Storage of material shall not create a hazard. Bags, containers, and bundles of construction materials and other equipment shall be stored in tiers, stacked, blocked or interlocked. They shall be limited in height (in general ≤ 5 ft) so that they are stable and secure against falling, sliding, or collapse.

3.9 Free access shall be maintained at all times to all exits, fire alarm boxes, fire extinguishing equipment, and any other emergency equipment. Free access means clear of all obstructions.

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- 3.10 All lunchrooms, washrooms and restrooms shall be kept in a clean and sanitary condition. Garbage cans in lunchrooms and restrooms shall be equipped with fitted covers, and the contents disposed of regularly.
- 3.11 Common garbage and other waste shall be disposed of at frequent and regular intervals.
- 3.12 Containers shall be provided for the collection and separation of waste, trash, oily or used rags, and other refuse. Containers used for garbage and other oily, flammable or hazardous wastes, (such as caustics, acids, harmful dusts or similar materials) shall be equipped with covers.
- 3.13 Chemical agents or substances, which might react to create a hazardous condition, shall be stored and disposed of separately.

6.0 References

- 29 CFR 1910 Occupational Safety and Health Standards (OSHA)
- 29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
- WAC 296-155 Safety Standards for Construction Work (WISHA)

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Confined Space Entry

1.0 Purpose

To establish requirements for confined space work.

2.0 Responsibility

The Contractor shall be responsible for protecting the health and safety of their staff members performing confined space entries.

3.0 General Requirements

3.1 Identifying Confined Spaces

Employers/supervisors perform the following activities:

- Survey each work area to identify confined spaces.

A confined space is defined as a space that meets all of these criteria:

- is large enough and configured such that an individual can bodily enter and perform assigned work, and
- has limited or restricted means of entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, and pits), and
- is not designed for continuous human occupancy.
- An initial hazard evaluation is performed and documented to assess potential and existing hazards inherent in the confined space. Classify the space as a permit required confined space or non-permit confined space.
- Document the initial hazard evaluation on the Confined Space Hazard Identification form or equivalent documentation.
- Control any confined space that does not have an initial hazard evaluation, as a permit required confined space until a hazard evaluation is performed and documented.
- Label or post permit required confined spaces with a danger sign at potential entry points, stating "DANGER: CONFINED SPACE - Contact Safety & Health Representative Before Entering" or using similar language.
- If the space dimensions or configuration do not permit the conventional attachment of signs, use other effective means to inform employees of the space location and hazards.
- A permit required confined space with more than one entry must be labeled with a sign at all access points.

3.2 Employers/Supervisors will perform the following activities:

- Comply with the requirements of the *Confined Space Entry* form and other applicable permits.
- Determine that employees have received confined space training and are qualified to fulfill assigned duties.

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- Obtain available information on the specific confined space from Battelle.
- Notify employees of required site-specific arrangements for a confined space entry, and provide additional information as follows:
 - a. Identify hazards and conditions that form the basis for classifying the particular confined space as a permit required confined space.
 - b. Notify employees of required precautions and procedures required by the space owner when employees are working in, or near, a permit required confined space.
 - c. Identify the means to coordinate entry operations when multi-contractor employees will be working in, or near, a permit required confined space.
 - d. Conduct and document a debriefing with employees at the conclusion of entry operations to determine whether unanticipated hazards were encountered or created during the work.
 - e. Coordinate entry operations with other workforces.
 - f. At the conclusion of the confined space operation, inform Battelle of unanticipated hazards and work conditions. Provide the Battelle Contract Representative the canceled permit and other records associated with the entry.

4.0 Classifying Confined Spaces

Before any work is performed in a confined space, the employer/supervisor must identify, evaluate, and plan methods to control potential hazards of the space by performing the following:

- Review existing hazard evaluations, if available.
- Identify the hazards associated with the work to be performed in the confined space.
- Classify the space as a permit required confined space or a non-permit confined space.
- Control all non-permit confined spaces.
- Based on the results of the hazard evaluation, a permit required confined space may temporarily be reclassified as a non-permit confined space under the following conditions:
 - If the permit-required space poses no actual or potential atmospheric hazards and if all engulfment, entrapment and serious safety hazards within the space are eliminated without entry into the space. The space may remain classified as a non-permit-required confined space for as long as the hazards remain eliminated.
 - If it is necessary to enter the permit-required space to eliminate hazards, such entry shall be performed under permit-required confined space procedures. If

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testing and inspection during that entry demonstrate that the hazards within the permit-required space have been eliminated, the permit-required space may be reclassified as a non-permit-required confined space for as long as the hazards remain eliminated.

Note: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards.

- The Contractor has documented the basis for determining that all the hazards in the space have been eliminated through a certification containing the date, space location, and the signature of the Contractor. The certification must be made available to all entrants. In addition to the above certification, routine work control documents must address the control methods for any other safety and health hazards that may be encountered during the entry.
- When the permit-required confined space cannot be reclassified as non-permit-required confined space, work is conducted in accordance with the *Confined Space Entry* form, which specifies control measures, and work practices to minimize exposures and maintain health and safety of staff members.

4.1 Working on Telecommunication or Electrical Equipment in Manholes or Underground Vaults

When telecommunication or electrical service work is performed in manholes or underground vaults, special requirements apply regardless of the classification status of the confined space (permitted or non-permitted).

Before telecommunication or electrical service work is performed in a manhole or underground vault, employers/supervisors must identify, evaluate, and plan methods to control potential hazards of the space by following these steps:

4.2 Guard the manhole or street opening

Note: When covers of manholes or vaults are removed, the opening must be promptly guarded by a railing, temporary cover, or other temporary barrier to prevent an accidental fall through the opening and to protect staff working in the manhole from foreign objects entering the manhole.

Test the space for oxygen levels and combustible gas with a properly calibrated and maintained combustible gas indicator.

Note: If an open flame is to be used in the space, combustible gas monitoring must be performed immediately prior to use of the flame. Storage of fuels (e.g.: acetylene) is not permitted in the space unless it is in actual use.

Establish forced air ventilation before entry into space and continue for the duration of the job. Mechanical forced air ventilation must be in operation at all times when workers are required to be in the manhole or vault.

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Note: The air should be tempered when necessary and care should be taken so that workers will not be subjected to excessive air velocities. If the forced air ventilation is discontinued during the course of the work (for example: during shift change or lunch breaks) the oxygen and combustible gas measurements must be repeated to verify adequate breathing air quality.

Provide ladders for entry and exit if manhole is more than 4 ft deep.
Provide first-aid trained staff during entry to render emergency first aid when there is electrical power exposure potential in the space.

Note: See the Electrical Safety practice for further electrical safety requirements.

If the space has been classified as a permit-required confined space for the purpose of this entry, conduct the work in accordance with the Confined Space Entry form, which specifies control measures and work practices to minimize exposures and maintain health and safety of staff members.

4.3 Non-Permit Confined Spaces

Before entry, verify and document on the Confined Space Hazard Identification form that the planned work or changes in the space configuration will not introduce permit required space hazards.

Review the initial hazard evaluation, if available and update as necessary. Appropriately manage all hazards associated with work activities in non-permit confined spaces.

Re-evaluate and, as necessary, reclassify non-permit confined spaces to permit required confined space when changes in the use or configuration of the non-permit confined space increase the hazards to which employees may be exposed.

Use documented engineering controls, or posting/labeling to prevent inadvertent entry into non-permit confined spaces.

4.4 Preparing for Entry Into Permit Required Confined Spaces

For each permit-required confined space entry, a job-specific briefing must be held for all employees involved in the entry to cover the known or anticipated hazards associated with the space and the work and the techniques for controlling these hazards.

Designate an appropriately trained entry supervisor to authorize, oversee, and terminate entry operations.

Assign at least one trained attendant to remain outside the permit space for the duration of the entry.

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The entry supervisor conducts the job-specific briefing for the entrant(s) and the attendant(s) based on the completed entry permit. Topics that must be included are:

- the work to be performed
- the anticipated hazards, including signs, symptoms, and consequences of exposure to the hazards
- hazard control measures
- verify entrant(s) and attendant(s) have appropriate training.
- emergency rescue procedures.

The entrant(s) and attendant(s) read and sign the permit. Signing the permit indicates that the signatories have been briefed on the hazards and the techniques used to control the hazards and that they will comply with these techniques and control measures.

Note: If more than one entrant or attendant is involved in the entry, each must sign the permit.

4.5 Multi-Employer Entries

Confined space entries involving employees of more than one Contractor or Sub-contractor working in a space simultaneously will be coordinated so all work is conducted safely.

The following activities will occur:

- Personnel involved in the confined space entry have been informed of hazards that may be introduced by other workforces.
- Entry is authorized by issuance of a single permit signed by a representative from each organization.
- Workers participating in a multi-employer entry attend a single prejob briefing.

4.6 Contractor Activity Interface

During contractor related work activities, control and classification of temporary or newly constructed confined spaces is the responsibility of the Battelle Contract Representative. Confined spaces will be classified prior to entry as part of the hazard evaluation and work planning process.

When the construction phase ends, the completed confined space will be turned over to Battelle.

4.6.1 Making Entries Into Permit – Required Confined Spaces

Work in a permit – required confined space must be conducted in compliance with the *Confined Space Entry* form.

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Designate qualified and trained entry team members to perform duties described in Attachment 01.

If a single attendant is assigned to monitor multiple spaces, determine the means or procedure the attendant can use to respond to an emergency affecting each of the spaces without compromising other assigned duties, and document on the permit.

The initial testing and evaluation of atmospheric hazards will occur before entry, and as often as necessary during re-entry to maintain acceptable conditions.

Determine what engineered controls, personal protective equipment, and atmospheric monitoring requirements are needed for chemical and physical hazards.

Provide rescue equipment, harnesses, lifelines, lifting devices, supplemental lighting, communication devices, personal protective equipment, ladders, ventilation equipment, or other special equipment as specified on the *Confined Space Entry* form. Provide for entrant rescue and retrieval, considering both the size and configuration of the space, the size of entrants and rescue personnel.

4.6.2 Permit System

Entries into permit required confined spaces are administratively controlled by a *Confined Space Entry* form. The permit system includes the hazard assessment, entry permit, and supporting documentation. The permit designates a specific operation, location, work package, and time period.

The duration of the permit may not exceed the time required to complete the assigned task or job as identified on the permit. If planned work will continue for more than 1 work shift the permit may be approved for subsequent re-entries, provided that the following conditions are met:

- No new hazards are identified or introduced into the space.
- There are no changes in work scope or permit-prescribed work controls.
- Pre-entry testing is performed, and acceptable entry conditions exist.
- Re-entries are authorized and documented on the permit.

Before entry, verify that all authorizing signatures are recorded on the permit.

Document all confined space entries/egresses on the *Confined Space Entry Log*.

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Restrict entry to those listed on the log, unless they are entering as members of the rescue team.

4.6.3 Terminate entry and cancel the permit when entry operations covered by the permit are complete or if conditions occur in or near the space that are not allowed by the permit. When entry operations are complete, do the following:

- Verify that all entrants have exited the space, remove any temporary barricades, and return the space to service as applicable.
- Cancel the permit by completing and signing the "Permit Cancellation" section on the permit itself.
- Note on the permit any unusual conditions encountered during the entry operation.

4.7 Unusual Conditions

Any of the following may be unusual conditions and, as such, require a review of the entry procedures if observed:

- An unauthorized entry into a permit space
- Detection of a permit space hazard not covered by a permit
- Occurrence of an injury or near miss during entry
- Change in the use or configuration of a permit space
- Detection of a condition prohibited by the permit
- When the employer or employee has reason to believe entry procedures do not protect entrants.

Obtain assistance from Battelle for conducting a review of permits that report unusual conditions, or when entry operations have been canceled because of conditions not allowed by the permit.

Submit canceled permits with the work package records. Maintain a copy for the project or facility records for annual review.

4.8 Atmospheric Testing For Permit Required Confined Spaces

4.8.1 For permit spaces with potential atmospheric hazards, perform atmospheric testing before employee entry and throughout the duration of the entry to maintain acceptable entry condition.

Note: Atmospheric testing will be performed by a qualified person.

Provide atmospheric testing equipment that is calibrated, maintained, and operated in accordance with the manufacturer's operating manual.

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Record instrument calibration data and all initial and subsequent atmospheric test results on the permit. Calibration and maintenance records will be maintained with the data collected representative of the levels of contaminants being measured.

4.8.2 Perform atmospheric monitoring, as prescribed by the permit, to determine whether acceptable entry conditions are being maintained during entry operations. Test for the following conditions in this sequence:

- Oxygen content between 19.5 percent and 23.5 percent
- Flammable gases and vapors (not to exceed 10 percent of the lower flammable limit)
- Toxic air contaminants, as specified on the permit

Test multiple levels of the space to determine any stratified layers that may be present. If there are areas that cannot be tested from outside the space, then test as the entry progresses. Use extension apparatus or other means to test the atmosphere at least 1.2 meters (4 ft) to the front and sides of the entrant.

If the space configuration limits effective atmospheric testing (as may occur with large spaces or spaces that cannot be isolated, such as sewer system entries), provide entrants with personal monitoring devices that they have been trained to use. Conduct pre-entry testing to the extent possible before authorizing entry, and continuously monitor conditions in areas where employees are working.

When portable mechanical ventilation is used, conduct atmospheric testing first with the ventilation off, then with the ventilation on.

If testing indicates the presence of a hazardous atmosphere in the confined space, prohibit entry until appropriate controls have been implemented, and implement monitoring strategies.

4.9 Applying Hazard Controls

Assign controls commensurate with the risk and dependent on the hazard(s) and whether the hazard will be eliminated before entry or controlled before and during entry. Implement hazard control/reduction, whenever feasible, by the following:

- Redesigning tasks to make personnel entry into confined spaces unnecessary.
- Using accepted engineering control measures.
- Applying administrative controls and work practices.
- Prescribing personal protective equipment.

When prescribing recommendations for controls or work practices, consider

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additional hazards that the control itself may introduce. Prescribed protective measures will not interfere with the ventilation requirements for the space, means of entrance or egress for the occupants, or rescue methods.

Based on the pre-entry hazard evaluation, apply the hazard controls and work practices described in Attachment 02, as applicable.

4.10 Emergency Response and Rescue for Permit Required Confined Space

4.10.1 Plan for effective retrieval/rescue of entrants. Emergency and rescue planning, procedures, and escape routes will be designed for the characteristics of the space. Consider effective response times in determining rescue measures. When working in the 300 Area or on the Hanford Site, the Hanford Fire Department is the emergency rescue team.

Attendants will have at least one of the following at the work location:

- telephone
- two-way radio
- cellular phone
- other suitable means of summoning the emergency rescue team.

The attendant will maintain constant communication with confined space occupants by voice, signal, or other means as specified on the permit.

4.10.2 The emergency rescue team will be available for response. If the emergency rescue team is unavailable or becomes unavailable for response, reschedule or suspend the entry.

4.10.3 For non-entry rescue from a permit space, determine appropriate retrieval systems or methods to summon the emergency rescue team. If the use of retrieval equipment increases the overall risk of entry or would not contribute to the rescue of the entrants, then define alternate rescue methods, document them on the permit, and communicate them to employees.

4.10.4 When required by the permit, each authorized entrant will use a full body harness with retrieval line attached at the center of the entrant's back near shoulder level or above the entrant's head. Wristlets may be used in lieu of the full body harness if you can demonstrate that the use of the full body harness is not feasible or creates a greater hazard and that the use of wristlets is the most effective and safe alternative.

Attach the other end of the retrieval line to a mechanical device or fixed point outside the permit space such that the rescue can begin as soon as the rescuer becomes aware that rescue is necessary. Dedicate a mechanical device to retrieve personnel from vertical type confined spaces more than 1.5 meters (5 ft) deep.

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The entry attendant and authorized entrants will be trained in the proper use of the retrieval equipment.

Inspect required harnesses, retrieval lines, and mechanical lifting devices so they will be immediately available at the work location during permit space entries.

4.10.5 Damaged equipment shall be tagged out-of-service and removed from use.

Note: Attendants do not enter a space to attempt a rescue.

5.0 When a non-entry rescue begins, contact the emergency rescue team in case an additional emergency response or rescue is needed. If retrieval or rescue requires entry into the space, the attendant will summon the designated rescue team, and stand by (the attendant is not to enter the permit space).

Inform the rescue team of all hazards associated with the confined space.

Summon the emergency rescue team under any of the following circumstances:

- Rescuers are required to enter the confined space.
- The rescue involves retrieval of an injured person.
- The attendant needs help in retrieving the confined space occupants.
- Medical assistance is required.

In the event of a chemical exposure, communicate hazard information from the material safety data sheet (MSDS) or other sources to the medical providers.

6.0 Training/Qualifications

The following conditions shall be met:

- Attendants, entrants, other supervisors, atmospheric testing personnel, and other entry team members are provided initial confined space training before performing their assigned duties for confined space entries.
- Employees are aware of the safety requirements and availability of this program.

Entry team members are appropriately informed of the following:

- There is a change in assigned duties.
- A change in permit space operations introduces a new hazard for which the employee has not been trained.
- Inadequacies in the employee's knowledge or use of this program or entry procedures have been identified.
- Changes in program requirements are communicated to entry team members.

Employees have completed any additional training requirements specified by the permit.

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In addition to the initial confined space training course required for all entry team members as required, the designated atmospheric testing person is trained on the proper use, application, and limitations of the instrumentation to be used, including the following:

- Field calibration and performance checks of the instruments
- Anticipated hazardous contaminants.
- Instrument operation.
- Knowledge of alarm set points and actions required when an alarm occurs.
- Related documentation requirements.

7.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Confined Space Entry	Contractor (also PNWD for any of its employees who must enter)	Contractor (site), PNWD as necessary
Training/Qualifications	Contractor	Contractor

8.0 References

- 29 CFR 1910 Occupational Safety and Health Standards (OSHA)
- 29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
- WAC 296-155 Safety Standards for Construction Work (WISHA)

9.0 Attachments

- Attachment 01, Entry Team Duties
- Attachment 02, Hazard Controls/Work Practices

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Attachment 01 Entry Team Duties

Entry Supervisor

Recognize the hazards that may be encountered during entry and the mode, signs, symptoms, and consequences of exposure.

Before signing the permit to authorize entry, verify completion of pre-entry activities, completion of the permit, and required signatures have been obtained. Post completed permit at the entrance of the confined space so that authorized entrants may confirm completion of pre-entry preparations.

Before entry into a permit space, notify the designated rescue team of the planned entry, location of the space, anticipated hazards, and any special considerations for rescue from the space. Verify availability of rescue service, and that the means to summon them are operable.

Perform a prejob briefing with all entry team members to review the work scope, hazards associated with the entry, and details of the permit requirements.

If the duties of entry supervisor are transferred from one individual to another during the course of entry, record the name of the current entry supervisor on the permit.

Entry operations will remain consistent with the terms of the entry permit.

Take appropriate measures to remove unauthorized personnel who are in or near the space.

Cancel the entry authorization and terminate entry whenever entry conditions are not acceptable.

When entry procedures are complete, close out entry operations and cancel the permit.

Document problems encountered during an entry operation the permit.

Note: An entry supervisor may also serve as standby attendant or entrant as long as he/she is trained and equipped to perform each role.

Attendant

Recognize the hazards that may be encountered during entry and the mode, signs, symptoms, and consequences of exposure.

Do not perform other tasks that could prevent, limit, or interfere with implementation of assigned duties as standby attendant.

Remain stationed outside the permit required confined space during entry operations until relieved by another attendant, documenting any change of duty on the permit.

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Monitor any conditions or changes that could occur in or around the confined space that could adversely affect the entrants.

Order entrants to evacuate the space immediately when any of the following conditions are observed:

- A condition that is not allowed on the permit (such as interruption of ventilation)
- Activation of an alarm on the atmospheric testing equipment.
- Effects of hazard exposure on behavior of entrants or an uncontrolled hazard in the space.
- A situation outside the space that could affect the safety of the entrants
- The need of the attendant to leave the workstation and another qualified attendant is not available as a replacement. Inability of the attendant to safely and effectively perform all required duties
- Unavailability of the emergency rescue team to perform a rescue.

Perform non-entry rescue as specified on the permit. Summon emergency/rescue services when required.

Maintain an entry log to identify and track the entry/egress of each authorized entrant.

Restrict access during entry operations to authorized entrants only. If there is an attempted unauthorized entry, notify the entry supervisor.

Authorized Entrants

Recognize the potential hazards that may be encountered during entry, including the mode, signs, and symptoms of exposure.

Review the requirements of the *Confined Space Entry* form and sign the entry log for each entry/egress.

Understand and implement required measures for work control as defined in the permit. Safely use all required equipment necessary for safe conduct of work in the space.

Communicate with the attendant to facilitate the monitoring of entrant status and conditions in the space.

Alert the attendant and exit the space when a warning sign, symptom of exposure, or prohibited condition is identified.

Exit the space when the order is given to evacuate, on recognition of warning signs/symptoms, when prohibited conditions are detected or alarms activated.

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Attachment 02 Hazard Controls/Work Practices

1. Isolation/Tagout Requirements

Evaluate energy sources/materials, including equipment not connected to an energy source but having unguarded movable parts. Consider outside sources that could introduce a hazardous substance into the space.

If determined to be potentially hazardous to the entrants, isolate in accordance with the Hanford Site Lockout/Tagout Program. Examples of hazardous energy include electrical, mechanical, hydraulic, pneumatic, chemical, and thermal energies, in addition to potential energies such as compressed gases, springs, or suspended objects.

Acceptable means of isolation include blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double-block-and-bleed system; lockout/tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

2. Purging/Flushing/Ventilation Requirements

Before entry, confined spaces will be emptied or otherwise purged of flammable, injurious, or incapacitating substances, as feasible.

If safe levels cannot be achieved, implement additional ventilation or other engineering controls to reduce contaminants to the lowest level feasible, and provide adequate personal protective equipment.

Do not introduce pure oxygen into the space for purposes of ventilation or to improve the breathing air quality.

If flammable gases, vapors, or combustible dusts are present, any ventilating equipment used will be approved for use in the specific hazardous location.

Test the atmosphere before and during ventilation of the space to verify acceptable entry conditions.

If the ventilation system shuts down, entrants shall leave the space and not re-enter until approved by Battelle.

Provide and maintain continuous ventilation or local exhaust ventilation of the confined space during welding, painting, and other operations that generate air contaminants. If ventilation is not possible or feasible, develop alternate protective measures.

The ventilation arrangement for the space will preclude the entry of atmospheric contaminants into the ventilation intake and the exhaust of contaminants into adjacent work areas.

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3. Welding, Cutting, and Heating

Welding and cutting performed in a confined space requires a [Permit for Work with Welding, Cutting, Grinding, or Open Flame](#) (PDF).

4. Fall Protection and Retrieval

Components making up both systems consist of personal protective gear (harness), connecting devices (retracting lifelines, retrieval devices), and approved anchorages (tripod).

Emergency retrieval equipment is specifically intended to lift injured personnel from a vertical confined space.

Material hoists must be separate and approved for use as part of the anchorage system.

Devices such as a combination retractable lifeline/retrieval device can meet both fall protection and emergency rescue functions.

5. Excavations and Trenches

Confined entry procedures may be applicable for certain excavations and trenches. Evaluate each situation separately to determine whether the requirements for confined space entry apply to the anticipated work.

6. Personal Protective Equipment

Personal protective equipment selection, as determined by project safety, will be appropriate for the conditions and configuration of the confined space, based on results of the hazard evaluation.

Confined space entrants, whose work requires respiratory protection, will be fit tested, trained, and medically cleared.

7. Requirements for Equipment and Tools

In confined spaces, ground fault circuit interrupters will be used with all power tools and electrical lighting.

If flammable liquids, gases, or vapors are present, use only tools, lighting, communications equipment, and other electrical equipment that are approved for use in the specific hazardous location.

8. Illumination Requirements

All lighting used in spaces containing, or having the potential to contain, flammable vapors or explosive dusts will be approved for use in hazardous atmospheres. This requirement also applies to low-voltage lighting such as droplights.

Install temporary lighting in accordance with National Electric Code requirements.

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Lighting will be sufficient for entrants to see clearly, avoid potential hazards, and exit the space quickly in an emergency.

9. External Hazards

When entrance barriers are removed from below-grade confined spaces, guard the opening with a railing, temporary cover, or barrier to prevent persons or objects from falling into the space.

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Chronic Beryllium Disease Prevention Program

1. Introduction

Background Information

The purpose of Battelle's Chronic Beryllium Disease Prevention Program (CDBPP) is to protect workers from health effects related to beryllium exposure. Battelle's approach to protecting workers is by controlling exposures to beryllium. This is done by identifying and minimizing beryllium hazards to levels as low as practical within the scope of essential work. Battelle's program to protect workers who come into contact with beryllium or beryllium-contaminated materials is based on the Hanford Chronic Beryllium Disease Prevention Program (CBDPP), which is in turn based on the DOE CDBPP, 10 CFR 850.

Inhaling beryllium (Be) in the form of dust, mists, or welding fumes can cause chronic beryllium disease, a lung disorder resulting from the body's immune response to beryllium in the lung. Chronic beryllium disease is generally preceded by beryllium sensitization, which may develop months or years after exposure. Beryllium sensitization indicates that exposure has occurred and that the body's immune system has responded to that exposure. There is evidence that skin exposure to beryllium may also produce sensitization. Beryllium sensitization is measured by the beryllium lymphocyte proliferation test (BeLPT), a blood test.

Beryllium is classified as a carcinogen by the International Agency for Research on Cancer (IARC), the American Conference of Governmental Industrial Hygienists (ACGIH), and the National Institute of Occupational Safety and Health (NIOSH). Skin irritation may result from direct contact with soluble beryllium compounds, and healing is impaired in beryllium-contaminated wounds. Metallic beryllium powders are a moderate fire hazard, and hazardous concentrations may be released by heating metallic beryllium above 650°C or by heating beryllium oxide above 1540°C.

2. Applicability

The Battelle CDBPP applies to current Battelle workers, Contractors, and Subcontractors whose work potentially involves beryllium. It covers both present and past beryllium exposures resulting from the U.S. Department of Energy (DOE) operations. The medical provisions also apply to employees of Battelle Contractors and Subcontractors who may have been exposed to beryllium at a DOE facility in the past. Former Pacific Northwest Division (PNWD) employees who may have been exposed to beryllium are covered by the Former Hanford Worker Medical Programs sponsored by DOE.

Laboratory operations that meet the definition of laboratory use of hazardous chemicals in 29 CFR 1910.1450, *Occupational Exposure to Hazardous Chemicals in Laboratories*, are specifically exempted from the Hanford CBDPP. It also exempts work with beryllium articles, unless those articles are being processed in such a way as to generate airborne beryllium, (e.g., welding, machining, etc.). However, Battelle applies a graded approach to the control of exempted beryllium activities and articles, including laboratory work, via our internal procedures. This is necessary to maintain employee exposures to beryllium to as low as practical.

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All portions of the DOE CDBPP (10 CFR 850) apply to Battelle. However, Battelle currently has no regulated areas, so the portions of 10 CFR 850 that apply only to regulated areas are not implemented by Battelle at this time. If Battelle has regulated areas in the future, those portions of the 10 CFR 850 will be implemented.

Battelle Beryllium Tasks and Potential Exposures

All current beryllium tasks at Battelle involve either laboratory use of beryllium or work with beryllium articles. Battelle will assess and manage the potential for exposure from these tasks. Battelle also manages DOE facilities where beryllium has been used in the past, and has employees who have been previously exposed to beryllium. Since areas of legacy contamination may pose a potential exposure risk to employees, work in these areas will also be actively assessed and managed by internal Battelle procedures.

3. Program Elements

Baseline Beryllium Inventory and Facilities List

Historical records were reviewed and employees were interviewed to determine areas where beryllium was used within Battelle

3.1. Battelle has conducted statistical surface sampling in facilities with evidence of past beryllium use to determine whether beryllium is still present, and if so, the extent and degree of beryllium contamination. Beryllium contamination was removed using prescribed methods to prevent resuspension of dust, in accordance with Battelle's policy to decontaminate beryllium-contaminated areas normally occupied by staff to less than the DOE public release limit of $0.2 \mu\text{g}/100 \text{ cm}^2$, specified in 10 CFR 850.31. Any contamination found in future wipe sampling will be similarly cleaned to below the public release limit.

Current activities are reported at Battelle's internal Beryllium website and surface sample results are reported at the PNNL Map Information Tool. The Battelle Chemical Management System website is used to identify locations where beryllium is currently being stored in laboratories.

3.2. Hazard Assessment

Battelle uses a risk-based approach to assessing beryllium exposure hazards. Work in contaminated, or potentially contaminated areas, is assessed in the job planning package or alternative hazard analysis processes. Where the hazard assessment indicates history of beryllium activities in an area, the potential for beryllium exposure will be assessed by the cognizant industrial hygienist using available air and surface sampling results. For uncharacterized areas such as closed systems or inaccessible areas of facilities or rooms where beryllium contamination may be present, surface sampling may be necessary to assess the hazard for job planning purposes. Measures will be identified to eliminate or control potential exposures. Where control measures cannot eliminate the risk of potential airborne exposures above $0.01 \mu\text{g}/\text{m}^3$, employees will receive training and medical qualification as beryllium-assigned workers. The cognizant industrial hygienist will prescribe

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the appropriate postings and labels, protective equipment, work controls, and conduct exposure monitoring.

3.3. Exposure Monitoring

Exposure monitoring will be managed by an industrial hygienist and conducted using nationally recognized exposure assessment methodologies. Only accredited industrial hygiene laboratories will be used for analytical data production. Exposure monitoring and sample analysis must comply with the requirements of 10 CFR 850.24 and 10 CFR 851.

Development of sampling plans will be based on reviews of the work to be performed, the areas where work is performed, and results of prior sampling.

Battelle uses both surface sampling and airborne beryllium monitoring to assess exposure. Surface sampling and air sampling detection limits must be adequate to assess compliance with the public release limit and medical restriction limit. Statistical sampling methods are not usually possible for air monitoring or targeted surface sampling at Battelle, due to the small number and short duration of tasks involving beryllium, but will be used for large-scale surface sampling.

Battelle observes an internal administrative control level (ACL) of $0.01 \mu\text{g}/\text{m}^3$. Any exposures that are anticipated to exceed the ACL require trained and medically qualified workers. Additionally, PNNL policy requires the use of beryllium-assigned workers when uncharacterized activities involving potential beryllium exposure are performed. Exposures exceeding the DOE action level of $0.2 \mu\text{g}/\text{m}^3$ will trigger the control measures specified in 10 CFR 850.23(b)

Monitoring results will be reported in writing to monitored employees within 10 working days of receipt of laboratory results. Monitoring results stripped of personal identifiers may be posted in the workplace if desired. Monitoring results are kept in paper copy in locked file cabinets in the central Environment, Safety, Health and Quality (ESH&Q) office.

3.4. Beryllium Emergencies

Beryllium emergencies are unlikely to occur at Battelle due to the small quantities of beryllium present in our facilities. Should quantities large enough to require an emergency plan be brought into Battelle facilities, an emergency plan will be developed at that time.

3.5. Exposure Risk Reduction and Minimization

3.5.1. Risk Reduction and Minimization Program

An exposure reduction and minimization program is required by 10 CFR 850.25 when airborne exposures are at, or above, the action level. To date, Battelle has had no airborne exposures of this magnitude. Battelle's goal is to keep all airborne exposures below the action limit. Supporting this goal is Battelle's policy of controlling beryllium surface contamination to at, or below, the public release limit

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of 0.2 $\mu\text{g}/100\text{ cm}^2$. This includes decontaminating beryllium-contaminated areas normally occupied by staff to less than the public release limit whenever possible. The following activities are some of the methods Battelle uses to minimize exposures:

- proactively sample for beryllium as needs are identified, with priority placed on immediate control of contaminated areas and decontamination
- minimize beryllium-contaminated areas and equipment consistent with research requirements
- control beryllium contamination to the public release limit
- limit beryllium use to areas, hoods, and exhaust systems where beryllium has been used in the past
- minimize use of beryllium alloy tools and equipment to essential uses
- incorporate beryllium information into the job planning process.

3.5.2. Access Control and Signage

Battelle has no regulated areas as of May 2003. Beryllium-controlled areas (where contamination levels exceed 0.2 $\mu\text{g}/100\text{ cm}^2$ and airborne beryllium exposures are possible during routine work) are access-controlled and posted. Postings for areas with potential or existing beryllium contamination will follow the requirements of the Hanford CDBPP and 10 CFR 850.

Hoods or gloveboxes in which beryllium or beryllium compounds are used must be labeled. Laboratory containers of beryllium reagents are exempt from labeling requirements and do not require warning labeling in addition to that provided by the manufacturer. However, other containers of beryllium or beryllium-contaminated materials must be labeled in accordance with 10 CFR 850.38.

Situations in which postings are required include the following:

- areas where beryllium contamination is likely, and characterization has not been done
- areas where levels of beryllium contamination have been above the public release limit, and accessible areas have been cleaned to below the public release limit
- areas where levels of beryllium contamination are above the public release limit, and are either awaiting decontamination or have been decontaminated and levels are still above the public release limit; **and** where airborne exposures are unlikely
- areas where levels of beryllium contamination are above the public release limit, and there is potential for airborne exposure
- equipment that has beryllium contamination above the public release limit, whether or not it has been decontaminated
- uncharacterized closed systems where it is reasonable to assume that low levels of beryllium may exist.

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3.5.3. Protective Clothing and Equipment

10 CFR 850.29 requires the use of protective clothing when dispersible forms of beryllium may contact the skin, enter breaks in the skin, or contact the eyes. This includes, but is not limited to, working in locations where 1) removable contamination levels exceed the DOE housekeeping limit, or 2) airborne exposures may reach or exceed the action level. Battelle further requires that protective clothing and/or equipment be used when airborne exposure to beryllium exceeding the medical removal limit of $0.01 \mu\text{g}/\text{m}^3$ is anticipated (e.g., maintenance within, or removal of, hoods or ventilation systems where beryllium is or has been used). In addition, skin and eye protection must be used when there is likelihood of skin or eye exposure to beryllium. The cognizant industrial hygienist will determine the level of protective clothing and equipment appropriate to the task. Protective clothing and equipment will be made available to any beryllium-associated worker who requests it, regardless of measured exposure levels. Organizations laundering such protective clothing and equipment will be informed of the potential hazards of beryllium precautions to prevent airborne beryllium.

3.5.4. Respiratory Protection

The use of NIOSH-approved respiratory protection is required for workers potentially exposed to airborne beryllium concentrations at or above the action level. Battelle requires respirator use when airborne exposures are anticipated unless exposures in similar operations or tasks have been evaluated and found to be below the action level. Any worker who requests the use of a respirator for protection against airborne beryllium exposures will be provided NIOSH-approved respiratory protection, regardless of measured exposure levels. All workers who use respiratory protection must be enrolled in the respiratory protection program.

3.5.5. Release of Beryllium Contaminated Material

Battelle will not release beryllium contaminated materials or equipment to the general public, even if cleaned below the public release criteria of 10 CFR 850.31. Beryllium-contaminated materials that have been cleaned below the public release criteria of 10 CFR 850.31 may be released to any DOE facility, provided appropriate labels are affixed to the material or equipment. Materials with contamination levels below the housekeeping limit of 10 CFR 850.30, but above the public release limit, can only be released to a facility performing work with beryllium. Any such equipment must be labeled in accordance with 10 CFR 850.38 and enclosed to prevent release of beryllium dust during transport.

3.5.6. Housekeeping

Regular surface sampling must be done in areas where beryllium is used to determine housekeeping and contamination status. Beryllium-contaminated floors and surfaces must be cleaned using a wet method, vacuuming, or other cleaning method, such as sticky tack cloths, that avoid the production of airborne dust. Cleaning equipment that is used to clean beryllium-contaminated surfaces must be labeled, controlled, and not used for non-hazardous materials.

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Surfaces contaminated with beryllium dusts and waste in operational areas of Battelle facilities should not exceed a removable contamination level of 3 µg/100 cm² excluding the interior of installed closed systems such as enclosures, glove boxes, chambers, or ventilation systems. Surfaces in occupied areas of facilities, or unoccupied areas where work is anticipated, with contamination levels above the public release limit of 0.2 µg/100 cm² will be decontaminated. A decontamination plan will be developed prior to conducting decontamination.

3.5.7. Waste Disposal

Work should be planned to minimize the amount of beryllium-contaminated waste. Beryllium waste and beryllium-contaminated waste materials (e.g., protective gloves, cleaning materials, etc.) must be placed in sealed impermeable containers and labeled as specified in accordance with 10 CFR 850.38.

3.5.7.1. Medical Surveillance, Consent, and Removal from Potential Exposure

For each of its employees and each of its lower-tier subcontract employees that the Contractor has identified as having potential occupational exposures that require enrollment in a medical surveillance or medical qualification program, the Contractor shall provide its Occupational Medical provider with the following information:

- Current information about actual or potential beryllium exposures;
- Actual or potential work-site beryllium exposures of each employee; and
- Personnel actions resulting in a change of job functions such that a change of hazards, or beryllium exposures results.

Each worker who is diagnosed with beryllium sensitization or chronic beryllium disease will be offered the opportunity to meet with a medical professional and a health and safety professional. The PNWD Health Advocate contacts the affected worker, and sends a letter identifying resources.

Where the SOMC determines that an employee must be temporarily or permanently removed from potential beryllium exposure, Battelle will consult with the affected worker and offer alternative work on a temporary or permanent basis to the best of Battelle's ability and as required by 10 CFR 850.35.

3.6. Training

General beryllium associated worker briefings will be given to all employees when hired. PNWD's Health Advocate in Human Resources is available to counsel current workers who are or have been exposed to beryllium to help them obtain medical exams and treatment. The occupational medical contractor will provide additional information and counseling. Managers of affected workers will receive training on Battelle work assignment, confidentiality, and other policies relating to affected workers. The Beryllium Health Advocate and ESH&Q staff will coordinate this training.

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Employees whose work may potentially involve airborne exposures to beryllium will be designated "beryllium-associated beryllium workers" and will receive training covering the following topics every two years or sooner if changes occur or if performance indicates reduced proficiency in safe beryllium work practices:

- beryllium health effects to employees and family members from contaminated clothing
- how to identify Hanford facilities with beryllium contamination
- signs used to identify beryllium contaminated areas and equipment
- an overview of Battelle's CBDPP, including assistance available from PNWD's Health Advocate and beryllium counseling offered by the SOMC.

3.7. Recordkeeping

The SOMC will maintain beryllium medical records. Battelle's ESH&Q Division will maintain exposure monitoring, inventory, and hazard assessment records. Battelle will protect the confidentiality of records in accordance with the requirements outlined in 10 CFR 850.39. Battelle will share exposure data with the SOMC and will remove all identifying information of workers named in beryllium records if data is transmitted to other approved parties, such as the Beryllium Registry within the DOE Office of Epidemiologic Studies.

The Battelle Beryllium website will be maintained by Battelle's ESH&Q Division. The Hanford Beryllium website will be maintained by the Fluor Hanford Beryllium Program Coordinator based on information provided by Battelle.

3.8. Performance Feedback

CBDPP assessments will be conducted in conjunction with other safety and health self-assessments at a frequency consistent with beryllium activities at Battelle. Such assessments will be conducted no more frequently than once every three years. Results will be provided to affected line managers, safety and health staff, workers, the occupational medical contractor, and made available to labor organizations on request.

4. Battelle Approved Beryllium Activities

The following activities are approved under this Manual. Work planning and hazard assessment will be performed for these activities prior to new work commencing or when changes in work practice are anticipated. Precautions will be taken to protect workers from contact with contaminated surfaces and airborne beryllium during intrusive work in hoods and associated exhaust systems and during remodeling or similar work in areas with beryllium contamination at or above $0.2 \mu\text{g}/100 \text{ cm}^2$. Unlisted activities involving potential airborne beryllium exposure require revision to this Manual and approval by Pacific Northwest Site Office (PNSO).

- laboratory operations that meet the definition of laboratory use of hazardous chemicals
- work with beryllium articles

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- research, maintenance, and housekeeping activities in facilities with beryllium contamination below the housekeeping limit
- HEPA filter removal or work on exhaust systems serving hoods or glove boxes where beryllium is being or has been used
- waste material packaging and removal
- decontamination to reduce beryllium contamination.

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Industrial Hygiene

1.0 Purpose

To define the requirements and responsibilities for recognizing, evaluating, and controlling employee exposures to chemical, physical, and biological agents encountered during construction activities.

The Industrial Hygiene (IH) program includes the following elements (as applicable):

- Hearing Protection/Hearing Conservation
- Hazardous Materials
- Sanitation
- Temperature Extremes
- Lighting and Illumination
- Ventilation
- Ionizing Radiation
- Lasers
- Contractor Work Site Dust Control

2.0 Responsibility

2.1 The Contractor shall be responsible for reviewing the worksites for compliance with this procedure, and for providing assistance on industrial hygiene matters.

2.2 The Contractor shall be responsible for implementing an effective IH program which:

- Identifies, evaluates, and controls potential and existing hazards/agents in the workplace through the prejob safety planning process.
- Determines that engineering devices, administrative controls, and personal protective equipment are available, appropriate, tested, and utilized by employees.
- Determines employees are trained as required.
- Stops work that is not being safely performed.
- Reports occupational exposure data to affected employees.

2.3 Employees shall be responsible for the following:

- Complying with the provisions of this procedure.
- Using all prescribed engineering control devices and personal protective equipment.
- Reporting unsafe conditions or suspected exposures to harmful agents to their supervisor.

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3.0 General Requirements

3.1 Identification of Health Hazards: The Contractor shall identify and document, as part of the JSA, existing and potential physical, chemical, and biological health hazards.

3.2 ALARA: In the prejob planning process, all exposures or potential exposures to employees shall be controlled so that levels are maintained ALARA. ALARA is an ongoing program that promotes high levels of employee recognition and understanding about safe practices and principles.

The Contractor will make every attempt to substitute less hazardous substances for any carcinogenic material.

3.3 Control Measures: This program requires that controls be implemented to eliminate or reduce employee exposures. Administrative and/or engineering controls shall be utilized first, if feasible. Personal protective equipment may be used in emergency situations for short-term exposures or where other methods of control have not proven feasible or available. These devices shall be used in the interim while other controls are being implemented. Gloves, splash protection coveralls, and other kinds of non-respiratory-type personal protective equipment may be routinely used.

3.4 Periodic Review: The employer shall perform periodic industrial hygiene surveys, inspections, evaluations, and/or surveillances of work activities. Employees shall have access to the results of these reviews.

3.5 Control of Hazardous Materials: Hazardous material exposures shall be maintained at ALARA levels wherever possible. Because of the broad definition of hazardous, a chemical shall not be used in any situation unless an individual has information indicating how the material can be used safely. See the Definition sections of the Manual for what constitutes a hazardous substance.

3.6 Bloodborne Pathogens

3.6.1 Employees who may reasonably be expected to be exposed to blood or other body fluids shall comply with OSHA/WISHA requirements relating to this subject.

3.6.2 First aid kits shall contain "Universal Precautions" items, including: chemical splash goggles, medical gloves, cardiopulmonary resuscitation (CPR) masks (with one-way valve), antiseptic hand cleaner, drying cloths, and red bags labeled "BIOHAZARD." (Disposal of medical waste during first aid shall be in labeled red bags, and may be in the same manner as normal refuse.)

4.0 Procedures

4.1 Hearing Conservation/Hearing Protection

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- 4.1.1 Engineering Controls: Every feasible effort shall be made to “engineer out” noise exposures greater than or equal to an 8-hr time-weighted-average (TWA) sound level of 85 decibels (dBA) on the A-weighted scale prior to utilizing personal hearing protection as a noise attenuation device. When controls are not feasible or fail to reduce noise to acceptable levels, hearing protection shall be required.
- 4.1.2 When work is to be performed in an environment that is suspected to exceed the allowable noise exposure as identified in the JSA, mandatory hearing protection requirements shall be implemented.
- 4.1.3 Noise Evaluation
 - 4.1.3.1 The Contractor shall survey and evaluate suspected high noise areas/work efforts.
 - 4.1.3.2 Employees may observe surveys and evaluations, and the results shall be made available to employees.
 - 4.1.3.3 Engineering control measures will be recommended when employee exposures exceed 85 dBA as an 8-hr TWA, or over 115 dBA maximum, or if impulse noise exceeds the standard.
- 4.1.4 Audiometric test records shall be retained by the Contractor.
- 4.1.5 Employees shall be given access to and notification of testing results.
- 4.1.6 Maximum allowable noise exposure shall not exceed the permissible noise exposures shown in CFR 29 1926.52 Table D-2/ WAC 296-62.
 - 4.1.6.1 Hearing Conservation Program: Employees who are routinely exposed to noise levels in excess of 85 dBA (based on an 8-hr TWA) shall be included in a hearing conservation program meeting the requirements of OSHA 29 CFR 1910.95 or WISHA Washington Administrative Code (WAC) 296-62, Part K
 - 4.1.6.2 Noise exposure shall be determined without regard to hearing protection.
 - 4.1.6.3 Audiometric testing shall be performed in accordance with OSHA/WISHA requirements. The **baseline audiogram** must be conducted within six months of confirmation of an exposure equal to or exceeding the 85dB action level. Audiograms shall be performed annually.
 - 4.1.6.4 Annual in-depth training on hearing conservation shall be provided. The training shall include the following:

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- Type of hearing protector required for each specific activity/area.
- Proper method of donning and fitting hearing protectors.
- Capabilities and limitations of hearing protectors.
- Care of hearing protectors.
- Effects of noise on hearing
- Purpose of audiometric testing procedures.
- Explanation of audiometric testing procedures.
- Employee's rights of access to records.

4.1.7 Hearing Protectors

4.1.7.1 The selection of the proper hearing protectors shall be based on the following:

- Nature of the operation.
- Period of time for which hearing protectors must be worn.
- Activities of workers in the surrounding area.
- Fit of the hearing protector device to the employee.

4.1.7.2 The Contractor, prior to the commencement of work, shall determine the proper type of hearing protection.

4.1.7.3 Hearing protectors shall be inspected by the wearer and shall be replaced if not in proper working condition.

4.1.7.4 Supervisory personnel shall periodically monitor worksites where hearing protection is required to verify that hearing protectors are being worn.

4.1.7.5 Attenuation: hearing protectors must reduce the decibel level to the internal ear to a level below an 8-hr TWA of 85 dBA. This attenuation is determined as follows:

- Identify the noise level at the ear (e.g., 95 dBA).
- Subtract the noise reduction rating (NRR) for the hearing protector from the noise level (e.g., 95 dBA – 30 NRR = 65 dBA).
- Add 7 e.g., 95 dBA – 30 NRR = 65 dBA + 7 = 72 dBA to the internal ear).

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4.1.7.6 High noise areas shall be posted with appropriate warning signs at all entrances.

4.2 Lead Program

The General Industry Lead Standard (OSHA 29 CFR 1910. /WISHA WAC 296-62-07521) or the Construction Lead Standard (OSHA 29 CFR 1926.62/WISHA WAC 296-155) will apply to all lead work performed by the Contractor. The Contractor shall be responsible for compliance with all requirements within the applicable Standards. These requirements include employee training, exposure assessment and monitoring, selection and use of respiratory protective equipment, medical surveillance, and application of methods for controlling the release of lead to the environment.

4.3 Asbestos Program

It is expected that either the General Industry Asbestos Standard (OSHA 29 CFR 1910.1001/ WISHA WAC 296-62 standards or the Construction Asbestos Standard (OSHA 29 CFR 1926.1101 /WISHA WAC 296-62) standards will apply to all asbestos work performed by the Contractor. The Contractor shall be responsible for compliance with all requirements within these Standards. These requirements include employee training, exposure assessment and monitoring, selection and use of respiratory protective equipment, medical surveillance, and application of methods for controlling the release of asbestos to the environment.

4.4 Carcinogen Control

4.4.1 Occupational exposure to chemical carcinogens shall be maintained at ALARA levels. The primary objective shall be to prohibit or reduce the use of known or suspected carcinogens in the workplace.

4.4.2 If hazardous materials containing carcinogenic components are used, control measures outlined in this section shall be included in a detailed JSA.

4.4.3 The JSA shall identify hazardous materials that contain greater than 0.1 percent by weight or volume of components that are known or suspect human carcinogens (as defined by OSHA, the American Conference of Governmental Industrial Hygienists [ACGIH], the National Toxicology Program [NTP], or the International Agency for Research on Cancer [IARC]).

4.4.4 Regulated (access controlled) areas shall be established where chemical carcinogens are used. A record shall be maintained of all personnel who enter the regulated area(s).

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- 4.4.5 Engineering controls shall be the primary method used to minimize exposure and to prevent the release of carcinogens into the work environment.
- 4.4.6 Signs warning of the presence of chemical carcinogens shall be posted at all entrances to regulated areas.
- 4.4.7 Identified employees shall be provided appropriate notification, monitoring results, and medical surveillance as required by the mandatory OSHA/WISHA requirements for each harmful agent.
- 4.4.8 Fifty percent of the permissible exposure limit (PEL) or the threshold limit value (TLV), whichever is most restrictive, shall be the “action level” (if a specific action level is not already established in applicable standards).
- 4.4.9 Carcinogens may be used only when no other practical substitute can be found.
- 4.4.10 All facilities that store or use carcinogens shall keep a current carcinogen inventory, including the following:
- Carcinogen product name
 - Material Safety Data Sheet (MSDS) number
 - Storage and use location
 - Volume on hand
 - Description of use
- 4.4.11 All employees who work with or are potentially exposed to chemical carcinogens shall be provided with documented use-specific training, including instruction on:
- Possible source of exposure, health effects
 - Handling procedures
 - Specific application of the chemical use
 - Potential hazardous conditions
 - Decontamination procedures, proper disposal
 - Emergency procedures, including spills
 - Medical surveillance requirements.
- JSA-specific training can satisfy this requirement, and documentation may be the JSA sign-in sheet, providing that adequate detail is included on the JSA.
- 4.4.12 Employees shall wash thoroughly after using or handling products containing carcinogens. Eating, drinking, smoking, chewing, and food

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utensil storage is prohibited in work areas where carcinogenic materials are used or stored.

4.5 Sanitation

4.5.1 All work areas, shops and offices shall be kept clean to the extent the nature of the work allows. The floor of every workroom shall be maintained, so far as practicable, in a dry condition.

4.5.2 Waste receptacles that do not leak and may be thoroughly cleaned and maintained in a sanitary condition shall be used. Lunchroom receptacles shall be equipped with a solid, tight fitting cover.

All sweepings, wastes, refuse, and garbage shall be removed in a timely and sanitary manner.

4.5.3 Housekeeping shall be maintained on a daily basis. Cleaning and sweeping shall be done in a manner, which minimizes the contamination of the air with dust or particulate matter.

4.5.4 Drinking water and ice shall conform to the quality criteria established by local, state and federal regulations.

4.5.5 Water facilities and containers shall be maintained, cleaned, and sanitized in accordance with applicable regulations. Use of common utensils (e.g., sharing the same cup) is prohibited.

4.5.6 Adequate and well-equipped toilets and wash stations (including eyewash stations and showers, where required) must be readily accessible to all employees. Those facilities shall be maintained in a sanitary manner at all times, and include soap, towels, and waste receptacles.

4.6 Temperature Extremes: This subsection describes the recommendations relating to heat stress and cold stress.

4.6.1 Heat Stress

4.6.1.1 Heat stress monitoring shall be measured by the ambient temperature and relative humidity or Wet Bulb Globe Temperatures (WBGT) index method when outdoor ambient or indoor work area temperatures exceed 85° F. The Battelle-PNNL Weather Station (373-2716) provides WBGT readings during daylight hours.

4.6.1.2 The American Conference of Industrial Hygienists (ACGIH) threshold limit value (TLV) guidelines shall be followed for developing and implementing heat stress mitigation strategies.

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4.6.1.3 The use of heat stress controls shall be addressed during the planning stages for all work that is to be performed in elevated temperature environments. Engineering controls, work time limits, work rates, and use of body cooling devices should be described in the JSA.

4.6.1.4 Working Conditions

- Adequate amounts of cool drinking water (50° F to 60° F) shall be at each worksite in coolers designated only for drinking water purposes. When ambient temperatures exceed 85° F, water breaks should be taken frequently during the day to replenish water lost from perspiration.
- Symptoms such as hot, dry skin, extremely high body temperature, rapid pulse, unconsciousness, or lack of perspiration suggest heat stroke and constitute a medical emergency.
- Solar shielding may be provided (if possible) when workers are exposed to direct sunlight throughout the workday when the temperature exceeds 100° F.

4.6.2 Cold Stress

4.6.2.1 The ACGIH Cold Threshold Limit Value (TLV) is the prescribed standard for cold exposure. The Cold Stress TLV requires that the air temperature, wind speed, and equivalent wind chill temperature be measured, calculated, and recorded at least every four hours when employees are exposed to temperatures below 30° F.

4.6.2.2 When work involves continuous employee exposure to an equivalent chill temperature (ECT) below 10° F, the following safe-work practices shall be observed:

- Work is conducted using the “buddy system.”
- Workers are instructed in symptoms of frostbite and in hypothermia, and appropriate preventive and first aid measures.
- Heated, warming shelters are conveniently available.

4.6.2.3 Non-emergency work is curtailed when the ECT in the work area is below -25° F.

4.6.2.4 Workers who experience symptoms of cold exposure (such as hypothermia), are immediately moved to a warm area, and then examined by a physician as a follow-up measure.

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4.7 Lighting and Illumination

- 4.7.1 The minimum level of task lighting in all indoor workplaces shall be an average of 5-ft candles measured 30 in above the floor.
- 4.7.2 General illumination for out-of-door work shall be a minimum of 5-ft candles. Auxiliary lighting shall be used when needed.

4.8 Ventilation

- 4.8.1 Local exhaust ventilation is a primary engineering control and is required to reduce concentrations of hazardous, irritating, and odoriferous air contaminants below allowable exposure limits (where feasible). The operability of such systems shall be evaluated prior to the start of the work.

4.9 Lasers

- 4.9.1 Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment. Use of non-construction laser equipment may require a laser use permit.
- 4.9.2 Proof of qualification of the laser equipment operator shall be in possession of the operator at all times.
- 4.9.3 Employees, when working in areas in which a potentially hazardous exposure to direct or reflected laser radiation exists, shall be provided with anti-laser protection devices.
- 4.9.4 Areas in which Class II and Class IIIa lasers are used shall be posted with standard laser warning placards.
- 4.9.5 Beam shutters or caps shall be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at a change of shifts, the laser shall be turned off.
- 4.9.6 Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.
- 4.9.7 The laser beam shall not be directed at employees.
- 4.9.8 When it is raining or snowing, or when there is dust or fog in the air, and it is impracticable to cease laser system operation, employees shall be kept out of range of the area of source and target during such weather conditions.

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4.9.9 Laser equipment shall bear a conspicuously displayed label to indicate hazard classification. This label shall be prepared in accordance with 21 CFR 1040.10.

4.9.10 Only Class I, II, or IIIa laser equipment shall be used. Class IIIb and IV laser equipment shall not be used without the express written permission of the Battelle Laser Safety Officer.

4.10 Contractor Work Site Dust Control

4.10.1 All contractor projects shall address dust control during prejob planning.

4.10.2 Areas to be cleared for construction shall be limited to keep dust generation to a minimum.

4.10.3 Construction of permanent roadways and parking areas shall be scheduled during the early stages of a project.

4.10.4 During construction, frequent watering shall be provided to roadways and disturbed areas that are not otherwise treated. Sufficient equipment shall be kept at the jobsite to control dust whenever a nuisance or hazard occurs.

4.11 Safety Showers and Eyewash Apparatus

4.11.1 Eyewash/shower apparatus shall be provided where there is significant potential for personnel exposure to injurious materials (e.g., corrosives, skin sensitizers, etc.)

4.11.2 Employees who may have a need for an eyewash/shower apparatus shall know where the nearest eyewash/shower apparatus is located and how to operate it.

4.11.3 Employees involved in work that presents potential exposure shall test the closest eyewash/shower apparatus prior to the start of the job.

4.11.4 Eyewash/shower apparatus shall be functionally tested monthly to flush the line and to verify proper operation. A record shall be maintained to verify testing.

4.11.5 The potable water provided for a portable eyewash/shower apparatus shall be flushed or changed according to manufacturer's specifications.

4.11.6 An eyewash/shower apparatus shall be located such that it would require no more than 10 seconds to reach from the hazard.

4.11.7 Access shall be free of any impediments.

5.0 References

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29 CFR 1910 Occupational Safety and Health Standards (OSHA)
29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
WAC 296-155 Safety Standards for Construction Work (WISHA)

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Electrical Work Safety

1.0 Purpose

To define the requirements for electrical safety and provide specific resources for other requirements, and to facilitate compliance with National Fire Protection Association, DOE, OSHA/ WISHA requirements.

2.0 Responsibility

Contractor adhere to the [Electrical Safety](#) CESH procedure (PDF).

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Signs and Barricades

1.0 Purpose

To establish requirements for the use of signs, signals, and barricades.

2.0 Responsibility

2.1 The Contractor shall be responsible for compliance with the provisions of this procedure.

2.2 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

3.1 Prior to commencing construction activities, the construction work shall have signs, signals, and barricades in the work area in accordance with the following statutory requirements:

3.1.1 29 Code of Federal Regulations (CFR) 1926, Subpart G; Signs, Signals, and Barricades (OSHA).

3.1.2 Washington Administrative Code (WAC) 296-155, Part E; Signs, Signals, and Barricades (WISHA).

3.2 Whenever appropriate, traffic control shall be instituted in accordance with the provisions of the Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration.

3.3 Signs, signals, and/or barricades shall be visible at all times when the work is being performed and shall be promptly removed or covered when the hazard no longer exists.

4.0 Procedure

4.1 Construction Activities

4.1.1 Caution signs and appropriate physical barricades shall be used to warn against potential hazards or to caution against unsafe practices.

4.1.2 Caution signs shall be yellow with black lettering.

4.1.3 Danger signs shall be used where an immediate hazard exists.

4.1.4 Danger signs shall be red with black lettering.

4.1.5 Where specific hazards exist (e.g., overhead hazards, noise, chemical exposure, radiation), signs shall be posted to warn of such hazards.

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- 4.2 Accident Prevention Tags: Accident prevention (Danger – Do Not Use) tags shall be used as a temporary means of warning employees of an existing hazard such as defective tools, equipment, etc.
- 4.3 Traffic Control
 - 4.3.1 Adequate warning, delineation, and routing by means of proper pavement marking, signing, and other devices which will give the motorist positive direction in advancing through the work area.
 - 4.3.2 When construction activities are adjacent to the roadway, warning signs shall be erected on the approach in both directions.
 - 4.3.3 All signs intended for hazard warning during hours of darkness shall be reflectorized and illuminated.
 - 4.3.4 A certified flag person shall be utilized at worksites to intermittently stop traffic as necessitated by work progress or to maintain continuous reduced-speed traffic past a worksite to help protect the work crew.
 - 4.3.5 A flag person (flagger) shall possess the following minimum qualifications:
 - 4.3.5.1 Each flagger shall have in their possession a valid certification of completion of an approved flagging course.
 - 4.3.5.2 Signaling directions by flaggers shall conform to the American National Standards Institute D6.1-1978, manual on Uniform Traffic Control Devices for Streets and Highways, as amended by the Washington State Department of Transportation.
 - 4.3.5.3 Good physical condition, including sight and hearing.
 - 4.3.5.4 Mental alertness.
 - 4.3.5.5 Courteous but firm manner.
 - 4.3.5.6 Sense of responsibility for safety of public and crew.

5.0 References

29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Safety and Health Regulations for Construction (OSHA)
WAC 296-155	Safety Standards for Construction Work (WISHA)
ANSI Z535.1/2535.2	Specifications for Accident Prevention Tags

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Floor Openings, Open Sides, and Ramps

1.0 Purpose

To define protective measures to be implemented on contractor work sites that involve temporary conditions of floor openings and open sided work surfaces where there exists danger of employees or materials falling into or off of working surfaces.

2.0 Responsibility

2.1 The Contractor shall be responsible for compliance with this procedure.

2.2 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

3.1 Floor openings, open sided surfaces and ramps shall comply with the following statutory requirements:

- 29 Code of Federal Regulations (CFR) 1910, Subpart D; Walking-Working Surfaces
- 29 Code of Federal Regulations (CFR) 1926, Subpart M; Floor and Wall Openings
- Washington Administrative Code (WAC) 296-155, Part K; Floor Openings, Wall Openings and Stairways

3.2 Floor Openings

3.2.1 Floor openings shall be guarded by a standard railing and toe boards on all exposed sides except at entrances to stairways.

3.2.2 Hatchways and chute openings shall be guarded by one of the following:

- Hinged covers of standard strength and construction and a standard railing with only one exposed side.
- A removable standard railing with toe board on no more than two sides of the opening and fixed standard railings with toe boards on all other exposed sides. The removable railing shall be kept in place when the opening is not in use and shall be hinged or mounted to be conveniently replaceable.

3.2.3 Pits and trap door floor openings shall be guarded by floor opening covers of standard strength and construction. While the cover is not in place, the pit or trap openings shall be protected on all exposed sides by removable standard railings.

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- 3.2.4 Manhole floor openings shall be guarded by standard covers, which need not be hinged in place. While the cover is not in place, standard railings shall protect the manhole opening.
 - 3.2.5 All floor-opening covers shall be capable of supporting the maximum potential load but never less than 200 pounds (with a safety factor of four).
 - 3.2.5.1 The cover shall be recessed to conform to the level of the surrounding floor or to be flush with the perimeter of the opening.
 - 3.2.5.2 The cover shall be secured by fastening devices to prevent unintentional removal.
 - 3.2.5.3 If it becomes necessary to remove the cover, a monitor shall remain at the opening until the cover is replaced. The monitor shall advise persons entering the area of the hazard shall prevent exposure to the fall hazard and shall perform no other duties.
 - 3.2.5.4 Floor opening covers shall be clearly marked, "HOLE" OR "FLOOR OPENING COVER."
 - 3.2.6 Floor holes into which persons can accidentally walk, shall be guarded by either a standard railing with standard toe boards on all exposed sides, or a floor hole cover of standard strength and construction that is secured against accidental displacement. While the cover is not in place a standard railing shall protect the floor hole.
- 3.3 Open Sided Surfaces
- 3.3.1 Every open sided floor or platform or surface 4 ft or more above adjacent floor or ground level shall be guarded by a standard railing on all open sides except where there is an entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a standard toe-board beneath the open sides wherever persons can pass, there is moving machinery, or there is equipment with which falling materials could create a hazard.
 - 3.3.2 Runways shall be guarded by standard railing on all open sides 4 ft or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toe-board shall be provided on each exposed side.
 - 3.3.3 Where employees entering runways become exposed to machinery, electrical equipment or other dangers that are not a falling hazard, additional guarding shall be provided.
 - 3.3.4 Regardless of height, open sided surfaces, walkways, platforms, runways above or adjacent to dangerous equipment shall be guarded with a standard railing and toe-board.

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3.4 Ramps

3.4.1 Ramps (runways) shall be a minimum of 18 inches in width.

3.4.2 Ramps shall be secured so that they cannot be accidentally displaced.

3.4.3 Ramps shall be provided with standard railing when located 4 ft above the ground or floor level.

3.4.4 Ramp specifications: Ramps (runways) and walkways shall not be inclined more than twenty degrees from horizontal and when inclined shall be cleated or otherwise treated to prevent a slipping hazard on the walking surface.

3.5 Fall Protection

3.5.1 Where guardrails cannot be provided and the potential for fall injuries exist, employees shall be protected in accordance with an acceptable fall plan.

4.0 References

29 CFR 1910	Occupational Safety and Health Standards (OSHA)
29 CFR 1926	Safety and Health Regulations for Construction (OSHA)
WAC 296-155	Safety Standards for Construction Work (WISHA)

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Lockout/Tagout

1.0 Purpose

To define the requirements for lockout/tagout of hazardous energy sources.

2.0 Responsibility

Contractors adhere to the [Lockout/Tagout Program](#) CESH procedure (PDF).

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Hand and Power Tools

1.0 Purpose

To establish the requirements for the selection, use, and maintenance of hand and portable power-operated tools.

2.0 Responsibility

2.1 The Contractor shall be responsible for implementing this procedure.

2.2 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

3.1 The selection, use, and maintenance of hand and portable power-operated tools shall comply with the following statutory requirements:

- 29 Code of Federal Regulations (CFR) Part 1926, Subpart I; Tools – Hand and Power.
- 29 Code of Federal Regulations (CFR) Part 1910, Subpart P; Hand and Portable Powered Tools and Other hand-Held Equipment.
- Washington Administrative Code (WAC) 296-155; Part G; Tools- Hand & Power

3.2 Hand and power tools and similar equipment shall be maintained in safe condition.

3.3 Employees shall inspect hand and power-operated tools prior to use. Defective tools shall be tagged with an accident prevention tag and turned in for repair or replacement.

3.4 When power-operated tools are designed to accommodate blade/wheel guards, they shall be equipped with such guards when in use.

3.5 Appropriate personal protective equipment shall be identified, provided, and used for the safe operation of hand/power tools in accordance with the JSA requirements.

3.6 Power tools shall be disconnected from their energy source when changing attachments or conducting repairs/maintenance on the tool.

3.7 Portable power tools shall be equipped with a constant-pressure switch that will shut off power when the operator releases the pressure.

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Exceptions: Hand-held powered grinders with wheels 2 in or less in diameter, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jig saws with blade shanks ¼ in wide or less, may be equipped with a positive "ON-OFF" switch.

3.8 Blades and wheels shall have the proper rating and revolutions per minute for the tool.

4.0 Procedure

4.1 Hand-Tools

4.1.1 Impact tools such as drift pins, wedges, and chisels shall be kept free of mushroomed heads.

4.1.2 Wooden handles of tools shall be kept free of splinters or cracks, and shall be kept tight in the tool.

4.2 Electric Tools

4.2.1 Electric power-operated tools shall be double insulated or grounded in accordance with applicable OSHA/ANSI standards.

4.2.2 Power tools shall not be hoisted or lowered by their electric cords.

4.3 Pneumatic Tools

4.3.1 Pneumatic tools shall not be hoisted or lowered by their hoses.

4.3.2 Safety clips or retainers shall be securely installed and maintained on pneumatic impact tools to prevent attachments from being accidentally expelled.

4.3.3 All pneumatically driven nailers, staplers, and other similar equipment provided with an automatic fastener feed shall be equipped with a safety device on the muzzle to prevent the tools from ejecting fasteners when the muzzle is not in contact with the work surface.

Exception: Pneumatic nailers or staplers utilizing "fine wire" brads or staples do not require a muzzle contact safety device under the following circumstances:

- The overall weight of the fastening device does not exceed the weight of 1-1/2 in of standard 18 gauge wire.
- The operator and any other person within 12 ft of the point of operation wear approved eye protection.

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- 4.3.4 All hoses exceeding ½ in at the inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
- 4.3.5 Pneumatic power tools shall be secured to the hose or whip to prevent the tool from becoming accidentally disconnected.
- 4.3.6 All pneumatic tools shall be equipped with deadman switches. Governor-controlled pneumatic tools shall be equipped with an air filter and oiler.
- 4.3.7 Pneumatic tools shall not be connected to an air supply, which exceeds the tool rating.
- 4.4 Fuel Powered Tools
 - 4.4.1 Fuel powered tools shall be stopped and allowed to cool prior to being refueled, serviced, or maintained.
- 4.5 Hydraulic Powered Tools
 - 4.5.1 Fluids used in hydraulic powered tools shall be fire-resistant fluids, approved under Schedule 30 of the Bureau of Mines.
 - 4.5.2 The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.
- 4.6 Powder Actuated Tools
 - 4.6.1 Only qualified operators (trained by the manufacturer) shall be permitted to use powder-actuated tools.
 - 4.6.2 When in use, powder actuated tools shall be tested each day before loading (in accordance with the manufacturer's recommended procedure) to verify that safety devices are in proper working condition.
 - 4.6.3 Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools shall be pointed at persons.
 - 4.6.4 Loaded tools shall not be left unattended.
 - 4.6.5 Powder actuated tools shall not be use in atmospheres having a 10% or greater reading for Lower Explosive Limit.
 - 4.6.6 Tools shall always be used with the correct shield, guard, or attachment as recommended by the manufacturer.
 - 4.6.7 Powder actuated tools shall be stored in labeled, lockable containers so as to render them unavailable to unauthorized persons.

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- 4.6.8 Tools shall be operated in strict accordance with the manufacturer's instructions. Only those types of fasteners and powder loads recommended by the tool manufacturer shall be used.
- 4.6.9 Prior to driving a fastener, the operator shall inspect the line-of-fire to assure safety should the fastener penetrate completely through the work surface.
- 4.6.10 In the event of a misfire, the operator shall follow the explicit instructions set forth by the tool manufacturer.
- 4.6.11 A sign at least 8 x 10 in using boldface type at least one inch in height shall be posted in plain sight on all construction projects where powder actuated tools are in use. The sign shall bear wording similar to the following: "POWDER ACTUATED TOOL IN USE."
- 4.6.12 Spent shell casing shall be picked-up and deposited daily.
- 4.6.13 Misfire shells shall be placed in water until the end of shift.
- 4.7 Abrasive Wheels and Tools
 - 4.7.1 Abrasive wheels shall be closely inspected for cracks or defects and ring-tested before mounting.
 - 4.7.2 Machine spindle speeds shall be checked before mounting the wheel to be certain that the wheel will not exceed the maximum operating speed marked on the wheel.
 - 4.7.3 Abrasive wheels shall be used only on machines with safety guards except as follows:
 - Wheels used for internal work while within the work being ground
 - Mounted wheels 2 in and smaller in diameter used in portable operations
 - Types 16, 17, 18, 18R, and 19 cones and plugs, and threaded hole pot balls where the work offers protection.
 - 4.7.4 Abrasive wheels shall be handled and stored in a manner that prevents damage to the wheels.
 - 4.7.5 Stationary grinding machines shall be equipped with a transparent spark shield, tongue guards (adjusted within ¼ in of the wheel), and a work rest (adjusted within 1/8 in of the wheel).
 - 4.7.6 Pneumatic grinding machines shall be operated at the correct pressures and off a regulated air supply.

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4.8 Woodworking Tools: All portable power-driven circular saws shall be equipped with guards above and below the base plate or shoe. Lower guards shall be properly maintained to so they will automatically and instantly return to the covering position when the tool is withdrawn from the work.

5.0 References

29 CFR 1910 Occupational Safety and Health Standards (OSHA)
29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
WAC 296-155 Safety Standards for Construction Work (WISHA)
ANSI B7.1-1988 The Use, care, and Protection of Abrasive Wheels
ANSI 01.1-1961 Safety Code for Woodworking Machinery
American National Standards Institute (ANSI) A10.3-1985; Safety Requirement for Powder Actuated Fastening Systems.

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Cutting, Welding, Grinding

1.0 Purpose

To define the requirements for performing work with open flame, welding, cutting, or grinding in a Designated Area and to those who supervise them.

2.0 Responsibility

Contractor adhere to the [Controlling Hot Work](#) CESH procedure (PDF).

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Scaffolds

1.0 Purpose

To define the responsibilities and requirements for the safe use, erection, and maintenance of scaffolds.

2.0 Responsibility

2.1 The Contractor shall be responsible for compliance with this procedure.

2.2 Employees shall be responsible for complying with provisions of this procedure.

3.0 General Requirements

3.1 Construction, maintenance, use and inspection of scaffolds shall comply with the following statutory requirements:

- 29 Code of Federal Regulations (CFR) 1926, Subpart L; Scaffolding
- 29 Code of Federal Regulations (CFR) 1910, Subpart D; Walking and Working Surfaces
- Washington Administrative Code (WAC) 296-155, Part J-1; Scaffolding.

3.2 A competent person shall be designated in writing who will:

- 3.2.1 Direct scaffold selection and erection/dismantling
- 3.2.2 Train scaffold erectors and inspectors
- 3.2.3 Resolve issues.

3.3 Scaffolding materials purchased, erected, and used shall meet applicable OSHA/WISHA safety standards and the manufacturer's rules and instructions for safe use and erection of scaffolding.

3.4 Scaffolds and component parts shall be maintained in a safe condition. Any scaffold parts damaged or weakened from any cause shall not be used.

3.5 Scaffolds and their components shall be capable of supporting at least four times the maximum intended load without failure. Ladders or makeshift devices shall not be used to increase the working height of scaffolds.

3.6 Standard guardrails (capable of sustaining 200-pound lateral force) and toe-boards shall be installed on all open sides and ends of scaffolds and platforms more than 10 ft above the ground or floor.

3.7 The height of manually propelled mobile scaffolds shall not exceed four times the minimum base dimension.

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- 3.8 Platforms shall be fully secured. Platforms shall be a minimum width of 2"x10" planks (if using planking), or at least 18 in (if using other material – such material shall be of sufficient type and strength/thickness).
- 3.9 A personal Fall Protection Work Plan shall be developed for workers exposed to fall hazard of 10 ft or more. Personal fall protection equipment or other means of equivalent protection shall be provided and used when guardrails cannot be installed.
- 3.10 Tube and coupler scaffolds shall be erected according to manufacturer's design.
- 3.11 The poles, legs, or uprights of scaffolds shall be plumb and securely and rigidly braced to prevent swaying and displacement.
- 4.0 Procedure
- 4.1 Scaffolds shall not be inspected by the erector(s) prior to turnover for use by other personnel.
- 4.2 Scaffolds shall be erected, dismantled, or altered under the supervision of a competent person. All scaffolds shall have the appropriate status tag attached to or near the access ladder. This status tag shall be installed by the scaffold erector(s), and shall be attached at all times during erection, use, and dismantlement of scaffold. The status tags (see scaffold sample tags below) shall be color-coded and shall have the following meanings:
- Red Tag: **KEEP OFF/DO NOT USE.** This tag is used to prohibit use of the scaffold during installation, alteration, or dismantlement except by the erecting crew performing installation, alteration, or dismantlement activities
 - Yellow Tag: **SPECIAL CONDITIONS/ADDITIONAL CONTROLS.** This tag indicates special safety measures for use of scaffold (e.g., fall protection or head protection).
 - Green Tag: **SCAFFOLDING IS ERECTED TO CODE/APPROVED FOR USE:** This tag is used to indicate that the completed scaffold meets all erection codes, standards, and company procedures, and is safe for use.
 - White Tag **INSPECTION TAG.** Indicates that the scaffold has been inspected by a competent person before each work shift.
- 4.3 Scaffolding planks are scaffold grade or equivalent as recognized by approved grading rules for the species of wood used.

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- 4.4 An access ladder or equivalent safe access shall be provided for each working level.
- 4.5 Scaffold work levels shall be kept clear of trash, snow, ice, and excess accumulation of materials or tools.
- 4.6 Footings and anchorages for scaffolds shall be firm and capable of carrying the maximum intended load without settling or displacement. Unstable objects, such as boxes, barrels, and concrete blocks, shall not be used. Mud plates shall be used on loose footings.
- 4.7 Scaffolds shall be placed as close to the work as possible. Where fall protection is being provided by the structure (building, wall, adjacent platform, etc.) on which work is being performed, the maximum allowable distance between the scaffold platform and the structure is 14 in.
- 4.8 Where a scaffold's height exceeds 4 times its smallest base dimension, guy, tie, or brace the unit at the closest horizontal member to the 4:1 height. Repeat every 26 ft vertically or 20 ft for those units less than or equal to 3 ft in width and 30 ft horizontally.
- 4.9 Planking shall be secured from movement.
- 4.10 Planking shall extend over end supports a minimum of 6 in but not more than 12 in.
- 4.11 Where persons are required to work or pass under the scaffold, scaffolds shall be provided with a screen between the toe-board and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard wire ½-in mesh, or the equivalent.
- 4.12 Conductive parts of scaffolds shall not be erected or positioned within 10 ft of exposed live electrical equipment unless the equipment is de-energized and locked out, or it is protected from contact by insulating blankets.
- 4.13 When scaffolding is to be erected within 20 ft of overhead utility or electrical lines, Utilities shall be notified.
- 4.14 If the scaffolding is to be erected 10 ft or less from overhead electrical lines, Utilities shall be contacted for assistance in de-energizing or insulating the lines prior to scaffold erection.
- 4.15 Workers shall not "ride" a manually propelled scaffold while it is being moved.
- 4.16 Workers shall not straddle or work outside of the guardrails.
- 4.17 All tools and materials shall be secured or removed from the platforms of mobile scaffolds before the scaffold is moved.

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- 4.18 Mobile scaffolds rest upon suitable footings and stand plumb. The casters or wheels are locked to prevent movement.
 - 4.19 A registered professional engineer shall design scaffolding over 125 ft in height.
 - 4.20 The height of freestanding scaffolding towers shall not exceed four times the minimum base dimension. All scaffolding components and materials shall be inspected before use.
 - 4.21 For rolling towers under 30 ft, 5-in or larger casters shall be used. For rolling towers 30 ft and over, 8-in or larger casters shall be used.
 - 4.22 Where moving vehicles are present, the scaffold area shall be marked with warnings such as flags and/or barricades.
- 5.0 Training
- 5.1 A competent person shall provide training to employees who are involved in erecting, dismantling, moving, and inspecting scaffolds. Training shall include:
 - 5.1.1.1 The nature of scaffold hazards
 - 5.1.1.2 The correct procedures for erecting, dismantling, moving, repairing, inspecting, and maintaining the type of scaffold in use
 - 5.1.1.3 Design criteria and load-carrying capacities
 - 5.1.1.4 Other pertinent requirements.
 - 5.2 A qualified person shall provide training to employees who perform work while on a scaffold. Training shall include:
 - 5.1.1.5 The nature of any electrical hazards, fall hazards, and falling object hazards in the work area
 - 5.1.1.6 The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems
 - 5.1.1.7 The proper use of the scaffold, and the proper handling of materials on the scaffold
 - 5.1.1.8 Design criteria and load-carrying capacities.
 - 5.1.1.9 Other pertinent requirements.
 - 5.3 Retraining of employees is required under the following situations.
 - 5.1.1.10 Where changes at the worksite present a hazard which an employee has not been previously trained
 - 5.1.1.11 Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment, which an employee has not been previously trained.
 - 5.1.1.12 When employees demonstrate inadequacies while working with scaffolds.

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6.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Competent Person Designation	Contractor	Contractor
Training Attendance Record	Contractor	Contractor

7.0 References

29 CFR 1910 Occupational Safety and Health Standards (OSHA)
29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
WAC 296-155 Safety Standards for Construction Work (WISHA)

8.0 Forms

[Scaffolds Inspection Checklist](#)

Scaffold Status Tags



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Ladders

1.0 Purpose

To define responsibilities and requirements for the safe use, handling, storage, and construction of ladders. Further, to ensure compliance with applicable requirements of the American National Standards Institute (ANSI), Occupational Safety and Health Administration/Washington Industrial Safety and Health Act (OSHA/WISHA), and the National Fire Protection Association (NFPA) requirements.

2.0 Responsibility

2.1 The Contractor shall be responsible for ensuring compliance with this procedure.

2.2 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

3.1 Use, care, and storage of ladders shall comply with the following statutory requirements:

- 29 Code of Federal Regulations (CFR) 1926, Subpart X; Stairways and Ladders.
- 29 Code of Federal Regulations (CFR) 1910, Subpart D; Walking and Working Surfaces.
- Washington Administrative Code (WAC) 296-155, Part J; Stairways and Ladders.

3.2 Ladders shall be maintained in good condition at all times. Those that are defective in any way shall be removed from service and tagged with an unsafe equipment tag until made safe for use, or destroyed.

3.3 Ladders may be repaired only if repairs will restore the ladder to a condition meeting its original design criteria.

3.4 Ladders used on Construction Sites shall be appropriate for industrial applications (Class I or 1-A). **Light-duty household ladders are not permitted.**

3.5 Job-made ladders shall be constructed in accordance with ANSI A14.4, "Safety Requirements for Job-Made Ladders".

3.6 When ascending or descending a ladder, the user shall face the ladder and always keep 3 limbs in firm contact with the ladder. Carry tools or equipment in a work belt or fanny pack, or hoist them to the work area using a rope or bucket.

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- 3.7 Metal ladders shall not be used where potential electrical hazards exist. Wood or fiberglass ladders having metal parts (other than hardware) shall not be used where potential electrical hazards exist unless they bear a manufacturer's label that indicates the following:
- The ladder complies with ANSI A14.5
 - The ladder is approved for electrical use.
- 3.8 Wood ladders shall not be coated with any opaque covering (i.e., paint) except for identification or warning labels, which may be placed on one face only of a side rail.
- 3.9 Employees shall be trained to the requirements of this procedure.
- 4.0 Procedure
- 4.1 Use of Ladders
- 4.1.1 Ladders shall be inspected by the user before each use.
- 4.1.2 Employees shall ensure that their shoes and the ladder steps are free of grease, mud or other materials that could cause them to slip while climbing.
- 4.1.3 Do not place ladders against any structure or equipment that is not strong and rigid enough to support the ladder, or that is not sufficiently anchored.
- 4.1.4 Straight ladders shall be used at an angle of approximately 75 degrees from the horizontal. (This position may be readily established by placing the base of the ladder $\frac{1}{4}$ of its working length from the vertical plane of the top support.)
- 4.1.5 No type of work shall be performed on a ladder 25 ft or more from the ground or floor unless a safety harness is worn and the safety lanyard is secured to an adequate fall arrest or fall restraint attachment point.
- 4.1.6 Use ladders only for short duration jobs with limited work scope.
- 4.1.7 Ladders shall be used only on firm, stable and level surfaces and shall be secured to prevent accidental displacement.
- Note:** Stepladders need not be secured except when required by subparagraphs 4.1.7.1 and 4.1.7.2.
- 4.1.7.1 Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces including, but

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- 4.1.7.2 Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways shall be secured to prevent accidental displacement or a barricade shall be used to keep the activities or traffic away from the ladder.
- 4.1.8 Ladders shall not be spliced together to form longer sections.
- 4.1.9 Prior to climbing and extension ladder, the user shall ensure that the locking clips (stops) are securely in place.
- 4.1.10 Ladders used to gain access from one level to another shall be long enough for the top to extend 3 feet above the landing or suitable grab rails shall be provided for safe movement to or from the point of access.
- 4.1.11 The platform and top step of ordinary types of stepladders shall not be used as steps.
- 4.1.12 Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladder is designed and provided with steps for climbing on both front and rear sections.
- 4.1.13 Stepladders shall not be used as straight ladders, and shall be used with legs fully extended.
- 4.1.14 Ladders shall not be used as braces, skids, levers, runways, platforms, scaffolds, or for any other purpose for which they are not intended.
- 4.1.15 Ladders shall not be climbed by more than one person at a time unless designed to support more than one person.
- 4.2 Care of Ladders
 - 4.2.1 Ladders shall be handled with care and shall not be subjected to unnecessary abuse or misuse.
 - 4.2.2 When not in use, ladders shall be stored where they are protected from potential damage by collision, temperature, moisture, etc.
 - 4.2.3 Ladders shall be returned to the proper storage location when the job is completed.
 - 4.2.4 Ladders shall not be painted.

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4.3 Training Requirements

4.3.1 The employer shall train each employee using ladders. This program shall enable each employee to recognize hazards related to ladders.

4.3.2 The employer shall ensure that each employee has been trained by a competent person in the following areas, as applicable:

- The nature of fall hazards in the work area.
- The correct procedures for erecting, maintaining, and disassembling the fall protection system to be used.
- The proper construction, use, placement, and care in handling of ladders.
- The maximum intended load-carrying capacities of ladders used.
- The information contained in this procedure.

4.3.3 Retraining shall be provided for each employee as necessary so that the employee maintains the understanding and knowledge acquired through compliance with this procedure.

5.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Training Attendance Record	N/A	Contractor

6.0 References

- ANSI A14.1 Ladders – Portable Wood – Safety Requirements
- ANSI A14.4 Safety Requirements for Job-Made Ladders
- ANSI A14.5 Safety Requirements for Portable Reinforced Plastic Ladders

7.0 Attachments

- [Training Attendance Record](#)

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Fall Protection

1.0 Purpose

To establish the requirements, responsibilities, and procedures for the selection, assembly, use, maintenance, and disassembly of fall restraint/arrest systems and equipment.

2.0 Responsibility

- 2.1 The provisions of this procedure apply to Contractors performing work efforts at construction work locations where fall hazards of 6 ft (OSHA/WISHA) are known or anticipated.
- 2.2 The Contractor shall be responsible for implementation and compliance with this procedure, developing and implementing fall protection work plans.
- 2.3 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

- 3.1 Fall Protection: Each employee subject to a fall hazard of 6ft (OSHA/WISHA) or more shall be protected by a fall arrest or fall restraint system 100 percent of the time (except as defined in paragraph 4.1.5.).
 - 3.1.1 Fall arrest/restraint shall be provided, maintained, and documented in accordance with the Contractor's Fall Protection Work Plan.
 - 3.1.2 Prior to the start of activities, a *Fall Protection Work Plan* shall be developed and implemented for areas where employees may be exposed to fall hazards of 6ft or more. The plan is a supplement to the Job Safety Analysis (JSA) and shall be maintained at the jobsite until activities have been completed.
 - 3.1.3 If a fall hazard of 6 ft or more is recognized after activities have begun, the work in that area shall be stopped, and a Fall Protection Work Plan shall be written and implemented (or the existing plan modified) prior to allowing activities to restart in the area of the hazard.
 - 3.1.4 Fall arrest/restraint shall be provided during the erection of scaffolding whenever feasible.
 - 3.1.5 No type of work shall be performed on a ladder over 25 ft from the ground or floor unless a safety harness is worn and the safety lanyard is secured to an adequate fall arrest or fall restraint attachment point.

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- 3.1.6 Whenever feasible, fall arrest/restraint shall be provided when employees are establishing fall protection anchorage points on roofs.
- 3.1.7 Fall arrest/restraint shall be provided when employees are working within 6 ft of a leading edge, outer edge, or other unprotected perimeter where the fall hazard is 6 ft or more.
- 3.1.8 The use of safety monitors (as defined in paragraph 4.4.7) shall be permitted as follows:
- During inspection, investigation, and estimating of roof level conditions where the workers will not be within 6 ft of an unguarded perimeter edge, leading edge, or open hole.
 - During maintenance and construction activities where the workers will not be within 6 ft of an unguarded perimeter edge, leading edge, or open holes.
- 3.1.9 The use of warning line systems (as defined in paragraph 4.4.8) shall be permitted for roof activities taking place no closer than 6 ft of an unguarded perimeter edge, leading edge, or open holes. When used, warning line systems shall be deployed in accordance with the applicable OSHA/WISHA requirements.
- 3.1.10 Where employees must work within 6 ft of an unguarded perimeter edge, leading edge, or open holes, the appropriate fall arrest/fall restraint systems shall be required.
- 3.1.11 Fall restraint protection shall consist of standard guardrails or Full body harnesses attached to securely rigged restraint lines or other appropriate anchorage points.
- 3.1.12 Anchorage points for fall restraint shall be capable of supporting four times the maximum intended load.
- 3.1.13 Fall restraint protection shall be rigged to allow employees to move only as far as the edges of the unprotected walking/working surface(s).
- 3.1.14 Fall arrest protection shall consist of a Class III full body harness. **Safety belts shall not be used.** The full body harness system shall be rigged to minimize free fall distance to a maximum of 6 ft and such that the employee will not contact any lower level.
- 3.1.15 Lifelines, harnesses, and lanyards shall be used only for employee safeguarding. Any of these devices subjected to an actual fall-arrest load situation (as distinguished from static load testing) shall be immediately removed from service and destroyed to preclude their inadvertent continued use.

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- 3.1.16 When self-retracting lifelines or other deceleration devices are used which limit free fall to 2 ft, anchorages shall be capable of withstanding 3,000 pounds.
- 3.1.17 Horizontal lifelines used for fall arrest shall have a tensile strength capable of supporting a fall impact load of at least 5,000 pounds per employee, applied anywhere along the lifeline.
- 3.1.18 Where lifelines may be subjected to cutting or abrasion, they shall be a minimum of 7/8-in wire core manila rope. For all other lifeline applications, a minimum of 3/4-in manila or equivalent, with a minimum breaking strength of 5,000 pounds, shall be used.
- 3.1.19 Lanyards shall be a minimum of 1/2-in nylon or equivalent with a maximum length to provide for a fall of no greater than 6 ft. The lanyard shall have a nominal breaking strength of 5,000 pounds and have deceleration device as part of the lanyard. The anchor end of the lanyard shall be secured at a level not lower than the workman's waist and at a horizontal distance not to exceed 6 ft.
- 3.1.20 For lifelines, lanyards, droplines, etc., suitability for service (including tensile strength) shall be determined based on the manufacturer's data and visual inspection of the equipment.
- 3.1.21 For lifeline and lanyard attachment points, suitability for use (including breaking strength meeting the requirements of applicable Occupational Safety and Health Administration/Washington Industrial Safety and Health Act (OSHA/WISHA) standards shall be determined by at least one of the following:
- Manufacturer's data.
 - Existing engineering/design documents.
 - Evaluation by a qualified engineer.
- The means by which attachment points have been determined to be suitable for use shall be documented on the Fall Protection Work Plan.
- 3.1.22 Exceptions to fall protection requirements (including those situations where providing fall protection is not feasible) shall be justified on the *Fall Protection Work Plan* and approved by Battelle prior to beginning the activity.
- 3.1.23 Snap hooks shall not be connected to loops made in webbing-type lanyards unless designed by the manufacture. To any object which is incompatibly shaped or dimensioned in relation to the snap-hook such that unintentional disengagement could occur by the connected object being able to depress the snap-hook keeper and release itself.

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3.2 Training Requirements

3.2.1 Employees shall be trained, prior to starting work, to the requirements of the job-specific *Fall Protection Work Plan* and the manufacturer's instructions for inspection, maintenance, and use of equipment. Training shall include the following topics:

- recognition of fall hazards
- nature of fall hazards
- correct procedure for erecting, maintaining, disassembling, and inspecting the fall protection system to be used
- use and operations of guardrail systems, PFAS, warning-line systems, safety monitoring systems, controlled access zones, and other protection to be used
- role of each employee in the safety monitoring system when this system is used
- limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs
- correct procedures for handling and storage of equipment and materials, and the erection of overhead protection
- role of employees in fall protection plans
- rescue considerations.

3.2.2 Training shall be documented on the Training Attendance Record.

3.3 Fall Protection Work Plan

3.3.1 The Fall Protection Work Plan consists of the following mandatory elements:

- Identification of all fall hazards in the work area.
- A description of the method of fall arrest or fall restraint to be provided.
- A description of the correct procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used.
- A description of the correct procedures for handling, storing, and securing tools and materials.
- A description of the method of providing overhead protection for workers who may be in or pass through the area below the worksite.
- A description of the methods for prompt, safe removal of injured employees.
- A description of the method used to determine the adequacy of attachment points.

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3.4 Fall Protection Equipment/Systems

- 3.4.1 Fall restraint/arrest systems shall be used to eliminate employee exposure to fall hazards at elevations of 6 ft or more above the ground, water, or floor levels.
- 3.4.2 Fall restraint/arrest systems shall be selected based on evaluation of the following:
- nature of the work to be performed
 - duration of the work to be performed
 - number of affected personnel
 - degree of mobility necessary for personnel to accomplish the work
 - limitations dictated by facility/worksite layout
 - physical or environmental factors affecting the integrity of the fall protection equipment
 - proximity of acceptable attachment/anchorage points.
- 3.4.3 In as much as possible, fall restraint/arrest equipment shall be protected against damage and maintained in a clean, dry condition. Fall protection equipment damaged by cuts, abrasions, burns, excessive moisture, etc. (when such damage affects the integrity of the equipment) shall be destroyed to preclude its inadvertent continued use.
- 3.4.4 Self-retracting lifelines shall be functionally inspected prior to use, and returned to the manufacturer for inspection as specified by the manufacturer's recommendations.
- 3.4.5 Catch platforms, when used, shall be installed within 6 of the work area. The catch platform's width shall equal the distance of the fall but shall be a minimum of 45 in wide and shall be equipped with standard guardrails on all open sides.
- 3.4.6 A person acting in the capacity of safety monitor shall be trained in the function of both the safety monitor and warning lines system, and shall:
- be a competent person.
 - have control authority over the work as it relates to fall protection
 - be instantly distinguishable over members of the work crew.
 - engage in no other duties while acting as safety monitor.
 - be positioned in relation to the workers under their protection, so as to have a clear, unobstructed view and be able to maintain normal voice communication.
 - supervise no more than eight exposed workers at one time.
- 3.4.7 Warning line(s) shall consist of a rope, wire, or chain and supporting stanchions erected as follows:

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- The rope, wire, or chain shall be flagged at not more than 6 ft intervals with high-visibility material.
- The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 39 in from the roof surface and its highest point is no more than 45 in from the roof surface.
- After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 Newtons) applied horizontal against the stanchion, 30 in (0.76 meters) above the roof surface, perpendicular to the warning line, and in the direction of the roof edge.
- The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (227 kilograms), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions.
- The line shall be attached at each stanchion in such a way that pulling on the section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

3.4.8 Access paths shall be erected as follows:

3.4.8.1 Points of access, materials handling areas, and storage areas shall be connected to the work area by a clear access path formed by two warning lines.

3.4.8.2 When the path to a point of access is not in use, a rope, wire, or chain, equal in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area.

4.0 Records

Document	Submittal Responsibility	Record Retention Responsibility
Fall Protection Work Plan	Contractor	Jobsite
Prejob Safety Planning Signoff	Contractor	Jobsite

5.0 References

OSHA / WISHA
 29 CFR 1910 Occupational Safety and Health Standards (OSHA)
 29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
 WAC 296-155 Safety Standards for Construction Work (WISHA)

6.0 Forms

Fall Protection Work Plan

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Aerial Lifts

1.0 Purpose

To define the system for safe operation and maintenance of elevated work platforms and aerial lifts.

2.0 Responsibility

2.1 The Contractor shall be responsible for compliance with this procedure.

2.2 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

3.1 Aerial lifts and elevating work platforms shall comply with the following statutory requirements:

- 29 Code of Federal Regulations (CFR) 1926, Subpart N; Cranes, Derricks, Hoists, Elevators and Conveyors
- 29 Code of Federal Regulations (CFR) 1910, Subpart F; Powered Platforms, manlifts, and Vehicle-Mounted Work Platforms
- Washington Administrative Code (WAC) 296-155, Part J; Ladders, Scaffolds and Elevating Work Platforms

3.2 Personnel who operate elevated work platforms and aerial lifts shall be trained to the requirements of this procedure.

3.3 Lift controls shall be tested by the user each day prior to use to determine that controls are in safe condition.

3.4 Fall protection for employees in vehicle-mounted articulating or extensible boom type elevating and rotating aerial devices (i.e., JLGs) shall be in accordance with the following:

3.4.1 Workers shall stand on the basket floor, and shall not sit or climb on the edge or handrail. Workers also shall not use planks, ladders, or other devices for a work position.

3.4.2 A full body harness and lanyard shall be worn and attached to the manufactured attachment point.

3.4.3 Tying-off to an adjacent pole, structure, or equipment while working in an aerial lift is prohibited.

3.5 Fall protection for employees on self-propelled elevating work platforms (scissor lifts) shall be in accordance with the following:

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- 3.5.1 Self-propelled elevating work platforms (scissor lifts) shall be provided with standard guardrail or the equivalent.
- 3.5.2 Personnel shall maintain a firm footing on the platform or basket. Do not stand, sit, or climb on the guardrail. Do not use planks, ladders, or other devices to reach work locations.
- 3.6 Boom and basket load limits posted on the unit shall not be exceeded.
- 3.7 Elevating work platforms or aerial lifts shall not be used to hoist materials that would otherwise require special lifting equipment such as chain-falls, forklifts, cranes, etc. Only material that can be readily handled by the employee using the work platform shall be lifted or moved using the platform. Additionally, only those materials that will be readily utilized (i.e., within two hours) shall be taken on a platform at one time.
- 3.8 Aerial lift trucks shall not be moved when the boom is elevated in a working position with personnel in the basket. The only exception is equipment specifically designed for this type of operation.
- 3.9 Articulating boom and extensible boom platforms shall have both upper and lower controls. Lower controls shall be capable of overriding upper controls. All controls shall be plainly marked as to their function.
- 3.10 The brakes shall be set and outriggers shall be fully extended and positioned on pads or a solid surface. Wheel chokes shall be used when working on inclines.
- 3.11 Operators shall verify that the area surrounding the work platform is clear of personnel and equipment before lowering the platform.
- 3.12 The user shall inspect aerial lifts and elevating work platforms (based on the manufacturer's manual) prior to use. Defective equipment shall be reported to the supervisor/manager, tagged out of service, and not used until repaired.
- 3.13 Aerial lifts shall be inspected daily.
- 3.14 Limit switches shall be checked weekly.
- 3.15 Manufacturer's maintenance and operator's manuals shall be provided with each work platform.

4.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Maintenance, Operator Manuals	Contractor	Job Site
Inspection Records	Contractor	Contractor

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5.0 References

- 29 CFR 1910 Occupational Safety and Health Standards (OSHA)
- 29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
- WAC 296-155 Safety Standards for Construction Work (WISHA)

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Hoisting and Rigging

1.0 Purpose

To define the requirements for performing hoisting and rigging operations.

2.0 Responsibility

At this time, the Contractor must follow the PNNL Hoisting and Rigging Manual. An electronic link to the manual is provided in the reference section below.

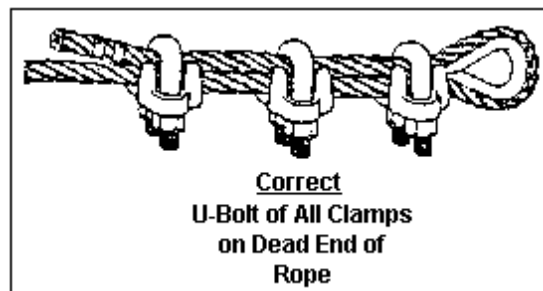
3.0 Requirements

The PNNL program provides all the details necessary to comply with hoisting and rigging requirements while performing work at Battelle facilities. For general information, this Plan summarizes the “Do’s and Don’ts” generally associated with safe material lifting practices.

4.0 Using Cranes/Hoists with Rigging

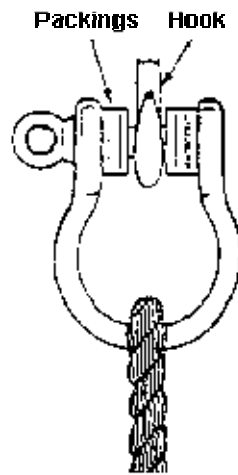
Do:

- Define the load path (the path the item will travel over while it is being lifted, and the place where it is set down)
- Choose equipment that will safely bear the load.
- Identify the characteristics (center of gravity, physical dimensions, weight, etc.) of the object being lifted.
- Identify and avoid the pinch points (where someone or something may be caught between two surfaces).
- Know the rigging requirements before the lift is performed. Consider load balance, configuration, and dimensions.
- Consult Battelle before wire rope clips are used.



- Use a properly fitted pin only. Never replace a shackle pin with a bolt.

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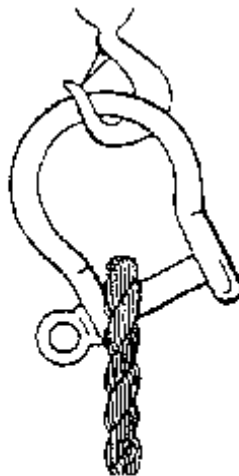
Good Practice
**Pack the Pin
with Washers
to Centralize
the Shackle**

- Keep shackles straight for maximum capacity. Never pull shackles at an angle because the capacity will be tremendously reduced. Centralize the load being hoisted on the pin by using suitable washers or spacers. Eccentric shackle loads are depicted in the diagram below.
- Know how the manufacturer intended the eyebolts to be used when they are permanently installed on equipment. Some eyebolts arriving on equipment may only be intended to lift a part of the equipment.
- Use shouldered eyebolts only. If non-shouldered eyebolts are needed, contact Battelle.
- Seat shoulders uniformly and snugly against the surface on which they bear.
- Pad slings used around sharp corners to minimize damage.
- Understand and obey all hand signals.
- Seat the load, sling, or lifting device in the bowl of the hook.
- Secure and balance the load in the sling or lifting device before it is lifted more than a few inches.
- Minimize swinging by bringing the hook over the load appropriately.
- Seat the rope in the drum rope grooves and in the sheaves.
- Inch powered hoists slowly into engagement with a load.
- Use dynamometers for weight indication only.
- Stand clear of the suspended load.
- Contact ends-stops and other carriers with caution.
- Stay clear of an energized crane and remain a safe distance away.
- Keep the load balanced while in a basket hitch to prevent slippage.
- Store wire rope slings in an area that does not subject them to mechanical damage, corrosive action, moisture, extreme heat, or kinking.

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Don't: (Using Cranes/Hoists with Rigging)

- Do not use hoists for side pulls, except when specifically authorized to do so by the Battelle Construction Manager.
- Do not cause the hoist to lift, lower, or travel while anyone is on the load or hook.
- Do not carry loads over people.
- Do not leave an attached load unattended. Land the load before leaving it.
- Do not reverse direction quickly.
- Do not suddenly accelerate or decelerate the moving load.
- Do not contact any obstruction.
- Do not use a dynamometer as a rigging device unless it has been certified for that application.
- Do not operate hoisting and rigging equipment when physically or otherwise unfit.
- Do not attempt to use, repair, or adjust hoisting and rigging equipment that needs maintenance or repair.
- Do not use screw pin shackles if the pin can roll under the load and unscrew.



Poor Practice
Never Allow Shackle
to be Pulled at an
Angle, the Legs
will Open Up

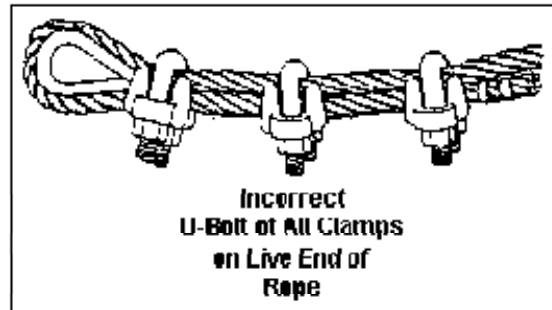
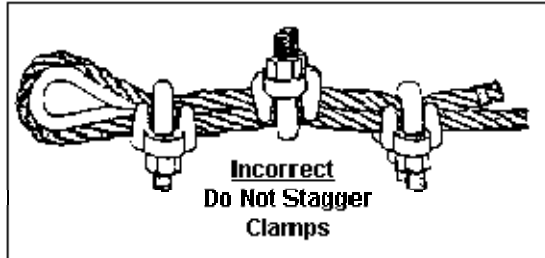
- Do not use wire rope clamps (clips) to fabricate wire rope slings except when the application of the sling prevents the use of a prefabricated sling or when the specific application is designed by a qualified person and according to the manufacturer's recommendations.

Note: Slings fabricated using wire rope clamps must be derated to 80% of the rated capacity when used. The nuts on the clamps must be checked periodically and retorqued to the recommended value to maintain the efficiency rating.

- Do not use slings made with wire rope clips as a choker hitch.

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- Do not use hoist rope that is kinked.
- Do not use multiple-part lines that are twisted around each other.



- Do not shorten or lengthen slings by knotting, twisting, or using other methods that are not approved by the sling manufacturer.
- Do not use damaged slings.
- Do not put any part of the body between the sling and the load.
- Do not shock load.
- Do not drag slings on the floor or over an abrasive surface.
- Do not use the end-fittings of the sling to make a choker hitch.
- Do not use nylon and polyester slings at temperatures above 180 degrees Fahrenheit.
- Do not use nylon or polyester fiber slings in Radiation Areas.
- Do not use synthetic web slings that incorporate aluminum fittings where fumes, vapors, sprays, mists of acids or caustics are present.
- Do not use synthetic web slings where extensive exposure to sunlight or ultraviolet light.

5.0 Operating Shop Cranes

Do:

- Before moving the load, lower the boom and the load to the lowest possible point.
- Use the shop cranes only on hard, level surfaces capable of sustaining the load.
 - **Caution:** Use on other than hard, level surfaces can result in shop crane instability and possible loss of load.
- Make sure the load does not drop suddenly or swing during transportation.
- If safety is in doubt, consult with the responsible management before operating the shop crane.
- Post or barricade to restrict entry of unauthorized personnel in the immediate area (about 30 in) around the shop crane if it is necessary to leave a suspended load unattended.
- If there is a tag, sign, or lock on the shop crane, the operator shall:
 - obey facility-specific lock and tag procedures
 - promptly report any known defects, needed adjustments or repairs to the equipment custodian
- check that operating controls are readily visible and accessible, not creating any pinch points, sharp edges, or snagging hazards to the operator.

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Don't:

- Engage in any practice that will divert attention while actually engaged in operating the shop crane
- Operate equipment when physically or mentally unfit
- Load the shop crane beyond its rated capacity (except for proof tests) for each specified boom
- Attempt to operate the shop crane if it is locked/tagged out
- Operate a shop hoist without a throat latch.

6.0 Operating Forklift Trucks

Do:

- Use seat belts, if provided
- Keep head, arms, and legs inside the operator's area of the forklift truck.
- Balance and stabilize the stacks and loads. Block and lash the load if necessary.
- Always spread the forks to suit the load width.
- Guard and clearly, visibly, and distinctively mark protrusions (permanent or temporary) of the loads, equipment, material, and construction facilities in usual operating areas.
- Drive the truck at a speed that will permit it to be brought to a stop in a safe manner. Unless facility-specific procedures state otherwise, the guideline is 5 miles per hour in-plant buildings and 15 miles per hour on in-plant roads.
- Drive slowly around curves, over railroad tracks, and on rough surfaces.
- Cross railroad tracks at an angle, whenever possible.
- Lift, lower, and carry loads with the mast vertical or tilted back, never forward.
- Watch for blind corners and intersections, and doorways. Stop or sound the horn, if appropriate.
- Use low gear or slowest speed control when descending ramps.
- Lower and raise the load slowly and only while the vehicle is stopped.
- Use special care when high-tiering. Return the lift to a vertical position before lowering load.
- Inspect floors on trucks, boxcars, unfamiliar ramps, or platforms before operation.
- Consider the weight of both the forklift truck and counterweight when operating in railcars and semi-trailers.
- When loading trucks or trailers, chock the wheels and set the brakes.
- Operate in front of the semi-trailer only if the tractor is attached or adequate trailer jacks are in place.
 - **CAUTION:** Semi-trailers not coupled to a tractor may require supports (e.g., fixed jacks) to prevent upending or corner dipping.
- Make sure that the bridge plates are sufficiently wide, strong, and secure. Check them frequently.

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- While turning, be cautious of rear end swing and stay clear of the edge of loading docks, pedestrians, other vehicles, building systems/structural members, etc.
- If the load being carried obstructs the forward view, travel with the load trailing, except when ascending or descending grades exceed 5 %.
- Travel straight up and down whenever possible.
- Always use tow bars rather than wire rope for towing.
- Safeguard pedestrians at all times.
- Use guides and signalers as necessary; if in doubt, check the conditions personally before proceeding.
- Hydraulic or pneumatic hoisting systems must include means to prevent unintended descent in excess of 120 ft per minute (0.6 meters per second) in the event of a hose failure. Be certain that the lifting mechanism is operating smoothly throughout the entire lift height, both empty and loaded, and that lift limiting devices and latches, if provided, are functional.
- Lower the forks, neutralize the controls, and set the brakes before dismounting the truck if the operator will be less than 25 ft (7.6 meters) away and within view of the truck.
- Before leaving a forklift truck unattended, fully lower the forks, neutralize the controls, shut off the power, and set the brakes. If parked on an incline, block the wheels. (A forklift truck is unattended when the operator is 25 ft (7.6 meters) or more away from the truck, or whenever the truck cannot be viewed directly by the operator.)
- At the end of the operator's shift, return the forklift truck to its assigned parking place, set brakes, lower forks flat on the floor, place controls in neutral position, turn ignition off, and secure the key.
- Report all accidents and "near misses" promptly to the immediate supervisor.
- Confirm the weight of the forklift and its load is within the marked capacity rating of a dock plate or bridge.
- Report unlabeled dock plates to the immediate supervisor.
- Manually propelled forklifts yield to all powered vehicles.
- Yield to emergency vehicles.

Don't:

- Do not allow riders on forklift trucks unless the truck is built for a passenger.
- Do not allow anyone to stand or pass under the elevated forks, whether the forks are loaded or empty.
- Do not exceed rated capacity. **Note:** Rated capacity is the weight established by the manufacturer at a required load center at an established height,
- Do not reach through the mast for any purpose.
- Do not park closer than 8 ft (2.4 meters) from the center of railroad tracks.
- Do not use rigging that is directly attached to forklift tines unless this configuration has been approved by Battelle.
- Do not make sudden starts and stops.
- Do not exceed overhead clearances. If in doubt, measure.

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- Do not travel with forks raised to unnecessary heights. Approximately 4 to 6 in (10 to 15 cm) above floor level is adequate.
- Do not turn sharply, if possible, and use extreme caution while on grades, ramps, or inclines.
- Do not use forklift trucks as tow trucks unless a towing hitch has been supplied by the manufacturer.
- Never butt loads with forks or rear end of truck.
- Do not drive forklift trucks onto any elevator unless specifically authorized and instructed to do so by a written, approved procedure.
- Do not drive a truck up to anyone who is standing in front of a fixed object.
- Do not attach or operate any attachment that has not been approved for use on that forklift truck.
- Do not lift with one fork without an engineering analysis and approval.

7.0 Lifting Staff Using a Forklift Truck

Do:

- Be certain the truck is set on a firm and level surface.
- Use only work platforms that are manufactured for the purpose of lifting people. Platforms must comply with ASME B56.1, Section 7.35, "Platforms - Elevating."
- Make sure that a restraining means (handrails or chains) exists that is capable of withstanding a force of 200 pounds (91 kilograms) in any direction. If no restraining means is provided, staff on the platform must wear fall protection equipment.
- Provide a 4-in (10-cm) toe board on the work platform.
- Securely attach the platform to the lifting carriage or forks so that it cannot slide or bounce.
- Be certain the platform is horizontal and is never tilted forward or rearward when elevated.
- Remain in the control position of the forklift truck.
- Wear overhead protection, as necessary by operating conditions.
- Protect staff, in their normal working position on the platform, from moving parts of the forklift truck that present a hazard.

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8.0 Operating Aerial Lifts (also, see the Aerial Lifts section of this Plan)

Do:

- Operate on a surface that is within the manufacturer's specified limits.
- Use any outriggers, stabilizers, extendable axles, or other stability enhancing means required by the manufacturer.
- Install guardrails and close/secure access gate openings during the lift.
- Load the platform (and any extensions) within the manufacturer's rated capacity.
- Maintain adequate clearance from overhead power lines and other obstructions. Know the required approach distances.
- Wear hardhats on all aerial lifts and in the area around the lift. Designate the area around the aerial lift with barricades that say "hard hat area."
- Guard against unauthorized use of an aerial lift.
- Maintain a clear view of the travel path.
- Match the speed of travel to the conditions of the ground surface, congestion, visibility, slope, and location of staff.
- Report suspected malfunctions or potentially unsafe conditions.
- Check that the area surrounding the aerial lift is clear of staff and equipment before lowering the platform.
- Always inspect and wear the proper fall protection equipment while using the aerial lift.
- Always be aware of special operating requirements within hazardous locations.
- Maintain good housekeeping in the platform as well as on the ground adjacent to the aerial lift.

Don't:

- Do not transport staff from one location to another while they are on the work platform.
- Do not position against another object to steady the platform.
- Do not use the aerial lift as a crane.
- Do not operate the lift in a reckless manner.
- Do not exceed the manufacturer's rating when driving on grades, side slopes, or ramps.
- Do not modify the aerial lift without the manufacturer's specific written approval.
- Do not operate in windy or poor weather conditions.
- Do not attempt to refuel or recharge the aerial lift without proper training.

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9.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Inspection Records (lift equipment, rigging)	Contractor (for own equipment. PNWD (for PNWD-owned equipment)	Contractor PNWD
Training and Qualifications Records (including medical)	Contractor	Contractor

10.0 References

29 CFR 1910 Occupational Safety and Health Standards (OSHA)
29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
WAC 296-155 Safety Standards for Construction Work (WISHA)
PNNL Hoisting and Rigging Manual

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Excavation

1.0 Purpose

To define the responsibilities and requirements for protecting personnel engaged in excavation, trenching and shoring.

2.0 Responsibility

2.1 The Contractor shall be responsible for the following:

2.1.1 Compliance with the procedure, including employee training.

2.1.2 Monitoring excavation, trenching and shoring operations.

2.1.3 Designating a "Competent Person"; who has had the training to act in this position; providing the competent person the authority to effectively discharge his/her duties.

2.2 The Competent Person(s) shall be responsible for the following:

2.2.1 Defining requirements and control measures.

2.2.2 Performing daily inspections for compliance.

2.2.3 Stopping work when non-compliances or problems/concerns are identified from inspections.

2.3 Employees shall be responsible for complying with the provisions of this procedure.

3.0 General Requirements

3.1 Excavation, trenching, and shoring shall be conducted in accordance with the following statutory requirements:

- 29 Code of Federal Regulations (CFR) 1926, Subpart P; Excavations
- Washington Administrative Code (WAC) 296-155, Subpart N; Excavations, Trenching and Shoring

3.2 Employees in excavations shall be protected from cave-ins by an adequate protective system (sloping, shoring, or shields) in accordance with the provisions of subsection 4.4.

3.3 Inspections

3.3.1 Daily inspections of excavations, adjacent areas, and protective systems shall be conducted by a designated competent person to identify

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evidence of a situation that could result in possible cave-ins, for indications of failure of protective systems, and for hazardous atmospheres or other hazardous conditions. The competent person(s) shall be documented on a Competent Person Designation form.

3.3.2 Inspections shall also be conducted after every rainstorm or other potential hazard-increasing occurrence.

3.3.3 Inspections shall be performed and documented using the Daily Excavation/Trenches Safety Inspection Checklist and Inspection Log.

Note: These inspections are only required when employee exposure can be reasonably anticipated (i.e.; 4 ft or more in depth and occupied by employees).

3.3.4 When inspection reveals evidence of a situation that could result in a possible cave-in, indications of protective system failure, hazardous atmospheres, or other hazardous conditions, employees shall be removed from the hazardous area until the necessary precautions have been taken.

3.4 Employees shall not work in excavations where water is accumulating or has accumulated unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

3.5 Employees exposed to vehicular traffic shall be provided with and shall wear warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

3.6 When the configuration of an excavation is such that the excavation is deemed to be a confined space, the provisions of the applicable confined space entry program apply.

3.7 Adequate barriers for physical protection shall be provided at all excavations. All wells, pits, shafts, etc., shall be barricaded or covered.

3.8 When mobile equipment is used or allowed next to excavations or trenches, stop logs or barricades shall be installed. Such devices shall not be required for equipment conducting the actual excavating or backfilling operations.

3.9 Special precautions for excavation/trenching around electrical utilities.

3.9.1 Each underground electrical interface with new construction shall be independently reviewed on a case-by-case basis.

3.9.2 If it can be determined from installation as-builts that the energized cable is protected by a rigid steel conduit raceway or concrete encasement, then de-energizing the cable is not required and excavation with hand tools such as shovels, pry bars, picks or air lances is acceptable.

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- 3.9.3 If it is determined from installation as-builts that the energized cable is protected by a PVC conduit raceway, then de-energizing the cable is not required and hand excavation as defined in paragraph 3.9.5 and subsection 3.9.6 is acceptable.

Note: De-energizing underground lines when excavating near or around them is always the safest and preferred method to mitigate electrical hazards during excavation.

- 3.9.4 If actual installation details are indeterminate, or the service is a direct buried cable not protected by rigid steel raceway, concrete encasement, or PVC, then the cable shall be de-energized.

Exception: If it is determined that the system cannot be de-energized due to the adverse effects on necessary operation or life safety systems, then justification to hand excavate must be provided. Such justification requires concurrence of the Battelle Construction Manager.

- 3.9.5 Minimum safety precautions during hand excavations of an energized direct buried cable shall include:

- The excavation worker shall wear protective insulated gloves, rated for the voltage potential and meeting the specifications of ANSI/ASTM D120-1984.
- A qualified standby person shall be in attendance during excavation. The standby person shall be CPR certified, first-aid trained, and trained in emergency electrical practices.
- The suspected cable location shall be periodically verified using a hand-held inductance meter.

- 3.9.6 Hand excavation around unprotected, energized electrical utilities is defined as the removal of surface and subsurface materials, including sand, gravel, soil, and rocks by direct labor methods where the only acceptable hand assist tool is a common hand shovel. The use of requiring hand-held picks and pry bars is expressly prohibited in situations requiring hand excavation. The use of a hand shovel to stab the soil in an effort to loosen or penetrate excavation material with anything greater than normal foot pressure is prohibited. The only acceptable aid to a hand excavation operation is an air-assisted dielectric soil pick, (e.g., air lance). The air lance is permitted to loosen compacted soil and/or expose a buried utility where soil conditions are sufficiently compacted, rocky or the presence of an underground utility is suspected and not yet physically verified.

4.0 Procedure

4.1 Preparation

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- 4.1.1 Prior to excavation, permits (internal and external, when required by contract) shall be obtained from authorized organizations and included with prejob planning documents where applicable. In addition, the necessary drawings, specification, and restrictions applicable to the excavation shall also be obtained.
- 4.1.2 Reference drawings and documents shall be checked in detail to determine location of all known underground obstructions, pipes, power lines, phone lines, foundations, etc. These locations shall be marked at the worksite in a conspicuous manner.
- 4.1.3 Utilities and facilities shall be de-activated, de-energized and/or interrupted, as required, and the source locked and tagged in accordance with the Lockout/Tagout Program. Coordination for this activity will be done through the Battelle Construction Manager.
- 4.1.4 Just prior to excavation, the excavation crew shall be briefed as to any special requirements or obstructions in the excavation area. The excavation permit and a Survey Scanning Report (when required) shall be at the excavation site during excavation as a reference for the excavation crew.
- 4.1.5 A spotter is used, when required, to assist the equipment operator during excavation.
- 4.1.6 All surface items to be protected shall be made visible to the equipment operator by high-viz tape or by a 7-ft bicycle flag mounted above the object
- 4.1.7 The equipment operator shall be made aware of these protected items prior to operating equipment such as cranes, trucks, backhoes, or loaders.
- 4.1.8 A stairway, ladder, ramp or other safe means of egress shall be located in trenches that are 4 ft or more in depth so as to require no more than 25 ft of lateral travel for employees.

4.2 Hand Excavation

- 4.2.1 All known underground obstructions shall be exposed by hand excavation beginning at a distance of 5 ft from the obstruction. For hand excavation around electrical utilities, also see subsection 3.9.5 and 3.9.6.

Note: Machines may be used to remove the soil from excavation, but shall not be used to dig undisturbed soil unless utility is can be seen by operator.

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- 4.2.2 In work areas where the exact location of underground electrical power lines is unknown, employees using jack hammers, bars, or other hand tools which may contact a line shall be provided with insulated gloves.
- 4.2.3 If obstructions shown on the drawings and/or permits are not found in the location indicated, or if obstructions are encountered that are not shown, the work in that area shall be stopped and the Battelle Construction Manager shall be contacted.
- 4.3 Machine Excavation: machine excavation, when permitted, shall take place after compliance with the above procedures. The following requirements apply:
 - 4.3.1 Battelle Construction Manager shall be notified of damage to utilities or facilities and of any abnormal conditions encountered.
 - 4.3.2 Equipment (i.e. bucket) shall be kept at least 5 ft horizontally from exposed underground utilities. Exception 4.2.1 note.
- 4.4 Protective Systems
 - 4.4.1 Excavations and protective systems shall be designed so that cave-ins and slides are avoided and safe conditions shall be maintained for employees working in and around the excavation.
 - 4.4.2 Whenever practical and feasible, the sides of excavations and trenches shall be sloped at an angle not steeper than 1-1/2 horizontal to 1 vertical (see Excavation Detail Sketch).
 - 4.4.2.1 When sloping is not practical or feasible, the sides of excavations and trenches may be vertical if they are provided with support systems (shoring or shielding).
 - 4.4.2.2 Support system shall be required in trenches more than 4 ft deep under the following circumstances:
 - The slopes are steeper than 1-1/2 horizontal to 1 vertical.
 - The slopes are at least 1-1/2 horizontal to 1 vertical but do not extend to the bottom of the trench.
 - 4.4.2.3 Support systems shall be installed and removed in a manner that protects employees from cave-ins and structural collapses and from being struck by members of the support system.
 - 4.4.2.4 Excavation of material to a level no greater than 2 ft below the bottom of the members of a support system shall be permitted only if the system is designed to resist the forces calculated for the full depth of the trench and there are no indications, while

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- 4.4.2.5 Shoring shall support the vertical portion of a trench and shall extend above the bottom of the slope at least 18 in to prevent material from sliding into the trench. The surface of the slope shall be cleared of boulders, stumps, or other hard masses of earth.
- 4.4.2.6 A support system may not be required under the following circumstances:
- The trench is less than 4 ft (WISHA)/5ft (OSHA) deep.
 - The trench is less than 20 ft deep and the slopes are at least 1-1/2 horizontal to 1 vertical and extend to the bottom of the trench.
- 4.4.3 Timber cross-brace or trench jacks shall be placed in a true horizontal position, vertically spaced, and secured to prevent sliding, falling, or kick outs. Wales shall be placed with the greater dimension horizontal.
- 4.4.4 The sides of an excavation next to a previously backfilled area shall be sloped at least one and one-half horizontal to one vertical, particularly when the separation is less than the depth of the excavation.
- 4.4.5 When employees or equipment must cross over an excavation 6ft in depth, a walkway or bridge with standard guardrails shall be provided.
- 4.4.6 Engineering-approved portable trench boxes or sliding trench shields may be used instead of a shoring system or slope. They shall protect as well as, or better than, the shoring required for the trench and are used in accordance with the manufacturer's recommendations.
- 4.4.7 Materials used for support systems shall be in good, serviceable condition. Sheeting and four-by-4 in timber cross-braces shall be Douglas Fir, No. 2, or better. Wales and 6-by-6 in timber cross-braces shall be Douglas Fir, No. 1, or better
- 4.4.8 When employees are required to enter and excavation, excavated material shall be kept back at least 2 ft from the edge of the excavation.
- 4.4.9 When the slopes of a trench are steeper than one and one-half horizontal to one vertical, and engineering-approved trench boxes or shields are not used, shoring shall be placed as detailed in the OSHA or WISHA standards.

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- 4.4.9.1 A combination using a simple slope with a vertical sided lower portion may be used as shown in the Excavation Detail Sketch - Detail 2).
- 4.4.9.2 Mudsills (wales installed at the toe of the trench side, having the same size and cross bracing spacing as the wales directly above them) may be used in place of embedding the uprights.
- 4.4.9.3 Sloping or shoring designs for trenches and excavations deeper than 20 ft shall have Registered Professional Engineering approval prior to placement.
- 4.4.9.4 Shoring, bracing, or underpinning shall be provided to stabilize adjoining structures, which may be endangered by an excavation. Among others, these structures would include the following:
 - buildings and walls
 - concrete encased raceways, piping, etc.
 - storage tanks
 - power poles.

5.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Competent Person Designation	Contractor	Construction Management
Shoring Designs	Contractor	Construction Management
Daily Excavation/Trenches Safety Inspection Log	NA	Contractor

6.0 References

- 29 CFR 1910 Occupational Safety and Health Standards (OSHA)
- 29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
- WAC 296-155 Safety Standards for Construction Work (WISHA)

7.0 Exhibit

- [Excavation Detail Sketch](#)

8.0 Form

- [Daily Excavations/Trenches Safety Inspection Checklist and Inspection Log](#)

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Occupational Medicine

1.0 Purpose

The purpose of this procedure is to define the requirements for contractor occupational medicine and to ensure compliance with Department of Energy (DOE), Occupational Safety and Health Administration (OSHA)/ Washington Industrial Safety and Health Act (WISHA) requirements. The provisions of this procedure apply to contractors and subcontractors performing work at the Pacific Northwest National Laboratory (PNNL) consolidated laboratory

2.0 Responsibility

Contractors adhere to the [Occupational Medicine](#) CESH procedure (PDF).

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Personal Protective Equipment

1.0 Purpose

To establish the responsibilities and requirements for the use of personal protective equipment (PPE).

2.0 Responsibility

Contractors adhere to the [Personal Protective Equipment](#) CESH procedure (PDF).

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Respiratory Protection

1.0 Purpose

This practice identifies a key aspect of the Industrial Hygiene (IH) program, and establishes the requirements and practices for the purchase, issue, control, and use of respirators.

2.0 Responsibility

The Contractor is responsible for a program that includes the following elements:

- assigned protection factors
- program administration
- medical examination
- training
- fit testing
- exposure assessment
- selection of respirators
- respirator issue, control, and use
- cleaning, maintenance, and storage
- emergency/IDLH (immediately dangerous to life and health) use
- compressor use.

3.0 Application

This practice applies to all work activities and personnel under the control of the Contractor and its Subcontractors.

4.0 General Requirements

Respiratory protection will be used only in those instances when engineering or administrative controls are ineffective, impractical, or are in the process of being installed. Employees will be medically cleared, fit tested, and trained prior to utilizing respiratory protection equipment.

4.1 Assigned Protection Factors

Differences in assigned protection factors for respirators exist between the various standards and guidelines. To resolve differences in protection factors, this program establishes Washington Industrial Safety and Health Act (WISHA)/Washington Administrative Code (WAC) 296-62, Part E as the overall basis for assigned protection factors for both radiological and chemical hazards. In addition, in situations involving hazards for which substance-specific standards apply (such as asbestos and lead), the protection factors listed in the applicable substance-specific WISHA standard will be used.

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When radiological and nonradiological hazards exist requiring respiratory protection, project safety and supervision will collaborate on selecting the appropriate respiratory protection that will provide protection against combined hazards.

4.2 Program Administration

The Contractor's designated person will serve as the initial point of contact for program administration and issue resolution on projects.

As necessary (for work demanding respiratory protection), the Contractor will appoint a suitably trained respiratory protection program administrator who will perform the following:

- oversee the implementation of practice requirements
- provide problem resolution
- conduct required evaluations of program effectiveness.

4.3 Medical Examination

The Contractor shall:

- Verify that employees receive an initial medical evaluation or examination prior to wearing a respirator, and annually thereafter, reviewed by a physician or other licensed health care professional (PLHCP). A WISHA-approved questionnaire may be used for the evaluation.
- For each employee who may wear a respirator, the PLHCP will provide a written recommendation regarding the employee's ability to use a respirator.

Note: A medical clearance is acceptable for all types of respirators unless a specific medical limitation has been designated.

- Provide additional medical evaluations if:
 - The employee reports medical signs or symptoms related to the ability to use a respirator, or
 - A change occurs in workplace conditions (such as physical work effort, protective

4.4 Training

The Contractor shall:

Enroll employees into initial respirator training course(s) as follows:

- Employees who may wear respirators
- Employees who issue respirators
- Employees who supervise respirator wearers.
- Enroll the employee into annual refresher training (assuming that the employee has a continued need to issue or wear a respirator or to

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supervise respirator wearers).

- Document training and maintain records. (Subcontractors and Sub-tier Contractors maintain records onsite.)

4.5 Fit Testing

- Use only WISHA-accepted fit-test protocols when fit-testing for respirators.
- Prior to the use of respirators in a hazardous atmosphere, respirator wearers will receive a fit test annually for each style and type of respirator that will be used. If an employee needs to wear a respirator they have not been fit tested for, arrange for additional fit testing through the fit test station prior to use of the respirator.
- Do not allow any worker to obtain a fit test who has facial hair that interferes with proper respirator fit.
- Respirator wearers will shave the morning of the fit test and maintain facial hair in a manner that does not interfere with respirator fit.

4.6 Exposure Assessment

The Contractor shall:

- Plan and implement a qualitative and quantitative exposure assessment for the purpose of identifying and quantifying airborne contaminants to determine and validate the level of respiratory protection.
- Qualitatively estimate and, as appropriate, quantitatively measure the airborne concentrations of chemical or particulate contaminants, before selecting a respiratory protection device.
- Consider using qualitative hazard analyses, hazard surveys, historical data, objective data, or quantitative source/area/personal monitoring to document the basis for selecting respiratory protection.
- When respirators are specified for a type of activity, validate their adequacy by initial and periodic personal/area monitoring, as appropriate.
- If historical data are not available and monitoring is not performed, the decision logic used to select the respiratory protection will be documented on the JSA.
- Use JSAs, qualitative exposure assessments, work permits, work packages, site-specific safety and health plans, or other appropriate systems to document hazard(s), specify respiratory protection, and establish job-based exposure monitoring to be conducted.

4.7 Respirator Issue, Control, and Use:

As necessary, the Contractor shall:

- Establish a controlled distribution point for the proper storage, issue, and return of respiratory protection equipment for the project.
- Designate a project respirator issuer to control the custody and integrity of

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respirators.

- Inform the respirator issuer of the types and quantities of respiratory protection equipment required for the project.
- In special circumstances where modified issue and control measures are required to accommodate unusual situations, develop supplemental procedures for issue and control.
- Verify that work permits, work packages, or other work control documents clearly identify the types of respiratory protection equipment to be used for worksites and activities, and that respirator issuers have full and convenient access to these documents.
- Verify that respirator wearers have current medical clearance, training, and fit testing appropriate for the types and styles of respirators to be issued for the project.

4.8 Cleaning, Maintenance, and Storage:

- Respirator users will be provided respirators which are clean, sanitary, and in good working order. Cleaning and disinfection of respirators will be conducted according to WISHA standards.
- Respirators and associated respiratory protection equipment will be stored in a controlled distribution area. Equipment will be stored in a manner that will protect it against physical and chemical agents such as sunlight, heat, cold, extreme cold, excessive moisture, or damaging chemicals. Equipment will be stored in a manner to prevent distortion of the face piece or elastomeric parts.

5.0 Records

Document	Record Submittal Responsibility	Record Retention Responsibility
Respirator Training Certificate (or similar)	Contractor	Contractor
Fit-Test Card	Contractor	Contractor
Respirator Medical Examination	Contractor	Contractor

6.0 References

29 CFR 1910 Occupational Safety and Health Standards (OSHA)
29 CFR 1926 Safety and Health Regulations for Construction (OSHA)
WAC 296-155 Safety Standards for Construction Work (WISHA)

PNNL Contractor Environment, Safety & Health Manual

Environmental Protection Plan

1.0 Purpose

This procedure provides requirements for environmental protection and management of project waste from construction and demolition activities in compliance with Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) standards. The provisions of this procedure apply to work activities associated with tasks performed by Battelle-Pacific Northwest Division (PNWD) subcontractors.

2.0 Responsibility

Contractor adhere to the [Environmental Protection Plan](#) CESH procedure (PDF).