

UT Battelle

ORNL Construction Safety and Health Plan – Rev 0

Revision Log

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1.0 Introduction

Integrated Safety Management System

Purpose

The Contractor Safety and Health Plan (CSHP) describes:

- The approach to worker safety and health that prevents occupational injuries, illnesses, and accidental losses by providing Oak Ridge National Laboratory (ORNL) employees and subcontractors with a safe, healthful workplace.
- Worker safety and health processes governing activities and operations at DOE-owned or leased facilities.
- Integration of the worker safety and health program with other ORNL systems and programs.
- ORNL processes for complying with worker safety and health requirements, including compliance orders issued by the Secretary of Energy under 10 CFR 851.

Each contractor and subcontractor is responsible for complying with all applicable requirements governing work at ORNL facilities, including consensus standards incorporated by reference.

Subcontractors may also be required to prepare job-specific submittals—such as an Activity Hazard Analysis (AHA), asbestos work plan, or lockout/tagout procedure—for ORNL review.

Integrated Safety Management System (ISMS)

Contractors must use a safety management system that conforms to ORNL’s Integrated Safety Management (ISM) requirements. An effective ISM plan integrates requirements into work planning and execution to protect workers, the public, and the environment.

ISM promotes worker involvement in:

1. Defining the scope of work and allocating resources to address safety, programmatic, and operational considerations.
2. Analyzing hazards associated with the work.
3. Developing and implementing hazard controls tailored to the work, using

- administrative and engineering methods.
- 4. Performing work under established conditions and requirements.
- 5. Providing feedback and improvements on the adequacy of controls and opportunities to improve planning and execution.
- 6. Clearly defining roles and responsibilities across ORNL and its contractors.
- 7. Ensuring competence is appropriate to responsibilities, with all personnel possessing the knowledge, skills, and abilities needed to perform their duties safely.

Flexibility in contractor programs is encouraged if they meet the spirit and intent of ISM provisions.

2.0 Emergency Response Plan

The emergency response plan must be based on actual jobsite conditions and operations identified in project and phase hazard analyses. It defines how employees and supervisors will respond to potential emergencies such as serious injuries, fatalities, structural failures, fires, or other incidents.

Coordination with Emergency Responders

The plan must be prepared in coordination with local responders (fire, police, EMTs, hospitals) and the contractor, as appropriate. It must include:

- Personnel responsibilities
- Emergency response telephone numbers
- Site alarm provisions and procedures
- Required response equipment and PPE
- Evacuation procedures, routes, and rally points

Workers must be familiar with the emergency action plan, including evacuation systems, response personnel, assembly areas, and accountability procedures. The plan should be practiced periodically to ensure competency.

Before evacuating, shut down or make safe equipment, if equipment or processes can be shut down without exposing the worker to additional hazards or risk, any that could present fire or safety hazards if left unattended.

Medical Treatment

All workers must have access to first aid and receive prompt medical treatment when injured. The plan must describe:

- Qualified on-site personnel available to administer first aid/CPR
- Special or unique first-aid equipment requirements

- Procedures for obtaining emergency medical services, including posted phone numbers
- The location of emergency medical facilities, with directions and transportation provisions
- Additional site-specific provisions, such as eyewash stations or emergency showers

Each project must be provided, at a minimum:

- A CPR- and first-aid-trained individual on site
- A first-aid kit appropriate for the site's hazards
- A means of transporting injured or ill workers to a medical facility
- Posted emergency telephone numbers (ambulance, hospital, physician)
- Other provisions necessary for site-specific hazards

Note:

- For life-threatening emergencies, UT-Battelle will provide ambulance and firefighting services. Contractors must use a UT-Battelle facility phone to dial 9-1-1 or pull a fire alarm box. If using a personal cell phone, call the Laboratory Shift Superintendent (LSS) at 865-576-6606.
- The ORNL Health Division will stabilize serious injuries before transport to the worker's chosen emergency facility.
- UT-Battelle firefighting services are accessed in the same manner—via facility phone (9-1-1) or fire alarm box, or by calling the LSS if using a cell phone.

3.0 Event Investigation and Reporting

Purpose

This section establishes the process for investigating, reporting, and analyzing accidents or incidents that occur during construction activities.

Responsibilities

- **All Contractor and Subcontractor employees** must immediately report injuries, illnesses, occupational exposures, motor vehicle incidents, property damage, and near misses to their supervisor.
- **Supervisors** must immediately notify the UT-Battelle Technical Project Officer (TPO), Project Manager, Construction Field Representative (CFR), and Qualified Safety and Health Professional (QSHP).
- **Key Contractor supervisory personnel** must notify the Laboratory Shift Superintendent (LSS) at 865-241-6606 within two (2) hours of any accident or near miss. For on-site emergencies (police, fire, rescue, hazmat), also call the LSS at 865-241-6606.

When a contractor employee is involved in a serious event or accident, the Contractor must:

1. Secure the event scene from disturbance or unauthorized entry until UT-Battelle representatives arrive.
2. Ensure equipment or articles involved in the event are not moved, altered, or repaired.
3. Cooperate with UT-Battelle representatives (Project Manager, TPO, QSHP) to verify all necessary questions are answered. Only these representatives may authorize release of the event scene.

Additional requirements:

- Contractors are responsible for notifying OSHA when required by regulation.
- Contractors must notify UT-Battelle within two (2) working days of learning about a recordable occupational injury or illness as defined by 29 CFR 1904.12(c).
- Contractors must participate in investigations, fact-finding, critiques, and reporting processes.

Recordkeeping and Reporting

Contractors must maintain complete records of exposures and accident experience, including those of subcontractors. At a minimum, records must include:

- Exposure work hours
- OSHA 300, 300A, and 301 logs of occupational injuries and illnesses
- Records of employee exposures to toxic materials and harmful physical agents

Contractors must immediately notify UT-Battelle of any excessive exposure and corrective hazard-control measures taken.

All recordable occupational injuries and illnesses must be reported on Form 5484.3 (Individual Accident/Incident Report), available in the Forms section of this document.

4.0 Project Safety Guidelines

The following general safety guidelines support successful project execution.

Responsibilities

- **Management and Supervisors** are responsible for effectively communicating and enforcing safety guidelines.
- **Employees** are responsible for following safety guidelines and recognizing that these do not cover every situation they may encounter.

All personnel are encouraged to **STOP or Pause Work** whenever questions or safety concerns arise.

Principles for a Strong Safety Culture

- Everyone is personally responsible for ensuring safe operations.
- Leaders value the safety legacy they create in their discipline.
- Staff raise safety concerns because trust permeates the organization.
- Cutting-edge science requires cutting-edge safety.
- A questioning attitude is cultivated.
- Learning never stops.
- Hazards are identified and evaluated for every task, every time.
- A healthy respect is maintained for what can go wrong.

5.0 Confined Space

Purpose

This section establishes requirements for confined space work in compliance with 29 CFR 1926 Subpart AA.

Responsibility

Contractors are responsible for protecting the health and safety of personnel performing confined space entries.

General Requirements

Identifying Confined Spaces

Before starting work, supervisors must:

- Survey the area to identify confined spaces.
- Classify spaces as *permit-required* or *non-permit required*.
- Treat all unclassified spaces as permit-required until a hazard evaluation is completed by a competent person.
- Post danger signs at all potential entry points. If dimensions prevent posting, use alternative effective means of communication.

Employers/Supervisors Must:

- Comply with the Confined Space Entry permit and other required permits.
- Ensure employees are trained and qualified for their assigned duties.
- Maintain an approved confined space program.
- Notify employees of hazards through posting and communication.
- Coordinate multi-contractor entries.

- Conduct debriefings after entry operations to document unanticipated hazards.
-

Classifying Confined Spaces

The competent person must:

1. Review existing hazard evaluations (if available).
2. Identify hazards associated with the work.
3. Classify the space accordingly:
 - **Permit-required confined space:** actual/potential atmospheric hazards or other serious risks.
 - **Non-permit confined space:** no hazards identified.

Reclassification:

- A permit-required space may be reclassified as non-permit if all hazards are eliminated without entry.
 - If entry is required to eliminate hazards, the entry must follow permit-required procedures until hazards are eliminated.
 - Written certification (date, location, contractor signature) is required to document hazard elimination.
-

Special Situations

Telecommunication or Electrical Work in Manholes/Vaults (1926.953):

- Guard openings to prevent falls and dropped objects.
 - Test for oxygen and combustible gases with calibrated instruments.
 - Provide forced-air ventilation during work.
 - Supply ladders for entry if depth > 4 feet.
 - Ensure CPR- and first-aid-trained staff are available.
-

Preparing for Entry

- Conduct a job-specific briefing for all entrants and attendants.
- Designate a qualified Entry Supervisor to authorize, oversee, and terminate entry.
- Assign at least one trained attendant outside the space.
- Review hazards, controls, training requirements, and emergency procedures.
- Require all entrants and attendants to read and sign the permit.

Multi-Employer Entries

- Share hazard information across all contractors.
 - Use a single permit signed by each employer's representative.
 - Conduct a joint pre-job briefing.
-

Permit System

- Confined space entries must be controlled by a permit.
 - Permit duration must not exceed the time required for the assigned task.
 - Re-entry is allowed if no new hazards are introduced, scope is unchanged, and pre-entry testing confirms safe conditions.
 - Cancel the permit once work is complete or conditions become unsafe.
-

Atmospheric Testing

- Conduct testing before entry and continuously during work.
 - Test in sequence: oxygen → flammable gases → toxic vapors.
 - Sample multiple levels of the space to detect stratification.
 - Provide entrants with personal monitors if full testing is not possible.
 - Record calibration data and test results on the permit.
-

Emergency Rescue

- Establish rescue and emergency procedures.
 - Provide attendants with reliable means of summoning rescue services (phone, radio).
 - Equip entrants with retrieval systems (full-body harness, lifelines, lifting devices).
 - Rescue personnel must be trained, equipped, and available before entry.
 - Attendants may not enter the space to attempt rescue.
-

Training/Qualifications

- All team members (entrants, attendants, supervisors) must be trained to recognize hazards and implement controls.
- Additional training is required when:

- Duties change
 - Operations introduce new hazards
 - Knowledge or procedure deficiencies are identified
 - Atmospheric testing personnel must be trained in instrument use, calibration, and documentation.
-

References

- 29 CFR 1910, Occupational Safety and Health Standards
- 29 CFR 1926, Safety and Health Regulations for Construction

6.0 Construction Ergonomics

Purpose

This section establishes requirements and responsibilities for managing ergonomic hazards in construction work.

Responsibility

- **Contractors** must identify, evaluate, and control ergonomic risk factors on their projects. They are responsible for implementing this procedure.
- **Employees** must comply with ergonomic practices and use safe work methods.

Requirements

Risk Identification

Contractors must assess tasks that increase the risk of musculoskeletal disorders (MSDs), including:

- Lifting heavy items
- Bending or reaching overhead
- Pushing and pulling heavy loads
- Awkward postures
- Repetitive tasks
- Exposure to vibration, cold, or combined risk factors

MSDs include conditions affecting nerves, tendons, muscles, and supporting structures. They can range from mild symptoms to chronic, debilitating conditions.

Prevention Strategies

- Use Activity Hazard Analyses (AHA) to identify and control ergonomic risk factors.
- Train workers to recognize and mitigate ergonomic hazards.
- Implement stretch-and-flex programs to promote wellness and injury prevention.
- Encourage early reporting of MSD symptoms.
- Continuously evaluate work processes and apply corrective actions where needed.

Examples of Common MSDs

- **Carpal Tunnel Syndrome:** Numbness/tingling in the hand and fingers, wrist/forearm pain, difficulty gripping.
- **Tenosynovitis:** Joint pain, tenderness, difficulty moving joints.
- **Tension Neck Syndrome:** Neck fatigue, stiffness, pain, and related headaches.
- **Lower Back Pain:** Persistent stiffness or sharp localized pain in the back.

References

- OSHA Ergonomics: <https://www.osha.gov/ergonomics>
- 10 CFR 851, Worker Safety and Health Program
- ACGIH Threshold Limit Values (TLVs) – Ergonomics

7.0 Control of Hazardous Energy (Lock/Tag/Verify)

Purpose

This section applies to contractors installing, servicing, or maintaining machines, equipment, or systems where unexpected startup or release of hazardous energy could cause injury. Hazards may be identified during planning, hazard analysis, or when unexpected conditions arise during work.

Requirements

These requirements apply to all contractors at ORNL:

- Hazardous energy control covers all equipment, vehicles, processes, and systems powered by electrical, mechanical, hydrostatic, or pneumatic energy.
- Contractors must develop a written Lockout/Tagout (LOTO) program compliant with:
 - 29 CFR 1910 Subpart S
 - 29 CFR 1926 Subpart K
 - NFPA 70E (Standard for Electrical Safety in the Workplace, 2015 edition)

- NFPA 70 (National Electrical Code)
- Only qualified persons (as defined in 1910.331–335 and 1926.449) may perform electrical work.
- Supervisors must approve energized work through an **Electrical Energized Work Permit (Form ORNL-646)**.

Planning for LOTO

- Use the Isolation/Outage Request Form to identify facility systems and services requiring hazardous energy isolation.
- The Controlling Organization reviews the scope, evaluates hazards, and determines how locks and tags will be applied.

Exceptions

LOTO does not apply when:

- No potential exists for release of hazardous energy.
- Systems are permanently deactivated (air-gapped with no intent of reconnection).
- New construction infrastructure is not yet connected to an energy source.
- Locks/tags are used for configuration control (covered separately).
- Emergency situations require immediate protective measures (e.g., rescues).

Additional exclusions include:

- Compressed gas cylinder work.
- Troubleshooting or maintenance requiring energized equipment.
- Work where de-energizing creates a greater hazard or is infeasible (per Electrical Work Safety procedures).

Procedures

- Only authorized, trained personnel may determine LOTO applicability.
- Use standard “DANGER – DO NOT OPERATE” tags with keyed locks.
- Tags must be dated, signed, and describe the work performed. They cannot be reused.
- No device may be operated while tagged or locked.
- No person may remove another worker’s tag or lock.
- Each authorized worker must apply their own lock/tag, using a gang lock box if needed.
- Supervisors must ensure no work proceeds without proper lockout/tagout or blinding/blanking.
- Affected workers must be informed of systems being locked out.

Electrical Work Safety Requirements

Contractors must address:

- Training for all employees exposed to electrical hazards.
- Underground/temporary electrical installations.
- Approach boundaries (limited/restricted).
- Shock risk assessment.
- Arc flash risk assessment.
- PPE requirements for electrical work.

Training:

- General workers receive basic electrical safety instruction.
- High-risk workers (technicians, electricians, vendors) must be trained per NFPA 70E.
- Licensed journeyman electricians must supervise apprentices and assign tasks appropriate to their skill and training.
- **ORNL prohibits energized work on ORNL systems.**

Underground/Temporary Installations:

- Must comply with NFPA 70.
- ORNL's Construction Electrical Equipment Inspectors must approve installations before energizing.
- Underground electrical services may require above-ground danger markers.

8.0 Demolition – 29 CFR 1926 Subpart T

Purpose

This section establishes requirements for demolition work in compliance with OSHA 29 CFR 1926.850.

Responsibility

Contractors are responsible for protecting the health and safety of employees performing demolition activities.

General Requirements

Preparation

- A competent person must perform an engineering survey of the structure to determine integrity and potential collapse hazards. Adjacent structures must also be evaluated.
- Survey reports and demolition plans must be kept at the job site.
- Contractors will be provided hazard characterization data for known materials (asbestos, lead, beryllium, radiological, etc.) to prepare safe work practices.
- All demolition equipment must be installed, maintained, and operated per federal/state regulations and manufacturer's instructions.
- All demolition must be conducted under competent supervision.

Utilities

- All utilities (electric, gas, water, steam, sewer) must be deactivated under an ORNL-approved process.
- Air-gapped utilities must be shut off, capped, or controlled outside the building line.
- If temporary utilities are required, they must be properly located and protected.

Hazardous Materials

- ORNL does characterizations for asbestos, hazardous chemicals, flammable materials, or other dangerous substances.
- Hazardous substances must be removed or controlled before demolition begins.
- If a hazardous material or unknown hazardous material is found during demolition activities, contractor should STOP or Pause work activities and call UT Battelle point of contact.

Structural Work

- Demolition must begin at the top and proceed downward.
- No work may expose lower-level workers to falling hazards.
- Floor openings must not exceed 25% of the floor area unless support remains intact.
- Floors weakened by demolition must be shored.
- Masonry walls must not exceed safe loading limits; silica exposure must be controlled with a Silica Exposure Control Plan.
- Free-standing walls above one story must have lateral bracing unless proven self-supporting.

Debris Handling

- When debris is dropped without chutes, the drop area must be barricaded, and lower-level removal is prohibited while upper-level debris is handled.
- Dust must be controlled with cleaning, HEPA vacuuming, and other approved methods. Allowing demolition dust/materials to free-fall is prohibited.
- Good housekeeping is required to prevent hazardous dust buildup.

Work Area Access

- Only designated access points may be used.
- Access points must be inspected, maintained, illuminated, and secured.

Use of Chutes

- No material may be dropped outside the building walls unless the area is protected.
- Chutes must comply with manufacturer specifications.
- Chutes must include gates controlled by a competent operator.

Equipment and Scaffolds

- Aerial lifts, scaffolds, ladders, and hoists must comply with OSHA Subparts H and T and the relevant sections of this manual.
- Mechanical equipment may not exceed floor load capacity.

Storage

- Debris storage must not exceed allowable floor loads.
- Wood floors may be partially removed to provide debris storage only if stability is not compromised.
- Storage areas must be blocked off except for necessary removal openings.

Mechanical Demolition

- No workers are allowed in areas affected by balling or clamming operations.
- Demolition balls must not exceed 50% of the crane's rated load (or 25% of line strength).
- Cranes must use the shortest practical boom and load line.
- Balls must be attached by swivel-type connections and secured against accidental release.
- Roof cornices and ornamental stonework must be removed before walls are pulled down.
- Competent persons must continuously inspect for hazards such as weakened floors or loosened materials.

References

- 29 CFR 1910, Occupational Safety and Health Standards
- 29 CFR 1926 Subpart T, Safety and Health Regulations for Construction

9.0 Electrical Safety

Purpose

This section defines requirements for electrical safety at ORNL. It applies to subcontractors and vendors who perform work on or near exposed, energized electrical equipment. Work must comply with:

- 29 CFR 1926 Subpart K
- 29 CFR 1910 Subpart S
- NFPA 70E (Standard for Electrical Safety in the Workplace, 2015)
- NFPA 70 (National Electrical Code)

Electrical work must be performed only by qualified persons as defined in 1910.331–335 and 1926.449.

Key Definitions

- **AED (Automated External Defibrillator):** Device that analyzes heart rhythm and delivers a shock to restore normal rhythm.
- **Arc Flash Boundary (AFB):** Distance from an arc source where incident energy equals 1.2 cal/cm².
- **Arc Rating:** Performance rating of materials when exposed to an arc flash, expressed in cal/cm².
- **Attendant:** Person assigned to warn/protect employees from electrical hazards when signs/barricades are insufficient.
- **Commissioning:** Process ensuring equipment functions correctly and per design.
- **Contact Release:** Technique to free a shock victim without endangering rescuer.
- **CPR (Cardiopulmonary Resuscitation):** Procedure of chest compressions to restore circulation and breathing.
- **De-Energized:** State in which all energy sources are disconnected, discharged, and blocked.
- **Diagnostic and Testing:** Tasks such as troubleshooting, voltage checks, or current measurement. Does not include repairing or altering energized equipment.
- **Electrical Hazard:** Dangerous condition that can result in shock, burns, or blast injury.
- **Electrical Work Plan (EWP):** Document assessing risks for non-energized electrical tasks.
- **Energized Electrical Work Permit (EEWP):** Required for justified energized work, including within the restricted approach boundary or where arc-flash hazards exist.
- **Qualified Electrical Worker (QEW):** Worker trained and experienced in electrical systems, hazards, PPE, and protective techniques.

- **Safe-to-Work Check:** Test confirming absence of hazardous energy before servicing/maintenance.
-

Requirements

General

- All equipment is considered energized until proven otherwise.
- Energized work must only occur when de-energizing is infeasible or introduces greater hazards, and must be justified with an ORNL provided EEWP.
- Barriers, signs, or attendants must restrict access to energized areas.

Safe-to-Work Checks

- Conducted by authorized workers with rated instruments.
- Verify absence of voltage phase-to-phase and phase-to-ground.
- Use permanently mounted test devices only if they meet NFPA 70E criteria.

Training

- All workers must receive electrical safety training appropriate to their role.
- High-risk workers (electricians, technicians, craftsmen) must be trained in NFPA 70E practices, PPE, and emergency response.
- Apprentices may not perform energized work. Licensed journeyman electricians must supervise apprentices and assign work based on skill and training.

Underground/Temporary Installations

- Must meet NFPA 70 requirements.
- ORNL Construction Electrical Equipment Inspectors must approve before energization.
- Mark underground services above ground with “Danger – Buried Electrical.”

Risk Assessments

- **Shock Risk:** Documented assessment identifying voltage exposure, approach boundaries, and PPE.
- **Arc Flash Risk:** Assessment of incident energy, arc flash boundary, working distance, and PPE. Work must not proceed if incident energy ≥ 40 cal/cm² unless equipment is placed in an electrically safe work condition.

Approach Boundaries

- **Limited Approach Boundary:** Only qualified workers may enter. Unqualified workers may enter only under escort.
- **Restricted Approach Boundary:** Only qualified workers with proper PPE and tools may enter.

Personal Protective Equipment (PPE)

- Workers within the arc flash boundary must wear arc-rated protective clothing and equipment appropriate for the incident energy level.
- Shock protection includes insulated gloves, blankets, tools, and PPE.
- PPE must be inspected before each use; damaged or contaminated PPE must not be used.
- Training in PPE use and manufacturer's instructions is required.

10.0 Fall Protection

Purpose

This section establishes requirements for protecting workers from fall hazards in compliance with OSHA 29 CFR 1926 Subpart M.

Responsibility

- **Contractors** must ensure all employees exposed to fall hazards are protected by appropriate systems, training, and supervision.
- **Employees** must use assigned fall protection equipment properly and follow safe practices.

General Requirements

- Fall protection is required whenever workers are exposed to falls of 6 feet or more to a lower level, or when working over dangerous equipment or conditions, regardless of height.
- Contractors must provide one or more of the following systems, as appropriate:
 - Guardrail systems
 - Safety net systems
 - Personal fall arrest systems (PFAS)
 - Positioning device systems
 - Warning line systems (for roofing work)
 - Controlled access zones (where permitted by regulation)

Personal Fall Arrest Systems (PFAS):

- Must be inspected before each use.
- Anchorages must support at least 5,000 pounds per worker.
- Harnesses, lanyards, and lifelines must meet OSHA and ANSI standards.

Training:

- Workers exposed to fall hazards must receive training by a competent person on recognizing fall hazards and using fall protection systems.
- Retraining is required when conditions or equipment change, or when worker performance indicates lack of understanding.

Protection Against Falling or Dropped Objects:

- Where there is potential for objects to fall, contractors must provide:
 - Toe boards, screens, or guardrail systems
 - Canopies
 - Barricaded areas to keep workers clear
 - Tool lanyards

Rescue and Response

- Contractors must develop and implement prompt rescue procedures in case of a fall, including equipment and trained personnel.

References

- OSHA 29 CFR 1926 Subpart M – Fall Protection
- ANSI Z359 – Fall Protection Code

11.0 Scaffolds

Purpose

This section establishes requirements for scaffold use in compliance with OSHA 29 CFR 1926 Subpart L.

Responsibility

- **Contractors** must ensure scaffolds are designed, erected, used, and dismantled safely.
- **Competent persons** must supervise scaffold erection, modification, and dismantling.

- **Employees** must be trained in safe scaffold practices and use fall protection when required.

General Requirements

- Scaffolds must be designed by a qualified person and erected under the supervision of a competent person.
- Platforms must be fully planked and able to support at least four times the intended load.
- Scaffolds must be inspected daily and after any event that could affect stability.
- Scaffolds must be plumb, level, and braced to prevent displacement.
- Access must be provided by ladders, stair towers, or ramps; climbing cross braces is prohibited.

Fall Protection

- Fall protection is required when working on scaffolds more than 10 feet above a lower level.
- Guardrails or personal fall arrest systems must be used.

Prohibited Practices

- Do not exceed scaffold load ratings.
- Do not use damaged or weakened components.
- Do not move scaffolds with workers on them unless specifically designed for such use.
- Do not use makeshift devices (e.g., boxes, ladders) to increase platform height.

Training

All workers must be trained by a qualified person to recognize hazards and use scaffolds safely, including fall protection requirements.

References

- OSHA 29 CFR 1926 Subpart L – Scaffolds

12.0 Aerial Lifts

Purpose

This section establishes requirements for safe aerial lift operation in compliance with OSHA 29 CFR 1926.453.

Responsibility

- **Contractors** must ensure that aerial lifts are maintained and operated safely.
- **Operators** must be trained, authorized, and competent in safe lift use.
- **Supervisors** must verify inspections, training, and proper use.

General Requirements

- Aerial lifts must meet ANSI A92 standards.
- Pre-use inspections must be completed at the start of each shift. Defective equipment must be tagged “Out of Service” until repaired.
- Workers must always stand firmly on the lift floor. Sitting, climbing, or using ladders or planks on the lift is prohibited.
- Fall protection is required: workers must wear a full-body harness with a lanyard attached to the designated anchor point.
- Lifts must not be moved with workers in the basket unless designed for that purpose.
- Load limits must not be exceeded. Tools and materials must be secured to prevent displacement.

Work Practices

- Maintain clearance from electrical power lines per OSHA requirements.
- Set brakes and use wheel chocks on inclined surfaces.
- Position lifts on stable, level surfaces. Outriggers must be used where provided.
- Keep both feet on the platform; do not lean or reach beyond guardrails.
- Barricade the work area if operating near traffic or pedestrians.

Training

Operators must be trained on:

- Equipment operation and manufacturer’s instructions
- Hazard recognition (falls, tip-overs, electrical contact, struck-by hazards)
- Emergency lowering procedures
- Safe work practices specific to job tasks

References

- OSHA 29 CFR 1926.453 – Aerial Lifts
- ANSI A92 – Mobile Elevating Work Platforms

13.0 Hoisting and Rigging

Purpose

This section establishes requirements for safe hoisting and rigging operations in compliance with OSHA 29 CFR 1926 Subpart H and DOE-STD-1090-2020.

Responsibility

- **Contractors** must ensure hoisting and rigging activities are planned, supervised, and performed safely.
- **Qualified Riggers and Signal Persons** must be designated where required by regulation.
- **Supervisors** must verify equipment inspections, operator qualifications, and compliance with load limits.

General Requirements

- Only trained and authorized personnel may operate cranes, hoists, and rigging equipment.
- Pre-use inspections must be conducted before each shift; defective equipment must be removed from service.
- Loads must not exceed rated capacities. Load charts must be accessible to operators at all times.
- Rigging must be performed by qualified riggers.
- Tag lines must be used to control swinging or rotating loads when necessary.
- Workers must stay clear of suspended loads.

Rigging Equipment

- Slings, shackles, hooks, and other hardware must be inspected prior to use.
- Defective, damaged, or worn rigging components must be removed from service immediately.
- Rigging must comply with manufacturer's specifications and rated load limits.
- Hooks must have safety latches unless designed otherwise by the manufacturer.

Cranes and Hoists

- Cranes must be set up on stable ground, properly leveled, and equipped with outriggers when required.
- Operators must be certified per OSHA 29 CFR 1926.1427.
- Swing radius hazards must be barricaded to prevent worker entry.
- Overhead power line clearance requirements must be strictly followed.

Signal Persons

- When operators' views are obstructed, a qualified signal person must be designated.
- Standard hand signals (per ANSI and OSHA) must be used unless electronic communication is established.

Lifting Practices

- Loads must be properly balanced and secured before lifting.
- Never leave suspended loads unattended.
- No worker may ride a load, hook, or rigging equipment.
- Lifts exceeding 75% of rated capacity, or critical lifts, require an engineered lift plan approved by a competent person.

Training

All personnel involved in hoisting and rigging must be trained on equipment operation, hazard recognition, and safe lifting practices.

References

- OSHA 29 CFR 1926 Subpart H – Materials Handling, Storage, Use, and Disposal
- OSHA 29 CFR 1926 Subpart CC – Cranes and Derricks in Construction
- ANSI/ASME B30 Series – Hoisting and Rigging Standards
- DOE-STD-1090-2020 – Hoisting and Rigging

14.0 Forklifts & Telehandler (Powered Industrial Trucks)

Purpose

This section establishes requirements for the safe operation of forklifts and other powered industrial trucks in compliance with OSHA 29 CFR 1910.178 and 29 CFR 1926.602.

Responsibility

- **Contractors** must ensure forklifts are maintained and operated safely.
- **Operators** must be trained, certified, and authorized to operate specific equipment.
- **Supervisors** must confirm that daily inspections, training, and operating practices are followed.

General Requirements

- Only trained and certified personnel may operate forklifts. Certification must include formal instruction, practical training, and an evaluation of performance.
- Daily pre-use inspections must be conducted and documented. Defective equipment must be removed from service.
- Modifications affecting capacity or safe operation are prohibited unless approved by the manufacturer.
- Load capacity plates must be legible and displayed.
- Seatbelts must be used at all times.
- Only manufacturers approved attachments permitted for use.

Safe Operating Practices

- Forklifts must not exceed rated load capacities. Loads must be stable and properly balanced.
- Operators must maintain clear visibility; spotters must be used when vision is obstructed.
- Speed must be safe for conditions. Sharp turns, sudden stops, or horseplay are prohibited.
- Forks must be kept low while traveling.
- Operators must sound horns at intersections and when approaching pedestrians.
- No person may ride on forks, pallets, or loads.
- A safe distance must be maintained from platform edges, ramps, and excavations.
- Rigging from the forks of a forklift or telehandler strictly prohibited.
- The use of spotters is recommended in tight and congested areas.

Refueling and Charging

- Refueling (liquid fuel or LPG) must be done in designated, ventilated areas with spill controls.
- Battery charging stations must provide adequate ventilation, fire protection, and spill control.
- Smoking and ignition sources are prohibited in fueling and charging areas.

Training

Operators must be trained and evaluated on:

- Equipment operation and limitations
- Load handling and stability
- Surface conditions and workplace hazards
- Safe driving and pedestrian awareness
- Refueling and battery charging procedures
- Emergency procedures

Retraining is required after accidents, near misses, unsafe operation, or changes in equipment or conditions.

References

- OSHA 29 CFR 1910.178 – Powered Industrial Trucks
- OSHA 29 CFR 1926.602 – Material Handling Equipment
- ANSI/ITSDF B56.1 – Safety Standard for Low Lift and High Lift Trucks

15.0 Hand and Power Tools

Purpose

This section establishes requirements for the safe use of hand and power tools in compliance with OSHA 29 CFR 1926 Subpart I and Subpart K.

Responsibility

- **Contractors** must ensure all tools are maintained in safe condition and used properly.
- **Employees** must inspect tools before use and operate them safely.
- **Supervisors** must verify training, inspections, and compliance with standards.

General Requirements

- Tools must be maintained in a safe condition. Defective or damaged tools must be removed from service immediately.
- Guards and safety devices must remain in place and functional.
- Portable electric tools must be grounded or double-insulated.
- Compressed air must not be used for cleaning at pressures greater than 30 psi unless equipped with effective chip guarding and PPE.
- Tools must never be used beyond their design capacity.

Hand Tools

- Keep cutting edges sharp and handles free of cracks, splinters, or burrs.
- Impact tools (chisels, wedges) must be free of mushroomed heads.
- Wrenches must not be altered (e.g., by adding pipe extensions).
- Tools must be stored and transported properly to avoid damage or accidental activation.

Power Tools

- All power tools must be equipped with proper guards and safety switches.

- Portable electric tools must be protected by GFCIs when used on construction sites.
- Pneumatic tools must be secured to hoses with positive locking devices.
- Fuel-powered tools must be shut down before refueling, with refueling performed in designated, ventilated areas.
- Powder-actuated tools must be used only by trained, certified operators and inspected before each use.
- Battery charging stations should be utilized per manufacturers' recommendations.

Training

Employees must be trained on:

- Tool inspection, operation, and limitations
- Proper PPE (e.g., eye, face, hearing, respiratory protection)
- Hazards associated with tool use (electrical, noise, vibration, flying objects)
- Manufacturer's instructions and safe work practices

References

- OSHA 29 CFR 1926 Subpart I – Tools – Hand and Power
- OSHA 29 CFR 1926 Subpart K – Electrical

16.0 Heavy Equipment

Purpose

This section establishes requirements for the safe operation of heavy equipment in compliance with OSHA 29 CFR 1926 Subpart O.

Responsibility

- **Contractors** must ensure heavy equipment is properly maintained, inspected, and operated safely.
- **Operators** must be trained, authorized, and competent in the safe use of assigned equipment.
- **Supervisors** must verify inspections, training, and compliance with safety procedures.

General Requirements

- Only trained and authorized personnel may operate heavy equipment.
- Daily pre-use inspections must be performed and documented. Defective equipment must be removed from service immediately.
- Seat belts must be worn at all times.

- Equipment must not be left unattended unless attachments are lowered, controls are neutralized, and brakes are set.
- Equipment must be operated at safe speeds and within rated capacities.
- Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have wheels chocked and parking brake set.
- Adequate clearance must be maintained from overhead power lines.
- Operators must maintain clear visibility; when vision is obstructed, a spotter must be used.
- Pedestrians must be kept clear of operating areas using barricades, flaggers, or signals as appropriate.
- All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of any machine.

Safe Operation around Power Lines – (follow 1926.600(a)(6))

- All equipment shall comply with requirements when working or being moved in vicinity of power lines or energized transmitters.
- A person or spotter shall be designated to observe clearance of equipment and give timely warning for operations where it is difficult for the operator to maintain the desired clearance by visual means.

Specific Requirements

- **Earthmoving equipment** (bulldozers, loaders, graders): Must be equipped with rollover protective structures (ROPS) and seat belts.
- **Excavators/backhoes:** Swing radius must be barricaded. Buckets must not be used to hoist personnel.
- **Dump trucks:** Must use audible backup alarms. Where alarms are ineffective, spotters must be assigned.
- **Compactors/rollers:** Must not be operated on unstable surfaces without proper precautions.
- **Cranes/hoists:** Must comply with Section 13.0 (Hoisting and Rigging).

Fueling and Maintenance

- Refueling must be performed in designated, ventilated areas with fire protection.
- Engines must be shut off during refueling.
- Smoking is prohibited during fueling and maintenance.
- Equipment must be properly grounded during refueling of flammable liquids.
- Maintenance must follow manufacturer's instructions and OSHA requirements.
- A spill kit should be readily accessible for fueling operations.

Training

Operators must be trained on:

- Equipment operation and limitations
- Workplace hazards (e.g., overhead lines, unstable soil, traffic)
- Load handling and stability
- Emergency shutdown and signaling procedures
- Manufacturer’s instructions and safe practices

Retraining is required after accidents, near misses, or unsafe operation.

References

- OSHA 29 CFR 1926 Subpart O – Motor Vehicles, Mechanized Equipment, and Marine Operations
- OSHA 29 CFR 1926.600 - Equipment
- OSHA 29 CFR 1926.602 – Material Handling Equipment

17.0 Hot Work

Purpose

This section establishes requirements for welding, cutting, grinding, and other hot work in compliance with OSHA 29 CFR 1926 Subpart J.

Responsibility

- **Contractors** must implement a hot work program that protects workers, property, and equipment from fire and explosion hazards.
- **Contracting Supervisors** must ensure permits, inspections, and fire watch requirements are followed per contractor’s own hot work permit procedures.
- **Employees** must perform hot work safely and comply with permit conditions.

General Requirements

- A **Hot Work Permit** is required for all welding, cutting, burning, grinding, or similar operations outside designated welding areas.
- The permit must identify hazards, required controls, and responsible personnel.
- Work must comply with OSHA standards, NFPA 51B, and site-specific requirements.
- Hot work must not begin until all combustible materials are removed or protected, and fire protection equipment is in place.

Fire Prevention

- A fire extinguisher (minimum 10 lb., 4A:40BC rating) must be located within immediate reach of hot work.

- A trained **fire watch** must be present whenever combustible materials are within 35 feet of the work area.
- Fire watches must remain on site for at least 30 minutes after work ends, or longer if conditions warrant.
- Flammable vapors, gases, or liquids must be eliminated before hot work begins.
- Ventilation must be provided in confined or enclosed spaces to prevent fume accumulation.

Personal Protective Equipment (PPE)

- Welders and helpers must wear proper PPE, including flame-resistant clothing, welding helmets, gloves, and safety glasses.
- Respiratory protection must be provided when work generates hazardous fumes or ventilation is inadequate.
- Hearing protection must be used where noise exceeds permissible exposure limits.

Cylinder and Equipment Safety

- Compressed gas cylinders must be stored upright, secured, and capped when not in use.
- Cylinders must be kept at least 20 feet from hot work or protected by fire-resistant barriers.
- Oxygen cylinders and fittings must be kept free from oil and grease.
- Hoses, regulators, and torches must be inspected daily; defective equipment must be removed from service.

Confined Spaces

- Hot work in confined spaces requires continuous atmospheric monitoring, ventilation, and a confined space permit in addition to a hot work permit.
- An attendant must be stationed outside the space at all times.

Training

Employees performing hot work must be trained on:

- Fire and explosion hazards
- Hot work permit requirements
- Safe equipment use and maintenance
- PPE selection and use
- Emergency procedures

References

- OSHA 29 CFR 1926 Subpart J – Welding and Cutting

- NFPA 51B – Standard for Fire Prevention During Welding, Cutting, and Other Hot Work

18.0 Housekeeping

Purpose

This section establishes housekeeping requirements to maintain safe, clean, and orderly work environments in compliance with OSHA 29 CFR 1926.25.

Responsibility

- **Contractors** must ensure good housekeeping practices are implemented on all job sites.
- **Employees** must keep their work areas clean and promptly remove waste materials.
- **Supervisors** must verify that housekeeping standards are enforced daily.

General Requirements

- Work areas must be kept free from debris, scrap, and unnecessary materials.
- Combustible waste (wood, paper, rags) must be removed regularly and stored in approved containers.
- Oily rags and flammable waste must be kept in covered, fire-resistant containers until disposal.
- Passageways, stairways, and exits must be kept clear of obstructions.
- Nails must be removed or bent over in scrap lumber.
- Spills must be cleaned up immediately using appropriate absorbents or cleaning agents.
- Waste must not be allowed to accumulate to create fire, tripping, or health hazards.

Storage

- Materials must be stored in a stable manner that prevents sliding, falling, or collapse.
- Flammable liquids must be stored in approved safety cans or cabinets.
- Cylinders, drums, and heavy materials must be properly secured.

Tools and Equipment

- Tools and equipment must be stored neatly when not in use.
- Extension cords and hoses must be routed to avoid creating tripping hazards.
- Damaged tools and equipment must be tagged and removed from service.

Training

All employees must be instructed on good housekeeping practices and the importance of maintaining a safe work environment.

References

- OSHA 29 CFR 1926.25 – Housekeeping
- NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations

19.0 Industrial Hygiene

Purpose

This section establishes requirements for identifying, evaluating, and controlling health hazards associated with construction work in compliance with OSHA, DOE, and ACGIH.

Responsibility

- **Contractors** must anticipate, recognize, evaluate, and control health hazards on their projects.
- **Supervisors** must ensure appropriate protective measures are implemented and maintained.
- **Employees** must follow safe work practices and use assigned protective equipment properly.

General Requirements

- ORNL will characterize existing facilities. Contractors must also assess workplace hazards that may expose employees to chemical, physical, or biological agents.
- Industrial hygiene evaluations must be documented and incorporated into project Activity Hazard Analyses (AHAs).
- When exposures are possible, contractors must implement engineering, administrative, and PPE controls.
- Hazard communication programs must comply with OSHA's Hazard Communication Standard (29 CFR 1926.59 / 1910.1200).

Common Hazards

- **Chemical Hazards:** Dusts, fumes, vapors, gases, and mists. Contractors must provide Safety Data Sheets (SDSs) for all hazardous materials brought on site.
- **Physical Hazards:** Noise, vibration, heat stress, cold stress, radiation, and non-ionizing energy sources.

- **Biological Hazards:** Mold, bacteria, or other microorganisms that may be encountered during demolition, renovation, or environmental work.

Monitoring and Exposure Control

- Air monitoring must be conducted where employee exposures may exceed permissible exposure limits (PELs) or threshold limit values (TLVs).
- Noise monitoring must be performed when exposures may exceed 85 dBA TWA.
- Sampling must be performed by qualified personnel using calibrated equipment.
- Results must be documented and shared with affected employees.

Personal Protective Equipment (PPE)

- PPE must be selected based on hazard evaluations and manufacturer recommendations.
- Respiratory protection requires a written program, medical clearance, fit-testing, and training in accordance with 29 CFR 1910.134.
- Hearing protection must be provided where noise exposures exceed action levels.
- Eye, face, skin, and specialized PPE must be used where exposures warrant.

Training

All employees must be trained to recognize health hazards and understand control measures. Training must include:

- Proper use of PPE
- Emergency procedures
- Signs and symptoms of overexposure
- Hazard communication requirements

References

- OSHA 29 CFR 1926.59 / 1910.1200 – Hazard Communication
- OSHA 29 CFR 1910.134 – Respiratory Protection
- OSHA 29 CFR 1926.52 – Occupational Noise Exposure
- DOE 10 CFR 851 – Worker Safety and Health Program
- American Conference of Governmental Industrial Hygienists (ACGIH)

20.0 Ladders

Purpose

This section establishes requirements for the safe use of ladders in compliance with OSHA 29 CFR 1926 Subpart X.

Responsibility

- **Contractors** must provide ladders that are safe, properly maintained, and appropriate for the task.
- **Employees** must use ladders correctly and inspect them before each use.
- **Supervisors** must ensure ladders are inspected, used properly, and removed from service if defective.

General Requirements

- Ladders must be used only for their intended purpose and within the manufacturer's load rating.
- Damaged ladders must be tagged "Do Not Use" and removed from service immediately.
- Metal ladders must not be used near energized electrical conductors.
- Portable ladders must be placed on stable, level surfaces and secured to prevent displacement.
- Access ladders must extend at least 3 feet above the landing surface or be equipped with grab rails.
- Ladders must be set at a 4:1 ratio (1 foot out for every 4 feet of vertical rise).

Safe Work Practices

- Face the ladder and maintain three points of contact while ascending or descending.
- Carry tools in a belt, pouch, or hoist—never in hands while climbing.
- Do not exceed the top step of a stepladder or the top three rungs of an extension ladder.
- Ladders must not be moved, shifted, or extended while occupied.
- Only one person may be on a ladder at a time unless specifically designed otherwise.

Training

Employees must be trained on:

- Proper ladder selection and placement
- Inspection procedures
- Safe climbing and working practices
- Hazard recognition (slippery surfaces, electrical hazards, unstable bases)

References

- OSHA 29 CFR 1926 Subpart X – Stairways and Ladders
- ANSI A14 Series – Safety Requirements for Ladders

21.0 Motor Vehicles and Mobile Equipment

Purpose

This section establishes requirements for the safe operation of motor vehicles and mobile equipment in compliance with OSHA 29 CFR 1926 Subpart O.

Responsibility

- **Contractors** must ensure all vehicles and mobile equipment are properly maintained, inspected, and operated safely.
- **Operators** must be trained, licensed (where required), and authorized to operate assigned equipment.
- **Supervisors** must verify inspections, driver qualifications, and compliance with safety rules.

General Requirements

- Vehicles and equipment must be inspected daily before use. Defects affecting safe operation must be corrected before the vehicle is placed in service.
- Seat belts must be provided and worn at all times.
- Operators must comply with posted speed limits and site-specific traffic rules.
- Pedestrians have the right of way in work areas.
- Vehicles and equipment must be operated at speeds appropriate for conditions and loads.
- Unauthorized personnel may not ride in or on vehicles or equipment.

Mobile Equipment Safety

- Equipment must not be operated on unstable ground or near excavations without protective measures.
- Back-up alarms or spotters must be used when vision is obstructed.
- Loads must be secured to prevent shifting, falling, or spillage.
- Operators must not exceed manufacturer-rated capacities.

Traffic Control

- Contractors must establish traffic control plans where vehicle and equipment movement could endanger workers or the public.
- Barricades, flaggers, or warning devices must be used where necessary.
- Work zones must be illuminated during night operations.

Fueling and Maintenance

- Vehicles must be shut down and brakes set during refueling.
- Refueling must be done in designated, ventilated areas away from ignition sources.
- Spill prevention and fire protection equipment must be provided at fueling stations.
- Smoking is prohibited during fueling and maintenance.

Training

Operators must be trained on:

- Safe driving and equipment operation
- Hazard recognition (e.g., blind spots, load shifts, unstable ground)
- Traffic control requirements
- Emergency response procedures

Retraining is required after accidents, near misses, or unsafe practices.

References

- OSHA 29 CFR 1926 Subpart O – Motor Vehicles, Mechanized Equipment, and Marine Operations
- ANSI/SAE J386 – Operator Restraint Systems

22.0 Noise

Purpose

This section establishes requirements for protecting employees from occupational noise exposure in compliance with OSHA 29 CFR 1926.52 and 29 CFR 1910.95.

Responsibility

- **Contractors** must evaluate noise levels on the job site and implement controls when exposures may exceed permissible limits.
- **Supervisors** must ensure monitoring, engineering controls, and protective measures are in place.
- **Employees** must use hearing protection when required and report symptoms of hearing loss.

Exposure Limits

- The permissible exposure limit (PEL) is 90 dBA as an 8-hour time-weighted average (TWA).
- The action level is 85 dBA TWA, which requires inclusion in a hearing conservation program.
- Peak sound levels must not exceed 140 dB.

Monitoring and Control

- Contractors must conduct noise monitoring when exposures may exceed action levels.
- Monitoring results must be documented and communicated to affected employees.
- Engineering and administrative controls must be used to reduce exposures when feasible.
- When noise cannot be reduced below action levels, hearing protection devices must be provided and worn.

Hearing Conservation Program

If employees are exposed at or above 85 dBA TWA:

- Baseline and annual audiometric testing must be provided.
- Hearing protection must be selected, fitted, and maintained.
- Employees must be trained on noise hazards, proper use of hearing protection, and effects of noise exposure.

Training

Employees must be trained annually on:

- The effects of noise on hearing
- Hearing protection selection, use, and care
- The purpose of audiometric testing and results interpretation

References

- OSHA 29 CFR 1926.52 – Occupational Noise Exposure
- OSHA 29 CFR 1910.95 – Occupational Noise Exposure
- ACGIH TLV

23.0 Personal Protective Equipment (PPE)

Purpose

This section establishes requirements for selecting, providing, and using PPE to protect workers from hazards in compliance with OSHA 29 CFR 1926 Subpart E.

Responsibility

- **Contractors** must provide and maintain PPE appropriate to the hazards of the work.
- **Supervisors** must ensure employees wear PPE correctly and consistently.
- **Employees** must use PPE properly and report damaged or defective equipment.

Hazard Assessment

- Contractors must evaluate work areas to determine the need for PPE.
- A written certification of hazard assessment must be maintained.
- PPE must be selected based on the hazards identified and in accordance with ANSI/OSHA standards.

General Requirements

- PPE must be kept clean, sanitary, and serviceable.
- Damaged or defective PPE must be removed from service immediately.
- Employees must be trained in the proper use, care, and limitations of PPE.
- Training must be documented, and retraining provided when conditions or equipment change.

Types of PPE

- **Head Protection:** Hard hats meeting ANSI Z89.1, required where there is potential for falling or flying objects, or electrical exposure.
- **Eye and Face Protection:** Safety glasses, goggles, or face shields meeting ANSI Z87.1, required when exposed to flying particles, molten metal, liquid chemicals, or radiation.
- **Hearing Protection:** Earplugs or earmuffs when noise levels exceed permissible exposure limits (see Section 23.0).
- **Respiratory Protection:** Must meet 29 CFR 1910.134 requirements, including medical clearance, fit-testing, and training.
- **Hand Protection:** Gloves appropriate to hazards (chemical-resistant, cut-resistant, insulated, etc.).

- **Foot Protection:** Safety-toe footwear meeting ASTM F2413, required where there is risk of falling or rolling objects, punctures, or electrical hazards.
- **Fall Protection Equipment:** Full-body harnesses, lanyards, and connectors per ANSI Z359 (see Section 10.0).
- **High-Visibility Apparel:** Required in traffic areas or when exposed to vehicle/equipment hazards.

Training

Employees must be trained on:

- PPE selection and proper fit
- Inspection, cleaning, and storage
- Limitations of PPE
- When PPE is required and how to use it correctly

References

- OSHA 29 CFR 1926 Subpart E – Personal Protective and Life Saving Equipment
- ANSI/ISEA Z87.1 – Eye and Face Protection
- ANSI Z89.1 – Industrial Head Protection
- ANSI Z359 – Fall Protection Code

24.0 Signs, Signals, and Barricades

Purpose

This section establishes requirements for the use of signs, signals, and barricades to protect workers and the public in compliance with OSHA 29 CFR 1926 Subpart G.

Responsibility

- **Contractors** must provide and maintain appropriate signs, signals, and barricades at job sites.
- **Supervisors** must ensure warning devices are in place and effective.
- **Employees** must obey posted signs and respect barricades at all times.

General Requirements

- Signs must be visible, legible, and placed to warn of hazards before workers are exposed.
- Danger, caution, and safety instruction signs must follow ANSI Z535 standards for color, design, and wording.
- Traffic control devices (cones, barriers, flaggers) must conform to the Manual on Uniform Traffic Control Devices (MUTCD).

- Barricades must be sturdy, properly secured, and appropriate for the hazard.
- Warning lights must be used when barricades are in place at night or in low-visibility conditions.

Signals

- Signal persons must be qualified and use standard hand signals or electronic communication.
- Only one designated signal person may communicate with the operator unless an emergency stop is required.
- Flaggers must wear high-visibility garments that meet ANSI/ISEA 107 standards.

Barricades

- Barricades must clearly mark hazardous areas such as excavations, demolition zones, overhead work, and vehicle paths.
- Barricades must not be removed without authorization from the responsible supervisor.
- Employees must not cross barricades unless authorized and trained to enter the area.

Training

Employees must be trained to recognize the meaning of signs, signals, and barricades used on the site, and to follow all posted warnings and instructions.

References

- OSHA 29 CFR 1926 Subpart G – Signs, Signals, and Barricades
- MUTCD – Manual on Uniform Traffic Control Devices
- ANSI Z535 – Safety Signs and Colors

25.0 Steel Erection

Purpose

This section establishes requirements for steel erection activities in compliance with OSHA 29 CFR 1926 Subpart R.

Responsibility

- **Contractors** must plan and perform steel erection activities safely.
- **Supervisors** must ensure all steel erection operations follow OSHA and site-specific requirements.

- **Employees** must use proper fall protection and follow safe work practices at all times.

General Requirements

- A **Steel Erection Plan** must be developed and implemented before work begins.
- Site layout must include controlled access zones, hoisting areas, and fall protection systems.
- All equipment must be inspected before use, and defective equipment removed from service.
- Only trained and qualified workers may perform steel erection tasks.

Fall Protection

- Fall protection is required for employees working at heights of 15 feet or more.
- Connectors and employees working on steel structures must use personal fall arrest systems, positioning devices, or fall restraint systems.
- Safety nets may be used where other systems are infeasible.
- Controlled Decking Zones (CDZs) must be clearly designated and meet OSHA requirements.

Hoisting and Rigging

- Cranes, rigging, and hoisting procedures must comply with OSHA 29 CFR 1926 Subpart CC and Section 13.0 of this plan.
- Loads must not be released until members are secured with at least two bolts per connection and drawn up wrench-tight.
- Multiple lift rigging (Christmas treeing) may only be performed under OSHA-approved conditions and by qualified personnel.

Structural Stability

- Stability of structures must be maintained during erection at all times.
- Erection bridging for open web steel joists must be installed as required before allowing loads on the joists.
- Plumbing-up equipment must be installed and used as specified in the erection plan.

Decking Operations

- Metal decking must be laid tightly and secured immediately to prevent movement.
- Workers must not ride on bundles of decking being hoisted.
- CDZs for decking must be clearly marked and controlled.
- CDZs must comply with OSHA 29 CFR 1926 Subpart R, Appendix D

Training

Employees involved in steel erection must be trained in:

- Fall protection and controlled decking zone procedures
- Hoisting, rigging, and connection requirements
- Hazard recognition specific to steel erection
- Safe climbing and access methods

References

- OSHA 29 CFR 1926 Subpart R – Steel Erection
- OSHA 29 CFR 1926 Subpart CC – Cranes and Derricks in Construction

26.0 Tools

Purpose

This section establishes requirements for the safe use of tools in compliance with OSHA 29 CFR 1926 Subpart I.

Responsibility

- **Contractors** must provide safe tools and ensure they are maintained in good condition.
- **Supervisors** must verify inspections, enforce proper use, and remove unsafe tools from service.
- **Employees** must inspect tools before use and operate them safely.

General Requirements

- Tools must be used only for their intended purpose.
- Damaged or defective tools must be tagged “Do Not Use” and removed from service immediately.
- Tools must not be modified in ways that compromise safety.
- Proper PPE (e.g., safety glasses, gloves, hearing protection) must be worn when using tools.

Hand Tools

- Cutting tools must be kept sharp and clean.
- Handles must be free of cracks, splinters, or looseness.
- Striking tools must be maintained free of mushroomed heads.
- Wrenches must not be used with cheater bars or other unauthorized extensions.

Power Tools

- Power tools must be grounded or double-insulated.
- Guards and safety devices must remain in place and functional.
- Tools must be disconnected when changing blades, bits, or attachments.
- Power cords must be inspected regularly; damaged cords must be removed from service.
- Tools must not be carried by their cords or hoses.

Pneumatic and Hydraulic Tools

- Hoses must be secured with safety clips or retainers.
- Pressure must be relieved before disconnecting hoses or fittings.
- Hydraulic fluid leaks must be repaired before use.

Powder-Actuated Tools

- Only trained, authorized personnel may operate powder-actuated tools.
- Tools must be inspected before use to ensure safety features are functional.
- Tools must not be loaded until immediately before use.
- Firing into hard or brittle materials (cast iron, glass, glazed tile, rock) is prohibited.

Storage and Transport

- Tools must be stored in designated areas when not in use.
- Sharp tools must be sheathed or stored to prevent accidental injury.
- Tools must be transported in containers, not carried in pockets.

Training

Employees must be trained on:

- Safe tool operation and limitations
- Inspection and maintenance requirements
- Hazards associated with hand and power tools
- Proper use of PPE during tool operation

References

- OSHA 29 CFR 1926 Subpart I – Tools – Hand and Power
- ANSI/ASSE standards relevant to specific tool types

27.0 Toxic and Hazardous Substances

Purpose

OSHA 1926, Subpart Z establishes construction-industry requirements for protecting workers from exposure to specific toxic substances and carcinogens. It contains substance-specific standards rather than one general rule covering every hazardous chemical.

Responsibilities

- **Contractors** must protect employees working in or near these hazardous substances.
- **Competent Persons** must inspect and evaluate these areas prior to working in or around toxic or hazardous substances.
- **Employees** must follow safe practices and immediately report unsafe conditions.

Major substances addressed include:

- Asbestos
- Vinyl chloride
- Inorganic arsenic
- Beryllium
- Hexavalent chromium
- Cadmium
- Benzene
- Acrylonitrile
- Ethylene oxide
- Formaldehyde
- Methylene chloride
- Respirable crystalline silica
- Several highly hazardous carcinogens

Depending on the substance and exposure level, contractors may be required to:

- Evaluate and monitor employee exposure.
- Comply with permissible exposure limits and action levels.
- Indoor Air Quality must be monitored
- Establish regulated or controlled areas.
- Use engineering and work-practice controls.
- Provide respirators and other personal protective equipment.
- Implement hygiene and housekeeping procedures.
- Train employees about hazards and protective measures.
- Provide medical surveillance.
- Post warning signs and maintain exposure and medical records.

A key principle is that engineering controls—such as ventilation, isolation, wet methods, and dust collection may be used.

It is important to note that some related construction requirements, including lead, hazard communication, and general limits for gases, vapors, fumes, dust, and mists, are in **OSHA 1926 Subpart D**, not Subpart Z.

References

- OSHA 1926 Subpart D
- OSHA 1926 Subpart Z
- ACGIH TLVs and BEIs
- Exhibit - Silica Exposure Control Methods for Construction Activities – Forms Section

28.0 Trenching and Excavation

Purpose

This section establishes requirements for trenching and excavation work in compliance with OSHA 29 CFR 1926 Subpart P.

ORNL has specific guidelines and a permitting process around Excavations and Penetrations. All contractors must follow these guidelines. Refer to contract document Specification 01 01 00 (General Work Requirements, Section 3.3 for specifics required). This includes location of underground or subsurface utilities.

Responsibility

- **Contractors** must protect employees working in or near excavations.
- **Competent Persons** must inspect excavations and protective systems daily and after hazard-increasing events.
- **Employees** must follow safe practices and immediately report unsafe conditions.

General Requirements

- Contractor shall utilize Tennessee One Call services in accordance with state law to manage protection of non-company utilities at ORNL.
- Protection of underground subsurface installations from damage or displacement.
- The excavation permit and requirements to utilize Tennessee One Call shall be referenced in the AHA and be available at the work site.
- A competent person must classify soil and determine protective measures before work begins.
- Protective systems (sloping, shoring, shielding, trench boxes) are required for excavations deeper than 5 feet unless the excavation is entirely in stable rock.

- Excavations greater than 20 feet must have protective systems designed by a registered professional engineer.
- Daily inspections must address stability, water accumulation, weather effects, and adjacent structures.

Access and Egress

- Ladders, ramps, or stairs must be provided for trenches 4 feet or more in depth.
- Means of egress must be located within 25 feet of all workers.

Hazard Controls

- Spoil piles, materials, and equipment must be kept at least 2 feet from the excavation edge.
- Barricades, warning signs, or guardrails must be used when excavations are not readily visible.
- Excavations below the water table require dewatering systems or other protective measures.
- Adjacent structures must be supported or shielded to prevent collapse.

Atmospheric Testing

- Excavations greater than 4 feet deep must be tested for hazardous atmospheres where oxygen deficiency or toxic gases may be present.
- Continuous monitoring is required when controls are in place to prevent accumulation of hazardous atmospheres.

Fall Protection

- Excavations with edges 6 feet or more above a lower level must have guardrails or fall protection.

Training

Employees must be trained on:

- Recognizing trenching and excavation hazards
- Protective systems and safe entry/exit methods
- Emergency procedures for cave-ins, flooding, or hazardous atmospheres

References

- OSHA 29 CFR 1926 Subpart P – Excavations
- OSHA 29 CFR 1926.651 – Specific Excavation Requirements
- OSHA 29 CFR 1926.652 – Protective Systems
- Division Spec. 01 01 00 - General Work Requirements, Section 3.3

29.0 Walking and Working Surfaces

Purpose

This section establishes requirements for safe walking and working surfaces in compliance with OSHA 29 CFR 1926 Subpart M and Subpart X.

Responsibility

- **Contractors** must provide and maintain safe walking and working surfaces.
- **Supervisors** must ensure surfaces are inspected, hazards are corrected, and fall protection is provided where required.
- **Employees** must use safe access routes and report unsafe conditions immediately.

General Requirements

- Surfaces must be kept clear of debris, spills, snow, ice, and other hazards.
- Open holes, floor openings, and skylights must be protected by covers, guardrails, or fall protection systems.
- Covers must support at least twice the maximum intended load, be secured against displacement, and be clearly marked “HOLE” or “COVER.”
- Elevated walkways and platforms must have guardrails when 6 feet or more above a lower level.
- Stairways must have handrails and be illuminated for safe passage.

Safe Work Practices

- Employees must not run, jump, or engage in horseplay on walking or working surfaces.
- Slippery conditions must be corrected immediately with sand, mats, absorbents, or other methods.
- Materials and equipment must be stored in ways that do not block access routes or create tripping hazards.
- Ladders and scaffolds must be used for elevated access—improvised climbing methods are prohibited.

Training

Employees must be trained on:

- Recognizing hazards associated with walking and working surfaces
- Proper use of protective systems (guardrails, covers, fall protection)
- Safe practices for access and egress
- Reporting and correcting hazards

References

- OSHA 29 CFR 1926 Subpart M – Fall Protection
- OSHA 29 CFR 1926 Subpart X – Stairways and Ladders
- OSHA 29 CFR 1910 Subpart D – Walking-Working Surfaces

30.0 Welding and Cutting

Purpose

This section establishes requirements for safe welding and cutting operations in compliance with OSHA 29 CFR 1926 Subpart J.

Responsibility

- **Contractors** must provide safe equipment, maintain it properly, and enforce welding and cutting safety practices.
- **Supervisors** must ensure permits, fire prevention, and worker training are in place.
- **Employees** must follow procedures, wear proper PPE, and stop work if unsafe conditions exist.

General Requirements

- Welding and cutting must comply with the contractors own issued **Hot Work Permit** unless performed in designated welding areas.
- Fire hazards must be removed or effectively protected before starting work.
- Adequate ventilation must be provided to control fumes, gases, and particulates.
- Welding screens or shields must be used to protect nearby workers from arc flash and sparks.

Fire Prevention

- A fire extinguisher must be available within immediate reach of the work area.
- A trained **fire watch** must be posted whenever combustibles are within 35 feet or when sparks could pass through openings.
- Fire watches must remain at least 30 minutes after completion of hot work, or longer if conditions require.
- Welding or cutting near flammable atmospheres is prohibited.

Personal Protective Equipment (PPE)

- Welders must wear flame-resistant clothing, welding helmets with appropriate filter lenses, gloves, and safety footwear.

- Helpers and nearby workers must wear eye protection with side shields or flash goggles.
- Respiratory protection must be provided where ventilation is inadequate per ACGIH TLV's.
- Hearing protection must be used where noise levels exceed permissible limits.

Equipment Safety

- Gas cylinders must be stored upright, secured, and capped when not in use.
- Oxygen cylinders must be kept at least 20 feet from fuel gas cylinders unless separated by a fire-resistant barrier.
- Hoses, regulators, and torches must be inspected daily. Damage or leaking equipment must be removed from service immediately.
- Arc welding leads must be insulated, protected from damage, and inspected regularly.

Confined Spaces

- Welding and cutting in confined spaces requires continuous ventilation and monitoring.
- A confined space permit must be obtained in addition to the hot work permit.
- An attendant must be stationed outside the space at all times.

Training

Workers performing welding and cutting must be trained in:

- Fire prevention and hot work permits
- Proper equipment use and maintenance
- Hazards of fumes, gases, and arc flash
- PPE requirements and safe practices
- Emergency procedures

References

- OSHA 29 CFR 1926 Subpart J – Welding and Cutting
- NFPA 51B – Fire Prevention During Welding, Cutting, and Other Hot Work
- ANSI Z49.1 – Safety in Welding, Cutting, and Allied Processes
- OSHA 29 CFR 1910.1200 Hazardous Communication
- OSHA 29 CFR 1926. 59 Hazardous Communication
- OSHA 29 CFR Subpart Z – Toxic and Hazardous Substances
- ACGIH TLVs and BEIs

31.0 Work in Elevated Areas

Duty to have overhead protection

Purpose

This section establishes requirements for safe work performed at elevations, in compliance with OSHA 29 CFR 1926 Subpart M and related standards.

Responsibility

- **Contractors** must plan and control elevated work to prevent falls and falling-object hazards.
- **Supervisors** must ensure fall protection systems are provided, inspected, and used.
- **Employees** must use fall protection properly and follow safe access procedures.

General Requirements

- Fall protection is required when employees are exposed to falls of 6 feet or more to a lower level.
- Work areas must be inspected daily for structural integrity and potential fall hazards.
- Open edges, floor openings, and platforms must be protected by guardrails, covers, or personal fall arrest systems.
- Tools and materials must be secured to prevent falling.

Access and Egress

- Safe access to elevated areas must be provided using ladders, scaffolds, stair towers, or aerial lifts.
- Improvised climbing methods (e.g., using structural members) are prohibited.
- Access routes must remain free of obstruction and properly illuminated.

Fall Protection Systems

- Acceptable systems include guardrails, safety nets, fall restraint, and personal fall arrest systems (PFAS).
- Anchor points must support at least 5,000 pounds per worker or meet OSHA criteria for engineered systems.
- Workers must be tied off 100% of the time when exposed to fall hazards.
- Equipment must be inspected before each use; defective gear must be removed from service immediately.

Safe Work Practices

- Employees must maintain three points of contact when climbing.
- Materials must be hoisted using mechanical means, not carried while climbing.
- Elevated work must stop during high winds, storms, or other unsafe weather conditions.
- Workers must not lean over edges or work outside guardrails without fall protection.

Training

Employees must be trained on:

- Hazard recognition in elevated areas
- Proper use of fall protection equipment
- Inspection and maintenance of PFAS
- Emergency response and rescue procedures

References

- OSHA 29 CFR 1926 Subpart M – Fall Protection
- OSHA 29 CFR 1926 Subpart X – Stairways and Ladders
- ANSI Z359 – Fall Protection Code

32.0 Work Permits

Purpose

This section establishes requirements for Contractor's own work permits to control hazardous activities and ensure coordination between contractors, subcontractors, and ORNL personnel.

Responsibility

- **Contractors** must obtain all required permits before beginning work.
- **Supervisors** must verify permits are completed, posted, and followed.
- **Employees** must comply with permit conditions and stop work if unsafe conditions arise.

General Requirements

- Permits must identify the scope of work, hazards, controls, and responsible personnel.
- Work must not begin until the permit is reviewed, signed, and posted at the job site.

- Permits must remain valid only for the specified time, scope, and conditions.
- Work must stop, and permits are reissued, if site conditions change or new hazards are introduced.

Types of Permits

Common permits include, but are not limited to:

- **Hot Work Permit** – required for welding, cutting, grinding, or other spark-producing activities.
- **Confined Space Entry Permit** – required for entry into permit-required confined spaces (see Section 5.0).
- **Electrical Energized Work Permit (EEWP)** – required for justified energized electrical work (see Section 9.0).
- **Excavation/Trenching Permit** – required for trenching and excavation operations (see Section 28.0).
- **Lockout/Tagout (LOTO) Permit** – required for controlling hazardous energy (see Section 7.0).
- **Radiological Work Permit (RWP)** – required for work in radiological areas.
- **Other Project-Specific Permits** – as determined by ORNL or regulatory requirements.

Posting and Documentation

- Permits must be posted at the work location or otherwise made immediately available to workers.
- Completed permits must be retained as project records in accordance with ORNL and DOE requirements.

Training

Employees must be trained to:

- Recognize when a permit is required
- Understand the conditions and limitations of permits
- Follow safe practices specified in permits
- Stop work if permit conditions are not maintained

References

- OSHA 29 CFR 1926 (multiple subparts depending on work type)
- NFPA 51B – Hot Work Permits
- DOE 10 CFR 851 – Worker Safety and Health Program

33.0 Worksite Analysis

Purpose

This section establishes requirements for evaluating worksites to identify, assess, and control hazards before and during construction activities.

Responsibility

- **Contractors** must conduct systematic analyses of worksites to identify hazards and implement corrective actions.
- **Supervisors** must ensure hazard assessments are completed and integrated into daily operations.
- **Employees** must participate in hazard recognition and immediately report unsafe conditions.

General Requirements

- Worksite analyses must be performed during project planning and updated as conditions change.
- Activity Hazard Analyses (AHAs) must be prepared for each major task, outlining hazards, controls, and responsible personnel.
- Pre-task safety briefings must be conducted daily to review hazards and mitigation strategies.
- Hazard analyses must consider environmental, chemical, physical, biological, and ergonomic risks.
- Inspections must be conducted regularly by competent persons to identify new or recurring hazards.

Hazard Controls

- Engineering and administrative controls must be applied to eliminate or reduce risks.
- Personal protective equipment (PPE) must be provided when hazards cannot be fully controlled by other means.
- Corrective actions must be documented and tracked until hazards are resolved.

Continuous Improvement

- Incident reports, near misses, and inspection results must be reviewed to identify trends and recurring issues.
- Lessons learned must be communicated to workers and incorporated into updated safety practices.
- Employees must be encouraged to raise safety concerns without fear of reprisal.

Training

All employees must be trained to:

- Recognize and report hazards
- Participate in pre-task briefings and hazard analyses
- Follow safe work practices and corrective measures
- Use PPE and engineering controls effectively

References

- OSHA 29 CFR 1926.20 – General Safety and Health Provisions
- DOE 10 CFR 851 – Worker Safety and Health Program

34.0 Work Planning and Control

Purpose

This section establishes requirements for planning and controlling construction activities to ensure hazards are identified, controls are implemented, and work is performed safely.

Responsibility

- **Contractors** must integrate safety into all phases of work planning and execution.
- **Supervisors** must ensure job hazard analyses, permits, and control measures are completed before work begins.
- **Employees** must participate in planning activities, follow established procedures, and stop work if unsafe conditions arise.

General Requirements

- All work must be planned and reviewed before execution. The level of planning must be appropriate to the scope, complexity, and hazards of the work.
- Job-specific Activity Hazard Analyses (AHAs) must be developed for major tasks and reviewed with workers before starting.
- Work requiring permits (e.g., hot work, confined space, electrical) must comply with the applicable sections of this plan.
- Plans must address sequencing of activities, equipment use, and coordination between multiple contractors.

Hazard Identification and Control

- Hazards must be identified during the planning phase and reevaluated if work conditions change.

- Engineering controls, administrative controls, and personal protective equipment (PPE) must be applied as necessary.
- Controls must be documented in AHAs, permits, or other planning documents.

Pre-Task Briefings

- Supervisors must conduct daily pre-task briefings with employees.
- Briefings must cover scope of work, hazards, control measures, PPE requirements, and emergency procedures.
- Employees must be encouraged to raise questions and stop work if conditions are unclear or unsafe.

Change Management

- When unexpected hazards arise or scope changes occur, work must stop until hazards are reassessed and controls updated.
- Revised plans and permits must be communicated to all affected personnel before work resumes.

Continuous Improvement

- Work planning and control practices must be reviewed periodically for effectiveness.
- Lessons learned from incidents, near misses, and inspections must be incorporated into future planning.
- Worker feedback must be used to strengthen planning processes and controls.

References

- OSHA 29 CFR 1926.20 – General Safety and Health Provisions
- DOE 10 CFR 851 – Worker Safety and Health Program
- ORNL Integrated Safety Management System (ISMS)

35.0 References

The following standards, regulations, and guidelines form the basis of this Contractor Safety and Health Plan (CSHP):

ORNL Contract Documents

- Section 01 11 00 – Safety and Health
- Section 01 01 00 – General Work Requirements

U.S. Department of Energy (DOE)

- 10 CFR 851 – Worker Safety and Health Program
- DOE Order 231.1B – Environment, Safety and Health Reporting
- DOE-STD-1090-2020 Hoisting and Rigging

Occupational Safety and Health Administration (OSHA)

- 29 CFR 1910 – Occupational Safety and Health Standards
- 29 CFR 1926 – Safety and Health Regulations for Construction
 - Subpart C – General Safety and Health Provisions
 - Subpart D – Occupational Health and Environmental Controls
 - Subpart E – Personal Protective and Life Saving Equipment
 - Subpart G – Signs, Signals, and Barricades
 - Subpart I – Tools – Hand and Power
 - Subpart J – Welding and Cutting
 - Subpart K – Electrical
 - Subpart L – Scaffolds
 - Subpart M – Fall Protection
 - Subpart N – Material Handling, Storage, Use, and Disposal
 - Subpart O – Motor Vehicles, Mechanized Equipment, and Marine Operations
 - Subpart P – Excavations
 - Subpart R – Steel Erection
 - Subpart T – Demolition
 - Subpart X – Stairways and Ladders
 - Subpart Z – Toxic and Hazardous Substances
 - Additional applicable subparts based on specific work activities

National Fire Protection Association (NFPA)

- NFPA 51B – Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
- NFPA 70 – National Electrical Code (NEC)
- NFPA 70E – Standard for Electrical Safety in the Workplace

- NFPA 241 – Standard for Safeguarding Construction, Alteration, and Demolition Operations

American National Standards Institute (ANSI)

- ANSI Z87.1 – Eye and Face Protection
- ANSI Z89.1 – Industrial Head Protection
- ANSI Z359 – Fall Protection Code
- ANSI A14 – Ladder Safety Requirements
- ANSI/ASME B30 – Hoisting and Rigging Standards
- ANSI/ITSDF B56.1 – Safety Standard for Low Lift and High Lift Trucks
- ANSI/ISEA 107 – High-Visibility Safety Apparel
- ANSI Z535 – Safety Signs and Colors

Other Guidance

- ACGIH Threshold Limit Values (TLVs) – Ergonomics and Chemical Exposure
- Manual on Uniform Traffic Control Devices (MUTCD)

36.0 Forms and Exhibits

1. Injury Reporting form 5484 (08-2025) – page 57
2. Activity Hazard Analysis (AHA) Example – pages 60-69
3. Exhibit – Silica Exposure Control Methods for Construction Activities – page 70

Injury reporting form – 5484 (08-2025)

Medical treatment (if any) and Medical Restrictions (if any) should be transmitted by separate e-mail to: mullerbm@ornl.gov

Organization Information			
Name of Organization:		Case Number/Multi-Case Number:	
Program Office:		Department/Division/ID Code:	
Investigation Type: ☐ A ☐ B ☐ C			
Employee Information			
Name (First M Last):	Hire Date (mm/dd/yyyy):	Date of Birth (mm/dd/yyyy):	Gender: ☐ Male ☐ Female
Home Address (Street, City, State, Zip) :			
Job Title/Occupation:	Length of Employment: ☐ less than 3 months ☐ 3-12 months ☐ over 12 months	Experience on job/equipment: ☐ less than 3 months ☐ 3-12 months ☐ over 12 months	
Health Care Information			
Name of Health Care Professional:		Emergency Room treatment: ☐ Yes ☐ No	
Treatment Location:		Hospitalized Overnight? ☐ Yes ☐ No	
Case Information			
Date of Injury/illness (mm/dd/yy):	Time of Event: (military): ☐ Unknown	Time employee began work (military): ☐ Unknown	
Accident place: ☐ Indoors ☐ Outdoors	Specific location:	On employer's premises: ☐ Yes ☐ No	
# of Days away from work:	Permanent transfer due to disability: ☐ Yes ☐ No	Is the case closed? ☐ Yes ☐ No	
# of Days of job transfer or restriction:	Terminated due to disability: ☐ Yes ☐ No		
Fatal Injury/Illness: ☐ Yes ☐ No	Date of Death (mm/dd/yyyy):		
OSHA Injury/Illness Classification: ☐ Injury ☐ Skin Disorder ☐ Respiratory condition ☐ Poisoning ☐ Hearing loss ☐ All other illnesses			
NARRATIVE GUIDE			
DO NOT INCLUDE THE NAME (OR OTHER PERSONAL IDENTIFIER) OF THE EMPLOYEE/OPERATOR OR WITNESS IN THIS SECTION. Use third person references, e.g., he slipped on the wet floor and broke his right toe.			
ACTIVITY DESCRIPTION: Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific. Examples: "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."			
EVENT: What happened? Tell us how the injury occurred. Examples: "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."			

NATURE of Injury/Illness: What was the injury or illness? Tell us the part of body that was affected and how it was affected; be more specific than "hurt," "pain," or "sore." Examples: "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."	
OBJECT: What object or substance directly harmed the employee? Examples: "concrete floor"; "chlorine"; "radial arm saw." If this question does not apply to the incident, leave it blank.	
PART(S) OF BODY AFFECTED:	
PERSONAL PROTECTIVE EQUIPMENT BEING USED: ☐ Safety Glasses ☐ Gloves ☐ Safety Shoes ☐ Respirator ☐ Other (specify)	
Accident Causes <u>Directly</u> Related to: ☐ Weather ☐ Procedure ☐ Other	☐ Design/Material ☐ Employee ☐ Unspecified
Accident Causes <u>Indirectly</u> Related to: ☐ Weather ☐ Procedure ☐ Other	☐ Design/Material ☐ Employee ☐ Unspecified
Accident Causes	
Conditions at the time of incident:	
Employee Actions:	
Factors Influencing:	
Corrective Actions	
Actions taken:	
Actions recommended:	
Supervisor responsible for Corrective Action & Phone:	
Completion Date (mm/dd/yy):	
Name & Phone of person who completed the form:	
Date (mm/dd/yy):	
Accident Investigation Contact & Phone (if different from the person who completed the form:	
Date (mm/dd/yy):	



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Subcontractor Name:
General Superintendent:

ORNL CFR:
ORNL HSE:
Site Project Manager:

Subcontractor Activity Hazard Analysis (AHA)

Activity	Hazard	Controls
Jobsite Evacuation / Emergency Action Plan		
Severe Weather Event (Lightning, Tornado) Emergency Event (Fire, Explosion)	- Severe Weather - Fire, Explosion - Lightning strike	- Follow >COMPANY NAME< >PROJECT NAME< Emergency Action Plan signals to "Shelter inside" OR Assembly Area - Follow ORNL Emergency Notification System (ENS) instructions to "Shelter <u>in</u> Place" OR - Report to the designated "Assembly Area" – _____ - ALL Supervisor(s) Conduct "<u>Head-count</u>". Report results to >COMPANY NAME< Project Manager - Do NOT leave. Remain assembled. Follow instructions given - Upon discovery of a fire / explosion, notify LSS immediately at 865.574.6606. Notify TPO, notify supervisor as soon as possible - NO Outside work when Closest Lightning strike is within 10-miles. See immediate shelter inside Building >BLDG #< or the Break Trailer - Supervisors will monitor LSS Text Alerts, WeatherBug APP, and/or Lightning APP for severe weather alert notifications.
Environmental Concerns		
Weather / Temperature Extremes	- Cold stress - Ice, Snow, - Mud - Wind - Heat stress	- Dress in layers of weather relevant clothing, wear appropriate hand protection - If clothing becomes wet, put on dry clothing - Take breaks in warm locations (Break Trailer) as needed - Take breaks in cool locations (Break Trailer) as needed - Monitor self and others – use the Buddy System to maintain awareness - Watch footing / plan path of travel to avoid icy areas - Keep area below trailer stairs free & clear of debris, mud - Clean work shoes, boots before entering trailers - Drink sufficient fluids (cool water provided) throughout the shift - Personnel will be briefed on signs and symptoms of heat stress



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
		- Use the buddy system and visually monitor each other for signs and symptoms of heat illness – flush color, excessive sweating, lack of sweating, confusion, dizziness, unconscious – Notify Supervisor if any signs of heat stress are detected. - Monitor WBGT readings from: - Implement Work/Rest regimen per
Change of Conditions	- Miscommunications - Near Misses/accidents/injuries	If conditions are not as expected, PAUSE WORK, contact the supervisor, and avoid the area until adequate controls are in place to safely proceed
Security	- Emergencies - Identification	- Obey all instructions from LSS, or ORNL security personnel <u>Wear ID badge on the outside of clothing and visible at all times.</u>
Illumination / Limited Visibility	Inadequate	- Work area illumination shall meet general construction lighting requirement – <u>5 foot</u> candles in the work area - Provide additional lighting (portable lighting) where needed:
Biological Hazards - Wildlife - Insects	Allergic reaction to plants/sings/bites	- All personnel will remain alert for the presence of biological hazards such as spiders, fire ants, snakes, mice, skunks, raccoons, groundhogs, or other biting/stinging insects - Notify your supervisor of any allergies to insect bites or stings - Inspect all dark areas for spiders/animals before entering or placing hands in those areas – use a pole/long handle tool to check – underneath mobile office trailers, around stored/stacked material, tool van, Porta Johns
Noise Hazards	- High noise areas - Loud equipment, tools	- Tools producing noise at 85 dBA or above require user to wear hearing protection (<u>ear muffs</u> / ear plugs). Others working in proximity shall wear hearing protection also. - Wear hearing protection when entering posted as “Hearing Protection Required” - Rule of thumb – If you must “Shout to be heard” at a 3-foot distance, hearing protection is required.
Accessing Worksite / Transiting Worksite		
Walk to Work Area - Parking lot to jobsite - Jobsite to work area	- Slip hazards -puddles of water, mud, oil, etc. - Trip hazards from uneven ground, hoses/cords, etc. - Struck by vehicle(s), forklifts, etc.	- Survey <u>walk</u> path / watch where you are walking, watch for wildlife – snakes, etc. - Use Crosswalk(s) to cross the street from parking lot - Do NOT cross Danger (RED) Tape or Caution (YELLOW) Tape – use designated Gate(s) - Avoid uneven ground and holes / excavations, etc. - Step around the puddles, not through them - Step over or around hoses or cords - Do NOT walk between stored / staged / stacked material - Pay attention to the vehicle and forklift traffic in the area - Make eye contact with the operator to make sure that they see you, maintain visual - If unable to make eye contact, step off to the side of the road and let them pass



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
		- Wear Hi-Visibility reflective (safety) vest - Porta-lets and handwashing stations are located on the jobsite - Identify first aid kit / eye wash station location at start of shift - Identify / Locate safety shelters and assembly areas in case of an emergency
Slips, Trips, and Falls	- Fall to same level or below - Improper footwear - Uneven ground, loose gravel - Obstructions impeding setup of equipment /staging areas - Falls from heights - Dropping of tools or materials - Open holes in floors, walls, ceilings, roof	- Assure proper footing when walking, standing, or working around designated areas of job site. - Ensure boots are free of oils, greases, mud. - Be alert for uneven terrain, loose gravel, wet surfaces, holes and openings in walking/working surfaces, and materials in walk path. - Set up sanitary or other waste storage and equipment staging areas in designated locations with a minimal number of obstructions. - Tripping hazards will be identified and remediated by implementing good housekeeping practices. - Place materials, tools, etc., in areas that will not cause tripping hazards. - Electrical cords elevated or positioned in a manner that keep them out of pathways. - Wear proper fall protection when working above 6'. - Workers should be trained on how to wear fall protection and attach to proper anchorage points. - Cover any openings with materials such as plywood. Plywood should be cleated and secured as to not slide. Place a sign to alert others "OPEN HOLE". - Protect workers from falling through any holes in walls with protective barriers capable of withstanding 200 lbs force.
Hand/Body Injuries	- Pinch points - Sharp edges - Abrasions/cuts/lacerations	- Be alert for areas that body parts can get caught between. - Leather or equivalent work gloves will be worn when working around pinch points or sharp edges. - Cut resistant gloves are required for involving the handling of materials with sharp edges or wooden materials. - Be alert for nails, splinters, metal slivers, and sharp edges. - Remove or bend nails/screws to avoid abrasions or lacerations. - Use the proper tools for the job.
Ergonomic Concerns	- Potential back injury - Muscle strains/sprains - Incorrect lifting of loads - Improper body positioning	- Personnel will be provided with adequate assistance in the form of additional - Personnel or mechanical lifting device to handle objects over 50 lbs. - Where body position cannot be well controlled or repetitive lifting occurs (4-5 lifts per minute for 2 hours or more per day), this may not be adequately protective to



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
	Improper negotiating of physical obstacles	- prevent injury and a lower weight threshold should be used to determine when assistance is needed. - Use mechanical material handling equipment only for items exceeding 100 lbs. - Avoid twisting of torso and over-extension of arms. - Ensure sound footing prior to lifting. - Avoid awkward or restricted work positions. - Bend at the hips and not at the waist. - Squat/stoop and lift with the legs. - If possible, push items/objects instead of pulling. - Know and be aware of personal limitations.
Chemical Exposure / Fire / Spills		
HazCom Chemical Exposure	- Inhalation, absorption, ingestion - Eye-contact, skin contact	- All chemical products used on site must have Safety Data Sheets readily available on-site - All exposed employees will be trained on the hazards and controls in the SDS - All containers of hazardous materials shall be appropriately marked / labeled - Appropriate PPE shall be utilized when working with chemicals when specified in the SDS - Hand protection (Gloves) / Arm & skin protection (Long sleeves / apron) / eye protection (splash proof goggles), respirator - Signs / caution tape will be posted to warn people to stay out of the work area
Spills / Loss of Containment	- Improper storage - Damage to container	- Upon discovery of a spill – notify LSS immediately at 865.574.6606. Notify TPO also - If safe to do so – Contain spill, isolated work area, warn others. Call supervisor and avoid area until material is identified and adequate controls are in place to proceed safely - Properly store all materials inside containment when not in use - Workers shall know the location of the jobsite spill kit.
Fire / Explosion (Flammable gases & liquids)	- Improper labeling - Improper storage	- Upon discovery of a fire / explosion, notify LSS immediately at 865.574.6606. Notify TPO, notify supervisor as soon as possible - Locate & maintain ABC Fire extinguisher within 30-feet of flammable storage cabinets and within 50 feet of refueling area. - Locate & maintain ABC fire extinguisher within 100-feet travel distance in protected area and jobsite - Inspect fire extinguishers monthly – fully charged (green), pin in place, secured, hose and parts present and functioning - Smoking and vaping are permitted only in designated areas - Spill kit shall be available in the immediate vicinity. - Store flammable liquids in an approved, metal safety can with safety cap and flash screen



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
Forklift – General Use		
Forklift (LULL/Class VII, III, IV)	- Equipment Failure - Struck-by / Caught in-between	- Inspect forklift daily/before each shift. Document inspection on: _____ - Report any leaks, spills, inoperable Safety devices, etc. to supervisor immediately - Authorized forklift operator only (Operating Engineer) – Qualified on the specific type of forklift (Class VII, Class III, Class IV, etc.) Training/certification current (within 3 years) - Wear seatbelt at all times while operating forklift
Material Handling Dumping into debris box	Falling objects / Unstable load	- Inspect load before making the “pick”, ensure load is properly secured to pallet, etc. - NO Free-rigging off forks or carriage, utilize proper attachment (Truss Boom, picking eye, etc.) compatible with the model/type of forklift – to include proper load chart for device - Inspect rigging (slings, shackles, etc.) before use. If damaged, Red Tag & remove from service - Utilize spotter when transiting congested areas, for blind picks, awkward loads (size, configuration) - Do not leave forklift <u>running while</u> unattended, remain within 25-<u>feet</u> - Do not leave load raised, lower to ground - Secure skip box to forklift using shackles/rigging to secure box
Refueling, lubricating, Forklift - Fuel can - Fuel transfer cell (in Pick-up truck)	- Fuel Spill, chemical exposure, Fire - Struck-by, caught in between	- Refuel in designated area – away from workers, stored material, etc. - NO Smoking – utilized designated smoking area - Spill kit and Fire Extinguisher located in designated refueling area - Turn off Forklift before refueling - Inspect Fuel Can for serviceability prior to fueling equipment - Using Fuel transfer cell, follow manufacturer requirements RE: grounding, etc. - Clean up any/all spills promptly – dispose of contaminated pads in spill kit - Operator lubricates forklift IAW operator manual – Mechanic performs maintenance
Moving off Site	- Struck-by - Pedestrians / Vehicles	- Use 2 spotters for Traffic control / Stop-Slow paddles for exiting / entering jobsite - STOP pedestrians / traffic for forklift movement or STOP Forklift to allow pedestrians / vehicles to pass by
Ladder Use (General)		
Extension Ladder – General	- Falling - Equipment failure	- Inspect ladder before using / remove from service if rungs and rails are bent, damaged, labels missing or illegible, missing rope, hardware, damaged or missing feet - Set up ladder on solid, level surface / set-up at a 4:1 slope ratio, height over distance - Extend at least <u>3-feet</u> above the landing / secure ladder at the top to prevent displacement or collapse when mounting / dismounting the ladder - Keep belt buckle between the ladder rails – do not <u>over extend</u> / <u>over reach</u> - Do not exceed ladder capacity (Type I or IA ladders only)



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
		• Maintain 3 points of contact while climbing • Use a rope to raise or <u>lower tools</u> / material to the next level • Keep area at ladder base free and clear of material, debris, obstructions, etc. • Work Facing the ladder – do Not stand backwards or outside the rails –body position must remain within the plane of the ladder rails at all times for stability
Step Ladder - General	• Falling • Equipment failure	• Inspect ladder before using / remove from service if rungs and rails are bent, damaged, labels missing or illegible, missing hardware, bent spreader bar(s), missing feet • Set up ladder on solid, level surface – do NOT lean against a wall or surface • Open ladder fully, lock spreader bars into place • Do not exceed ladder capacity (Type I or IA ladders only) • Keep belt buckle between the rails – do not <u>over extend</u> / <u>over reach</u> • Maintain 3 points of contact while climbing • Do NOT stand on the top step or top cap – go get a <u>Taller</u> ladder instead • No work requiring <u>lifting of</u> heavy materials or substantial exertion shall be done from ladders • Keep area at ladder base free and clear of material, debris, obstructions, etc. • Work Facing the ladder – do Not stand backwards or outside the rails –body position must remain within the plane of the ladder rails at all times for stability
Aerial Lift Use (General)		
Aerial Boom Lift use	• Equipment failure • Struck by • Falling • Overhead obstructions	• Inspect boom lift upon arrival and daily. Document daily inspections on inspection form • Trained, authorized personnel operating equipment. Verify operator's card current • Do not overload basket/exceed basket capacity, keep both feet on the basket floor • Review work area PRIOR to raising lift / watch for overhead obstructions • Keep a minimum of 10-<u>feet</u> away from overhead power lines • Utilize spotter(s) to position/reposition aerial lift – verify path is clear of obstacles • Barricade work area below when working Inside >BLDG #< • All occupants wear PFAS at all times while operating equipment
Scissors Lift Use	• Equipment failure • Struck by • Falling • Overhead obstructions	• Inspect scissors lift upon arrival and daily. Document daily inspections on: • Trained, authorized personnel operating equipment. Verify operator's card current • Do not overload basket/exceed basket capacity, keep both feet on the basket floor • Review work area PRIOR to raising lift / watch for overhead obstructions • Utilize spotter(s) to position/reposition aerial lift – verify path is clear of obstacles • Barricade work area below when working inside >BLDG #<
Hand Tool / Power Tool Use - General		



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
Hand Tools, Knife(s) - utility	- Improper training - Damaged tool - Contusion/struck by - Cut, laceration - Eye injury	- Ensure workers are trained in proper care and use of tools prior to commencing work - Inspect all hand tools prior to use – RED Tag and remove from service if damaged – look for spalled heads, broken or cracked handles, loose heads – remove if defective - Use tool for its intended purpose only – screwdrivers are not chisels, etc. - Wear appropriate hand protection for the tool and the task – use Cut Resistant gloves - Wear appropriate eye protection for the tool and the task – minimum Safety Glasses - Do NOT leave a knife laying in the open position unattended, for any reason - Do NOT walk with a knife in the open position - Replace dull or broken blades - NEVER cut any material that is braced on any part of your body – use saw horses or other firm, stable surfaces – ALWAYS cut away from your body - Use proper cutting techniques (proper body stance, good grip, stable footing)
Power Tools (Drill motor, porta band saw, Skil saws, grinders, Sawz -all, Bench Grinder, Band Saw, MagDrill , Drill Press, etc.) - Corded - Battery powered	- Improper training - Damaged tool - Electric shock - Contusion/struck-by - Cut, laceration - Eye injury	- Ensure workers are trained in proper care and use of tools prior to commencing work - Obtain operator manual(s) for tool, make available for worker reference - Inspect all power tools prior to use – RED Tag and remove from service if damaged - Unplug tools or remove battery before changing bits, blades, making adjustments etc. - Use saw horses, or other firm, stable platform, tri-pod stand to support material - Wear appropriate hand protection for the tool and the task – use Cut Resistant gloves – NOTE: Some tools do NOT want gloves worn – REVIEW the operator manual(s) - Wear appropriate eye protection for the tool and the task – minimum Safety Glasses - Wear Face shield for grinder(s) or chop saws use in addition to Safety Glasses - Keep both hands on handles (porta band, Skil saw) when using tool – secure material - Verify tongue guard is in place (Bench grinder) AND adjusted (gap not exceeding 1/4") - Wear leather gloves when handling/changing band saw blades. - Do NOT wear gloves when using Drill Press per Drill Press O&M
Silica (1926.1153 - Table 1 Activities / Tools) - Drilling into concrete - Saw Cutting / chipping concrete - Core Drilling / Bushing / Grinding - Sweeping / Clean-up	- Respirable Silica - Slips, falls	- Competent Person for Silica will assess activities prior to commencing work - Competent Person for silica will prepare written exposure control plan (WECP) for each specific task (anchors, demo, saw cutting, grouting, etc.) - Implement control measures specified in Table 1 when working with concrete/silica - Utilize method to exhaust dust drilling into concrete to install anchors, etc. - Engineering controls include: Manufactured HEPA vacuum driven collar system that surrounds the drilling and captures the dust as it is produced. Integral water delivery system that minimized release of visible dust - Vacuum wet/slurry after saw-cutting / core drilling to prevent slip / fall hazard - Wear respiratory protection in accordance with Table 1 requirements - Wear respiratory protection in accordance with Tool Manufacturer requirements - Utilize "Sweep Sorb" or other product to capture/contain silica. NO "Dry" sweeping



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
		See Respiratory Protection section for details regarding Respirator Use (Below)
Extension Cord(s)	Electric shock	- Inspect all extension cords prior to use – RED Tag and remove from service if damaged – outer jacket damaged/inner conductors exposed, missing Ground, etc. - Cord jacket must be rated for Hard or Extra Hard usage - Inspect all extension cords - Route cords to avoid sharp edges, doorways, other obstructions, pools water - Protect cords running across roads / access path(s) – use cord covers at roadway - GFCI protection / GFCI Outlet will be used on all cords / tools
Respiratory Protection (General)		
Any Activity Requiring Wear of Respirator (Silica, Welding, Chemical exposure)	- Untrained - Unqualified (medically) - Improper fit - Wrong respirator type	- Follow >COMPANY NAME< 10. Respiratory Protection (Procedure Reference: >COMPANY NAME< - Workers required to wear respirators shall have current Respiratory Medical Certification (within 1 year), fit test wearing fitted type respirator (1/2 face, full face, PAPR), training in proper care and use of respirators - Respirator cartridge will match the associated hazard – P100 Cartridge for Silica, etc.
Control of Hazardous Energy (LOTO)		
Perform Lockout / Tagout (>COMPANY NAME< Procedure) Electrical Energy Sources >COMPANY NAME< and Sub-tiered contractors	Shock / Electrocution	- Follow >COMPANY NAME< - Identify hazardous energy source(s) – electrical, mechanical, hydraulic, fluids, gases, etc. - Hazardous energy source(s) present must be de-energized and locked out before beginning work involving the hazardous energy source(s) - Conduct coordination briefing with ORNL Facilities to facilitate integration of LO/TO activities involving ORNL controlled systems - For ORNL controlled systems/equipment, provide 5-day advance notice of LO/TO request - Prepare <u>ORNL Electrical Energized Work Permit</u> for specific scope/circuits to be Verified as De-energized. Submit to ORNL TPO for review/approval (if ORNL system) - Each Authorized >COMPANY NAME< employee will be assigned their own individually keyed lock - All Tags used must contain: <u>Employee Name, Date, Equipment ID, Reason for Lockout</u> - Each Sub-tiered contractor employee will provide their own style of locks and tags - Each authorized employee will be trained on >COMPANY NAME< LO/TO Procedure. Document training on Attachment 7 - Conduct Task-specific Pre-job briefing for all authorized and/or affected employees. Document briefing on <u>JSA/Pre-task form</u>



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
		Qualified person verifies ZERO Energy using multi-meter. If Energy present, inform Supervisor Immediately. If ZERO Energy confirmed – proceed with work
Perform Lockout / Tagout (>COMPANY NAME< Procedure) - Mechanical Energy Source(s) - Hydraulic or pneumatic	- Burn(s) - Injection - Contusion	- Shut off all energy sources (pumps, compressors) – apply Lock & Tag to valve(s) - Drain/bleed Stored pressure from hydraulic/pneumatic lines if release could cause injury - Make sure controls are returned to their safest position (off, stop, standby, jog, etc.)
Perform Lockout / Tagout (>COMPANY NAME< Procedure) - Mechanical Energy Source(s) - Fluids & Gases	- Burn(s) - Chemical exposure	- Identify type of fluid or gas – wear appropriate hand protection and eye protection - Close valve(s) to prevent flow. Lockout/tagout valve - Drain and bleed lines to Zero Energy <u>state</u> - If valve is electrically controlled, shut off and lockout/tagout - Check for Zero Energy state at the equipment
Scaffold Use		
Inspect Scaffold, Verify inspection	- Unqualified inspector - Damaged components, missing components, incomplete components - Missing Inspection - Unqualified user	- Scaffold Inspection performed by designated >COMPANY NAME< Competent Person for Scaffolding - Scaffold inspected at the Start of each shift - Inspection FAILS with Any Damaged / Missing components, incomplete components - Scaffold Tag system in use: <u>RED</u> Tag (Do NOT Use) / GREEN Tag (OKAY to <u>use</u>) / YELLOW Tag (fall protection required at working level) - Inspection Date MUST match actual date, otherwise DO NOT USE until inspected - Scaffold TAG located at scaffold Access Point (Ladder) - All trades undergo "Scaffold User Training" before being allowed access to scaffold
Accessing Scaffold	Falls, falling	- Use designated LADDER access point – Do NOT climb cross-braces to access scaffold - Do NOT carry tools, materials while accessing scaffold – use tag lines to raise/lower tools & materials - Lock wheels before accessing mobile scaffold
Working on scaffold	- Falls, falling - Dropped objects - Severe Weather – lightning, tornado	- Keep platform clear of debris and material - Remove excess material / tools / debris when finished working on Scaffold - Keep wheels locked on mobile scaffold - Do NOT modify scaffolding – contact Scaffold erection supervisor for assistance - Exit exterior scaffold during severe weather alert (lightning, tornado, etc.) - Utilize tool tethers, etc. to secure tools, material on scaffold - Do NOT work below scaffolding - Verify netting is in place (if applicable) from guardrail down to <u>toeboard</u>
Working around / near scaffolding	Struck by / falling objects	- Barricade area BELOW scaffold when working above - Barricade area around scaffold when Erecting OR Dismantling scaffold - Install toe-boards AND screening to prevent tools, material from falling below



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Activity	Hazard	Controls
Lawn Care		
Prepare weed cutter (battery powered) for operation	- Struck-by / pinch - Strain/sprain - Cut / laceration	- Review operator manual before using - Inspect machine prior to use / inspect for damage, missing parts, guard, etc. - Select proper cutting head (thread vs. plastic cutting disk) - Remove battery when performing maintenance, changing cutting heads
Operate Weed cutter	- Wildlife, snakes, stinging insects, rocks, debris - Bystanders, by-passers - Struck-by, cut, laceration	- Wear PPE – safety glasses AND face shield, gloves (leather OR dexterous), long pants, long sleeves, work boots, hearing protection if desired - Do NOT operate weed cutter closer than 25-feet from other personnel - Inspect area to be trimmed BEFORE beginning – remove large rocks, material, debris, trash, cords, etc. - Monitor Weed Cutter noise level. If 85dB or above, hearing Protection is REQUIRED
Housekeeping – General	- Slips, trips, falls - Sharp objects - Heavy objects - Dust	- Ensure tools, supplies, and materials are kept out of walkways and properly stored when not in use. - Maintain walking /working surfaces free of debris. - Keep transient combustibles to a minimum and dispose of properly. - Get assistance with heavy loads, practice proper lifting techniques, use mechanical equipment (forklift, hand truck) - Use sweeping compound to keep dust to a minimum
Competent Persons (>COMPANY NAME<)		
Fall Protection / Safety Monitor		
Scaffold		
Rigging / Qualified Rigger		
Signal Person		
Confined Space		
Excavation / Trenching		



UT-Battelle Subcontractor Activity Hazard Analysis (AHA)- DRAFT

Name (Printed)	Signature	Date

The HA shall notify/inform employees that if unsafe conditions have not been addressed, each employee has the right to contact either the ORNL Employee Concern Program by calling 1-888-280-0616, or the Department of Energy Oak Ridge Operations (DOE-ORO) Employee Concerns Hotline at 865-241-3267.

Exhibit: Silica Exposure Control Methods for Construction Activities

This exhibit has been developed to meet the Respirable Crystalline Silica threshold limit value (TLV) published by the American Conference of Governmental Industrial Hygienist (ACGIH), in the “Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices,” as referenced in the latest edition of 10 CFR 851 Worker Safety and Health Program. For staff engaged in a task identified in the table below, the engineering controls, work practices, and respiratory protection specified for the task must be fully and properly implemented to mitigate potential for staff to be exposed in excess of the occupational exposure limit (OEL). All tools and equipment listed in this table must be operated and maintained per manufacturer's instructions to minimize dust emissions. See [Respiratory Protection](#) subject area regarding assignment of type of respiratory protection needed to meet specified assigned protection factor (APF).

Note: For each equipment/task description in the table there is a link to an OSHA Fact Sheet for that equipment/task which describes dust controls to be used to minimize the amount of airborne dust when engaged in referenced equipment/task.

Major Revision:
Jun 24, 2019

Subject Matter Expert:
Andrew Bryson Jr

Equipment/Task	Engineering and Work Practice Control Methods	ORNL Required Respiratory Protection and Minimum APF		
		≤ 1 hr/shift	≤ 4 hr/shift	> 4 hr/shift
Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to blade. ² Note: See OSHA Fact Sheet 3631	None	None	APF 10
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to blade. ² When used outdoors When used indoors or enclosed area ³ Note: See OSHA Fact Sheet 3627	None APF 10	APF 10 APF 10	APF 10 APF 25
Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Dust collector must provide air flow recommended by tool manufacturer, or greater, and have a filter with 99% or greater efficiency. NOTE: See OSHA Fact Sheet 3927	None	None	APF 10

Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to blade.² When used outdoors When used indoors or enclosed area³ • Note: See OSHA Fact Sheet 3633	None APF 10	None APF 10	APF 10 APF 25
Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to blade.² Note: See OSHA Fact Sheet 3928	None	None	APF 10
Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface.² Note: See OSHA Fact Sheet 3929	None	None	APF 10
Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowl with dust collection system. Dust collector must provide air flow recommended by tool manufacturer, or greater, and have HEPA filter and filter-cleaning mechanism⁴. Use HEPA-filtered vacuum when cleaning holes. Note: See OSHA Fact Sheet 3630	None	None	APF 10
Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with dust collection system. Dust collector must have a HEPA filter and filter cleaning mechanism. Use HEPA-filtered vacuum when cleaning holes. Note: See OSHA Fact Sheet 3930	APF 10	APF 10	APF 25
Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with low-flow water spray to wet dust at dust collector discharge point.² or	None	None	APF 10
	Operate from within an enclosed cab and use water for dust suppression on drill bit.^{2,5} Note: See OSHA Fact Sheet 3931	None	None	APF 10
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies continuous stream or spray of water at point of impact.² When used outdoors When used indoors or enclosed area³	None APF 10	APF 10 APF 10	APF 10 APF 25
	• or • Use tool equipped with commercially available shroud and dust collection system. Dust collector must provide air flow recommended by tool manufacturer, or greater, and have HEPA filter and filter-cleaning mechanism.⁴ When used outdoors When used indoors or enclosed area³ Note: See OSHA Fact Sheet 3629 •	None APF 10	APF 10 APF 10	APF 10 APF 25

Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system. When used indoors or in enclosed area, use HEPA-filtered vacuum to remove loose dust between passes. ³ Note: See OSHA Fact Sheet 3632	APF 10	APF 25	APF 50
Handheld grinders for uses other than mortar removal.	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to grinding surface. or Use grinder equipped with commercially available shroud and dust collection system. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have HEPA and cyclonic pre-separator or filter-cleaning mechanism. ⁴ • When used outdoors • When used indoors or enclosed area ³ Note: See OSHA Fact Sheet 3628	None None	None None APF 10	APF 10 APF 10
Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to cutting surface. or Use machine equipped with dust collection system recommended by manufacturer. Dust collector must provide air flow recommended by manufacturer, or greater, and have HEPA filter and filter-cleaning mechanism. ⁴ When used indoors or enclosed area use HEPA-filtered vacuum to remove loose dust between passes. Note: See OSHA Fact Sheet 3932	None None	None None	APF 10 APF 10
Small drivable milling machines (less than half-lane)	Use machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with surfactant. ² Note: See OSHA Fact Sheet 3933	None	None	APF 10
Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. ² For cuts of four inches in depth or less on any substrate: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. ² or Use machine equipped with supplemental water spray designed to suppress dust. Water must be combined with surfactant. ² Note: See OSHA Fact Sheet 3934	None None	None None	APF 10 APF 10
Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (hoppers, conveyers, sieves/sizing or vibrating components, and discharge points). Use ventilated booth that provides fresh, climate-controlled air to operators, or a remote-control station Note: See OSHA Fact Sheet 3935	None	None	APF 10

Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab. ⁵	None	None	APF 10
	When staff outside of cab are engaged in task, apply water and/or dust suppressants as necessary to minimize dust emission. ² Note: See OSHA Fact Sheet 3936	None	None	APF 10
Heavy equipment and utility vehicles for tasks such as grading and excavating but not including demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions. ² or When equipment operator is only staff engaged in task, operate equipment from within enclosed cab. ⁵ Note: See OSHA Fact Sheet 3937	None	None	APF 10

Table Footnotes:

¹ Where staff perform more than one task on table during shift, and total duration of all tasks combined is more than four hours, required respiratory protection for each task is respiratory protection specified for more than four hours per shift. If total duration of all tasks on table combined is less than four hours, required respiratory protection for each task is respiratory protection specified for less than four hours per shift. If total duration of all tasks on table combined is less than one hour, required respiratory protection for each task is the highest respiratory protection listed for any of less than 1-hour tasks. .

² For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust.

³ For tasks performed indoors or enclosed areas, provide means of exhaust as needed to minimize accumulation of visible airborne dust.

⁴ Full and proper implementation of dust collection systems requires employer to ensure the following:

- Shroud or cowl is intact and installed in accordance with manufacturer's instructions Hose connecting tool to
- vacuum is intact and without kinks or tight bends
- Filter on vacuum is cleaned or changed in accordance with manufacturer's instructions Dust collection bags are
- emptied to avoid overfilling

⁵ For measures implemented that include enclosed cab or booth, ensure enclosed cab or booth meets the following criteria:

- Cab or booth maintained as free as practicable from settled dust Door seals and
- closing mechanisms work properly
- Gaskets and seals are in good condition and work properly
- Cab or booth is under positive pressure maintained through continuous delivery of fresh air Intake air is filtered
- through filter that is 95% efficient in 0.3-10.0 µm range (e.g., MERV-16 or better)
- Cab or booth has heating and cooling capabilities